

# CRUDE OIL ASSAY

PROJECT NO. :	201401094	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 22, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 11:35		EMPACT
	O'HARE 1-5-10-57		
***FIELD DATA***		SAMPLE TEMP. :	91
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK #10571		

<u>SPECIFICATION</u>	<u>TEST METHOD</u>	<u>UNITS</u>	<u>RESULTS</u>
API GRAVITY		API 60/60	32.7
RVP @100 DEG F	D323	PSIG	5.6
TOTAL SULFUR	D2622	WT %	0.487
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
<u>BS&amp;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 PREFORMED FOR THIS PARAMETER

*The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.*



303-637-0150

**EXTENDED NATURAL GAS LIQUID ANALYSIS (\*DHA)**

**MAIN PAGE**

PROJECT NO. :	201401094	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 24, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	5986
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 10:50		EMPACT
	O'HARE 1-5-10-57		
***FIELD DATA***		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0013	0.0009	0.0008
NITROGEN (AIR)	0.1078	0.0275	0.0252
CARBON DIOXIDE	0.0345	0.0138	0.0125
METHANE	0.2214	0.0324	0.0800
ETHANE	0.4100	0.1124	0.2337
PROPANE	1.3499	0.5425	0.7926
I-BUTANE	0.3204	0.1697	0.2233
N-BUTANE	1.7237	0.9130	1.1580
I-PENTANE	0.7401	0.4866	0.5774
N-PENTANE	1.2712	0.8358	0.9809
HEXANES PLUS	93.8197	96.8654	95.9156
TOTALS	100.0000	100.0000	100.0000

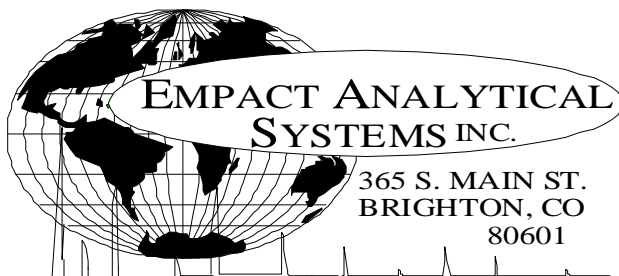
BTEX COMPONENTS	MOLE%	MASS%
BENZENE	0.8642	0.6152
TOLUENE	2.6449	2.2209
ETHYLBENZENE	0.2669	0.2582
XYLENE	2.5127	2.4310
TOTAL BTEX	6.2887	5.5253

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

	TOTAL SAMPLE	C6+ FRACTION
Specific Gravity (H2O=1) =	0.7412	0.7478 60/60
API Gravity =	59.41	57.72 60/60
Molecular Weight =	109.73	113.664
Absolute Density =	6.18	6.24 LBS/GAL
Heating Value Liq. Idl Gas=	126185	127372 BTU/GAL
Vapor/Liquid =	21.39	20.87 CUFT/GAL
Vapor Pressure =	19.85	1.56 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. :	201401094	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 24, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	5986
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 10:50		EMPACT
	O'HARE 1-5-10-57		
***FIELD DATA***		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %	Wt %	LV %
CARBON DIOXIDE	0.0345	0.0138	0.0125
NITROGEN (AIR)	0.1078	0.0275	0.0252
METHANE	0.2214	0.0324	0.0800
ETHANE	0.4100	0.1124	0.2337
PROPANE	1.3499	0.5425	0.7926
I-BUTANE	0.3204	0.1697	0.2233
N-BUTANE	1.7237	0.9130	1.1580
I-PENTANE	0.7401	0.4866	0.5774
N-PENTANE	1.2712	0.8358	0.9809
CYCLOPENTANE (N-C5)	0.7893	0.5044	0.4915
N-HEXANE	5.3469	4.1993	4.6862
CYCLOHEXANE (OTHER C6)	2.8636	2.1963	2.0765
OTHER HEXANES	8.4606	6.5830	7.0133
OTHER HEPTANES	13.4517	12.2070	12.7619
METHYLCYCLOHEXANE (OTHER C7)	5.9667	5.3399	5.1055
2,2,4 TRIMETHYLPENTANE	0.7856	0.7030	0.6911
BENZENE	0.8642	0.6152	0.5161
TOLUENE	2.6449	2.2209	1.8817
ETHYLBENZENE	0.2669	0.2582	0.2187
XYLENES	2.5127	2.4310	2.0634
OTHER OCTANES	14.9861	15.5658	15.5439
OCTANES PLUS	---- 53.4318	---- 62.9994	---- 61.3829
NONANES	14.1909	16.4353	16.2271
DECANES PLUS	20.6896	27.6061	26.6387
SUB TOTAL	99.9987	99.9991	99.9992
ALCOHOLS	0.0013	0.0009	0.0008
TOTAL	100.0000	100.0000	100.0000

API Gravity	=	59.41	60/60
Vapor Pressure	=	19.85	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	146.41	
Average Specific Gravity of Decanes plus	=	0.7690	

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

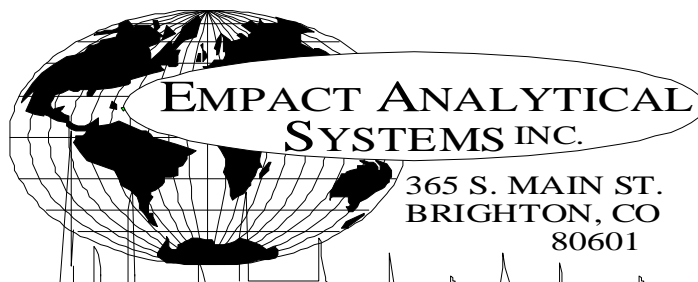
**EXTENDED NATURAL GAS LIQUID ANALYSIS (\*DHA)**

**BY CARBON NUMBER**

PROJECT NO. :	201401094	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 24, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	5986
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 10:50		EMPACT
	O'HARE 1-5-10-57		
***FIELD DATA***			
SAMPLE PRES. :	25	SAMPLE TEMP. :	140
VAPOR PRES. :		AMBIENT TEMP.:	
COMMENTS :	SPOT; NO PROBE	GRAVITY :	

COMPONENT / CARBON NUMBER	MOLE%	MASS %	VOLUME %
ALCOHOLS	0.0013	0.0009	0.0008
NITROGEN	0.1078	0.0275	0.0252
CARBON DIOXIDE	0.0345	0.0138	0.0125
C1	0.2214	0.0324	0.0800
C2	0.4100	0.1124	0.2337
C3	1.3499	0.5425	0.7926
C4	2.0441	1.0827	1.3813
C5	2.8006	1.8268	2.0498
C6	17.5353	13.5938	14.2921
C7	22.0633	19.7678	19.7491
C8	18.5513	18.9580	18.5171
C9	14.1909	16.4353	16.2271
C10	12.1771	15.4001	14.9578
C11	5.3508	7.3247	6.9750
C12	2.1472	3.1647	3.0431
C13	0.8077	1.3413	1.2988
C14	0.1963	0.3549	0.3444
C15	0.0105	0.0204	0.0196
C16	0.0000	0.0000	0.0000
C17	0.0000	0.0000	0.0000
C18	0.0000	0.0000	0.0000
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
<b>Total</b>	<b>100.0000</b>	<b>100.0000</b>	<b>100.0000</b>

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303-637-0150

**EXTENDED NATURAL GAS LIQUID ANALYSIS (\*DHA)**

**DHA COMPONENT LIST**

PROJECT NO. :	201401094	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 24, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	5986
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SEPARATOR @ 10:50		IMPACT
	O'HARE 1-5-10-57		
***FIELD DATA***		SAMPLE TEMP. :	140
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.1078	0.0275	0.0252
Carbon Dioxide	NHC	0.0345	0.0138	0.0125
Methane	P1	0.2214	0.0324	0.0800
Ethane	P2	0.4100	0.1124	0.2337
Propane	P3	1.3499	0.5425	0.7926
i-Butane	I4	0.3204	0.1697	0.2233
n-Butane	P4	1.7237	0.9130	1.1580
2,2-Dimethylpropane	I5	0.0117	0.0077	0.0095
i-Pentane	I5	0.7284	0.4789	0.5679
n-Pentane	P5	1.2712	0.8358	0.9809
t-Butanol	X4	0.0013	0.0009	0.0008
2,2-Dimethylbutane	I6	0.0934	0.0734	0.0831
Cyclopentane	N5	0.7893	0.5044	0.4915
2,3-Dimethylbutane	I6	0.3770	0.2961	0.3288
2-Methylpentane	I6	2.8746	2.2576	2.5423
3-Methylpentane	I6	1.7603	1.3825	1.5309
n-Hexane	P6	5.3469	4.1993	4.6862
2,2-Dimethylpentane	I7	0.0271	0.0247	0.0268
Methylcyclopentane	N6	3.3553	2.5734	2.5282
2,4-Dimethylpentane	I7	0.2938	0.2683	0.2938
2,2,3-Trimethylbutane	I7	0.0363	0.0331	0.0353
Benzene	A6	0.8642	0.6152	0.5161
3,3-Dimethylpentane	I7	0.0353	0.0322	0.0343
Cyclohexane	N6	2.8636	2.1963	2.0765
2-Methylhexane	I7	1.1062	1.0101	1.0965
2,3-Dimethylpentane	I7	0.8022	0.7325	0.7725
1,1-Dimethylcyclopentane	N7	0.6077	0.5438	0.5305
3-Methylhexane	I7	1.8037	1.6470	1.7610
1c,3-Dimethylcyclopentane	N7	0.8535	0.7637	0.7547
1t,3-Dimethylcyclopentane	N7	0.7856	0.7030	0.6911
3-Ethylpentane	I7	0.0462	0.0422	0.0444
1t,2-Dimethylcyclopentane	N7	1.3830	1.2375	1.2123
2,2,4-Trimethylpentane	I8	0.2061	0.2145	0.2273
n-Heptane	P7	5.1494	4.7021	5.0607
1c,2-Dimethylcyclopentane	N7	0.0544	0.0487	0.0464

Methylcyclohexane	N7	5.9667	5.3399	5.1055
2,2-Dimethylhexane	I8	0.8817	0.9178	0.9710
Ethylcyclopentane	N7	0.4673	0.4181	0.4016
2,5-Dimethylhexane	I8	0.1388	0.1445	0.1533
2,2,3-Trimethylpentane	I8	0.0547	0.0569	0.0585
2,4-Dimethylhexane	I8	0.3389	0.3528	0.3724
1c,2t,4-Trimethylcyclopentane	N8	0.4305	0.4402	0.4246
3,3-Dimethylhexane	I8	0.1228	0.1278	0.1326
2,3,4-Trimethylpentane	I8	0.0577	0.0601	0.0615
2,3,3-Trimethylpentane	I8	0.0255	0.0265	0.0269
Toluene	A7	2.6449	2.2209	1.8817
2,3-Dimethylhexane	I8	0.1771	0.1844	0.1907
2-Methyl-3-ethylpentane	I8	0.1333	0.1388	0.1420
1,1,2-Trimethylcyclopentane	N8	0.0377	0.0385	0.0367
2-Methylheptane	I8	1.4683	1.5285	1.6092
4-Methylheptane	I8	0.5494	0.5719	0.5876
3-Methyl-3-ethylpentane	I8	0.1597	0.1662	0.1683
3,4-Dimethylhexane	I8	0.1576	0.1641	0.1678
1c,2c,4-Trimethylcyclopentane	N8	0.0579	0.0592	0.0565
1c,3-Dimethylcyclohexane	N8	0.0541	0.0553	0.0532
3-Methylheptane	I8	0.0829	0.0863	0.0901
1c,2t,3-Trimethylcyclopentane	N8	2.0045	2.0498	1.9593
3-Ethylhexane	I8	0.2562	0.2667	0.2754
1t,4-Dimethylcyclohexane	N8	1.3524	1.3829	1.3355
1,1-Dimethylcyclohexane	N8	0.2499	0.2555	0.2410
3c-Ethylmethylcyclopentane	N8	0.0040	0.0041	0.0039
3t-Ethylmethylcyclopentane	N8	0.1364	0.1395	0.1340
2t-Ethylmethylcyclopentane	N8	0.1021	0.1044	0.1000
1,1-Methylethylcyclopentane	N8	0.3428	0.3505	0.3306
2,2,4-Trimethylhexane	I9	0.0481	0.0562	0.0578
1t,2-Dimethylcyclohexane	N8	0.8365	0.8554	0.8121
1t,3-Dimethylcyclohexane	N8	0.0077	0.0079	0.0074
n-Octane	P8	2.7394	2.8517	2.9880
1c,4-Dimethylcyclohexane	N8	1.1694	1.1958	1.1251
i-Propylcyclopentane	I8	0.0458	0.0468	0.0444
2,4,4-Trimethylhexane	I9	0.0256	0.0299	0.0305
2,2,3,4-Tetramethylpentane	I9	0.0426	0.0498	0.0510
2,3,4-Trimethylhexane	I9	0.0254	0.0297	0.0303
1c,2-Dimethylcyclohexane	N8	0.2024	0.2070	0.1915
2,3,5-Trimethylhexane	I9	0.0963	0.1126	0.1149
2,2-Dimethylheptane	I9	0.0329	0.0385	0.0399
1,1,4-Trimethylcyclohexane	N9	1.0994	1.2648	1.2069
2,2,3-Trimethylhexane	I9	0.4221	0.4934	0.4982
2,4-Dimethylheptane	I9	0.1493	0.1745	0.1796
4,4-Dimethylheptane	I9	0.1803	0.2107	0.2169
Ethylcyclohexane	N8	0.7417	0.7584	0.7092
n-Propylcyclopentane	N8	0.3205	0.3277	0.3108
1c,3c,5-Trimethylcyclohexane	N9	0.0934	0.1075	0.1026
2,5-Dimethylheptane	I9	0.1206	0.1410	0.1449
3,3-Dimethylheptane	I9	0.1085	0.1268	0.1303
3,5-Dimethylheptane	I9	0.0607	0.0709	0.0728
2,6-Dimethylheptane	I9	0.0290	0.0339	0.0352
1,1,3-Trimethylcyclohexane	N9	0.0493	0.0567	0.0541
Ethylbenzene	A8	0.2669	0.2582	0.2187
1c,2t,4t-Trimethylcyclohexane	N9	0.5305	0.6103	0.5713
2,3-Dimethylheptane	I9	0.0015	0.0017	0.0017
1,3-Dimethylbenzene (m-Xylene)	A8	0.9441	0.9134	0.7783
1,4-Dimethylbenzene (p-Xylene)	A8	0.8610	0.8330	0.7120
3,4-Dimethylheptane	I9	0.3582	0.4187	0.4216
3,4-Dimethylheptane (2)	I9	0.3531	0.4127	0.4156
4-Ethylheptane	I9	0.0911	0.1065	0.1096
4-Methyloctane	I9	0.3154	0.3687	0.3768
2-Methyloctane	I9	0.3582	0.4187	0.4321
1c,2t,4c-Trimethylcyclohexane	I9	0.0662	0.0774	0.0786
3-Ethylheptane	I9	0.0844	0.0986	0.0999
3-Methyloctane	I9	0.5287	0.6180	0.6315
3,3-Diethylpentane	I9	0.0871	0.1018	0.0994

1c,2t,3-Trimethylcyclohexane	N9	0.1625	0.1869	0.1750
1,1,2-Trimethylcyclohexane	N9	0.1016	0.1169	0.1094
1,2-Dimethylbenzene (o-Xylene)	A8	0.7076	0.6846	0.5731
i-Butylcyclopentane	N9	0.3618	0.4162	0.3926
UnknownC8s	U8	0.1253	0.1304	0.1366
n-Nonane	P9	1.0690	1.2495	1.2822
1,1-Methylethylcyclohexane	N9	1.4995	1.7527	1.8040
i-Propylbenzene	A9	0.1734	0.1899	0.1620
i-Propylcyclohexane	N9	0.0886	0.1019	0.0936
2,2-Dimethyloctane	I10	0.1009	0.1308	0.1303
2,4-Dimethyloctane	I10	0.0830	0.1076	0.1072
2,6-Dimethyloctane	I10	0.0246	0.0319	0.0328
2,5-Dimethyloctane	I10	0.0590	0.0765	0.0762
n-Butylcyclopentane	N9	0.2146	0.2743	0.2529
3,3-Dimethyloctane	I10	0.0874	0.1133	0.1129
n-Propylbenzene	A9	0.2330	0.2552	0.2177
3,6-Dimethyloctane	I10	0.1736	0.2251	0.2242
3-Methyl-5-ethylheptane	I10	0.1603	0.1874	0.1902
1,3-Methylethylbenzene	A9	0.2389	0.2617	0.2214
1,4-Methylethylbenzene	A9	0.2596	0.2844	0.2406
1,3,5-Trimethylbenzene	A9	0.1989	0.2179	0.1856
2,3-Dimethyloctane	I10	0.0818	0.1061	0.1057
5-Methylnonane	I10	0.3121	0.4047	0.4069
1,2-Methylethylbenzene	A9	0.2412	0.2642	0.2223
2-Methylnonane	I10	0.1348	0.1748	0.1772
3-Ethyloctane	I10	0.1269	0.1645	0.1639
3-Methylnonane	I10	0.2057	0.2667	0.2679
1,2,4-Trimethylbenzene	A9	0.0345	0.0378	0.0318
t-Butylbenzene	A10	0.2218	0.2713	0.2308
i-Butylcyclohexane	N10	0.1756	0.2245	0.2038
1t-Methyl-2-n-propylcyclohexane	I10	0.0839	0.0981	0.0996
i-Butylbenzene	A10	0.0831	0.1016	0.0878
sec-Butylbenzene	A10	0.0907	0.1109	0.0948
UnknownC9s	U9	3.5747	4.1783	4.2878
n-Decane	P10	1.4255	1.8483	1.8648
1,2,3-Trimethylbenzene	A9	0.3812	0.4175	0.3442
1,3-Methyl-i-propylbenzene	A10	0.1438	0.1575	0.1325
1,4-Methyl-i-propylbenzene	A10	0.1009	0.1105	0.0930
Sec-Butylcyclohexane	N10	0.2206	0.2820	0.2556
1,2-Methyl-i-propylbenzene	A10	0.2573	0.3147	0.2646
3-Ethylnonane	I10	0.0588	0.0762	0.0773
1,3-Diethylbenzene	A10	0.1306	0.1597	0.1362
1,3-Methyl-n-propylbenzene	A10	0.0450	0.0550	0.0471
1,4-Diethylbenzene	A10	0.1588	0.1942	0.1661
1,4-Methyl-n-propylbenzene	A10	0.0671	0.0821	0.0705
n-Butylbenzene	A10	0.0634	0.0776	0.0664
1,3-Dimethyl-5-ethylbenzene	A10	0.0864	0.1057	0.0901
1,2-Diethylbenzene	A10	0.1181	0.1445	0.1211
1,2-Methyl-n-propylbenzene	A10	0.1164	0.1424	0.1201
1,4-Dimethyl-2-ethylbenzene	A10	0.0813	0.0994	0.0835
1,3-Dimethyl-4-ethylbenzene	A10	0.1240	0.1517	0.1276
1,2-Dimethyl-4-ethylbenzene	A10	0.1667	0.2039	0.1719
1,3-Dimethyl-2-ethylbenzene	A10	0.0512	0.0626	0.0518
1t,2c,4-Trimethylcyclopentane	A10	0.4578	0.4681	0.4612
1,2-Dimethyl-3-ethylbenzene	A10	0.1640	0.2006	0.1657
1,2-Ethyl-i-propylbenzene	A10	0.0812	0.0993	0.0835
1,4-Methyl-t-butylbenzene	A11	0.0813	0.0994	0.0836
UnknownC10s	U10	5.6498	7.3256	7.3910
n-Undecane	P11	0.7843	1.1172	1.1116
1,4-Ethyl-i-propylbenzene	A11	0.4455	0.5449	0.4581
1,2,4,5-Tetramethylbenzene	A11	0.1715	0.2098	0.1745
1,2-Methyl-n-butylbenzene	A11	0.1262	0.1544	0.1298
1,2,3,5-Tetramethylbenzene	A11	0.0359	0.0439	0.0363
1,2-Methyl-t-butylbenzene	A11	0.0231	0.0283	0.0238
5-Methylindan	A11	0.0207	0.0321	0.0316
4-Methylindan	A11	0.0342	0.0531	0.0523
1,2-Ethyl-n-propylbenzene	A11	0.1448	0.1771	0.1489

2-Methylindan	A11	0.0528	0.0820	0.0807
1,3-Methyl-n-butylbenzene	A11	0.0752	0.0920	0.0774
1,3-Di-i-propylbenzene	A11	0.0223	0.0273	0.0230
sec-Pentylbenzene	A11	0.0537	0.0657	0.0552
n-Pentylbenzene	A11	0.0424	0.0573	0.0492
1t-M-2-(4MP)cyclopentane	P12	0.0204	0.0317	0.0312
1,2-Di-n-propylbenzene	A11	0.1553	0.1900	0.1597
1,4-Di-i-propylbenzene	A11	0.0992	0.1213	0.1020
Tetrahydronaphthalene	A10	0.0322	0.0394	0.0331
t-Decahydronaphthalene	A10	0.0639	0.0782	0.0657
Naphthalene	A10	0.1071	0.1251	0.1052
1-t-Butyl-3,5-dimethylbenzene	A12	0.0367	0.0449	0.0378
1,4-Ethyl-t-butylbenzene	A11	0.0454	0.0555	0.0467
UnknownC11s	U11	2.8569	4.0696	4.0491
n-Dodecane	P12	0.4919	0.7636	0.7514
1,3-Di-n-propylbenzene	A12	0.0718	0.0878	0.0738
1,3,5-Triethylbenzene	A12	0.0501	0.0549	0.0467
1,2,4-Triethylbenzene	A12	0.2040	0.2234	0.1879
1,4-Methyl-n-pentylbenzene	A12	0.0446	0.0546	0.0459
n-Hexylbenzene	A12	0.0269	0.0398	0.0342
1,2,3,4,5-Pentamethylbenzene	A13	0.0342	0.0418	0.0351
2-Methylnaphthalene	A11	0.0427	0.0553	0.0465
1-Methylnaphthalene	A11	0.0374	0.0485	0.0350
UnknownC12s	U12	1.2008	1.8640	1.8342
n-Tridecane	P13	0.0675	0.1134	0.1103
UnknownC13s	U13	0.7060	1.1861	1.1534
n-Tetradecane	P14	0.0031	0.0056	0.0054
UnknownC14s	U14	0.1932	0.3493	0.3390
n-Pentadecane	P15	0.0005	0.0010	0.0010
UnknownC15s	U15	0.0100	0.0194	0.0186
<b>TOTAL</b>		<b>100.0000</b>	<b>100.0000</b>	<b>100.0000</b>

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303-637-0150

**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**MAIN PAGE**

PROJECT NO. :	201401094	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 23, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	0616
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 11:20 O'HARE 1-5-10-57		
***FIELD DATA***		SAMPLE TEMP. :	88
SAMPLE PRES. :	54	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1 PPM (1-7 PPM) @11:25		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0013	0.0033		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.35	1.46	---	---
CARBON DIOXIDE	2.37	4.04	---	---
METHANE	66.25820	41.15080	---	---
ETHANE	10.9490	12.7458	2.9264	2.9424
PROPANE	9.9421	16.9725	2.7371	2.7520
I-BUTANE	1.1187	2.5173	0.3657	0.3677
N-BUTANE	4.1943	9.4379	1.3214	1.3287
I-PENTANE	1.0063	2.8037	0.3616	0.3636
N-PENTANE	1.2864	3.5932	0.4659	0.4684
HEXANES PLUS	1.4837	5.2655	0.5997	0.6031
TOTALS	100.00000	100.00000	8.7778	8.8259

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0513	0.1551	LOW NET DRY REAL :	1324.2 /scf	1331.5 /scf
TOLUENE	0.0315	0.1123	NET WET REAL :	1301.1 /scf	1308.3 /scf
ETHYLBENZENE	0.0032	0.0132	HIGH GROSS DRY REAL :	1453.1 /scf	1461.0 /scf
XYLENES	0.0060	0.0246	GROSS WET REAL :	1427.7 /scf	1435.6 /scf
TOTAL BTEX	0.0920	0.3052	NET DRY REAL :	19487.1 /lb	19593.5 /lb
			GROSS DRY REAL :	21380.2 /lb	21496.9 /lb

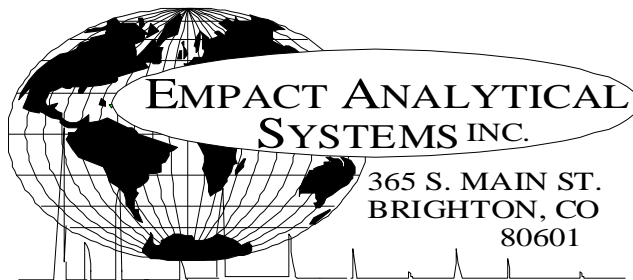
RELATIVE DENSITY (AIR=1):	0.8911
COMPRESSIBILITY FACTOR :	0.99503

(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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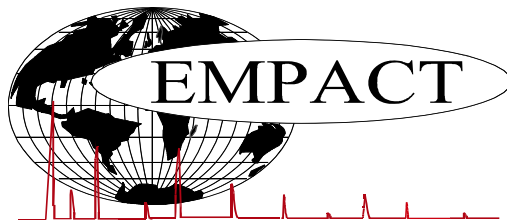
**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**GLYCALC INFORMATION**

PROJECT NO. :	201401094	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 23, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	0616
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 11:20 O'HARE 1-5-10-57		
***FIELD DATA***		SAMPLE TEMP. :	88
SAMPLE PRES. :	54	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1 PPM (1-7 PPM) @11:25		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.37	4.04
Nitrogen	1.35	1.46
Methane	66.25820	41.15080
Ethane	10.9490	12.7458
Propane	9.9421	16.9725
Isobutane	1.1187	2.5173
n-Butane	4.1943	9.4379
Isopentane	0.9158	2.5580
n-Pentane	1.2864	3.5932
Cyclopentane	0.0905	0.2457
n-Hexane	0.3080	1.0276
Cyclohexane	0.0781	0.2545
Other Hexanes	0.5550	1.8378
Heptanes	0.2626	1.0115
Methycyclohexane	0.0560	0.2128
2,2,4 Trimethylpentane	0.0001	0.0004
Benzene	0.0513	0.1551
Toluene	0.0315	0.1123
Ethylbenzene	0.0032	0.0132
Xylenes	0.0060	0.0246
C8+ Heavies	0.1319	0.6157
<b>Subtotal</b>	<b>99.98870</b>	<b>99.98670</b>
Oxygen/Argon	0.01	0.01
Alcohols	0.0013	0.0033
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

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**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**DHA COMPONENT LIST**

PROJECT NO. :	201401094	ANALYSIS NO. :	03
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JANUARY 23, 2014
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 21, 2014
PRODUCER :		CYLINDER NO. :	0616
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 11:20 O'HARE 1-5-10-57		
***FIELD DATA***		SAMPLE TEMP. :	88
SAMPLE PRES. :	54	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1 PPM (1-7 PPM) @11:25		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.35	1.46	---	---
Carbon Dioxide	---	2.37	4.04	---	---
Methane	P1	66.25820	41.15080	---	---
Ethane	P2	10.9490	12.7458	2.926	2.942
Propane	P3	9.9421	16.9725	2.737	2.752
i-Butane	I4	1.1187	2.5173	0.366	0.368
n-Butane	P4	4.1943	9.4379	1.321	1.329
2,2-Dimethylpropane	I5	0.0024	0.0067	0.001	0.001
i-Pentane	I5	0.9134	2.5513	0.334	0.335
Acetone	X3	0.0003	0.0007	0.000	0.000
i-Propanol	X3	0.0005	0.0012	0.000	0.000
n-Pentane	P5	1.2863	3.5929	0.466	0.468
t-Butanol	X4	0.0005	0.0014	0.000	0.000
2,2-Dimethylbutane	I6	0.0028	0.0093	0.001	0.001
Cyclopentane	N5	0.0905	0.2457	0.027	0.027
2,3-Dimethylbutane	I6	0.0400	0.1335	0.016	0.016
2-Methylpentane	I6	0.2203	0.7350	0.091	0.092
3-Methylpentane	I6	0.1146	0.3823	0.047	0.047
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.3080	1.0276	0.126	0.127
2,2-Dimethylpentane	I7	0.0010	0.0039	0.000	0.000
Methylcyclopentane	N6	0.1773	0.5777	0.063	0.064
2,4-Dimethylpentane	I7	0.0072	0.0279	0.003	0.003
2,2,3-Trimethylbutane	I7	0.0002	0.0008	0.000	0.000
Benzene	A6	0.0513	0.1551	0.014	0.014
3,3-Dimethylpentane	I7	0.0006	0.0023	0.000	0.000
Cyclohexane	N6	0.0781	0.2545	0.027	0.027
2-Methylhexane	I7	0.0304	0.1179	0.014	0.014
2,3-Dimethylpentane	I7	0.0164	0.0636	0.007	0.007
1,1-Dimethylcyclopentane	N7	0.0062	0.0236	0.003	0.003
3-Methylhexane	I7	0.0372	0.1443	0.017	0.017
1c,3-Dimethylcyclopentane	N7	0.0190	0.0722	0.009	0.009
1t,3-Dimethylcyclopentane	N7	0.0169	0.0642	0.008	0.008
3-Ethylpentane	I7	0.0021	0.0081	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0362	0.1376	0.017	0.017

2,2,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
n-Heptane	P7	0.0767	0.2975	0.035	0.035
1c,2-Dimethylcyclopentane	N7	0.0018	0.0069	0.001	0.001
Methylcyclohexane	N7	0.0560	0.2128	0.022	0.022
2,2-Dimethylhexane	I8	0.0036	0.0159	0.002	0.002
Ethylcyclopentane	N7	0.0105	0.0399	0.004	0.004
2,5-Dimethylhexane	I8	0.0016	0.0071	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0003	0.0013	0.000	0.000
2,4-Dimethylhexane	I8	0.0026	0.0115	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0048	0.0209	0.002	0.002
3,3-Dimethylhexane	I8	0.0003	0.0013	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0056	0.0243	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0011	0.0049	0.001	0.001
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0315	0.1123	0.011	0.011
2,3-Dimethylhexane	I8	0.0022	0.0097	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0014	0.0062	0.001	0.001
2-Methylheptane	I8	0.0118	0.0522	0.006	0.006
4-Methylheptane	I8	0.0033	0.0146	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0003	0.0013	0.000	0.000
3,4-Dimethylhexane	I8	0.0003	0.0013	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	0.0043	0.0190	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0077	0.0335	0.004	0.004
3-Ethylhexane	I8	0.0009	0.0040	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0024	0.0104	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0009	0.0039	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0018	0.0078	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0015	0.0065	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0050	0.0217	0.003	0.003
2,2,4-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0035	0.0152	0.002	0.002
1t,3-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
UnknownC7s	U7	0.0002	0.0008	0.000	0.000
n-Octane	P8	0.0155	0.0686	0.008	0.008
1c,4-Dimethylcyclohexane	N8	0.0022	0.0096	0.001	0.001
i-Propylcyclopentane	I8	0.0005	0.0022	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0003	0.0015	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	0.0011	0.0048	0.001	0.001
1,1,4-Trimethylcyclohexane	N9	0.0047	0.0230	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0018	0.0089	0.001	0.001
2,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
4,4-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
Ethylcyclohexane	N8	0.0025	0.0109	0.001	0.001
n-Propylcyclopentane	N8	0.0009	0.0039	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
3,3-Dimethylheptane	I9	0.0004	0.0020	0.000	0.000
3,5-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
2,6-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0007	0.0034	0.000	0.000
Ethylbenzene	I8	0.0032	0.0132	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0006	0.0029	0.000	0.000
2,3-Dimethylheptane	I9	0.0018	0.0089	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0031	0.0127	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0010	0.0041	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000

3,4-Dimethylheptane (2)	I9	0.0005	0.0025	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0010	0.000	0.000
4-Methyloctane	I9	0.0009	0.0045	0.001	0.001
2-Methyloctane	I9	0.0010	0.0050	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0010	0.000	0.000
3-Methyloctane	I9	0.0013	0.0065	0.001	0.001
1,1,2-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0019	0.0078	0.001	0.001
i-Butylcyclopentane	N9	0.0007	0.0034	0.000	0.000
n-Nonane	P9	0.0037	0.0184	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
i-Propylbenzene	A9	0.0005	0.0023	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0010	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0007	0.0034	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Propylbenzene	A9	0.0006	0.0028	0.000	0.000
3,6-Dimethyloctane	I10	0.0004	0.0022	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0006	0.0033	0.000	0.000
1,3-Methylethylbenzene	A9	0.0006	0.0028	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0009	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0009	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0003	0.0017	0.000	0.000
1,2-Methylethylbenzene	A9	0.0006	0.0028	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0005	0.000	0.000
3-Methylnonane	I10	0.0002	0.0011	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0016	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0011	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0005	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	0.0033	0.0164	0.002	0.002
n-Decane	P10	0.0010	0.0055	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0002	0.0009	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0011	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-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
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
UnknownC10s	U10	0.0025	0.0138	0.002	0.002
n-Undecane	P11	0.0005	0.0030	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0006	0.000	0.000
Naphthalene	A10	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0007	0.0042	0.000	0.000
n-Dodecane	P12	0.0004	0.0026	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0006	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0006	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0005	0.0030	0.000	0.000
n-Tridecane	P13	0.0003	0.0021	0.000	0.000
UnknownC13s	U13	0.0005	0.0036	0.000	0.000

n-Tetradecane	P14	0.0002	0.0016	0.000	0.000
UnknownC14s	U14	0.0005	0.0038	0.000	0.000
n-Pentadecane	P15	0.0001	0.0008	0.000	0.000
UnknownC15s	U15	0.0003	0.0025	0.000	0.000
n-Hexadecane	P16	0.0001	0.0009	0.000	0.000
UnknownC16s	U16	0.0002	0.0017	0.000	0.000
n-Heptadecane	P17	0.0001	0.0009	0.000	0.000
UnknownC17s	U17	0.0001	0.0009	0.000	0.000
UnknownC18s	U18	0.0002	0.0020	0.000	0.000
UnknownC19s	U19	0.0001	0.0011	0.000	0.000
<b>TOTAL</b>		<b>100.0000</b>	<b>100.0000</b>	<b>8.7778</b>	<b>8.8259</b>

<b>BTEX COMPONENTS</b>	<b>MOLE%</b>	<b>WT%</b>	<b>BTU @</b>	<b>14.650</b>	<b>14.730</b>
BENZENE	0.0513	0.1551	<b>LOW</b> NET DRY REAL :	1324.2 /scf	1331.5 /scf
TOLUENE	0.0315	0.1123	NET WET REAL :	1301.1 /scf	1308.3 /scf
ETHYLBENZENE	0.0032	0.0132	<b>HIGH</b> GROSS DRY REAL :	1453.1 /scf	1461.0 /scf
XYLENES	0.0060	0.0246	GROSS WET REAL :	1427.7 /scf	1435.6 /scf
<b>TOTAL BTEX</b>	<b>0.0920</b>	<b>0.3052</b>	NET DRY REAL :	19487.1 /lb	19593.5 /lb
			GROSS DRY REAL :	21380.2 /lb	21496.9 /lb

RELATIVE DENSITY (AIR=1): 0.8911  
COMPRESSIBILITY FACTOR : 0.99503

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

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

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