CRUDE OIL ASSAY

PROJECT NO. :	201406119	ANALYSIS NO. :	04
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 24, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	1L GLASS JAR
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	TANK BATTERY @ 17:20		EMPACT
	BRINGELSON RANCH 12-20-9-58		
FIELD DATA		SAMPLE TEMP. :	92
SAMPLE PRES. :		AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; TK #20803		

SPECIFICATION	TEST METHOD	UNITS	RESULTS
API GRAVITY		API 60/60	35.4
RVP @100 DEG F	D323	PSIG	6.6
TOTAL SULFUR	D2622	WT %	0.347
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
BS&W	D96		
Crude Oil		VOL %	N/A
Water		VOL %	N/A
Emulsion		VOL %	N/A
Sediment		VOL %	N/A
DISTILLATION:	D86		
INITIAL POINT		DEG F	N/A
50%		DEG F	N/A
90%		DEG F	N/A
END POINT		DEG F	N/A
DISTILLATION:	@TEMP D445		
Average Centipoise	20°C		N/A
Average Centipoise	30°C		N/A
Average Centipoise	80°C		N/A
Kinetic Viscosity	20°C	cSt (mm2/s)	N/A
Kinetic Viscosity	30°C	cSt (mm2/s)	N/A
Kinetic Viscosity	80°C	cSt (mm2/s)	N/A

ND: NOT DETECTED

N/A: NO TEST PREFORMED FOR THIS PARAMETER

EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201406119	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 21, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 16:40 BRINGELSON RANCH 12-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	MOLE %	MASS %	VOL %
ALCOHOLS	0.0081	0.0046	0.0043
NITROGEN (AIR)	0.0300	0.0074	0.0068
CARBON DIOXIDE	0.0270	0.0104	0.0095
METHANE	0.1210	0.0170	0.0423
ETHANE	0.4120	0.1088	0.2277
PROPANE	1.5810	0.6123	0.9003
I-BUTANE	0.3750	0.1914	0.2535
N-BUTANE	2.0030	1.0223	1.3050
I-PENTANE	0.8588	0.5441	0.6496
N-PENTANE	1.4420	0.9136	1.0791
HEXANES PLUS	93.1421	96.5681	95.5219
TOTALS	100.0000	100.0000	100.0000

BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.1345	0.7782
TOLUENE	2.3907	1.9343
ETHYLBENZENE	0.6264	0.5840
XYLENE	2.2570	2.1043
TOTAL BTEX	6.4086	5.4008

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

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7458	0.754	60/60
API Gravity =	58.23	56.17	60/60
Molecular Weight =	113.88	118.79	
Absolute Density =	6.22	6.28	LBS/GAL
Heating Value Liq. Idl Gas=	126090	127651	BTU/GAL
Vapor/Liquid =	20.81	20.23	CUFT/GAL
Vapor Pressure =	15.56	1.62	PSIA @100 F

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

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201406119	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 21, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 16:40 BRINGELSON RANCH 12-20-9-58		EMPACT
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0270		0.0104		0.0095	
NITROGEN (AIR)	0.0300		0.0074		0.0068	
METHANE	0.1210		0.0170		0.0423	
ETHANE	0.4120		0.1088		0.2277	
PROPANE	1.5810		0.6123		0.9003	
I-BUTANE	0.3750		0.1914		0.2535	
N-BUTANE	2.0030		1.0223		1.3050	
I-PENTANE	0.8588		0.5441		0.6496	
N-PENTANE	1.4420		0.9136		1.0791	
CYCLOPENTANE (N-C5)	1.3808		0.8503		0.8338	
N-HEXANE	6.3268		4.7879		5.3763	
CYCLOHEXANE (OTHER C6)	2.6065		1.9263		1.8329	
OTHER HEXANES	9.9438		7.4488		7.9495	
OTHER HEPTANES	13.1812		11.5165		12.0677	
METHYLCYCLOHEXANE (OTHER C7)	4.0449		3.4877		3.3561	
2,2,4 TRIMETHYLPENTANE	0.8433		0.7271		0.7194	
BENZENE	1.1345		0.7782		0.6571	
TOLUENE	2.3907		1.9343		1.6494	
ETHYLBENZENE	0.6264		0.5840		0.4979	
XYLENES	2.2570		2.1043		1.7967	
OTHER OCTANES	11.5104		11.5670		11.6968	
OCTANES PLUS	----	52.1329	----	63.8381	----	61.7991
NONANES	11.1526		12.3973		12.1400	
DECANES PLUS	25.7432		36.4584		34.9483	
SUB TOTAL	99.9919		99.9954		99.9957	
ALCOHOLS	0.0081		0.0046		0.0043	
TOTAL	100.0000		100.0000		100.0000	

API Gravity	=	**58.23**	60/60
Vapor Pressure	=	**15.56**	PSIA & 100 F
Average Molecular Weight of Decanes plus	=	**161.29**	
Average Specific Gravity of Decanes plus	=	**0.7740**	

EMPACT ANALYTICAL SYSTEMS INC.
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303-637-0150

EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201406119	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 21, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 16:40		EMPACT
	BRINGELSON RANCH 12-20-9-58		
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
ALCOHOLS		0.0081	0.0046	0.0043
NITROGEN		0.0300	0.0074	0.0068
CARBON DIOXIDE		0.0270	0.0104	0.0095
	C1	0.1210	0.0170	0.0423
	C2	0.4120	0.1088	0.2277
	C3	1.5810	0.6123	0.9003
	C4	2.3780	1.2137	1.5585
	C5	3.6816	2.3080	2.5625
	C6	20.0116	14.9412	15.8158
	C7	19.6168	16.9385	17.0732
	C8	15.2371	14.9824	14.7108
	C9	11.1526	12.3973	12.1400
	C10	9.9777	11.9834	11.4691
	C11	5.0025	6.5291	6.1240
	C12	3.2574	4.6235	4.4640
	C13	2.5073	3.9530	3.8309
	C14	2.0352	3.5455	3.4626
	C15	1.7116	3.1927	3.0822
	C16	0.5688	1.1310	1.0848
	C17	0.2933	0.6193	0.5922
	C18	0.3105	0.6939	0.6615
	C19	0.0707	0.1667	0.1579
	C20	0.0082	0.0203	0.0191
	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. :	201406119	ANALYSIS NO. :	05
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 21, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	7043
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	HEATER-TREATER @ 16:40		EMPACT
	BRINGELSON RANCH 12-20-9-58		
FIELD DATA		SAMPLE TEMP. :	138
SAMPLE PRES. :	25	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0300	0.0074	0.0068
Carbon Dioxide	NHC	0.0270	0.0104	0.0095
Methane	P1	0.1210	0.0170	0.0423
Ethane	P2	0.4120	0.1088	0.2277
Propane	P3	1.5810	0.6123	0.9003
i-Butane	I4	0.3750	0.1914	0.2535
n-Butane	P4	2.0030	1.0223	1.3050
2,2-Dimethylpropane	I5	0.0078	0.0049	0.0061
i-Pentane	I5	0.8510	0.5392	0.6435
i-Propanol	X3	0.0052	0.0027	0.0025
n-Pentane	P5	1.4420	0.9136	1.0791
t-Butanol	X4	0.0029	0.0019	0.0018
2,2-Dimethylbutane	I6	0.0313	0.0237	0.0270
Cyclopentane	N5	1.3808	0.8503	0.8338
2,3-Dimethylbutane	I6	0.3364	0.2546	0.2846
2-Methylpentane	I6	3.2857	2.4865	2.8181
3-Methylpentane	I6	1.9814	1.4995	1.6711
n-Hexane	P6	6.3268	4.7879	5.3763
2,2-Dimethylpentane	I7	0.0179	0.0158	0.0173
Methylcyclopentane	N6	4.3090	3.1845	3.1487
2,4-Dimethylpentane	I7	0.2357	0.2074	0.2286
2,2,3-Trimethylbutane	I7	0.0182	0.0160	0.0172
Benzene	A6	1.1345	0.7782	0.6571
3,3-Dimethylpentane	I7	0.0210	0.0185	0.0198
Cyclohexane	N6	2.6065	1.9263	1.8329
2-Methylhexane	I7	1.1805	1.0387	1.1348
2,3-Dimethylpentane	I7	0.6438	0.5665	0.6013
1,1-Dimethylcyclopentane	N7	0.3697	0.3188	0.3130
3-Methylhexane	I7	1.6506	1.4523	1.5628
1c,3-Dimethylcyclopentane	N7	0.9010	0.7769	0.7727
1t,3-Dimethylcyclopentane	N7	0.8433	0.7271	0.7194
3-Ethylpentane	I7	0.1543	0.1358	0.1438
1t,2-Dimethylcyclopentane	N7	1.7087	1.4733	1.4526
2,2,4-Trimethylpentane	I8	0.1056	0.1059	0.1129
n-Heptane	P7	4.5229	3.9797	4.3107

1c,2-Dimethylcyclopentane	N7	0.1716	0.1480	0.1420
Methylcyclohexane	N7	4.0449	3.4877	3.3561
2,2-Dimethylhexane	I8	0.4400	0.4414	0.4700
Ethylcyclopentane	N7	0.6320	0.5449	0.5268
2,5-Dimethylhexane	I8	0.1138	0.1141	0.1218
2,2,3-Trimethylpentane	I8	0.0478	0.0479	0.0496
2,4-Dimethylhexane	I8	0.2287	0.2294	0.2437
1c,2t,4-Trimethylcyclopentane	N8	0.4286	0.4223	0.4099
3,3-Dimethylhexane	I8	0.0549	0.0551	0.0575
2,3,4-Trimethylpentane	I8	0.0959	0.0962	0.0991
2,3,3-Trimethylpentane	I8	0.0041	0.0041	0.0042
Toluene	A7	2.3907	1.9343	1.6494
2,3-Dimethylhexane	I8	0.2001	0.2007	0.2089
2-Methyl-3-ethylpentane	I8	0.1345	0.1349	0.1389
1,1,2-Trimethylcyclopentane	N8	0.0069	0.0068	0.0065
2-Methylheptane	I8	1.3528	1.3570	1.4378
4-Methylheptane	I8	0.4262	0.4275	0.4420
3-Methyl-3-ethylpentane	I8	0.0585	0.0587	0.0598
3,4-Dimethylhexane	I8	0.0822	0.0825	0.0849
1c,2c,4-Trimethylcyclopentane	N8	0.0348	0.0343	0.0329
1c,3-Dimethylcyclohexane	N8	0.0275	0.0271	0.0262
3-Methylheptane	I8	0.6297	0.6316	0.6634
1c,2t,3-Trimethylcyclopentane	N8	1.0744	1.0587	1.0184
3-Ethylhexane	I8	0.1438	0.1442	0.1499
1t,4-Dimethylcyclohexane	N8	0.4544	0.4477	0.4351
1,1-Dimethylcyclohexane	N8	0.1257	0.1239	0.1176
3c-Ethylmethylcyclopentane	N8	0.0051	0.0050	0.0048
3t-Ethylmethylcyclopentane	N8	0.2210	0.2178	0.2105
2t-Ethylmethylcyclopentane	N8	0.1876	0.1849	0.1782
1,1-Methylethylcyclopentane	N8	0.6253	0.6161	0.5848
2,2,4-Trimethylhexane	I9	0.0497	0.0560	0.0580
1t,2-Dimethylcyclohexane	N8	0.6304	0.6212	0.5935
1t,3-Dimethylcyclohexane	N8	0.0115	0.0113	0.0107
UnknownC7s	U7	0.1100	0.0968	0.1049
n-Octane	P8	2.6453	2.6535	2.7981
1c,4-Dimethylcyclohexane	N8	0.5905	0.5819	0.5510
i-Propylcyclopentane	I8	0.0743	0.0732	0.0699
2,4,4-Trimethylhexane	I9	0.0213	0.0240	0.0246
2,2,3,4-Tetramethylpentane	I9	0.0207	0.0233	0.0240
2,3,4-Trimethylhexane	I9	0.0240	0.0270	0.0277
1c,2-Dimethylcyclohexane	N8	0.2116	0.2085	0.1941
2,3,5-Trimethylhexane	I9	0.0876	0.0987	0.1013
2,2-Dimethylheptane	I9	0.0182	0.0205	0.0214
1,1,4-Trimethylcyclohexane	N9	1.0135	1.1235	1.0790
2,2,3-Trimethylhexane	I9	0.4282	0.4823	0.4901
2,4-Dimethylheptane	I9	0.0556	0.0626	0.0648
4,4-Dimethylheptane	I9	0.0487	0.0548	0.0568
Ethylcyclohexane	N8	0.5695	0.5612	0.5282
n-Propylcyclopentane	N8	0.2315	0.2281	0.2177
1c,3c,5-Trimethylcyclohexane	N9	0.0394	0.0437	0.0420
2,5-Dimethylheptane	I9	0.0809	0.0911	0.0942
3,3-Dimethylheptane	I9	0.0900	0.1014	0.1049
3,5-Dimethylheptane	I9	0.0667	0.0751	0.0777
2,6-Dimethylheptane	I9	0.0641	0.0722	0.0755
1,1,3-Trimethylcyclohexane	N9	0.1422	0.1576	0.1514
Ethylbenzene	A8	0.6264	0.5840	0.4979
1c,2t,4t-Trimethylcyclohexane	N9	0.2086	0.2312	0.2178
2,3-Dimethylheptane	I9	0.1362	0.1534	0.1566
1,3-Dimethylbenzene (m-Xylene)	A8	1.2915	1.2041	1.0325
1,4-Dimethylbenzene (p-Xylene)	A8	0.3473	0.3238	0.2786
3,4-Dimethylheptane	I9	0.0404	0.0455	0.0461
3,4-Dimethylheptane (2)	I9	0.1430	0.1611	0.1633
4-Ethylheptane	I9	0.0285	0.0321	0.0333
4-Methyloctane	I9	0.3008	0.3388	0.3485
2-Methyloctane	I9	0.4026	0.4534	0.4709
1c,2t,4c-Trimethylcyclohexane	I9	0.0571	0.0643	0.0657
3-Ethylheptane	I9	0.0658	0.0741	0.0756

3-Methyloctane	I9	0.4735	0.5333	0.5484
3,3-Diethylpentane	I9	0.0467	0.0526	0.0517
1c,2t,3-Trimethylcyclohexane	N9	0.0767	0.0850	0.0801
1,1,2-Trimethylcyclohexane	N9	0.0310	0.0344	0.0324
1,2-Dimethylbenzene (o-Xylene)	A8	0.6182	0.5764	0.4856
i-Butylcyclopentane	N9	0.2853	0.3163	0.3003
UnknownC8s	U8	0.0792	0.0794	0.0837
n-Nonane	P9	1.8464	2.0796	2.1478
1,1-Methylethylcyclohexane	N9	0.4061	0.4574	0.4738
i-Propylbenzene	A9	0.3626	0.3827	0.3285
i-Propylcyclohexane	N9	0.1092	0.1211	0.1120
2,2-Dimethyloctane	I10	0.0842	0.1052	0.1055
2,4-Dimethyloctane	I10	0.0891	0.1113	0.1116
2,6-Dimethyloctane	I10	0.0125	0.0156	0.0162
2,5-Dimethyloctane	I10	0.0484	0.0605	0.0606
n-Butylcyclopentane	N9	0.3077	0.3790	0.3517
3,3-Dimethyloctane	I10	0.1048	0.1309	0.1313
n-Propylbenzene	A9	0.4402	0.4646	0.3989
3,6-Dimethyloctane	I10	0.2773	0.3465	0.3474
3-Methyl-5-ethylheptane	I10	0.4857	0.5470	0.5587
1,3-Methylethylbenzene	A9	0.3636	0.3838	0.3268
1,4-Methylethylbenzene	A9	0.2387	0.2519	0.2145
1,3,5-Trimethylbenzene	A9	0.1239	0.1308	0.1121
2,3-Dimethyloctane	I10	0.0662	0.0827	0.0829
5-Methylnonane	I10	0.2293	0.2865	0.2899
1,2-Methylethylbenzene	A9	0.4789	0.5055	0.4281
2-Methylnonane	I10	0.0658	0.0822	0.0839
3-Ethyloctane	I10	0.0929	0.1161	0.1164
3-Methylnonane	I10	0.2533	0.3165	0.3199
1,2,4-Trimethylbenzene	A9	0.0555	0.0586	0.0496
t-Butylbenzene	A10	0.4828	0.5690	0.4872
i-Butylcyclohexane	N10	0.2371	0.2920	0.2667
1t-Methyl-2-n-propylcyclohexane	I10	0.0951	0.1071	0.1094
i-Butylbenzene	A10	0.0812	0.0957	0.0832
sec-Butylbenzene	A10	0.0678	0.0799	0.0688
UnknownC9s	U9	1.6422	1.8496	1.9102
n-Decane	P10	1.4308	1.7876	1.8151
1,2,3-Trimethylbenzene	A9	0.2306	0.2434	0.2019
1,3-Methyl-i-propylbenzene	A10	0.1141	0.1204	0.1020
1,4-Methyl-i-propylbenzene	A10	0.1357	0.1432	0.1213
Sec-Butylcyclohexane	N10	0.3567	0.4394	0.4008
1,2-Methyl-i-propylbenzene	A10	0.1979	0.2332	0.1973
3-Ethylnonane	I10	0.0559	0.0698	0.0712
1,3-Diethylbenzene	A10	0.1756	0.2070	0.1777
1,3-Methyl-n-propylbenzene	A10	0.0580	0.0684	0.0589
1,4-Diethylbenzene	A10	0.1792	0.2112	0.1818
1,4-Methyl-n-propylbenzene	A10	0.1451	0.1710	0.1477
n-Butylbenzene	A10	0.0653	0.0770	0.0663
1,3-Dimethyl-5-ethylbenzene	A10	0.0640	0.0754	0.0647
1,2-Diethylbenzene	A10	0.1317	0.1552	0.1309
1,2-Methyl-n-propylbenzene	A10	0.1191	0.1404	0.1192
1,4-Dimethyl-2-ethylbenzene	A10	0.1582	0.1865	0.1577
1,3-Dimethyl-4-ethylbenzene	A10	0.0080	0.0094	0.0080
1,2-Dimethyl-4-ethylbenzene	A10	0.2160	0.2546	0.2160
1,3-Dimethyl-2-ethylbenzene	A10	0.1375	0.1621	0.1351
1t,2c,4-Trimethylcyclopentane	A10	0.5363	0.5284	0.5240
1,2-Dimethyl-3-ethylbenzene	A10	0.0865	0.1020	0.0848
1,2-Ethyl-i-propylbenzene	A10	0.1198	0.1412	0.1195
1,4-Methyl-t-butylbenzene	A11	0.2077	0.2448	0.2071
UnknownC10s	U10	2.3190	2.8974	2.9420
n-Undecane	P11	1.1332	1.5554	1.5575
1,4-Ethyl-i-propylbenzene	A11	0.0592	0.0698	0.0591
1,2,4,5-Tetramethylbenzene	A11	0.0950	0.1120	0.0938
1,2-Methyl-n-butylbenzene	A11	0.0762	0.0898	0.0760
1,2,3,5-Tetramethylbenzene	A11	0.0644	0.0759	0.0633
1,2-Methyl-t-butylbenzene	A11	0.1027	0.1210	0.1024
5-Methylindan	A11	0.0245	0.0366	0.0363

4-Methylindan	A11	0.0149	0.0223	0.0221
1,2-Ethyl-n-propylbenzene	A11	0.1647	0.1941	0.1642
2-Methylindan	A11	0.0803	0.1201	0.1190
1,3-Methyl-n-butylbenzene	A11	0.0800	0.0943	0.0798
1,3-Di-i-propylbenzene	A11	0.0607	0.0715	0.0605
sec-Pentylbenzene	A11	0.1117	0.1316	0.1114
n-Pentylbenzene	A11	0.0511	0.0665	0.0575
1t-M-2-(4MP)cyclopentane	P12	0.0970	0.1451	0.1437
1,2-Di-n-propylbenzene	A11	0.1133	0.1335	0.1130
1,4-Di-i-propylbenzene	A11	0.2044	0.2409	0.2038
Tetrahydronaphthalene	A10	0.1220	0.1438	0.1217
t-Decahydronaphthalene	A10	0.1540	0.1815	0.1536
Naphthalene	A10	0.1178	0.1326	0.1122
1-t-Butyl-3,5-dimethylbenzene	A12	0.0642	0.0757	0.0641
1,4-Ethyl-t-butylbenzene	A11	0.1264	0.1490	0.1261
UnknownC11s	U11	1.7179	2.3580	2.3611
n-Dodecane	P12	0.9771	1.4616	1.4475
1,3-Di-n-propylbenzene	A12	0.0868	0.1023	0.0866
1,3,5-Triethylbenzene	A12	0.0443	0.0468	0.0401
1,2,4-Triethylbenzene	A12	0.3487	0.3680	0.3115
1,4-Methyl-n-pentylbenzene	A12	0.0648	0.0764	0.0646
n-Hexylbenzene	A12	0.1059	0.1509	0.1305
1,2,3,4,5-Pentamethylbenzene	A13	0.2410	0.2840	0.2403
2-Methylnaphthalene	A11	0.2905	0.3627	0.3069
1-Methylnaphthalene	A11	0.2237	0.2793	0.2031
UnknownC12s	U12	1.4686	2.1967	2.1754
n-Tridecane	P13	0.8598	1.3920	1.3623
UnknownC13s	U13	1.4065	2.2770	2.2283
n-Tetradecane	P14	0.6013	1.0475	1.0230
UnknownC14s	U14	1.4339	2.4980	2.4396
n-Pentadecane	P15	0.3516	0.6559	0.6332
UnknownC15s	U15	1.3600	2.5368	2.4490
n-Hexadecane	P16	0.1256	0.2497	0.2395
UnknownC16s	U16	0.4432	0.8813	0.8453
n-Heptadecane	P17	0.1345	0.2840	0.2716
UnknownC17s	U17	0.1588	0.3353	0.3206
n-Octadecane	P18	0.0699	0.1562	0.1489
UnknownC18s	U18	0.2406	0.5377	0.5126
n-Nonadecane	P19	0.0268	0.0632	0.0599
UnknownC19s	U19	0.0439	0.1035	0.0980
n-Eicosane	P20	0.0082	0.0203	0.0191
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. :	201406119	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	0883
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:55 BRINGELSON RANCH 12-20-9-58		
FIELD DATA		SAMPLE TEMP. :	108
SAMPLE PRES. :	109	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 17:00		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0004	0.0010		
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.04	1.17	---	---
CARBON DIOXIDE	2.39	4.21	---	---
METHANE	66.40920	42.63310	---	---
ETHANE	12.7525	15.3446	3.4076	3.4262
PROPANE	10.5065	18.5394	2.8917	2.9075
I-BUTANE	1.0134	2.3570	0.3315	0.3334
N-BUTANE	3.4465	8.0161	1.0858	1.0917
I-PENTANE	0.6833	1.9681	0.2454	0.2467
N-PENTANE	0.8143	2.3510	0.2945	0.2961
HEXANES PLUS	0.9139	3.3997	0.3723	0.3742
TOTALS	100.00000	100.00000	8.6288	8.6758

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0252	0.0788
TOLUENE	0.0177	0.0653
ETHYLBENZENE	0.0022	0.0094
XYLENES	0.0051	0.0216
TOTAL BTEX	0.0502	0.1751

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1287.0 **/scf**	1294.0 **/scf**
	NET WET REAL :	1264.5 **/scf**	1271.5 **/scf**
HIGH	GROSS DRY REAL :	1412.9 **/scf**	1420.6 **/scf**
	GROSS WET REAL :	1388.2 **/scf**	1395.9 **/scf**
	NET DRY REAL :	19568.7 **/lb**	19675.6 **/lb**
	GROSS DRY REAL :	21487.5 **/lb**	21604.9 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8617
	COMPRESSIBILITY FACTOR :		0.99524

(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

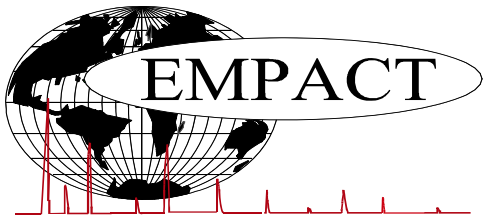
303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201406119	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	0883
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:55 BRINGELSON RANCH 12-20-9-58		
FIELD DATA		SAMPLE TEMP. :	108
SAMPLE PRES. :	109	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 17:00		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.39	4.21
Nitrogen	1.04	1.17
Methane	66.40920	42.63310
Ethane	12.7525	15.3446
Propane	10.5065	18.5394
Isobutane	1.0134	2.3570
n-Butane	3.4465	8.0161
Isopentane	0.6249	1.8042
n-Pentane	0.8143	2.3510
Cyclopentane	0.0584	0.1639
n-Hexane	0.1810	0.6242
Cyclohexane	0.0460	0.1549
Other Hexanes	0.3233	1.1067
Heptanes	0.1669	0.6646
Methycyclohexane	0.0381	0.1497
2,2,4 Trimethylpentane	0.0001	0.0004
Benzene	0.0252	0.0788
Toluene	0.0177	0.0653
Ethylbenzene	0.0022	0.0094
Xylenes	0.0051	0.0216
C8+ Heavies	0.1083	0.5241
Subtotal	99.98960	99.98900
Oxygen/Argon	0.01	0.01
Alcohols	0.0004	0.0010
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201406119	ANALYSIS NO. :	06
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	JUNE 25, 2014
ACCOUNT NO. :		SAMPLE DATE :	JUNE 18, 2014
PRODUCER :		CYLINDER NO. :	0883
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 16:55 BRINGELSON RANCH 12-20-9-58		
FIELD DATA		SAMPLE TEMP. :	108
SAMPLE PRES. :	109	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 2 PPM (1-7 PPM) @ 17:00		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.04	1.17	---	---
Carbon Dioxide	---	2.39	4.21	---	---
Methane	P1	66.40920	42.63310	---	---
Ethane	P2	12.7525	15.3446	3.408	3.426
Propane	P3	10.5065	18.5394	2.892	2.908
i-Butane	I4	1.0134	2.3570	0.332	0.333
n-Butane	P4	3.4465	8.0161	1.086	1.092
2,2-Dimethylpropane	I5	0.0026	0.0075	0.001	0.001
Ethanol	X2	0.0002	0.0004	0.000	0.000
i-Pentane	I5	0.6223	1.7967	0.227	0.229
n-Pentane	P5	0.8143	2.3510	0.295	0.296
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0018	0.0062	0.001	0.001
Cyclopentane	N5	0.0584	0.1639	0.017	0.017
2,3-Dimethylbutane	I6	0.0197	0.0680	0.008	0.008
2-Methylpentane	I6	0.1302	0.4490	0.054	0.054
3-Methylpentane	I6	0.0688	0.2373	0.028	0.028
n-Hexane	P6	0.1810	0.6242	0.074	0.075
2,2-Dimethylpentane	I7	0.0007	0.0028	0.000	0.000
Methylcyclopentane	N6	0.1028	0.3462	0.036	0.036
2,4-Dimethylpentane	I7	0.0044	0.0177	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0252	0.0788	0.007	0.007
3,3-Dimethylpentane	I7	0.0004	0.0016	0.000	0.000
Cyclohexane	N6	0.0460	0.1549	0.016	0.016
2-Methylhexane	I7	0.0195	0.0782	0.009	0.009
2,3-Dimethylpentane	I7	0.0093	0.0373	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0050	0.0197	0.002	0.002
3-Methylhexane	I7	0.0231	0.0926	0.011	0.011
1c,3-Dimethylcyclopentane	N7	0.0129	0.0507	0.006	0.006
1t,3-Dimethylcyclopentane	N7	0.0116	0.0456	0.005	0.005
3-Ethylpentane	I7	0.0012	0.0048	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0232	0.0912	0.011	0.011
2,2,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
n-Heptane	P7	0.0482	0.1933	0.022	0.022
1c,2-Dimethylcyclopentane	N7	0.0017	0.0067	0.001	0.001
Methylcyclohexane	N7	0.0381	0.1497	0.015	0.015
2,2-Dimethylhexane	I8	0.0033	0.0151	0.002	0.002
Ethylcyclopentane	N7	0.0056	0.0220	0.002	0.002
2,5-Dimethylhexane	I8	0.0011	0.0050	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0002	0.0009	0.000	0.000
2,4-Dimethylhexane	I8	0.0018	0.0082	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0035	0.0157	0.002	0.002
3,3-Dimethylhexane	I8	0.0002	0.0009	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0040	0.0180	0.002	0.002

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2,3,4-Trimethylpentane	I8	0.0007	0.0032	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0177	0.0653	0.006	0.006
2,3-Dimethylhexane	I8	0.0012	0.0055	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0010	0.0046	0.000	0.000
2-Methylheptane	I8	0.0083	0.0379	0.004	0.004
4-Methylheptane	I8	0.0023	0.0105	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0003	0.0014	0.000	0.000
3,4-Dimethylhexane	I8	0.0003	0.0014	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	0.0040	0.0183	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0054	0.0243	0.003	0.003
3-Ethylhexane	I8	0.0007	0.0032	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0020	0.0090	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0007	0.0032	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0011	0.0049	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0010	0.0045	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0031	0.0139	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0028	0.0126	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0128	0.0585	0.007	0.007
1c,4-Dimethylcyclohexane	N8	0.0010	0.0045	0.001	0.001
i-Propylcyclopentane	I8	0.0004	0.0018	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0006	0.0031	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	0.0027	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0032	0.0162	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0015	0.0077	0.001	0.001
2,4-Dimethylheptane	I9	0.0006	0.0031	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0019	0.0085	0.001	0.001
n-Propylcyclopentane	N8	0.0008	0.0036	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0007	0.0035	0.000	0.000
Ethylbenzene	I8	0.0022	0.0094	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0007	0.0035	0.000	0.000
2,3-Dimethylheptane	I9	0.0018	0.0092	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0026	0.0110	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0008	0.0034	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0020	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0008	0.0041	0.000	0.000
2-Methyloctane	I9	0.0010	0.0051	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0015	0.000	0.000
3-Methyloctane	I9	0.0012	0.0062	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	0.0017	0.0072	0.001	0.001
i-Butylcyclopentane	N9	0.0008	0.0040	0.000	0.000
UnknownC8s	U8	0.0003	0.0014	0.000	0.000
n-Nonane	P9	0.0038	0.0195	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0005	0.0025	0.000	0.000
i-Propylbenzene	A9	0.0006	0.0029	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0010	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0007	0.0035	0.000	0.000
3,3-Dimethyloctane	I10	0.0003	0.0017	0.000	0.000
n-Propylbenzene	A9	0.0007	0.0034	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0011	0.0063	0.001	0.001

1,3-Methylethylbenzene	A9	0.0006	0.0029	0.000	0.000
1,4-Methylethylbenzene	A9	0.0003	0.0014	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	0.0023	0.000	0.000
1,2-Methylethylbenzene	A9	0.0004	0.0019	0.000	0.000
2-Methylnonane	I10	0.0004	0.0023	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methylnonane	I10	0.0003	0.0017	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0002	0.0010	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0027	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0011	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	0.0030	0.0154	0.002	0.002
n-Decane	P10	0.0013	0.0074	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0003	0.0014	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	0.0017	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	0.0002	0.0011	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
1,3-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	0.0028	0.0159	0.002	0.002
n-Undecane	P11	0.0005	0.0031	0.000	0.000
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0006	0.000	0.000
UnknownC11s	U11	0.0006	0.0038	0.000	0.000
n-Dodecane	P12	0.0003	0.0020	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	0.0006	0.000	0.000
UnknownC12s	U12	0.0001	0.0006	0.000	0.000
n-Tridecane	P13	0.0002	0.0015	0.000	0.000
UnknownC13s	U13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0002	0.0016	0.000	0.000
UnknownC14s	U14	0.0001	0.0008	0.000	0.000
n-Pentadecane	P15	0.0002	0.0017	0.000	0.000
UnknownC15s	U15	0.0001	0.0008	0.000	0.000
n-Hexadecane	P16	0.0001	0.0009	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
TOTAL		100.00000	100.00000	8.6288	8.6758

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0252	0.0788
TOLUENE	0.0177	0.0653
ETHYLBENZENE	0.0022	0.0094
XYLENES	0.0051	0.0216
TOTAL BTEX	0.0502	0.1751

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1287.0 **/scf**	1294.0 **/scf**
	NET WET REAL :	1264.5 **/scf**	1271.5 **/scf**
HIGH	GROSS DRY REAL :	1412.9 **/scf**	1420.6 **/scf**
	GROSS WET REAL :	1388.2 **/scf**	1395.9 **/scf**
	NET DRY REAL :	19568.7 **/lb**	19675.6 **/lb**
	GROSS DRY REAL :	21487.5 **/lb**	21604.9 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8617
	COMPRESSIBILITY FACTOR :		0.99524

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

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

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