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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201412066	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	10411
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER 15:25		EMPACT
	BRINGLESON RANCH 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	165
SAMPLE PRES. :	26	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0090	0.0022	0.0020
CARBON DIOXIDE	0.0090	0.0035	0.0032
METHANE	0.0220	0.0031	0.0077
ETHANE	0.1950	0.0514	0.1080
PROPANE	1.0840	0.4189	0.6182
I-BUTANE	0.3090	0.1574	0.2092
N-BUTANE	1.6640	0.8475	1.0858
I-PENTANE	0.7697	0.4867	0.5835
N-PENTANE	1.2710	0.8036	0.9527
HEXANES PLUS	94.6673	97.2257	96.4297
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.4421	0.9871
TOLUENE	2.5952	2.0955
ETHYLBENZENE	0.8742	0.8134
XYLENE	1.9280	1.7939
TOTAL BTEX	6.8395	5.6899

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

	TOTAL SAMPLE	C6+ FRACTION	
Specific Gravity (H2O=1) =	0.7483	0.7538	60/60
API Gravity =	57.6	56.22	60/60
Molecular Weight =	114.11	118.102	
Absolute Density =	6.24	6.29	LBS/GAL
Heating Value Liq. Idl Gas=	126704	127621	BTU/GAL
Vapor/Liquid =	20.91	20.38	CUFT/GAL
Vapor Pressure =	7.82	1.71	PSIA @100 F

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

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E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201412066	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
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LEASE NO. :		SAMPLED BY :	JOHN MOSER
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	BRINGLESON RANCH 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	165
SAMPLE PRES. :	26	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0090		0.0035		0.0032	
NITROGEN (AIR)	0.0090		0.0022		0.0020	
METHANE	0.0220		0.0031		0.0077	
ETHANE	0.1950		0.0514		0.1080	
PROPANE	1.0840		0.4189		0.6182	
I-BUTANE	0.3090		0.1574		0.2092	
N-BUTANE	1.6640		0.8475		1.0858	
I-PENTANE	0.7697		0.4867		0.5835	
N-PENTANE	1.2710		0.8036		0.9527	
CYCLOPENTANE (N-C5)	1.7923		1.1015		1.0842	
N-HEXANE	7.0041		5.2899		5.9637	
CYCLOHEXANE (OTHER C6)	2.5200		1.8585		1.7750	
OTHER HEXANES	11.4201		8.5429		9.1869	
OTHER HEPTANES	12.0329		10.4879		11.0132	
METHYLCYCLOHEXANE (OTHER C7)	3.6847		3.1706		3.0623	
2,2,4 TRIMETHYLPENTANE	0.7867		0.6769		0.6722	
BENZENE	1.4421		0.9871		0.8366	
TOLUENE	2.5952		2.0955		1.7935	
ETHYLBENZENE	0.8742		0.8134		0.6961	
XYLENES	1.9280		1.7939		1.5349	
OTHER OCTANES	10.4127		10.4459		10.6051	
OCTANES PLUS	----	52.1759	----	63.6918	----	61.7143
NONANES	11.7855		13.0787		12.8405	
DECANES PLUS	26.3888		36.8830		35.3655	
SUB TOTAL	100.0000		100.0000		100.0000	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**57.60**	60/60
Vapor Pressure	=	**7.82**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**159.49**	
Average Specific Gravity of Decanes plus	=	**0.7850**	

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BY CARBON NUMBER

PROJECT NO. :	201412066	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	10411
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER 15:25		EMPACT
	BRINGLESON RANCH 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	165
SAMPLE PRES. :	26	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0090	0.0022	0.0020
CARBON DIOXIDE		0.0090	0.0035	0.0032
	C1	0.0220	0.0031	0.0077
	C2	0.1950	0.0514	0.1080
	C3	1.0840	0.4189	0.6182
	C4	1.9730	1.0049	1.2950
	C5	3.8330	2.3918	2.6204
	C6	22.3863	16.6784	17.7622
	C7	18.3128	15.7540	15.8690
	C8	14.0016	13.7301	13.5083
	C9	11.7855	13.0787	12.8405
	C10	11.3704	13.6918	13.1157
	C11	5.7180	7.4283	6.9759
	C12	2.7670	3.9251	3.8043
	C13	2.0042	3.1450	3.0562
	C14	1.4849	2.5815	2.5306
	C15	1.4339	2.6692	2.5864
	C16	0.7114	1.4116	1.3590
	C17	0.3474	0.7321	0.7026
	C18	0.2576	0.5745	0.5498
	C19	0.1458	0.3431	0.3263
	C20	0.0750	0.1857	0.1756
	C21	0.0385	0.1001	0.0941
	C22	0.0296	0.0805	0.0755
	C23	0.0051	0.0145	0.0135
	C24	0.0000	0.0000	0.0000
	C25	0.0000	0.0000	0.0000
	C26	0.0000	0.0000	0.0000
	C27	0.0000	0.0000	0.0000
	C28	0.0000	0.0000	0.0000
	C29	0.0000	0.0000	0.0000
	C30+	0.0000	0.0000	0.0000
	Total	100.0000	100.0000	100.0000

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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201412066	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
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LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER 15:25		EMPACT
	BRINGLESON RANCH 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	165
SAMPLE PRES. :	26	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0090	0.0022	0.0020
Carbon Dioxide	NHC	0.0090	0.0035	0.0032
Methane	P1	0.0220	0.0031	0.0077
Ethane	P2	0.1950	0.0514	0.1080
Propane	P3	1.0840	0.4189	0.6182
i-Butane	I4	0.3090	0.1574	0.2092
n-Butane	P4	1.6640	0.8475	1.0858
2,2-Dimethylpropane	I5	0.0137	0.0087	0.0109
i-Pentane	I5	0.7560	0.4780	0.5726
n-Pentane	P5	1.2710	0.8036	0.9527
2,2-Dimethylbutane	I6	0.0342	0.0258	0.0295
Cyclopentane	N5	1.7923	1.1015	1.0842
2,3-Dimethylbutane	I6	0.4051	0.3059	0.3432
2-Methylpentane	I6	4.0853	3.0853	3.5097
3-Methylpentane	I6	2.2827	1.7239	1.9283
n-Hexane	P6	7.0041	5.2899	5.9637
2,2-Dimethylpentane	I7	0.0170	0.0149	0.0163
Methylcyclopentane	N6	4.6128	3.4020	3.3762
2,4-Dimethylpentane	I7	0.2513	0.2207	0.2442
2,2,3-Trimethylbutane	I7	0.0100	0.0088	0.0095
Benzene	A6	1.4421	0.9871	0.8366
3,3-Dimethylpentane	I7	0.0153	0.0134	0.0144
Cyclohexane	N6	2.5200	1.8585	1.7750
2-Methylhexane	I7	1.1229	0.9860	1.0812
2,3-Dimethylpentane	I7	0.6048	0.5311	0.5658
1,1-Dimethylcyclopentane	N7	0.3194	0.2748	0.2708
3-Methylhexane	I7	1.5079	1.3241	1.4301
1c,3-Dimethylcyclopentane	N7	0.8604	0.7404	0.7391
1t,3-Dimethylcyclopentane	N7	0.7867	0.6769	0.6722
3-Ethylpentane	I7	0.1445	0.1269	0.1348
1t,2-Dimethylcyclopentane	N7	1.6647	1.4324	1.4175
2,2,4-Trimethylpentane	I8	0.0710	0.0711	0.0761
n-Heptane	P7	3.9318	3.4524	3.7535
1c,2-Dimethylcyclopentane	N7	0.1711	0.1472	0.1418
Methylcyclohexane	N7	3.6847	3.1706	3.0623
2,2-Dimethylhexane	I8	0.4057	0.4061	0.4340
Ethylcyclopentane	N7	0.6251	0.5379	0.5220
2,5-Dimethylhexane	I8	0.1291	0.1292	0.1384
2,2,3-Trimethylpentane	I8	0.0166	0.0166	0.0172
2,4-Dimethylhexane	I8	0.2060	0.2062	0.2199
1c,2t,4-Trimethylcyclopentane	N8	0.5081	0.4996	0.4868
3,3-Dimethylhexane	I8	0.0430	0.0430	0.0451

2,3,4-Trimethylpentane	I8	0.1031	0.1032	0.1067
Toluene	A7	2.5952	2.0955	1.7935
2,3-Dimethylhexane	I8	0.1134	0.1135	0.1186
2-Methyl-3-ethylpentane	I8	0.1321	0.1322	0.1366
1,1,2-Trimethylcyclopentane	N8	0.0152	0.0150	0.0144
2-Methylheptane	I8	1.1385	1.1397	1.2120
4-Methylheptane	I8	0.3688	0.3692	0.3832
3-Methyl-3-ethylpentane	I8	0.0575	0.0576	0.0589
3,4-Dimethylhexane	I8	0.0696	0.0697	0.0720
1c,2c,4-Trimethylcyclopentane	N8	0.0293	0.0288	0.0278
1c,3-Dimethylcyclohexane	N8	0.0253	0.0249	0.0242
3-Methylheptane	I8	0.5731	0.5737	0.6049
1c,2t,3-Trimethylcyclopentane	N8	0.8793	0.8646	0.8348
3-Ethylhexane	I8	0.1691	0.1693	0.1766
1t,4-Dimethylcyclohexane	N8	0.3916	0.3851	0.3757
1,1-Dimethylcyclohexane	N8	0.1107	0.1089	0.1038
3t-Ethylmethylcyclopentane	N8	0.2045	0.2011	0.1951
2t-Ethylmethylcyclopentane	N8	0.1818	0.1788	0.1730
1,1-Methylethylcyclopentane	N8	0.6261	0.6157	0.5866
2,2,4-Trimethylhexane	I9	0.0373	0.0419	0.0436
1t,2-Dimethylcyclohexane	N8	0.5750	0.5654	0.5422
1t,3-Dimethylcyclohexane	N8	0.0068	0.0067	0.0064
n-Octane	P8	2.5112	2.5138	2.6607
1c,4-Dimethylcyclohexane	N8	0.3493	0.3435	0.3265
i-Propylcyclopentane	I8	0.0523	0.0514	0.0493
2,4,4-Trimethylhexane	I9	0.0326	0.0366	0.0377
2,2,3,4-Tetramethylpentane	I9	0.0241	0.0271	0.0280
2,3,4-Trimethylhexane	I9	0.0158	0.0178	0.0183
1c,2-Dimethylcyclohexane	N8	0.2331	0.2292	0.2142
2,3,5-Trimethylhexane	I9	0.0656	0.0737	0.0759
2,2-Dimethylheptane	I9	0.0190	0.0214	0.0224
1,1,4-Trimethylcyclohexane	N9	0.9007	0.9964	0.9605
2,2,3-Trimethylhexane	I9	0.3949	0.4439	0.4528
2,4-Dimethylheptane	I9	0.1482	0.1666	0.1732
4,4-Dimethylheptane	I9	0.0437	0.0491	0.0510
Ethylcyclohexane	N8	0.5711	0.5616	0.5305
n-Propylcyclopentane	N8	0.2284	0.2246	0.2152
1c,3c,5-Trimethylcyclohexane	N9	0.0468	0.0518	0.0499
2,5-Dimethylheptane	I9	0.0768	0.0863	0.0896
3,3-Dimethylheptane	I9	0.0828	0.0931	0.0966
3,5-Dimethylheptane	I9	0.0638	0.0717	0.0744
2,6-Dimethylheptane	I9	0.0716	0.0805	0.0845
1,1,3-Trimethylcyclohexane	N9	0.1243	0.1375	0.1325
Ethylbenzene	A8	0.8742	0.8134	0.6961
1c,2t,4t-Trimethylcyclohexane	N9	0.2458	0.2719	0.2571
2,3-Dimethylheptane	I9	0.4131	0.4643	0.4758
1,3-Dimethylbenzene (m-Xylene)	A8	0.7245	0.6741	0.5802
1,4-Dimethylbenzene (p-Xylene)	A8	0.4719	0.4391	0.3791
3,4-Dimethylheptane	I9	0.1183	0.1330	0.1353
3,4-Dimethylheptane (2)	I9	0.1521	0.1710	0.1739
4-Ethylheptane	I9	0.0507	0.0570	0.0593
4-Methyloctane	I9	0.2885	0.3243	0.3348
2-Methyloctane	I9	0.3624	0.4073	0.4246
1c,2t,4c-Trimethylcyclohexane	I9	0.0467	0.0525	0.0538
3-Ethylheptane	I9	0.1377	0.1548	0.1585
3-Methyloctane	I9	0.4822	0.5420	0.5594
3,3-Diethylpentane	I9	0.0493	0.0554	0.0546
1c,2t,3-Trimethylcyclohexane	N9	0.0930	0.1029	0.0973
1,1,2-Trimethylcyclohexane	N9	0.0251	0.0278	0.0263
1,2-Dimethylbenzene (o-Xylene)	A8	0.7316	0.6807	0.5756
i-Butylcyclopentane	N9	0.3232	0.3576	0.3407
UnknownC8s	U8	0.1037	0.1038	0.1099
n-Nonane	P9	2.1047	2.3656	2.4522
1,1-Methylethylcyclohexane	N9	0.3387	0.3807	0.3958
i-Propylbenzene	A9	0.3667	0.3862	0.3328
i-Propylcyclohexane	N9	0.1237	0.1368	0.1269
2,2-Dimethyloctane	I10	0.0837	0.1044	0.1050
2,4-Dimethyloctane	I10	0.1368	0.1706	0.1717
2,6-Dimethyloctane	I10	0.0291	0.0363	0.0377
2,5-Dimethyloctane	I10	0.0513	0.0640	0.0644
n-Butylcyclopentane	N9	0.3810	0.4683	0.4362
3,3-Dimethyloctane	I10	0.1872	0.2334	0.2350
n-Propylbenzene	A9	0.3126	0.3292	0.2837
3,6-Dimethyloctane	I10	0.4244	0.5292	0.5325

3-Methyl-5-ethylheptane	I10	0.4450	0.5002	0.5128
1,3-Methylethylbenzene	A9	0.4790	0.5045	0.4311
1,4-Methylethylbenzene	A9	0.1852	0.1951	0.1667
1,3,5-Trimethylbenzene	A9	0.2203	0.2320	0.1996
2,3-Dimethyloctane	I10	0.0640	0.0798	0.0803
5-Methylnonane	I10	0.3146	0.3923	0.3985
1,2-Methylethylbenzene	A9	0.5842	0.6153	0.5230
2-Methylnonane	I10	0.0555	0.0692	0.0709
3-Ethyloctane	I10	0.0637	0.0794	0.0799
3-Methylnonane	I10	0.2447	0.3051	0.3095
1,2,4-Trimethylbenzene	A9	0.0374	0.0394	0.0335
t-Butylbenzene	A10	0.6548	0.7702	0.6619
i-Butylcyclohexane	N10	0.2833	0.3482	0.3193
1t-Methyl-2-n-propylcyclohexane	I10	0.0717	0.0806	0.0826
i-Butylbenzene	A10	0.0869	0.1022	0.0892
sec-Butylbenzene	A10	0.0419	0.0493	0.0426
UnknownC9s	U9	1.4291	1.6063	1.6651
n-Decane	P10	1.5843	1.9754	2.0133
1,2,3-Trimethylbenzene	A9	0.2868	0.3021	0.2516
1,3-Methyl-i-propylbenzene	A10	0.1209	0.1273	0.1082
1,4-Methyl-i-propylbenzene	A10	0.1234	0.1300	0.1105
Sec-Butylcyclohexane	N10	0.4078	0.5013	0.4590
1,2-Methyl-i-propylbenzene	A10	0.2467	0.2902	0.2465
3-Ethylnonane	I10	0.0646	0.0806	0.0826
1,3-Diethylbenzene	A10	0.1753	0.2062	0.1777
1,3-Methyl-n-propylbenzene	A10	0.0735	0.0865	0.0748
1,4-Diethylbenzene	A10	0.2613	0.3073	0.2654
1,4-Methyl-n-propylbenzene	A10	0.1019	0.1199	0.1040
n-Butylbenzene	A10	0.0857	0.1008	0.0871
1,3-Dimethyl-5-ethylbenzene	A10	0.1070	0.1259	0.1084
1,2-Diethylbenzene	A10	0.1414	0.1663	0.1408
1,2-Methyl-n-propylbenzene	A10	0.1382	0.1626	0.1386
1,4-Dimethyl-2-ethylbenzene	A10	0.1584	0.1863	0.1581
1,3-Dimethyl-4-ethylbenzene	A10	0.0545	0.0641	0.0545
1,2-Dimethyl-4-ethylbenzene	A10	0.2669	0.3139	0.2673
1,3-Dimethyl-2-ethylbenzene	A10	0.1982	0.2331	0.1949
1t,2c,4-Trimethylcyclopentane	A10	0.3920	0.3855	0.3837
1,2-Dimethyl-3-ethylbenzene	A10	0.1332	0.1567	0.1308
1,2-Ethyl-i-propylbenzene	A10	0.1446	0.1701	0.1445
1,4-Methyl-t-butylbenzene	A11	0.1596	0.1877	0.1594
UnknownC10s	U10	2.6896	3.3535	3.4178
n-Undecane	P11	1.2293	1.6839	1.6924
1,4-Ethyl-i-propylbenzene	A11	0.0669	0.0787	0.0668
1,2,4,5-Tetramethylbenzene	A11	0.2355	0.2770	0.2328
1,2-Methyl-n-butylbenzene	A11	0.1108	0.1303	0.1107
1,2,3,5-Tetramethylbenzene	A11	0.1656	0.1948	0.1629
1,2-Methyl-t-butylbenzene	A11	0.1768	0.2080	0.1767
5-Methylindan	A11	0.0293	0.0437	0.0434
4-Methylindan	A11	0.0095	0.0142	0.0141
1,2-Ethyl-n-propylbenzene	A11	0.1955	0.2299	0.1953
2-Methylindan	A11	0.1338	0.1997	0.1985
1,3-Methyl-n-butylbenzene	A11	0.0924	0.1087	0.0923
1,3-Di-i-propylbenzene	A11	0.1517	0.1784	0.1515
sec-Pentylbenzene	A11	0.0998	0.1174	0.0997
n-Pentylbenzene	A11	0.0936	0.1216	0.1054
1t-M-2-(4MP)cyclopentane	P12	0.0860	0.1284	0.1276
1,2-Di-n-propylbenzene	A11	0.1408	0.1656	0.1406
1,4-Di-i-propylbenzene	A11	0.1494	0.1757	0.1492
Tetrahydronaphthalene	A10	0.0584	0.0687	0.0583
t-Decahydronaphthalene	A10	0.2151	0.2530	0.2149
Naphthalene	A10	0.1889	0.2122	0.1802
1-t-Butyl-3,5-dimethylbenzene	A12	0.0734	0.0863	0.0733
1,4-Ethyl-t-butylbenzene	A11	0.1093	0.1286	0.1092
UnknownC11s	U11	1.8842	2.5810	2.5940
n-Dodecane	P12	0.9007	1.3445	1.3364
1,3-Di-n-propylbenzene	A12	0.1043	0.1227	0.1042
1,3,5-Triethylbenzene	A12	0.0285	0.0300	0.0258
1,2,4-Triethylbenzene	A12	0.2759	0.2906	0.2469
1,4-Methyl-n-pentylbenzene	A12	0.0278	0.0327	0.0278
n-Hexylbenzene	A12	0.0904	0.1285	0.1115
1,2,3,4,5-Pentamethylbenzene	A13	0.2117	0.2490	0.2115
2-Methylnaphthalene	A11	0.2729	0.3401	0.2888
1-Methylnaphthalene	A11	0.2113	0.2633	0.1922
UnknownC12s	U12	1.1800	1.7614	1.7508

n-Tridecane	P13	0.6858	1.1080	1.0884
UnknownC13s	U13	1.1067	1.7880	1.7563
n-Tetradecane	P14	0.4848	0.8428	0.8262
UnknownC14s	U14	1.0001	1.7387	1.7044
n-Pentadecane	P15	0.3770	0.7018	0.6800
UnknownC15s	U15	1.0569	1.9674	1.9064
n-Hexadecane	P16	0.2272	0.4508	0.4340
UnknownC16s	U16	0.4842	0.9608	0.9250
n-Heptadecane	P17	0.1198	0.2525	0.2423
UnknownC17s	U17	0.2276	0.4796	0.4603
n-Octadecane	P18	0.0687	0.1532	0.1466
UnknownC18s	U18	0.1889	0.4213	0.4032
n-Nonadecane	P19	0.0478	0.1125	0.1070
UnknownC19s	U19	0.0980	0.2306	0.2193
n-Eicosane	P20	0.0239	0.0592	0.0560
UnknownC20s	U20	0.0511	0.1265	0.1196
n-Heneicosane	P21	0.0102	0.0265	0.0249
UnknownC21s	U21	0.0283	0.0736	0.0692
n-Docosane	P22	0.0049	0.0133	0.0125
UnknownC22s	U22	0.0247	0.0672	0.0630
n-Tricosane	P23	0.0019	0.0054	0.0050
UnknownC23s	U23	0.0032	0.0091	0.0085
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. :	201412066	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1672
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 15:30 BRINGLESON 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	97
SAMPLE PRES. :	82	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN 0.75 PPM (1-7PPM) 15:35		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0006	0.0015		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.13	1.32	---	---
CARBON DIOXIDE	2.39	4.38	---	---
METHANE	70.07550	46.85450	---	---
ETHANE	10.9212	13.6867	2.9167	2.9326
PROPANE	9.3535	17.1901	2.5732	2.5873
I-BUTANE	0.9208	2.2306	0.3014	0.3030
N-BUTANE	3.1235	7.5665	0.9832	0.9886
I-PENTANE	0.6214	1.8634	0.2223	0.2235
N-PENTANE	0.7155	2.1515	0.2593	0.2607
HEXANES PLUS	0.7180	2.7452	0.2882	0.2896
TOTALS	100.00000	100.00000	7.5443	7.5853

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0268	0.0872
TOLUENE	0.0147	0.0564
ETHYLBENZENE	0.0019	0.0084
XYLENES	0.0032	0.0141
TOTAL BTEX	0.0466	0.1661

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1235.3 **/scf**	1242.1 **/scf**
	NET WET REAL :	1213.7 **/scf**	1220.5 **/scf**
HIGH	GROSS DRY REAL :	1358.2 **/scf**	1365.6 **/scf**
	GROSS WET REAL :	1334.5 **/scf**	1341.9 **/scf**
	NET DRY REAL :	19561.3 **/lb**	19668.1 **/lb**
	GROSS DRY REAL :	21501.5 **/lb**	21618.9 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8274
	COMPRESSIBILITY FACTOR :		0.99562

(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

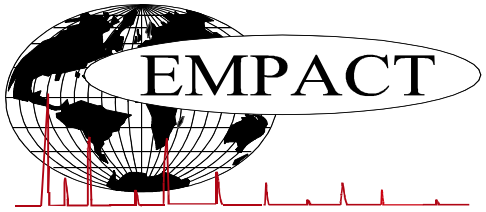
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201412066	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1672
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 15:30 BRINGLESON 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	97
SAMPLE PRES. :	82	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN 0.75 PPM (1-7PPM) 15:35		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.39	4.38
Nitrogen	1.13	1.32
Methane	70.07550	46.85450
Ethane	10.9212	13.6867
Propane	9.3535	17.1901
Isobutane	0.9208	2.2306
n-Butane	3.1235	7.5665
Isopentane	0.5603	1.6848
n-Pentane	0.7155	2.1515
Cyclopentane	0.0611	0.1786
n-Hexane	0.1447	0.5197
Cyclohexane	0.0377	0.1322
Other Hexanes	0.2695	0.9606
Heptanes	0.1246	0.5164
Methycyclohexane	0.0280	0.1146
2,2,4 Trimethylpentane	0.0002	0.0010
Benzene	0.0268	0.0872
Toluene	0.0147	0.0564
Ethylbenzene	0.0019	0.0084
Xylenes	0.0032	0.0141
C8+ Heavies	0.0667	0.3346
Subtotal	99.98940	99.98850
Oxygen/Argon	0.01	0.01
Alcohols	0.0006	0.0015
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201412066	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1672
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 15:30 BRINGLESON 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	97
SAMPLE PRES. :	82	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN 0.75 PPM (1-7PPM) 15:35		

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	---	1.13	1.32	---	---
Carbon Dioxide	---	2.39	4.38	---	---
Methane	P1	70.07550	46.85450	---	---
Ethane	P2	10.9212	13.6867	2.917	2.933
Propane	P3	9.3535	17.1901	2.573	2.587
i-Butane	I4	0.9208	2.2306	0.301	0.303
n-Butane	P4	3.1235	7.5665	0.983	0.989
2,2-Dimethylpropane	I5	0.0027	0.0081	0.001	0.001
i-Pentane	I5	0.5576	1.6767	0.203	0.204
Acetone	X3	0.0005	0.0012	0.000	0.000
i-Propanol	X3	0.0001	0.0003	0.000	0.000
n-Pentane	P5	0.7154	2.1512	0.259	0.261
2,2-Dimethylbutane	I6	0.0015	0.0054	0.001	0.001
Cyclopentane	N5	0.0611	0.1786	0.018	0.018
2,3-Dimethylbutane	I6	0.0101	0.0363	0.004	0.004
2-Methylpentane	I6	0.1110	0.3987	0.046	0.046
3-Methylpentane	I6	0.0584	0.2098	0.024	0.024
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.1447	0.5197	0.059	0.059
2,2-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Methylcyclopentane	N6	0.0883	0.3097	0.031	0.031
2,4-Dimethylpentane	I7	0.0034	0.0142	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0268	0.0872	0.007	0.007
Cyclohexane	N6	0.0377	0.1322	0.013	0.013
2-Methylhexane	I7	0.0136	0.0568	0.006	0.006
2,3-Dimethylpentane	I7	0.0070	0.0292	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0049	0.0201	0.002	0.002
3-Methylhexane	I7	0.0175	0.0731	0.008	0.008
1c,3-Dimethylcyclopentane	N7	0.0097	0.0397	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0076	0.0311	0.003	0.003
3-Ethylpentane	I7	0.0010	0.0042	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0196	0.0802	0.009	0.009
2,2,4-Trimethylpentane	I8	0.0002	0.0010	0.000	0.000
UnknownC6s	U6	0.0002	0.0007	0.000	0.000
n-Heptane	P7	0.0338	0.1412	0.016	0.016
1c,2-Dimethylcyclopentane	N7	0.0012	0.0049	0.001	0.001
Methylcyclohexane	N7	0.0280	0.1146	0.011	0.011

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2,2-Dimethylhexane	I8	0.0020	0.0095	0.001	0.001
Ethylcyclopentane	N7	0.0047	0.0192	0.002	0.002
2,5-Dimethylhexane	I8	0.0005	0.0024	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0003	0.0014	0.000	0.000
2,4-Dimethylhexane	I8	0.0012	0.0057	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0023	0.0108	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0029	0.0135	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0003	0.0014	0.000	0.000
Toluene	A7	0.0147	0.0564	0.005	0.005
2,3-Dimethylhexane	I8	0.0010	0.0048	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0004	0.0019	0.000	0.000
2-Methylheptane	I8	0.0049	0.0233	0.003	0.003
4-Methylheptane	I8	0.0016	0.0076	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0001	0.0005	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	0.0010	0.0048	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0042	0.0196	0.002	0.002
3-Ethylhexane	I8	0.0011	0.0053	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0013	0.0061	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0019	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0008	0.0038	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0008	0.0038	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0023	0.0108	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0018	0.0084	0.001	0.001
n-Octane	P8	0.0045	0.0214	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0033	0.0154	0.002	0.002
i-Propylcyclopentane	I8	0.0002	0.0009	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0002	0.0011	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0003	0.0014	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0022	0.0116	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0006	0.0032	0.000	0.000
2,4-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0012	0.0056	0.001	0.001
n-Propylcyclopentane	N8	0.0004	0.0019	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0010	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	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0019	0.0084	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,3-Dimethylheptane	I9	0.0004	0.0021	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0015	0.0066	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0007	0.0031	0.000	0.000
3,4-Dimethylheptane	I9	0.0005	0.0027	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0002	0.0011	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0004	0.0021	0.000	0.000
2-Methyloctane	I9	0.0005	0.0027	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Methyloctane	I9	0.0006	0.0032	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0010	0.0044	0.000	0.000
i-Butylcyclopentane	N9	0.0005	0.0026	0.000	0.000
UnknownC8s	U8	0.0004	0.0019	0.000	0.000
n-Nonane	P9	0.0020	0.0107	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0004	0.0021	0.000	0.000
i-Propylbenzene	A9	0.0005	0.0025	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000

n-Butylcyclopentane	N9	0.0004	0.0021	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0012	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0015	0.000	0.000
3,6-Dimethyloctane	I10	0.0003	0.0018	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0003	0.0018	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0020	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	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
3-Methylnonane	I10	0.0002	0.0012	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0017	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	0.0005	0.000	0.000
UnknownC9s	U9	0.0027	0.0144	0.002	0.002
n-Decane	P10	0.0009	0.0053	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	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
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-n-propylbenzene	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
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0026	0.0154	0.002	0.002
n-Undecane	P11	0.0004	0.0026	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0007	0.000	0.000
UnknownC11s	U11	0.0008	0.0052	0.001	0.001
n-Dodecane	P12	0.0002	0.0014	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0007	0.000	0.000
UnknownC12s	U12	0.0004	0.0026	0.000	0.000
n-Tridecane	P13	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	7.5443	7.5853

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0268	0.0872
TOLUENE	0.0147	0.0564
ETHYLBENZENE	0.0019	0.0084
XYLENES	0.0032	0.0141
TOTAL BTEX	0.0466	0.1661

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1235.3 **/scf**	1242.1 **/scf**
	NET WET REAL :	1213.7 **/scf**	1220.5 **/scf**
HIGH	GROSS DRY REAL :	1358.2 **/scf**	1365.6 **/scf**
	GROSS WET REAL :	1334.5 **/scf**	1341.9 **/scf**
	NET DRY REAL :	19561.3 **/lb**	19668.1 **/lb**
	GROSS DRY REAL :	21501.5 **/lb**	21618.9 **/lb**

RELATIVE DENSITY (AIR=1): 0.8274

COMPRESSIBILITY FACTOR : 0.99562

(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 LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201412066	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:45		EMPACT
	BRINGLESON RANCH 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	71
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.4158	0.1108	0.1045
NITROGEN (AIR)	0.0240	0.0056	0.0052
CARBON DIOXIDE	0.0000	0.0000	0.0000
METHANE	0.0000	0.0000	0.0000
ETHANE	0.0710	0.0177	0.0373
PROPANE	0.7640	0.2801	0.4151
I-BUTANE	0.2950	0.1425	0.1902
N-BUTANE	1.8090	0.8741	1.1245
I-PENTANE	0.9099	0.5457	0.6566
N-PENTANE	1.5010	0.9003	1.0717
HEXANES PLUS	94.2103	97.1232	96.3949
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.1045	0.7172
TOLUENE	2.3724	1.8173
ETHYLBENZENE	0.5758	0.5082
XYLENE	1.4295	1.2618
TOTAL BTEX	5.4822	4.3045

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7519	0.7565	60/60
API Gravity =	56.69	55.55	60/60
Molecular Weight =	120.28	124.763	
Absolute Density =	6.27	6.31	LBS/GAL
Heating Value Liq. Idl Gas=	125925	127237	BTU/GAL
Vapor/Liquid =	20.03	19.54	CUFT/GAL
Vapor Pressure =	5.08	1.53	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. :	201412066	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:45 BRINGLESON RANCH 6-34-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	71
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0000		0.0000		0.0000	
NITROGEN (AIR)	0.0240		0.0056		0.0052	
METHANE	0.0000		0.0000		0.0000	
ETHANE	0.0710		0.0177		0.0373	
PROPANE	0.7640		0.2801		0.4151	
I-BUTANE	0.2950		0.1425		0.1902	
N-BUTANE	1.8090		0.8741		1.1245	
I-PENTANE	0.9099		0.5457		0.6566	
N-PENTANE	1.5010		0.9003		1.0717	
CYCLOPENTANE (N-C5)	1.3025		0.7594		0.7505	
N-HEXANE	5.9757		4.2814		4.8460	
CYCLOHEXANE (OTHER C6)	2.4396		1.7069		1.6368	
OTHER HEXANES	9.4495		6.6993		7.1922	
OTHER HEPTANES	12.9988		10.7493		11.3352	
METHYLCYCLOHEXANE (OTHER C7)	3.7483		3.0598		2.9673	
2,2,4 TRIMETHYLPENTANE	0.8167		0.6667		0.6648	
BENZENE	1.1045		0.7172		0.6103	
TOLUENE	2.3724		1.8173		1.5617	
ETHYLBENZENE	0.5758		0.5082		0.4367	
XYLENES	1.4295		1.2618		1.0827	
OTHER OCTANES	10.8720		10.3457		10.5414	
OCTANES PLUS	----	54.8190	----	67.3326	----	65.4949
NONANES	12.3443		12.9916		12.7852	
DECANES PLUS	28.7807		41.5586		39.9841	
SUB TOTAL	99.5842		99.8892		99.8955	
ALCOHOLS	0.4158		0.1108		0.1045	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**56.69**	60/60
Vapor Pressure	=	**5.08**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**173.69**	
Average Specific Gravity of Decanes plus	=	**0.7820**	

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. :	201412066	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:45		EMPACT
	BRINGLESON RANCH 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	71
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.4158	0.1108	0.1045
NITROGEN		0.0240	0.0056	0.0052
CARBON DIOXIDE		0.0000	0.0000	0.0000
	C1	0.0000	0.0000	0.0000
	C2	0.0710	0.0177	0.0373
	C3	0.7640	0.2801	0.4151
	C4	2.1040	1.0166	1.3147
	C5	3.7134	2.2054	2.4788
	C6	18.9693	13.4048	14.2853
	C7	19.1195	15.6264	15.8642
	C8	13.6940	12.7824	12.7256
	C9	12.3443	12.9916	12.7852
	C10	9.9518	11.3086	10.9037
	C11	5.1848	6.3915	6.0281
	C12	3.1747	4.2254	4.0910
	C13	2.3884	3.5594	3.4742
	C14	1.9525	3.2203	3.1695
	C15	1.6875	2.9801	2.8994
	C16	1.0233	1.9264	1.8621
	C17	0.7209	1.4412	1.3888
	C18	0.6717	1.4212	1.3655
	C19	0.5999	1.3393	1.2786
	C20	0.4045	0.9502	0.9022
	C21	0.2695	0.6645	0.6277
	C22	0.2284	0.5898	0.5552
	C23	0.1840	0.4966	0.4661
	C24	0.1135	0.3195	0.2992
	C25	0.0559	0.1639	0.1534
	C26	0.0455	0.1387	0.1289
	C27	0.0244	0.0772	0.0718
	C28	0.0150	0.0492	0.0456
	C29	0.0121	0.0411	0.0380
	C30+	0.0724	0.2545	0.2351
	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. :	201412066	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:45		EMPACT
	BRINGLESON RANCH 6-34-9-58		
FIELD DATA		SAMPLE TEMP. :	71
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0240	0.0056	0.0052
Carbon Dioxide	NHC	0.0000	0.0000	0.0000
Methane	P1	0.0000	0.0000	0.0000
Ethane	P2	0.0710	0.0177	0.0373
Propane	P3	0.7640	0.2801	0.4151
i-Butane	I4	0.2950	0.1425	0.1902
Methanol	X1	0.4158	0.1108	0.1045
n-Butane	P4	1.8090	0.8741	1.1245
2,2-Dimethylpropane	I5	0.0089	0.0053	0.0067
i-Pentane	I5	0.9010	0.5404	0.6499
n-Pentane	P5	1.5010	0.9003	1.0717
2,2-Dimethylbutane	I6	0.0250	0.0179	0.0206
Cyclopentane	N5	1.3025	0.7594	0.7505
2,3-Dimethylbutane	I6	0.2596	0.1860	0.2095
2-Methylpentane	I6	3.0512	2.1861	2.4969
3-Methylpentane	I6	1.8824	1.3487	1.5148
n-Hexane	P6	5.9757	4.2814	4.8460
2,2-Dimethylpentane	I7	0.0078	0.0065	0.0072
Methylcyclopentane	N6	4.2283	2.9584	2.9479
2,4-Dimethylpentane	I7	0.1890	0.1574	0.1748
2,2,3-Trimethylbutane	I7	0.0092	0.0077	0.0083
Benzene	A6	1.1045	0.7172	0.6103
3,3-Dimethylpentane	I7	0.0173	0.0144	0.0155
Cyclohexane	N6	2.4396	1.7069	1.6368
2-Methylhexane	I7	1.2264	1.0216	1.1248
2,3-Dimethylpentane	I7	0.6588	0.5488	0.5870
1,1-Dimethylcyclopentane	N7	0.2754	0.2248	0.2224
3-Methylhexane	I7	1.6792	1.3988	1.5169
1c,3-Dimethylcyclopentane	N7	0.8811	0.7193	0.7210
1t,3-Dimethylcyclopentane	N7	0.8167	0.6667	0.6648
3-Ethylpentane	I7	0.0935	0.0779	0.0831
1t,2-Dimethylcyclopentane	N7	1.8327	1.4961	1.4865
2,2,4-Trimethylpentane	I8	0.0213	0.0202	0.0217
UnknownC6s	U6	0.0030	0.0022	0.0025
n-Heptane	P7	4.3800	3.6487	3.9830
1c,2-Dimethylcyclopentane	N7	0.1846	0.1507	0.1457
Methylcyclohexane	N7	3.7483	3.0598	2.9673
2,2-Dimethylhexane	I8	0.2873	0.2728	0.2927
Ethylcyclopentane	N7	0.7471	0.6099	0.5942
2,5-Dimethylhexane	I8	0.1242	0.1179	0.1268
2,2,3-Trimethylpentane	I8	0.0204	0.0194	0.0202
2,4-Dimethylhexane	I8	0.2138	0.2030	0.2174

1c,2t,4-Trimethylcyclopentane	N8	0.4214	0.3931	0.3845
3,3-Dimethylhexane	I8	0.0279	0.0265	0.0279
2,3,4-Trimethylpentane	I8	0.0854	0.0811	0.0842
2,3,3-Trimethylpentane	I8	0.0037	0.0035	0.0036
Toluene	A7	2.3724	1.8173	1.5617
2,3-Dimethylhexane	I8	0.2155	0.2047	0.2147
2-Methyl-3-ethylpentane	I8	0.1380	0.1311	0.1360
1,1,2-Trimethylcyclopentane	N8	0.0118	0.0110	0.0106
2-Methylheptane	I8	1.3467	1.2789	1.3656
4-Methylheptane	I8	0.4338	0.4120	0.4293
3-Methyl-3-ethylpentane	I8	0.0383	0.0364	0.0374
3,4-Dimethylhexane	I8	0.0294	0.0279	0.0289
1c,2c,4-Trimethylcyclopentane	N8	0.0317	0.0296	0.0287
1c,3-Dimethylcyclohexane	N8	0.0241	0.0225	0.0219
3-Methylheptane	I8	0.5750	0.5461	0.5781
1c,2t,3-Trimethylcyclopentane	N8	1.0530	0.9823	0.9523
3-Ethylhexane	I8	0.1145	0.1087	0.1139
1t,4-Dimethylcyclohexane	N8	0.3443	0.3212	0.3146
1,1-Dimethylcyclohexane	N8	0.1119	0.1044	0.0999
3c-Ethylmethylcyclopentane	N8	0.0064	0.0060	0.0058
3t-Ethylmethylcyclopentane	N8	0.2413	0.2251	0.2193
2t-Ethylmethylcyclopentane	N8	0.2101	0.1960	0.1904
1,1-Methylethylcyclopentane	N8	0.7331	0.6839	0.6542
2,2,4-Trimethylhexane	I9	0.0379	0.0404	0.0422
1t,2-Dimethylcyclohexane	N8	0.5675	0.5294	0.5098
1t,3-Dimethylcyclohexane	N8	0.0062	0.0058	0.0055
n-Octane	P8	2.7385	2.6007	2.7638
1c,4-Dimethylcyclohexane	N8	0.4506	0.4204	0.4012
i-Propylcyclopentane	I8	0.0775	0.0723	0.0696
2,4,4-Trimethylhexane	I9	0.0232	0.0247	0.0256
2,2,3,4-Tetramethylpentane	I9	0.0179	0.0191	0.0198
2,3,4-Trimethylhexane	I9	0.0199	0.0212	0.0219
1c,2-Dimethylcyclohexane	N8	0.1700	0.1586	0.1488
2,3,5-Trimethylhexane	I9	0.0739	0.0788	0.0815
2,2-Dimethylheptane	I9	0.0116	0.0124	0.0130
1,1,4-Trimethylcyclohexane	N9	1.0116	1.0617	1.0276
2,2,3-Trimethylhexane	I9	0.3989	0.4254	0.4357
2,4-Dimethylheptane	I9	0.0811	0.0865	0.0903
4,4-Dimethylheptane	I9	0.0338	0.0360	0.0376
Ethylcyclohexane	N8	0.5581	0.5206	0.4938
n-Propylcyclopentane	N8	0.2250	0.2099	0.2019
1c,3c,5-Trimethylcyclohexane	N9	0.0292	0.0306	0.0296
2,5-Dimethylheptane	I9	0.0869	0.0927	0.0966
3,3-Dimethylheptane	I9	0.0997	0.1063	0.1108
3,5-Dimethylheptane	I9	0.0620	0.0661	0.0689
2,6-Dimethylheptane	I9	0.0744	0.0793	0.0835
1,1,3-Trimethylcyclohexane	N9	0.2132	0.2238	0.2166
Ethylbenzene	A8	0.5758	0.5082	0.4367
1c,2t,4t-Trimethylcyclohexane	N9	0.3443	0.3614	0.3431
2,3-Dimethylheptane	I9	0.8282	0.8831	0.9086
1,3-Dimethylbenzene (m-Xylene)	A8	0.4559	0.4024	0.3478
1,4-Dimethylbenzene (p-Xylene)	A8	0.3301	0.2914	0.2526
3,4-Dimethylheptane	I9	0.0339	0.0361	0.0369
3,4-Dimethylheptane (2)	I9	0.1409	0.1502	0.1534
4-Ethylheptane	I9	0.0566	0.0603	0.0629
4-Methyloctane	I9	0.3233	0.3447	0.3573
2-Methyloctane	I9	0.4004	0.4269	0.4468
1c,2t,4c-Trimethylcyclohexane	I9	0.0294	0.0314	0.0323
3-Ethylheptane	I9	0.0857	0.0914	0.0940
3-Methyloctane	I9	0.5104	0.5442	0.5640
3,3-Diethylpentane	I9	0.0490	0.0523	0.0518
1c,2t,3-Trimethylcyclohexane	N9	0.0897	0.0941	0.0893
1,1,2-Trimethylcyclohexane	N9	0.0220	0.0231	0.0219
1,2-Dimethylbenzene (o-Xylene)	A8	0.6435	0.5680	0.4823
i-Butylcyclopentane	N9	0.2790	0.2928	0.2801
UnknownC8s	U8	0.0310	0.0294	0.0312
n-Nonane	P9	2.0067	2.1398	2.2271
1,1-Methylethylcyclohexane	N9	0.3035	0.3236	0.3378
i-Propylbenzene	A9	0.4290	0.4287	0.3709
i-Propylcyclohexane	N9	0.1200	0.1259	0.1173
2,2-Dimethyloctane	I10	0.0935	0.1106	0.1117
2,4-Dimethyloctane	I10	0.0933	0.1104	0.1115
2,6-Dimethyloctane	I10	0.0069	0.0082	0.0086
2,5-Dimethyloctane	I10	0.0440	0.0521	0.0526

n-Butylcyclopentane	N9	0.4120	0.4805	0.4493
3,3-Dimethyloctane	I10	0.1084	0.1282	0.1296
n-Propylbenzene	A9	0.4759	0.4755	0.4114
3,6-Dimethyloctane	I10	0.3754	0.4441	0.4487
3-Methyl-5-ethylheptane	I10	0.5026	0.5359	0.5516
1,3-Methylethylbenzene	A9	0.3989	0.3986	0.3420
1,4-Methylethylbenzene	A9	0.2585	0.2583	0.2216
1,3,5-Trimethylbenzene	A9	0.1698	0.1697	0.1466
2,3-Dimethyloctane	I10	0.1142	0.1351	0.1365
5-Methylnonane	I10	0.2814	0.3329	0.3395
1,2-Methylethylbenzene	A9	0.5671	0.5667	0.4837
2-Methylnonane	I10	0.0332	0.0393	0.0404
3-Ethyloctane	I10	0.0411	0.0486	0.0491
3-Methylnonane	I10	0.2634	0.3116	0.3174
1,2,4-Trimethylbenzene	A9	0.0702	0.0702	0.0599
t-Butylbenzene	A10	0.4756	0.5307	0.4579
i-Butylcyclohexane	N10	0.2366	0.2759	0.2540
1t-Methyl-2-n-propylcyclohexane	I10	0.0844	0.0900	0.0926
i-Butylbenzene	A10	0.0764	0.0852	0.0747
sec-Butylbenzene	A10	0.0673	0.0751	0.0651
UnknownC9s	U9	1.3965	1.4891	1.5499
n-Decane	P10	1.5536	1.8377	1.8805
1,2,3-Trimethylbenzene	A9	0.2682	0.2680	0.2241
1,3-Methyl-i-propylbenzene	A10	0.1201	0.1200	0.1024
1,4-Methyl-i-propylbenzene	A10	0.1220	0.1219	0.1040
Sec-Butylcyclohexane	N10	0.3744	0.4366	0.4014
1,2-Methyl-i-propylbenzene	A10	0.1684	0.1879	0.1602
3-Ethylnonane	I10	0.0351	0.0415	0.0427
1,3-Diethylbenzene	A10	0.1703	0.1900	0.1644
1,3-Methyl-n-propylbenzene	A10	0.0437	0.0488	0.0424
1,4-Diethylbenzene	A10	0.2377	0.2652	0.2300
1,4-Methyl-n-propylbenzene	A10	0.1136	0.1268	0.1104
n-Butylbenzene	A10	0.0681	0.0760	0.0659
1,3-Dimethyl-5-ethylbenzene	A10	0.0607	0.0677	0.0585
1,2-Diethylbenzene	A10	0.1274	0.1422	0.1209
1,2-Methyl-n-propylbenzene	A10	0.1338	0.1493	0.1278
1,4-Dimethyl-2-ethylbenzene	A10	0.1621	0.1809	0.1542
1,3-Dimethyl-4-ethylbenzene	A10	0.0504	0.0562	0.0479
1,2-Dimethyl-4-ethylbenzene	A10	0.2308	0.2575	0.2201
1,3-Dimethyl-2-ethylbenzene	A10	0.1071	0.1195	0.1003
1t,2c,4-Trimethylcyclopentane	A10	0.5600	0.5224	0.5220
1,2-Dimethyl-3-ethylbenzene	A10	0.0933	0.1041	0.0872
1,2-Ethyl-i-propylbenzene	A10	0.0613	0.0684	0.0583
1,4-Methyl-t-butylbenzene	A11	0.1934	0.2158	0.1840
UnknownC10s	U10	2.0312	2.4026	2.4586
n-Undecane	P11	1.1941	1.5517	1.5659
1,4-Ethyl-i-propylbenzene	A11	0.0680	0.0759	0.0647
1,2,4,5-Tetramethylbenzene	A11	0.1037	0.1157	0.0976
1,2-Methyl-n-butylbenzene	A11	0.0777	0.0867	0.0739
1,2,3,5-Tetramethylbenzene	A11	0.0711	0.0793	0.0666
1,2-Methyl-t-butylbenzene	A11	0.1057	0.1179	0.1005
5-Methylindan	A11	0.0230	0.0326	0.0325
4-Methylindan	A11	0.0169	0.0239	0.0239
1,2-Ethyl-n-propylbenzene	A11	0.1608	0.1794	0.1530
2-Methylindan	A11	0.0846	0.1198	0.1196
1,3-Methyl-n-butylbenzene	A11	0.0967	0.1079	0.0920
1,3-Di-i-propylbenzene	A11	0.1340	0.1495	0.1275
sec-Pentylbenzene	A11	0.1358	0.1515	0.1292
n-Pentylbenzene	A11	0.1688	0.2080	0.1811
1t-M-2-(4MP)cyclopentane	P12	0.0130	0.0184	0.0184
1,2-Di-n-propylbenzene	A11	0.1189	0.1327	0.1132
1,4-Di-i-propylbenzene	A11	0.2089	0.2331	0.1988
Tetrahydronaphthalene	A10	0.1140	0.1272	0.1085
t-Decahydronaphthalene	A10	0.1725	0.1925	0.1642
Naphthalene	A10	0.1425	0.1518	0.1294
1-t-Butyl-3,5-dimethylbenzene	A12	0.1250	0.1395	0.1190
1,4-Ethyl-t-butylbenzene	A11	0.1522	0.1698	0.1448
UnknownC11s	U11	1.6409	2.1324	2.1519
n-Dodecane	P12	0.9587	1.3577	1.3550
1,3-Di-n-propylbenzene	A12	0.0959	0.1070	0.0912
1,3,5-Triethylbenzene	A12	0.0611	0.0611	0.0528
1,2,4-Triethylbenzene	A12	0.3559	0.3556	0.3034
1,4-Methyl-n-pentylbenzene	A12	0.0776	0.0866	0.0738
n-Hexylbenzene	A12	0.1056	0.1425	0.1242

1,2,3,4,5-Pentamethylbenzene	A13	0.2433	0.2715	0.2315
2-Methylnaphthalene	A11	0.2481	0.2933	0.2501
1-Methylnaphthalene	A11	0.1815	0.2146	0.1573
UnknownC12s	U12	1.3819	1.9570	1.9532
n-Tridecane	P13	0.7981	1.2233	1.2065
UnknownC13s	U13	1.3470	2.0646	2.0362
n-Tetradecane	P14	0.6407	1.0567	1.0400
UnknownC14s	U14	1.3118	2.1636	2.1295
n-Pentadecane	P15	0.5287	0.9337	0.9084
UnknownC15s	U15	1.1588	2.0464	1.9910
n-Hexadecane	P16	0.3816	0.7184	0.6944
UnknownC16s	U16	0.6417	1.2080	1.1677
n-Heptadecane	P17	0.2892	0.5782	0.5572
UnknownC17s	U17	0.4317	0.8630	0.8316
n-Octadecane	P18	0.2485	0.5258	0.5052
UnknownC18s	U18	0.4232	0.8954	0.8603
n-Nonadecane	P19	0.3140	0.7010	0.6692
UnknownC19s	U19	0.2859	0.6383	0.6094
n-Eicosane	P20	0.1851	0.4348	0.4128
UnknownC20s	U20	0.2194	0.5154	0.4894
n-Heneicosane	P21	0.1224	0.3018	0.2851
UnknownC21s	U21	0.1471	0.3627	0.3426
n-Docosane	P22	0.1156	0.2985	0.2810
UnknownC22s	U22	0.1128	0.2913	0.2742
n-Tricosane	P23	0.0837	0.2259	0.2120
UnknownC23s	U23	0.1003	0.2707	0.2541
n-Tetracosane	P24	0.0470	0.1323	0.1239
UnknownC24s	U24	0.0665	0.1872	0.1753
n-Pentacosane	P25	0.0256	0.0751	0.0703
UnknownC25s	U25	0.0303	0.0888	0.0831
n-Hexacosane	P26	0.0186	0.0567	0.0527
UnknownC26s	U26	0.0269	0.0820	0.0762
n-Heptacosane	P27	0.0135	0.0427	0.0397
UnknownC27s	U27	0.0109	0.0345	0.0321
n-Octacosane	P28	0.0096	0.0315	0.0292
UnknownC28s	U28	0.0054	0.0177	0.0164
n-Nonacosane	P29	0.0103	0.0350	0.0324
UnknownC29s	U29	0.0018	0.0061	0.0056
n-Triacontane Plus	P30	0.0724	0.2545	0.2351
TOTAL		100.0000	100.0000	100.0000

CRUDE OIL ASSAY

PROJECT NO. :	201412066	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	DECEMBER 9, 2014
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 8, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK 15:45 BRINGLESON RANCH 6-34-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	71
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	@TEMP	TEST METHOD	UNITS	RESULTS
API GRAVITY			API 60/60	34.6
RVP @100 DEG F		D323	PSIG	7.8
TOTAL SULFUR		D2622	WT %	0.434
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				BLACK
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