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

303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201404096	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MAY 1, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 14:20 STATE 3-16-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	117
SAMPLE PRES. :	24	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0107	0.0063	0.0060
NITROGEN (AIR)	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0400	0.0160	0.0145
METHANE	0.1264	0.0184	0.0455
ETHANE	0.4123	0.1127	0.2348
PROPANE	1.7693	0.7091	1.0378
I-BUTANE	0.4676	0.2470	0.3256
N-BUTANE	2.4249	1.2809	1.6275
I-PENTANE	1.0380	0.6807	0.8089
N-PENTANE	1.7308	1.1349	1.3343
HEXANES PLUS	91.9800	95.7940	94.5651
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.3526	0.9602
TOLUENE	2.6303	2.2026
ETHYLBENZENE	0.8748	0.8441
XYLENE	2.1010	2.0274
TOTAL BTEX	6.9587	6.0343

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7424	0.7522	60/60
API Gravity =	59.1	56.61	60/60
Molecular Weight =	110.03	115.41	
Absolute Density =	6.19	6.27	LBS/GAL
Heating Value Liq. Idl Gas=	125810	127364	BTU/GAL
Vapor/Liquid =	21.45	20.75	CUFT/GAL
Vapor Pressure =	16.73	1.79	PSIA @100 F

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

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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201404096	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MAY 1, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 14:20 STATE 3-16-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	117
SAMPLE PRES. :	24	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0400		0.0160		0.0145	
NITROGEN (AIR)	0.0000		0.0000		0.0000	
METHANE	0.1264		0.0184		0.0455	
ETHANE	0.4123		0.1127		0.2348	
PROPANE	1.7693		0.7091		1.0378	
I-BUTANE	0.4676		0.2470		0.3256	
N-BUTANE	2.4249		1.2809		1.6275	
I-PENTANE	1.0380		0.6807		0.8089	
N-PENTANE	1.7308		1.1349		1.3343	
CYCLOPENTANE (N-C5)	1.6691		1.0638		1.0384	
N-HEXANE	7.0917		5.5548		6.2102	
CYCLOHEXANE (OTHER C6)	2.7056		2.0695		1.9600	
OTHER HEXANES	11.2644		8.7330		9.2754	
OTHER HEPTANES	14.0216		12.6768		13.2090	
METHYLCYCLOHEXANE (OTHER C7)	3.9658		3.5391		3.3898	
2,2,4 TRIMETHYLPENTANE	0.9085		0.8107		0.7984	
BENZENE	1.3526		0.9602		0.8070	
TOLUENE	2.6303		2.2026		1.8694	
ETHYLBENZENE	0.8748		0.8441		0.7163	
XYLENES	2.1010		2.0274		1.7220	
OTHER OCTANES	11.0110		11.4687		11.5605	
OCTANES PLUS	----	47.2789	----	58.9942	----	56.8059
NONANES	10.4718		12.0402		11.6972	
DECANES PLUS	21.9118		31.8031		30.3115	
SUB TOTAL	99.9893		99.9937		99.9940	
ALCOHOLS	0.0107		0.0063		0.0060	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**59.10**	60/60
Vapor Pressure	=	**16.73**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**159.69**	
Average Specific Gravity of Decanes plus	=	**0.7790**	

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BY CARBON NUMBER

PROJECT NO. :	201404096	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MAY 1, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 14:20		EMPACT
	STATE 3-16-9-60		
FIELD DATA		SAMPLE TEMP. :	117
SAMPLE PRES. :	24	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
ALCOHOLS	0.0107	0.0063	0.0060
NITROGEN	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0400	0.0160	0.0145
C1	0.1264	0.0184	0.0455
C2	0.4123	0.1127	0.2348
C3	1.7693	0.7091	1.0378
C4	2.8925	1.5279	1.9531
C5	4.4379	2.8794	3.1816
C6	22.4143	17.3175	18.2526
C7	20.6177	18.4185	18.4682
C8	14.8953	15.1509	14.7972
C9	10.4718	12.0402	11.6972
C10	8.6702	10.7496	10.2428
C11	4.5406	6.1241	5.6987
C12	2.5525	3.7434	3.5876
C13	2.0835	3.4006	3.2806
C14	1.7123	3.0874	3.0013
C15	1.4377	2.7756	2.6672
C16	0.6602	1.3587	1.2972
C17	0.2116	0.4625	0.4402
C18	0.0358	0.0828	0.0786
C19	0.0046	0.0112	0.0106
C20	0.0028	0.0072	0.0067
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

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EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201404096	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MAY 1, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	OIL TREATER @ 14:20 STATE 3-16-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	117
SAMPLE PRES. :	24	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	0.0400	0.0160	0.0145
Methane	P1	0.1264	0.0184	0.0455
Ethane	P2	0.4123	0.1127	0.2348
Propane	P3	1.7693	0.7091	1.0378
i-Butane	I4	0.4676	0.2470	0.3256
n-Butane	P4	2.4249	1.2809	1.6275
2,2-Dimethylpropane	I5	0.0082	0.0054	0.0067
i-Pentane	I5	1.0298	0.6753	0.8022
i-Propanol	X3	0.0070	0.0038	0.0036
n-Pentane	P5	1.7308	1.1349	1.3343
t-Butanol	X4	0.0037	0.0025	0.0024
2,2-Dimethylbutane	I6	0.0319	0.0250	0.0284
Cyclopentane	N5	1.6691	1.0638	1.0384
2,3-Dimethylbutane	I6	0.3545	0.2777	0.3089
2-Methylpentane	I6	3.7316	2.9228	3.2972
3-Methylpentane	I6	2.2508	1.7629	1.9556
n-Hexane	P6	7.0917	5.5548	6.2102
2,2-Dimethylpentane	I7	0.0105	0.0096	0.0104
Methylcyclopentane	N6	4.8956	3.7446	3.6853
2,4-Dimethylpentane	I7	0.2238	0.2038	0.2236
2,2,3-Trimethylbutane	I7	0.0117	0.0107	0.0114
Benzene	A6	1.3526	0.9602	0.8070
3,3-Dimethylpentane	I7	0.0221	0.0201	0.0214
Cyclohexane	N6	2.7056	2.0695	1.9600
2-Methylhexane	I7	1.3252	1.2068	1.3123
2,3-Dimethylpentane	I7	0.6799	0.6192	0.6541
1,1-Dimethylcyclopentane	N7	0.3146	0.2808	0.2744
3-Methylhexane	I7	1.8000	1.6392	1.7557
1c,3-Dimethylcyclopentane	N7	0.9882	0.8819	0.8731
1t,3-Dimethylcyclopentane	N7	0.9085	0.8107	0.7984
3-Ethylpentane	I7	0.1628	0.1483	0.1563
1t,2-Dimethylcyclopentane	N7	1.9084	1.7031	1.6714
2,2,4-Trimethylpentane	I8	0.0495	0.0514	0.0546
n-Heptane	P7	4.7069	4.2864	4.6214

1c,2-Dimethylcyclopentane	N7	0.1910	0.1704	0.1627
Methylcyclohexane	N7	3.9658	3.5391	3.3898
2,2-Dimethylhexane	I8	0.3849	0.3996	0.4235
Ethylcyclopentane	N7	0.7445	0.6644	0.6393
2,5-Dimethylhexane	I8	0.1405	0.1459	0.1550
2,2,3-Trimethylpentane	I8	0.0244	0.0253	0.0261
2,4-Dimethylhexane	I8	0.2231	0.2316	0.2449
1c,2t,4-Trimethylcyclopentane	N8	0.4451	0.4539	0.4386
3,3-Dimethylhexane	I8	0.0366	0.0380	0.0395
2,3,4-Trimethylpentane	I8	0.1080	0.1121	0.1149
2,3,3-Trimethylpentane	I8	0.0058	0.0060	0.0061
Toluene	A7	2.6303	2.2026	1.8694
2,3-Dimethylhexane	I8	0.2016	0.2093	0.2169
2-Methyl-3-ethylpentane	I8	0.1442	0.1497	0.1534
1,1,2-Trimethylcyclopentane	N8	0.0044	0.0045	0.0043
2-Methylheptane	I8	1.3488	1.4003	1.4768
4-Methylheptane	I8	0.3951	0.4102	0.4222
3-Methyl-3-ethylpentane	I8	0.0648	0.0673	0.0683
3,4-Dimethylhexane	I8	0.0599	0.0622	0.0637
1c,2c,4-Trimethylcyclopentane	N8	0.0337	0.0344	0.0329
1c,3-Dimethylcyclohexane	N8	0.0244	0.0249	0.0240
3-Methylheptane	I8	0.6659	0.6913	0.7228
1c,2t,3-Trimethylcyclopentane	N8	0.9994	1.0192	0.9759
3-Ethylhexane	I8	0.1068	0.1109	0.1147
1t,4-Dimethylcyclohexane	N8	0.3763	0.3838	0.3713
1,1-Dimethylcyclohexane	N8	0.1119	0.1141	0.1078
3c-Ethylmethylcyclopentane	N8	0.0030	0.0031	0.0030
3t-Ethylmethylcyclopentane	N8	0.2363	0.2410	0.2319
2t-Ethylmethylcyclopentane	N8	0.2078	0.2119	0.2033
1,1-Methylethylcyclopentane	N8	0.6779	0.6913	0.6531
2,2,4-Trimethylhexane	I9	0.0405	0.0472	0.0487
1t,2-Dimethylcyclohexane	N8	0.5822	0.5937	0.5646
1t,3-Dimethylcyclohexane	N8	0.0250	0.0255	0.0240
UnknownC7s	U7	0.0235	0.0214	0.0231
n-Octane	P8	2.7271	2.8312	2.9717
1c,4-Dimethylcyclohexane	N8	0.3807	0.3882	0.3659
i-Propylcyclopentane	I8	0.0878	0.0895	0.0851
2,4,4-Trimethylhexane	I9	0.0235	0.0274	0.0280
2,2,3,4-Tetramethylpentane	I9	0.0201	0.0234	0.0240
2,3,4-Trimethylhexane	I9	0.0205	0.0239	0.0244
1c,2-Dimethylcyclohexane	N8	0.1954	0.1993	0.1847
2,3,5-Trimethylhexane	I9	0.0714	0.0832	0.0850
2,2-Dimethylheptane	I9	0.0132	0.0154	0.0160
1,1,4-Trimethylcyclohexane	N9	0.9318	1.0691	1.0220
2,2,3-Trimethylhexane	I9	0.4028	0.4695	0.4749
2,4-Dimethylheptane	I9	0.0826	0.0963	0.0993
4,4-Dimethylheptane	I9	0.0416	0.0485	0.0500
Ethylcyclohexane	N8	0.5682	0.5795	0.5429
n-Propylcyclopentane	N8	0.2232	0.2276	0.2162
1c,3c,5-Trimethylcyclohexane	N9	0.0355	0.0407	0.0389
2,5-Dimethylheptane	I9	0.0789	0.0920	0.0947
3,3-Dimethylheptane	I9	0.0941	0.1097	0.1129
3,5-Dimethylheptane	I9	0.0684	0.0797	0.0820
2,6-Dimethylheptane	I9	0.0646	0.0753	0.0783
1,1,3-Trimethylcyclohexane	N9	0.1995	0.2289	0.2188
Ethylbenzene	A8	0.8748	0.8441	0.7163
1c,2t,4t-Trimethylcyclohexane	N9	0.0786	0.0902	0.0846
2,3-Dimethylheptane	I9	0.1903	0.2218	0.2254
1,3-Dimethylbenzene (m-Xylene)	A8	1.2068	1.1645	0.9940
1,4-Dimethylbenzene (p-Xylene)	A8	0.2579	0.2489	0.2131
3,4-Dimethylheptane	I9	0.0498	0.0580	0.0585
3,4-Dimethylheptane (2)	I9	0.1518	0.1770	0.1785
4-Ethylheptane	I9	0.0334	0.0389	0.0401
4-Methyloctane	I9	0.2853	0.3326	0.3405
2-Methyloctane	I9	0.3491	0.4069	0.4207
1c,2t,4c-Trimethylcyclohexane	I9	0.0347	0.0405	0.0412
3-Ethylheptane	I9	0.0840	0.0979	0.0994

3-Methyloctane	I9	0.4587	0.5347	0.5473
3,3-Diethylpentane	I9	0.0781	0.0910	0.0890
1c,2t,3-Trimethylcyclohexane	N9	0.0820	0.0941	0.0882
1,1,2-Trimethylcyclohexane	N9	0.0239	0.0274	0.0257
1,2-Dimethylbenzene (o-Xylene)	A8	0.6363	0.6140	0.5149
i-Butylcyclopentane	N9	0.2809	0.3223	0.3046
UnknownC8s	U8	0.0498	0.0517	0.0543
n-Nonane	P9	1.8098	2.1097	2.1688
1,1-Methylethylcyclohexane	N9	0.2810	0.3275	0.3377
i-Propylbenzene	A9	0.4331	0.4731	0.4043
i-Propylcyclohexane	N9	0.1029	0.1181	0.1087
2,2-Dimethyloctane	I10	0.0857	0.1108	0.1106
2,4-Dimethyloctane	I10	0.0899	0.1163	0.1160
2,6-Dimethyloctane	I10	0.0127	0.0164	0.0169
2,5-Dimethyloctane	I10	0.0398	0.0515	0.0514
n-Butylcyclopentane	N9	0.3328	0.4243	0.3919
3,3-Dimethyloctane	I10	0.1031	0.1333	0.1331
n-Propylbenzene	A9	0.4163	0.4547	0.3886
3,6-Dimethyloctane	I10	0.2550	0.3298	0.3291
3-Methyl-5-ethylheptane	I10	0.5044	0.5880	0.5978
1,3-Methylethylbenzene	A9	0.3462	0.3782	0.3205
1,4-Methylethylbenzene	A9	0.2586	0.2825	0.2394
1,3,5-Trimethylbenzene	A9	0.1521	0.1662	0.1418
2,3-Dimethyloctane	I10	0.0680	0.0879	0.0877
5-Methylnonane	I10	0.2421	0.3131	0.3154
1,2-Methylethylbenzene	A9	0.4556	0.4977	0.4196
2-Methylnonane	I10	0.0639	0.0826	0.0839
3-Ethyloctane	I10	0.0867	0.1121	0.1119
3-Methylnonane	I10	0.2317	0.2996	0.3014
1,2,4-Trimethylbenzene	A9	0.0395	0.0432	0.0364
t-Butylbenzene	A10	0.4168	0.5084	0.4333
i-Butylcyclohexane	N10	0.2079	0.2650	0.2410
1t-Methyl-2-n-propylcyclohexane	I10	0.0346	0.0403	0.0410
i-Butylbenzene	A10	0.0677	0.0826	0.0715
sec-Butylbenzene	A10	0.0683	0.0833	0.0714
UnknownC9s	U9	1.2423	1.4481	1.4886
n-Decane	P10	1.2872	1.6645	1.6823
1,2,3-Trimethylbenzene	A9	0.2320	0.2534	0.2093
1,3-Methyl-i-propylbenzene	A10	0.1077	0.1177	0.0992
1,4-Methyl-i-propylbenzene	A10	0.0916	0.1001	0.0844
Sec-Butylcyclohexane	N10	0.3217	0.4101	0.3724
1,2-Methyl-i-propylbenzene	A10	0.1661	0.2026	0.1706
3-Ethylnonane	I10	0.0411	0.0531	0.0539
1,3-Diethylbenzene	A10	0.1404	0.1713	0.1464
1,3-Methyl-n-propylbenzene	A10	0.0469	0.0572	0.0491
1,4-Diethylbenzene	A10	0.2559	0.3122	0.2674
1,4-Methyl-n-propylbenzene	A10	0.0397	0.0484	0.0416
n-Butylbenzene	A10	0.0590	0.0720	0.0617
1,3-Dimethyl-5-ethylbenzene	A10	0.0654	0.0798	0.0681
1,2-Diethylbenzene	A10	0.0984	0.1200	0.1007
1,2-Methyl-n-propylbenzene	A10	0.1017	0.1241	0.1049
1,4-Dimethyl-2-ethylbenzene	A10	0.1341	0.1636	0.1377
1,2-Dimethyl-4-ethylbenzene	A10	0.1965	0.2397	0.2024
1,3-Dimethyl-2-ethylbenzene	A10	0.1409	0.1719	0.1426
1t,2c,4-Trimethylcyclopentane	A10	0.5732	0.5846	0.5770
1,2-Dimethyl-3-ethylbenzene	A10	0.0740	0.0903	0.0747
1,2-Ethyl-i-propylbenzene	A10	0.0988	0.1205	0.1015
1,4-Methyl-t-butylbenzene	A11	0.1259	0.1536	0.1294
UnknownC10s	U10	1.7449	2.2563	2.2804
n-Undecane	P11	1.0272	1.4593	1.4545
1,4-Ethyl-i-propylbenzene	A11	0.0596	0.0727	0.0612
1,2,4,5-Tetramethylbenzene	A11	0.1396	0.1703	0.1419
1,2-Methyl-n-butylbenzene	A11	0.0753	0.0919	0.0774
1,2,3,5-Tetramethylbenzene	A11	0.1175	0.1433	0.1189
1,2-Methyl-t-butylbenzene	A11	0.0905	0.1104	0.0930
5-Methylindan	A11	0.0213	0.0330	0.0325
4-Methylindan	A11	0.0102	0.0158	0.0156

1,2-Ethyl-n-propylbenzene	A11	0.1442	0.1759	0.1481
2-Methylindan	A11	0.1147	0.1776	0.1751
1,3-Methyl-n-butylbenzene	A11	0.0845	0.1031	0.0868
1,3-Di-i-propylbenzene	A11	0.1377	0.1680	0.1415
sec-Pentylbenzene	A11	0.0722	0.0881	0.0742
n-Pentylbenzene	A11	0.0861	0.1160	0.0998
1t-M-2-(4MP)cyclopentane	P12	0.0818	0.1266	0.1248
1,2-Di-n-propylbenzene	A11	0.1078	0.1315	0.1108
1,4-Di-i-propylbenzene	A11	0.1601	0.1953	0.1645
Tetrahydronaphthalene	A10	0.0452	0.0551	0.0464
t-Decahydronaphthalene	A10	0.1614	0.1969	0.1658
Naphthalene	A10	0.1001	0.1166	0.0982
1-t-Butyl-3,5-dimethylbenzene	A12	0.0488	0.0595	0.0501
1,4-Ethyl-t-butylbenzene	A11	0.0939	0.1145	0.0964
UnknownC11s	U11	1.4352	2.0389	2.0322
n-Dodecane	P12	0.8344	1.2918	1.2734
1,3-Di-n-propylbenzene	A12	0.0917	0.1119	0.0942
1,3,5-Triethylbenzene	A12	0.0331	0.0362	0.0309
1,2,4-Triethylbenzene	A12	0.2781	0.3038	0.2560
1,4-Methyl-n-pentylbenzene	A12	0.0333	0.0406	0.0342
n-Hexylbenzene	A12	0.1284	0.1894	0.1630
1,2,3,4,5-Pentamethylbenzene	A13	0.1983	0.2419	0.2037
2-Methylnaphthalene	A11	0.2352	0.3040	0.2560
1-Methylnaphthalene	A11	0.2019	0.2609	0.1889
UnknownC12s	U12	1.0229	1.5836	1.5610
n-Tridecane	P13	0.7005	1.1737	1.1433
UnknownC13s	U13	1.1847	1.9850	1.9336
n-Tetradecane	P14	0.5622	1.0137	0.9854
UnknownC14s	U14	1.1501	2.0737	2.0159
n-Pentadecane	P15	0.3175	0.6130	0.5891
UnknownC15s	U15	1.1202	2.1626	2.0781
n-Hexadecane	P16	0.1494	0.3075	0.2936
UnknownC16s	U16	0.5108	1.0512	1.0036
n-Heptadecane	P17	0.0306	0.0669	0.0637
UnknownC17s	U17	0.1810	0.3956	0.3765
n-Octadecane	P18	0.0083	0.0192	0.0182
UnknownC18s	U18	0.0275	0.0636	0.0604
n-Nonadecane	P19	0.0046	0.0112	0.0106
n-Eicosane	P20	0.0028	0.0072	0.0067
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. :	201404096	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	1084
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:30 STATE 3-16-9-60		
FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	118	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 5.2 PPM (1-7 PPM) @ 14:35		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0002	0.0006		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.10	1.29	---	---
CARBON DIOXIDE	2.91	5.34	---	---
METHANE	69.73690	46.69060	---	---
ETHANE	11.3268	14.2140	3.0246	3.0411
PROPANE	9.1977	16.9263	2.5300	2.5438
I-BUTANE	0.8647	2.0975	0.2823	0.2839
N-BUTANE	2.9336	7.1159	0.9231	0.9281
I-PENTANE	0.5696	1.7101	0.2042	0.2053
N-PENTANE	0.6544	1.9704	0.2373	0.2386
HEXANES PLUS	0.6861	2.6346	0.2712	0.2725
TOTALS	100.00000	100.00000	7.4727	7.5133

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0252	0.0821
TOLUENE	0.0159	0.0611
ETHYLBENZENE	0.0022	0.0098
XYLENES	0.0043	0.0191
TOTAL BTEX	0.0476	0.1721

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1222.1 **/scf**	1228.7 **/scf**
	NET WET REAL :	1200.7 **/scf**	1207.4 **/scf**
HIGH	GROSS DRY REAL :	1343.6 **/scf**	1350.9 **/scf**
	GROSS WET REAL :	1320.1 **/scf**	1327.5 **/scf**
	NET DRY REAL :	19378.8 **/lb**	19484.7 **/lb**
	GROSS DRY REAL :	21303.8 **/lb**	21420.2 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8265
	COMPRESSIBILITY FACTOR :		0.99568

(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

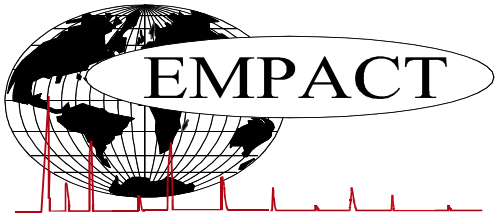
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201404096	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	1084
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:30 STATE 3-16-9-60		
FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	118	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 5.2 PPM (1-7 PPM) @ 14:35		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.91	5.34
Nitrogen	1.10	1.29
Methane	69.73690	46.69060
Ethane	11.3268	14.2140
Propane	9.1977	16.9263
Isobutane	0.8647	2.0975
n-Butane	2.9336	7.1159
Isopentane	0.5110	1.5386
n-Pentane	0.6544	1.9704
Cyclopentane	0.0586	0.1715
n-Hexane	0.1361	0.4895
Cyclohexane	0.0355	0.1247
Other Hexanes	0.2481	0.8853
Heptanes	0.1218	0.5053
Methycyclohexane	0.0274	0.1123
2,2,4 Trimethylpentane	0.0002	0.0010
Benzene	0.0252	0.0821
Toluene	0.0159	0.0611
Ethylbenzene	0.0022	0.0098
Xylenes	0.0043	0.0191
C8+ Heavies	0.0694	0.3444
Subtotal	99.98980	99.98940
Oxygen/Argon	0.01	0.01
Alcohols	0.0002	0.0006
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201404096	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	1084
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @ 14:30 STATE 3-16-9-60		
FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	118	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 5.2 PPM (1-7 PPM) @ 14:35		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.10	1.29	---	---
Carbon Dioxide	---	2.91	5.34	---	---
Methane	P1	69.73690	46.69060	---	---
Ethane	P2	11.3268	14.2140	3.025	3.041
Propane	P3	9.1977	16.9263	2.530	2.544
i-Butane	I4	0.8647	2.0975	0.282	0.284
n-Butane	P4	2.9336	7.1159	0.923	0.928
2,2-Dimethylpropane	I5	0.0020	0.0060	0.001	0.001
i-Pentane	I5	0.5090	1.5326	0.186	0.187
n-Pentane	P5	0.6543	1.9701	0.237	0.239
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0013	0.0047	0.001	0.001
Cyclopentane	N5	0.0586	0.1715	0.017	0.017
2,3-Dimethylbutane	I6	0.0090	0.0324	0.004	0.004
2-Methylpentane	I6	0.1005	0.3615	0.042	0.042
3-Methylpentane	I6	0.0525	0.1888	0.021	0.021
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.1361	0.4895	0.056	0.056
Methylcyclopentane	N6	0.0848	0.2979	0.030	0.030
2,4-Dimethylpentane	I7	0.0031	0.0130	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0002	0.0008	0.000	0.000
Benzene	A6	0.0252	0.0821	0.007	0.007
3,3-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Cyclohexane	N6	0.0355	0.1247	0.012	0.012
2-Methylhexane	I7	0.0136	0.0569	0.006	0.006
2,3-Dimethylpentane	I7	0.0068	0.0284	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0037	0.0152	0.002	0.002
3-Methylhexane	I7	0.0167	0.0698	0.008	0.008
1c,3-Dimethylcyclopentane	N7	0.0097	0.0397	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0086	0.0352	0.004	0.004
3-Ethylpentane	I7	0.0007	0.0029	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0183	0.0750	0.008	0.008
2,2,4-Trimethylpentane	I8	0.0002	0.0010	0.000	0.000
n-Heptane	P7	0.0341	0.1426	0.016	0.016
1c,2-Dimethylcyclopentane	N7	0.0014	0.0057	0.001	0.001
Methylcyclohexane	N7	0.0274	0.1123	0.011	0.011

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2,2-Dimethylhexane	I8	0.0023	0.0110	0.001	0.001
Ethylcyclopentane	N7	0.0048	0.0197	0.002	0.002
2,5-Dimethylhexane	I8	0.0007	0.0033	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0010	0.000	0.000
2,4-Dimethylhexane	I8	0.0013	0.0062	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0025	0.0117	0.001	0.001
3,3-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0030	0.0141	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0005	0.0024	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
Toluene	A7	0.0159	0.0611	0.005	0.005
2,3-Dimethylhexane	I8	0.0011	0.0053	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0006	0.0029	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0005	0.000	0.000
2-Methylheptane	I8	0.0057	0.0272	0.003	0.003
4-Methylheptane	I8	0.0015	0.0071	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
3-Methylheptane	I8	0.0024	0.0114	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0039	0.0183	0.002	0.002
3-Ethylhexane	I8	0.0007	0.0033	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0014	0.0066	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0023	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0009	0.0042	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0008	0.0038	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0024	0.0112	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0020	0.0094	0.001	0.001
n-Octane	P8	0.0073	0.0348	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0021	0.0099	0.001	0.001
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
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0024	0.0126	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0009	0.0048	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	0.0061	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	0.0002	0.0011	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0022	0.0098	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0005	0.0026	0.000	0.000
2,3-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0018	0.0080	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0012	0.0053	0.000	0.000

3,4-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0003	0.0016	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0005	0.0027	0.000	0.000
2-Methyloctane	I9	0.0006	0.0032	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0008	0.0043	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0013	0.0058	0.000	0.000
i-Butylcyclopentane	N9	0.0005	0.0026	0.000	0.000
n-Nonane	P9	0.0023	0.0123	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0003	0.0016	0.000	0.000
i-Propylbenzene	A9	0.0006	0.0030	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
n-Butylcyclopentane	N9	0.0004	0.0021	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0004	0.0020	0.000	0.000
3,6-Dimethyloctane	I10	0.0004	0.0024	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	0.0001	0.0005	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0002	0.0012	0.000	0.000
1,2-Methylethylbenzene	A9	0.0004	0.0020	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0017	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0021	0.0112	0.001	0.001
n-Decane	P10	0.0005	0.0030	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
1,3-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0014	0.0083	0.001	0.001
n-Undecane	P11	0.0001	0.0007	0.000	0.000
UnknownC11s	U11	0.0003	0.0020	0.000	0.000
n-Pentadecane	P15	0.0002	0.0018	0.000	0.000
n-Hexadecane	P16	0.0001	0.0010	0.000	0.000
TOTAL		100.00000	100.00000	7.4727	7.5133

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0252	0.0821
TOLUENE	0.0159	0.0611
ETHYLBENZENE	0.0022	0.0098
XYLENES	0.0043	0.0191
TOTAL BTEX	0.0476	0.1721

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1222.1 **/scf**	1228.7 **/scf**
	NET WET REAL :	1200.7 **/scf**	1207.4 **/scf**
HIGH	GROSS DRY REAL :	1343.6 **/scf**	1350.9 **/scf**
	GROSS WET REAL :	1320.1 **/scf**	1327.5 **/scf**
	NET DRY REAL :	19378.8 **/lb**	19484.7 **/lb**
	GROSS DRY REAL :	21303.8 **/lb**	21420.2 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8265
	COMPRESSIBILITY FACTOR :		0.99568

(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.

CRUDE OIL ASSAY

PROJECT NO. :	201404096	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	APRIL 30, 2014
ACCOUNT NO. :		SAMPLE DATE :	APRIL 17, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	PRODUCTION TANK @ 14:40 STATE 3-16-9-60		EMPACT
FIELD DATA		SAMPLE TEMP. :	68
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	35.4
RVP @100 DEG F	D323	PSIG	8.4
TOTAL SULFUR	D2622	WT %	0.314
TOTAL CHLORIDE	D4929	ug/g	N/A
ORGANIC CHLORIDE	D4929	ug/g	N/A
FLASH POINT	D93	° F	N/A
HEATING VALUE	D4809	BTU/ LB	N/A
VISUAL APPEARANCE			DARK RED/BROWN, CLOUDY
BS&W	D96		
Crude Oil		VOL %	N/A
Water		VOL %	N/A
Emulsion		VOL %	N/A
Sediment		VOL %	N/A
DISTILLATION:	D86		
INITIAL POINT		DEG F	N/A
50%		DEG F	N/A
90%		DEG F	N/A
END POINT		DEG F	N/A
DISTILLATION:	@TEMP D445		
Average Centipoise	20°C		N/A
Average Centipoise	30°C		N/A
Average Centipoise	80°C		N/A
Kinetic Viscosity	20°C	cSt (mm2/s)	N/A
Kinetic Viscosity	30°C	cSt (mm2/s)	N/A
Kinetic Viscosity	80°C	cSt (mm2/s)	N/A

ND: NOT DETECTED

N/A: NO TEST PREFORMED FOR THIS PARAMETER