

CRUDE OIL ASSAY

PROJECT NO. :	201403015	ANALYSIS NO. :	10
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 15:55		EMPACT
	BAILEY 5-26-8-60		
FIELD DATA		SAMPLE TEMP. :	85
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK# 52110		

<u>SPECIFICATION</u>	<u>TEST METHOD</u>	<u>UNITS</u>	<u>RESULTS</u>
API GRAVITY		API 60/60	36.1
RVP @100 DEG F	D323	PSIG	5.8
TOTAL SULFUR	D2622	WT %	N/A
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			RED/BROWN
<u>BS&W</u>	D96		
Crude Oil		VOL %	N/A
Water		VOL %	N/A
Emulsion		VOL %	N/A
Sediment		VOL %	N/A
<u>DISTILLATION:</u>	D86		
INITIAL POINT		DEG F	N/A
50%		DEG F	N/A
90%		DEG F	N/A
END POINT		DEG F	N/A
<u>DISTILLATION:</u>	@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 PERFORMED FOR THIS PARAMETER

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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403015	ANALYSIS NO. :	11
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:30		EMPACT
	BAILEY 5-26-8-60		
FIELD DATA		SAMPLE TEMP. :	158
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0347	0.0090	0.0082
CARBON DIOXIDE	0.0204	0.0083	0.0075
METHANE	0.0429	0.0064	0.0158
ETHANE	0.3598	0.1005	0.2088
PROPANE	1.5807	0.6473	0.9448
I-BUTANE	0.4456	0.2405	0.3162
N-BUTANE	2.2427	1.2104	1.5337
I-PENTANE	0.9902	0.6634	0.7860
N-PENTANE	1.6432	1.1009	1.2908
HEXANES PLUS	92.6398	96.0133	94.8882
TOTALS	100.0000	100.0000	100.0000

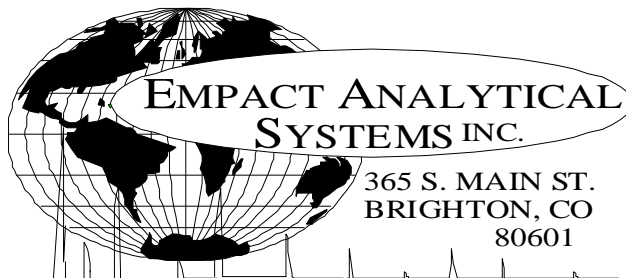
BTEX COMPONENTS	MOLE%	MASS%
BENZENE	1.4131	1.0250
TOLUENE	2.9077	2.4879
ETHYLBENZENE	0.5186	0.5113
XYLENE	2.0187	1.9903
TOTAL BTEX	6.8581	6.0145

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

	TOTAL SAMPLE	C6+ FRACTION
Specific Gravity (H2O=1) =	0.74	0.7483 60/60
API Gravity =	59.72	57.6 60/60
Molecular Weight =	107.69	112.24
Absolute Density =	6.17	6.24 LBS/GAL
Heating Value Liq. Idl Gas=	126073	127236 BTU/GAL
Vapor/Liquid =	21.85	21.20 CUFT/GAL
Vapor Pressure =	11.63	1.76 PSIA @100 F

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

THIS DATA HAS BEEN ACQUIRED THROUGH APPLICATION OF CURRENT STATE-OF-THE-ART ANALYTICAL TECHNIQUES.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201403015	ANALYSIS NO. :	11
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE :	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:30		EMPACT
	BAILEY 5-26-8-60		
FIELD DATA		SAMPLE TEMP. :	158
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %	Wt %	LV %			
CARBON DIOXIDE	0.0204	0.0083	0.0075			
NITROGEN (AIR)	0.0347	0.0090	0.0082			
METHANE	0.0429	0.0064	0.0158			
ETHANE	0.3598	0.1005	0.2088			
PROPANE	1.5807	0.6473	0.9448			
I-BUTANE	0.4456	0.2405	0.3162			
N-BUTANE	2.2427	1.2104	1.5337			
I-PENTANE	0.9902	0.6634	0.7860			
N-PENTANE	1.6432	1.1009	1.2908			
CYCLOPENTANE (N-C5)	1.3827	0.9005	0.8766			
N-HEXANE	6.7433	5.3956	6.0154			
CYCLOHEXANE (OTHER C6)	2.9235	2.2848	2.1580			
OTHER HEXANES	10.4748	8.2985	8.7966			
OTHER HEPTANES	14.0430	12.9765	13.5072			
METHYLCYCLOHEXANE (OTHER C7)	4.4938	4.0975	3.9139			
2,2,4 TRIMETHYLPENTANE	0.8719	0.7950	0.7808			
BENZENE	1.4131	1.0250	0.8591			
TOLUENE	2.9077	2.4879	2.1058			
ETHYLBENZENE	0.5186	0.5113	0.4327			
XYLENES	2.0187	1.9903	1.6859			
OTHER OCTANES	12.3425	13.1095	13.1448			
OCTANES PLUS	----	48.2579	----	58.5470	----	56.6556
NONANES	12.6715	14.9369	14.6638			
DECANES PLUS	19.8347	27.2040	25.9476			
SUB TOTAL	100.0000	100.0000	100.0000			
TOTAL	100.0000	100.0000	100.0000			

API Gravity	=	59.72	60/60
Vapor Pressure	=	11.63	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	147.70	
Average Specific Gravity of Decanes plus	=	0.7800	

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



303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201403015	ANALYSIS NO. :	11
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:30		EMPACT
	BAILEY 5-26-8-60		
FIELD DATA		SAMPLE TEMP. :	158
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
NITROGEN	0.0347	0.0090	0.0082
CARBON DIOXIDE	0.0204	0.0083	0.0075
C1	0.0429	0.0064	0.0158
C2	0.3598	0.1005	0.2088
C3	1.5807	0.6473	0.9448
C4	2.6883	1.4509	1.8499
C5	4.0161	2.6648	2.9534
C6	21.5547	17.0039	17.8291
C7	21.4445	19.5619	19.5269
C8	15.7517	16.4061	16.0442
C9	12.6715	14.9369	14.6638
C10	10.9318	13.9638	13.3932
C11	4.7807	6.6140	6.1904
C12	2.3368	3.4866	3.3398
C13	1.0390	1.7295	1.6628
C14	0.5170	0.9524	0.9233
C15	0.1946	0.3839	0.3679
C16	0.0315	0.0662	0.0630
C17	0.0010	0.0022	0.0021
C18	0.0023	0.0054	0.0051
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

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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201403015	ANALYSIS NO. :	11
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 6, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	6842
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 15:30		IMPACT
	BAILEY 5-26-8-60		
FIELD DATA		SAMPLE TEMP. :	158
SAMPLE PRES. :	20	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0347	0.0090	0.0082
Carbon Dioxide	NHC	0.0204	0.0083	0.0075
Methane	P1	0.0429	0.0064	0.0158
Ethane	P2	0.3598	0.1005	0.2088
Propane	P3	1.5807	0.6473	0.9448
i-Butane	I4	0.4456	0.2405	0.3162
n-Butane	P4	2.2427	1.2104	1.5337
2,2-Dimethylpropane	I5	0.0047	0.0031	0.0038
i-Pentane	I5	0.9855	0.6603	0.7822
n-Pentane	P5	1.6432	1.1009	1.2908
2,2-Dimethylbutane	I6	0.0339	0.0271	0.0307
Cyclopentane	N5	1.3827	0.9005	0.8766
2,3-Dimethylbutane	I6	0.3567	0.2855	0.3167
2-Methylpentane	I6	3.5225	2.8190	3.1714
3-Methylpentane	I6	2.0688	1.6556	1.8315
n-Hexane	P6	6.7433	5.3956	6.0154
2,2-Dimethylpentane	I7	0.0240	0.0223	0.0242
Methylcyclopentane	N6	4.4929	3.5113	3.4463
2,4-Dimethylpentane	I7	0.2992	0.2784	0.3046
2,2,3-Trimethylbutane	I7	0.0415	0.0386	0.0411
Benzene	A6	1.4131	1.0250	0.8591
3,3-Dimethylpentane	I7	0.0341	0.0317	0.0337
Cyclohexane	N6	2.9235	2.2848	2.1580
2-Methylhexane	I7	1.1977	1.1144	1.2085
2,3-Dimethylpentane	I7	0.7715	0.7179	0.7563
1,1-Dimethylcyclopentane	N7	0.4673	0.4261	0.4153
3-Methylhexane	I7	1.7710	1.6479	1.7602
1c,3-Dimethylcyclopentane	N7	0.9599	0.8752	0.8641
1t,3-Dimethylcyclopentane	N7	0.8719	0.7950	0.7808
3-Ethylpentane	I7	0.1498	0.1394	0.1465
1t,2-Dimethylcyclopentane	N7	1.7830	1.6257	1.5910
2,2,4-Trimethylpentane	I8	0.1491	0.1582	0.1674
n-Heptane	P7	4.9327	4.5897	4.9349
1c,2-Dimethylcyclopentane	N7	0.1603	0.1462	0.1392
Methylcyclohexane	N7	4.4938	4.0975	3.9139

2,2-Dimethylhexane	I8	0.6577	0.6977	0.7375
Ethylcyclopentane	N7	0.5779	0.5269	0.5056
2,5-Dimethylhexane	I8	0.1463	0.1552	0.1645
2,2,3-Trimethylpentane	I8	0.0268	0.0284	0.0292
2,4-Dimethylhexane	I8	0.2745	0.2912	0.3071
1c,2t,4-Trimethylcyclopentane	N8	0.4331	0.4513	0.4349
3,3-Dimethylhexane	I8	0.0766	0.0813	0.0842
2,3,4-Trimethylpentane	I8	0.1165	0.1236	0.1263
2,3,3-Trimethylpentane	I8	0.0023	0.0024	0.0024
Toluene	A7	2.9077	2.4879	2.1058
2,3-Dimethylhexane	I8	0.2529	0.2683	0.2772
2-Methyl-3-ethylpentane	I8	0.1411	0.1497	0.1530
1,1,2-Trimethylcyclopentane	N8	0.0137	0.0143	0.0136
2-Methylheptane	I8	1.3251	1.4056	1.4783
4-Methylheptane	I8	0.4967	0.5269	0.5408
3-Methyl-3-ethylpentane	I8	0.1203	0.1276	0.1291
3,4-Dimethylhexane	I8	0.1226	0.1301	0.1329
1c,2c,4-Trimethylcyclopentane	N8	0.0348	0.0363	0.0346
1c,3-Dimethylcyclohexane	N8	0.0489	0.0510	0.0490
3-Methylheptane	I8	0.5733	0.6081	0.6341
1c,2t,3-Trimethylcyclopentane	N8	1.0942	1.1401	1.0887
3-Ethylhexane	I8	0.1989	0.2110	0.2177
1t,4-Dimethylcyclohexane	N8	0.6681	0.6962	0.6717
1,1-Dimethylcyclohexane	N8	0.1503	0.1566	0.1476
3c-Ethylmethylcyclopentane	N8	0.0082	0.0085	0.0082
3t-Ethylmethylcyclopentane	N8	0.2059	0.2145	0.2058
2t-Ethylmethylcyclopentane	N8	0.1638	0.1707	0.1633
1,1-Methylethylcyclopentane	N8	0.5989	0.6241	0.5880
2,2,4-Trimethylhexane	I9	0.0732	0.0872	0.0897
1t,2-Dimethylcyclohexane	N8	0.6939	0.7230	0.6857
1t,3-Dimethylcyclohexane	N8	0.0054	0.0056	0.0053
UnknownC7s	U7	0.0012	0.0011	0.0012
n-Octane	P8	2.4505	2.5994	2.7209
1c,4-Dimethylcyclohexane	N8	0.7834	0.8163	0.7673
i-Propylcyclopentane	I8	0.0800	0.0834	0.0790
2,4,4-Trimethylhexane	I9	0.0242	0.0288	0.0293
2,2,3,4-Tetramethylpentane	I9	0.0191	0.0228	0.0233
2,3,4-Trimethylhexane	I9	0.0246	0.0293	0.0299
1c,2-Dimethylcyclohexane	N8	0.2341	0.2439	0.2254
2,3,5-Trimethylhexane	I9	0.1031	0.1228	0.1251
2,2-Dimethylheptane	I9	0.0218	0.0260	0.0269
1,1,4-Trimethylcyclohexane	N9	0.9983	1.1703	1.1157
2,2,3-Trimethylhexane	I9	0.5324	0.6341	0.6397
2,4-Dimethylheptane	I9	0.0466	0.0555	0.0571
4,4-Dimethylheptane	I9	0.0863	0.1028	0.1057
Ethylcyclohexane	N8	0.5730	0.5971	0.5578
n-Propylcyclopentane	N8	0.2340	0.2438	0.2310
1c,3c,5-Trimethylcyclohexane	N9	0.0630	0.0739	0.0705
2,5-Dimethylheptane	I9	0.0885	0.1054	0.1082
3,3-Dimethylheptane	I9	0.1106	0.1317	0.1352
3,5-Dimethylheptane	I9	0.0727	0.0866	0.0889
2,6-Dimethylheptane	I9	0.0522	0.0622	0.0645
1,1,3-Trimethylcyclohexane	N9	0.1010	0.1184	0.1129
Ethylbenzene	A8	0.5186	0.5113	0.4327
1c,2t,4t-Trimethylcyclohexane	N9	0.4160	0.4877	0.4561
2,3-Dimethylheptane	I9	0.0053	0.0063	0.0064
1,3-Dimethylbenzene (m-Xylene)	A8	0.4573	0.4509	0.3838
1,4-Dimethylbenzene (p-Xylene)	A8	0.8441	0.8322	0.7106
3,4-Dimethylheptane	I9	0.1660	0.1977	0.1989
3,4-Dimethylheptane (2)	I9	0.2475	0.2948	0.2966
4-Ethylheptane	I9	0.0467	0.0556	0.0572
4-Methyloctane	I9	0.2766	0.3294	0.3363
2-Methyloctane	I9	0.3612	0.4302	0.4435
1c,2t,4c-Trimethylcyclohexane	I9	0.0993	0.1183	0.1199
3-Ethylheptane	I9	0.1049	0.1249	0.1265
3-Methyloctane	I9	0.4289	0.5108	0.5214
3,3-Diethylpentane	I9	0.0541	0.0644	0.0628

1c,2t,3-Trimethylcyclohexane	N9	0.1185	0.1389	0.1299
1,1,2-Trimethylcyclohexane	N9	0.0458	0.0537	0.0502
1,2-Dimethylbenzene (o-Xylene)	A8	0.7173	0.7072	0.5915
i-Butylcyclopentane	N9	0.2492	0.2921	0.2753
UnknownC8s	U8	0.0595	0.0631	0.0661
n-Nonane	P9	1.8173	2.1645	2.2190
1,1-Methylethylcyclohexane	N9	0.5903	0.7031	0.7230
i-Propylbenzene	A9	0.3230	0.3605	0.3072
i-Propylcyclohexane	N9	0.1134	0.1329	0.1220
2,2-Dimethyloctane	I10	0.0687	0.0908	0.0904
2,4-Dimethyloctane	I10	0.0959	0.1267	0.1261
2,6-Dimethyloctane	I10	0.0136	0.0180	0.0185
2,5-Dimethyloctane	I10	0.0402	0.0531	0.0528
n-Butylcyclopentane	N9	0.2668	0.3475	0.3201
3,3-Dimethyloctane	I10	0.1389	0.1835	0.1827
n-Propylbenzene	A9	0.3059	0.3414	0.2910
3,6-Dimethyloctane	I10	0.2903	0.3836	0.3817
3-Methyl-5-ethylheptane	I10	0.5595	0.6664	0.6757
1,3-Methylethylbenzene	A9	0.3839	0.4285	0.3621
1,4-Methylethylbenzene	A9	0.1376	0.1536	0.1298
1,3,5-Trimethylbenzene	A9	0.1336	0.1491	0.1269
2,3-Dimethyloctane	I10	0.0757	0.1000	0.0995
5-Methylnonane	I10	0.2789	0.3685	0.3702
1,2-Methylethylbenzene	A9	0.4142	0.4623	0.3887
2-Methylnonane	I10	0.1596	0.2109	0.2136
3-Ethylheptane	I10	0.0947	0.1251	0.1245
3-Methylnonane	I10	0.2427	0.3207	0.3218
1,2,4-Trimethylbenzene	A9	0.0262	0.0292	0.0245
t-Butylbenzene	A10	0.4054	0.5053	0.4295
i-Butylcyclohexane	N10	0.2703	0.3521	0.3193
1t-Methyl-2-n-propylcyclohexane	I10	0.0684	0.0815	0.0826
i-Butylbenzene	A10	0.0768	0.0957	0.0826
sec-Butylbenzene	A10	0.1209	0.1507	0.1288
UnknownC9s	U9	2.9037	3.4584	3.5455
n-Decane	P10	1.5804	2.0881	2.1047
1,2,3-Trimethylbenzene	A9	0.2180	0.2433	0.2004
1,3-Methyl-i-propylbenzene	A10	0.1154	0.1288	0.1083
1,4-Methyl-i-propylbenzene	A10	0.0900	0.1005	0.0845
Sec-Butylcyclohexane	N10	0.3339	0.4349	0.3938
1,2-Methyl-i-propylbenzene	A10	0.1251	0.1559	0.1309
3-Ethylheptane	I10	0.0627	0.0828	0.0839
1,3-Diethylbenzene	A10	0.1369	0.1706	0.1454
1,3-Methyl-n-propylbenzene	A10	0.0334	0.0416	0.0356
1,4-Diethylbenzene	A10	0.1269	0.1582	0.1351
1,4-Methyl-n-propylbenzene	A10	0.0853	0.1063	0.0912
n-Butylbenzene	A10	0.1289	0.1607	0.1373
1,3-Dimethyl-5-ethylbenzene	A10	0.0825	0.1028	0.0875
1,2-Diethylbenzene	A10	0.1468	0.1830	0.1532
1,2-Methyl-n-propylbenzene	A10	0.1116	0.1391	0.1172
1,4-Dimethyl-2-ethylbenzene	A10	0.1331	0.1659	0.1393
1,3-Dimethyl-4-ethylbenzene	A10	0.0526	0.0656	0.0551
1,2-Dimethyl-4-ethylbenzene	A10	0.1821	0.2270	0.1911
1,3-Dimethyl-2-ethylbenzene	A10	0.2199	0.2741	0.2267
1t,2c,4-Trimethylcyclopentane	A10	0.5073	0.5286	0.5203
1,2-Dimethyl-3-ethylbenzene	A10	0.1068	0.1331	0.1099
1,2-Ethyl-i-propylbenzene	A10	0.0774	0.0965	0.0811
1,4-Methyl-t-butylbenzene	A11	0.1768	0.2204	0.1851
UnknownC10s	U10	3.1893	4.2138	4.2473
n-Undecane	P11	1.0849	1.5747	1.5652
1,4-Ethyl-i-propylbenzene	A11	0.0737	0.0919	0.0772
1,2,4,5-Tetramethylbenzene	A11	0.1880	0.2343	0.1947
1,2-Methyl-n-butylbenzene	A11	0.0901	0.1123	0.0943
1,2,3,5-Tetramethylbenzene	A11	0.1285	0.1602	0.1325
1,2-Methyl-t-butylbenzene	A11	0.1208	0.1506	0.1265
5-Methylindan	A11	0.0248	0.0392	0.0385
4-Methylindan	A11	0.0106	0.0168	0.0165
1,2-Ethyl-n-propylbenzene	A11	0.1256	0.1565	0.1314

2-Methylindan	A11	0.0884	0.1398	0.1375
1,3-Methyl-n-butylbenzene	A11	0.0480	0.0598	0.0502
1,3-Di-i-propylbenzene	A11	0.0548	0.0683	0.0574
sec-Pentylbenzene	A11	0.0769	0.0959	0.0806
n-Pentylbenzene	A11	0.0598	0.0823	0.0706
1t-M-2-(4MP)cyclopentane	P12	0.0749	0.1185	0.1165
1,2-Di-n-propylbenzene	A11	0.0869	0.1083	0.0910
1,4-Di-i-propylbenzene	A11	0.1531	0.1908	0.1603
Tetrahydronaphthalene	A10	0.1022	0.1274	0.1070
t-Decahydronaphthalene	A10	0.1238	0.1543	0.1296
Naphthalene	A10	0.0770	0.0916	0.0769
1-t-Butyl-3,5-dimethylbenzene	A12	0.0513	0.0639	0.0537
1,4-Ethyl-t-butylbenzene	A11	0.1368	0.1705	0.1432
UnknownC11s	U11	1.7663	2.5638	2.5484
n-Dodecane	P12	0.5871	0.9287	0.9130
1,3-Di-n-propylbenzene	A12	0.0706	0.0880	0.0739
1,3,5-Triethylbenzene	A12	0.0804	0.0897	0.0763
1,2,4-Triethylbenzene	A12	0.2412	0.2692	0.2262
1,4-Methyl-n-pentylbenzene	A12	0.0483	0.0602	0.0506
n-Hexylbenzene	A12	0.0379	0.0571	0.0490
1,2,3,4,5-Pentamethylbenzene	A13	0.1059	0.1320	0.1109
2-Methylnaphthalene	A11	0.1072	0.1416	0.1189
1-Methylnaphthalene	A11	0.1787	0.2360	0.1704
UnknownC12s	U12	1.1451	1.8113	1.7806
n-Tridecane	P13	0.2143	0.3669	0.3564
UnknownC13s	U13	0.7188	1.2306	1.1955
n-Tetradecane	P14	0.0980	0.1805	0.1750
UnknownC14s	U14	0.4190	0.7719	0.7483
n-Pentadecane	P15	0.0478	0.0943	0.0904
UnknownC15s	U15	0.1468	0.2896	0.2775
n-Hexadecane	P16	0.0032	0.0067	0.0064
UnknownC16s	U16	0.0283	0.0595	0.0566
n-Heptadecane	P17	0.0010	0.0022	0.0021
n-Octadecane	P18	0.0009	0.0021	0.0020
UnknownC18s	U18	0.0014	0.0033	0.0031
<u>TOTAL</u>		<u>100.0000</u>	<u>100.0000</u>	<u>100.0000</u>

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303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403015	ANALYSIS NO. :	12
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0030
LEASE NO. :		SAMPLED BY :	BRIAN MORROW-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:35 BAILEY 5-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90 F
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 7+PPM (1-7PPM) @ 15:40 LENGTH OF H2S STAIN @ <10PPM (2.5-60PPM) @ 15:40; WITNESSED BY GALE MCENDREE-EMPACT		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0001	0.0003		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	0.92	1.08	---	---
CARBON DIOXIDE	2.49	4.58	---	---
METHANE	69.72260	46.78890	---	---
ETHANE	12.2928	15.4618	3.2829	3.3008
PROPANE	8.8922	16.4019	2.4469	2.4603
I-BUTANE	0.8604	2.0919	0.2813	0.2829
N-BUTANE	2.7888	6.7803	0.8780	0.8828
I-PENTANE	0.5518	1.6610	0.1982	0.1993
N-PENTANE	0.6404	1.9327	0.2323	0.2335
HEXANES PLUS	0.8209	3.2112	0.3332	0.3348
TOTALS	100.00000	100.00000	7.6528	7.6944

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0273	0.0892	LOW NET DRY REAL :	1231.8 /scf	1238.5 /scf
TOLUENE	0.0207	0.0798	NET WET REAL :	1210.3 /scf	1217.0 /scf
ETHYLBENZENE	0.0023	0.0102	HIGH GROSS DRY REAL :	1353.9 /scf	1361.3 /scf
XYLENES	0.0061	0.0271	GROSS WET REAL :	1330.2 /scf	1337.6 /scf
TOTAL BTEX	0.0564	0.2063	NET DRY REAL :	19577.8 /lb	19684.7 /lb
			GROSS DRY REAL :	21521.8 /lb	21639.3 /lb

RELATIVE DENSITY (AIR=1): 0.8242
COMPRESSIBILITY FACTOR : 0.99569

(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.
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303-637-0150

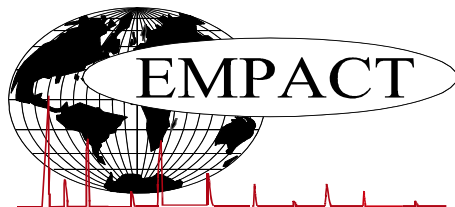
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201403015	ANALYSIS NO. :	12
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 4, 2014
PRODUCER :		CYLINDER NO. :	0030
LEASE NO. :		SAMPLED BY :	BRIAN MORROW-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:35		
	BAILEY 5-26-8-60		
FIELD DATA		SAMPLE TEMP. :	90 F
SAMPLE PRES. :	120	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 7+PPM (1-7PPM) @ 15:40		
	LENGTH OF H2S STAIN @ <10PPM (2.5-60PPM) @ 15:40; WITNESSED BY GALE MCENDREE-EMPACT		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.49	4.58
Nitrogen	0.92	1.08
Methane	69.72260	46.78890
Ethane	12.2928	15.4618
Propane	8.8922	16.4019
Isobutane	0.8604	2.0919
n-Butane	2.7888	6.7803
Isopentane	0.5005	1.5105
n-Pentane	0.6404	1.9327
Cyclopentane	0.0513	0.1505
n-Hexane	0.1506	0.5429
Cyclohexane	0.0437	0.1539
Other Hexanes	0.2702	0.9664
Heptanes	0.1511	0.6288
Methycyclohexane	0.0393	0.1614
2,2,4 Trimethylpentane	0.0003	0.0014
Benzene	0.0273	0.0892
Toluene	0.0207	0.0798
Ethylbenzene	0.0023	0.0102
Xylenes	0.0061	0.0271
C8+ Heavies	0.1093	0.5501
<u>Subtotal</u>	<u>99.98990</u>	<u>99.98970</u>
Oxygen/Argon	0.01	0.01
Alcohols	0.0001	0.0003
Total	100.00000	100.00000

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. : 201403015
 COMPANY NAME : CARRIZO OIL & GAS
 ACCOUNT NO. :
 PRODUCER :
 LEASE NO. :
 NAME/DESCRIP : SALES GAS @ 15:35
 BAILEY 5-26-8-60

ANALYSIS NO. : 12
 ANALYSIS DATE: MARCH 7, 2014
 SAMPLE DATE : MARCH 4, 2014
 CYLINDER NO. : 0030
 SAMPLED BY : BRIAN MORROW-EMPACT

FIELD DATA

SAMPLE PRES. : 120
 VAPOR PRES. :
 COMMENTS :

SAMPLE TEMP. : 90 F
 AMBIENT TEMP.:
 GRAVITY :

SPOT; PROBE; LENGTH OF H2S STAIN @ 7+PPM (1-7PPM) @ 15:40
 LENGTH OF H2S STAIN @ <10PPM (2.5-60PPM) @ 15:40; WITNESSED BY GALE MCENDREE-EMPACT

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	---	0.92	1.08	---	---
Carbon Dioxide	---	2.49	4.58	---	---
Methane	P1	69.72260	46.78890	---	---
Ethane	P2	12.2928	15.4618	3.283	3.301
Propane	P3	8.8922	16.4019	2.447	2.460
i-Butane	I4	0.8604	2.0919	0.281	0.283
n-Butane	P4	2.7888	6.7803	0.878	0.883
2,2-Dimethylpropane	I5	0.0023	0.0069	0.001	0.001
i-Pentane	I5	0.4982	1.5036	0.182	0.183
n-Pentane	P5	0.6404	1.9327	0.232	0.234
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0017	0.0062	0.001	0.001
Cyclopentane	N5	0.0513	0.1505	0.015	0.015
2,3-Dimethylbutane	I6	0.0151	0.0544	0.006	0.006
2-Methylpentane	I6	0.1073	0.3868	0.044	0.044
3-Methylpentane	I6	0.0559	0.2015	0.023	0.023
n-Hexane	P6	0.1506	0.5429	0.062	0.062
2,2-Dimethylpentane	I7	0.0007	0.0029	0.000	0.000
Methylcyclopentane	N6	0.0902	0.3175	0.032	0.032
2,4-Dimethylpentane	I7	0.0040	0.0168	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0273	0.0892	0.008	0.008
3,3-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Cyclohexane	N6	0.0437	0.1539	0.015	0.015
2-Methylhexane	I7	0.0175	0.0734	0.008	0.008
2,3-Dimethylpentane	I7	0.0082	0.0344	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0052	0.0214	0.002	0.002
3-Methylhexane	I7	0.0204	0.0855	0.009	0.009
1c,3-Dimethylcyclopentane	N7	0.0116	0.0476	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0105	0.0431	0.005	0.005
3-Ethylpentane	I7	0.0009	0.0038	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0207	0.0850	0.010	0.010
2,2,4-Trimethylpentane	I8	0.0003	0.0014	0.000	0.000
n-Heptane	P7	0.0444	0.1861	0.020	0.020
1c,2-Dimethylcyclopentane	N7	0.0015	0.0062	0.001	0.001
Methylcyclohexane	N7	0.0393	0.1614	0.016	0.016
2,2-Dimethylhexane	I8	0.0035	0.0167	0.002	0.002
Ethylcyclopentane	N7	0.0049	0.0201	0.002	0.002
2,5-Dimethylhexane	I8	0.0010	0.0048	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0017	0.0081	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0034	0.0160	0.002	0.002
3,3-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0037	0.0174	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0007	0.0034	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
Toluene	A7	0.0207	0.0798	0.007	0.007
2,3-Dimethylhexane	I8	0.0012	0.0057	0.001	0.001

2-Methyl-3-ethylpentane	I8	0.0009	0.0043	0.000	0.000
2-Methylheptane	I8	0.0084	0.0402	0.004	0.004
4-Methylheptane	I8	0.0023	0.0110	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000
3,4-Dimethylhexane	I8	0.0004	0.0019	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
3-Methylheptane	I8	0.0041	0.0196	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0060	0.0282	0.003	0.003
3-Ethylhexane	I8	0.0005	0.0024	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0022	0.0103	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0008	0.0038	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0011	0.0051	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0009	0.0042	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0030	0.0141	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0032	0.0150	0.002	0.002
n-Octane	P8	0.0131	0.0626	0.007	0.007
1c,4-Dimethylcyclohexane	N8	0.0012	0.0057	0.001	0.001
i-Propylcyclopentane	I8	0.0003	0.0014	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0006	0.0032	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	0.0006	0.0028	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0037	0.0195	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0016	0.0086	0.001	0.001
2,4-Dimethylheptane	I9	0.0004	0.0021	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0021	0.0099	0.001	0.001
n-Propylcyclopentane	N8	0.0008	0.0038	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	0.0003	0.0016	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0007	0.0037	0.000	0.000
Ethylbenzene	I8	0.0023	0.0102	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0008	0.0042	0.000	0.000
2,3-Dimethylheptane	I9	0.0020	0.0108	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0032	0.0142	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0010	0.0044	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0005	0.0027	0.000	0.000
4-Methyloctane	I9	0.0009	0.0048	0.001	0.001
2-Methyloctane	I9	0.0010	0.0054	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0016	0.000	0.000
3-Methyloctane	I9	0.0013	0.0070	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	0.0019	0.0085	0.001	0.001
i-Butylcyclopentane	N9	0.0009	0.0048	0.000	0.000
UnknownC8s	U8	0.0005	0.0024	0.000	0.000
n-Nonane	P9	0.0038	0.0204	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0006	0.0032	0.000	0.000
i-Propylbenzene	A9	0.0006	0.0030	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0011	0.000	0.000
2,2-Dimethyloctane	I10	0.0002	0.0012	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0012	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0008	0.0042	0.000	0.000
3,3-Dimethyloctane	I10	0.0003	0.0018	0.000	0.000
n-Propylbenzene	A9	0.0007	0.0035	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0011	0.0066	0.001	0.001
1,3-Methylethylbenzene	A9	0.0006	0.0030	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0010	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	0.0004	0.0024	0.000	0.000
1,2-Methylethylbenzene	A9	0.0004	0.0020	0.000	0.000
2-Methylnonane	I10	0.0004	0.0024	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0006	0.000	0.000

3-Methylnonane	I10	0.0003	0.0018	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0028	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
sec-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0029	0.0156	0.002	0.002
n-Decane	P10	0.0012	0.0072	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0003	0.0018	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0011	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
1,3-Dimethyl-2-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	0.0024	0.0143	0.001	0.001
n-Undecane	P11	0.0004	0.0026	0.000	0.000
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0006	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
Naphthalene	A10	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0004	0.0026	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
UnknownC12s	U12	0.0003	0.0020	0.000	0.000
n-Tridecane	P13	0.0001	0.0008	0.000	0.000
UnknownC13s	U13	0.0001	0.0008	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
UnknownC14s	U14	0.0001	0.0008	0.000	0.000
n-Pentadecane	P15	0.0001	0.0009	0.000	0.000
UnknownC15s	U15	0.0001	0.0009	0.000	0.000
TOTAL		100.00000	100.00000	7.6528	7.6944

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0273	0.0892	LOW NET DRY REAL :	1231.8 /scf	1238.5 /scf
TOLUENE	0.0207	0.0798	NET WET REAL :	1210.3 /scf	1217.0 /scf
ETHYLBENZENE	0.0023	0.0102	HIGH GROSS DRY REAL :	1353.9 /scf	1361.3 /scf
XYLENES	0.0061	0.0271	GROSS WET REAL :	1330.2 /scf	1337.6 /scf
TOTAL BTEX	0.0564	0.2063	NET DRY REAL :	19577.8 /lb	19684.7 /lb
			GROSS DRY REAL :	21521.8 /lb	21639.3 /lb

RELATIVE DENSITY (AIR=1): 0.8242
COMPRESSIBILITY FACTOR : 0.99569

(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.

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