

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

## **MAIN PAGE**

PRIMARY DB KEY:  
LEASE #:  
FIELD/AREA:

NAME/DESCRIP : **ORCA 44-19**  
**WELLHEAD GAS**

PROJECT NO. : **201905051**  
COMPANY NAME : **FREMONT PETROLEUM CORP**  
OFFICE / BRANCH: **FLORENCE, CO**  
CUSTOMER REF:  
PRODUCER :

ANALYSIS NO. : **09**  
ANALYSIS DATE: **MAY 10, 2019 10:33**  
SAMPLE DATE : **MAY 7, 2019 14:40**  
TO:  
EFFECTIVE DATE:

### **\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE:  
SAMPLE PRES. : 0.35 psig  
FLOW PRES. : psig  
LAB PRES: psig  
SAMPLE TEMP. : 52 °f  
AMBIENT TEMP.: °f  
H2O BY STAIN TUBE: - #/mmcf  
FIELD COMMENTS:  
LAB COMMENTS:

SAMPLE TYPE: SPOT  
PROBE : NO  
CYLINDER NO. : 1956  
SAMPLED BY : GALE MCENDREE  
SAMPLING COMPANY: EMPACT  
H2S BY STAIN TUBE: **BDL** ppm  
CO2 BY STAIN TUBE: - Mol %

<b>COMPONENT</b>	<b>MOLE %</b>	<b>MASS %</b>	<b>GPM @ 14.73</b>	<b>GPM @ 14.65</b>
ALCOHOLS	0.0011	0.0021	0.0000	0.0000
HELIUM	0.07	0.01	---	---
HYDROGEN	0.11	0.01	---	---
OXYGEN/ARGON	2.51	3.25	---	---
NITROGEN	10.68	12.10	---	---
CARBON DIOXIDE	1.97	3.51	---	---
METHANE	67.33430	43.70030	---	---
ETHANE	4.0981	4.9852	1.0992	1.0932
PROPANE	5.4888	9.7916	1.5165	1.5083
I-BUTANE	1.1926	2.8043	0.3912	0.3891
N-BUTANE	2.2914	5.3880	0.7251	0.7211
I-PENTANE	1.0965	3.1941	0.3962	0.3941
N-PENTANE	0.8236	2.4040	0.2997	0.2981
HEXANES PLUS	2.3336	8.8504	0.9882	0.9830
<b>TOTALS</b>	<b>100.00000</b>	<b>100.00000</b>	<b>5.4161</b>	<b>5.3869</b>

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.73	14.65
BENZENE	0.0079	0.0250	LOW NET DRY REAL :	1098.0 /scf	1092.1 /scf
TOLUENE	0.0054	0.0202	NET WET REAL :	1078.9 /scf	1073.0 /scf
ETHYLBENZENE	0.0019	0.0082	HIGH GROSS DRY REAL :	1206.7 /scf	1200.1 /scf
XYLENES	0.0043	0.0185	GROSS WET REAL :	1185.7 /scf	1179.1 /scf
TOTAL BTEX	0.0195	0.0719	NET DRY REAL :	16919.3 /lb	16827.4 /lb
			GROSS DRY REAL :	18592.0 /lb	18491.1 /lb
			RELATIVE DENSITY (AIR=1):		0.8526
			DENSITY		0.06513 lb/scf
			COMPRESSIBILITY FACTOR :		0.99670
			REGULAR WOBBE INDEX		1303.8

\*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730,GPA 2261 & GPA 2286.

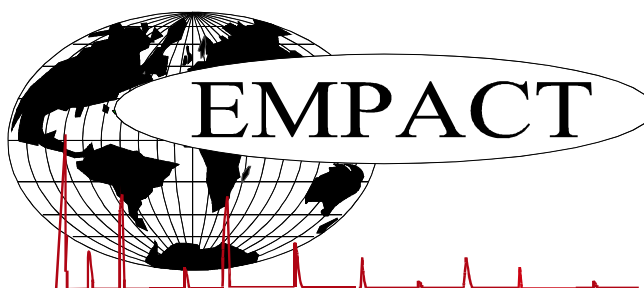
(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)

\*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730,GPA 2261 & GPA 2286.

(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)

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.



# EXTENDED NATURAL GAS ANALYSIS (\*DHA)

## GLYCALC INFORMATION

PROJECT NO. :	201905051	ANALYSIS NO. :	09
COMPANY NAME :	FREMONT PETROLEUM CORP	ANALYSIS DATE:	MAY 10, 2019 12:32
ACCOUNT NO. :		SAMPLE DATE :	MAY 7, 2019 14:40
PRODUCER :		CYLINDER NO. :	1956
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	ORCA 44-19 WELLHEAD GAS		

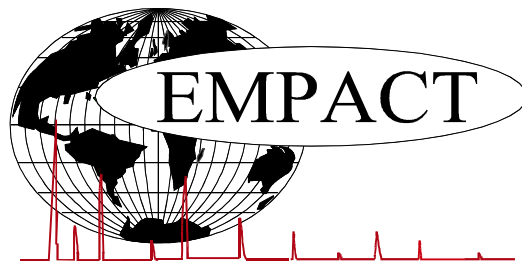
### \*\*\*FIELD DATA\*\*\*

SAMPLE PRES. : 0.35  
 COMMENTS : SPOT, NO PROBE

SAMPLE TEMP. : 52  
 AMBIENT TEMP.:

Componet	Mole %	Wt %
Helium	0.07	0.01
Hydrogen	0.11	0.01
Carbon Dioxide	1.97	3.51
Nitrogen	10.68	12.10
Methane	67.33430	43.70030
Ethane	4.0981	4.9852
Propane	5.4888	9.7916
Isobutane	1.1926	2.8043
n-Butane	2.2914	5.3880
Isopentane	1.0176	2.9702
n-Pentane	0.8236	2.4040
Cyclopentane	0.0789	0.2239
n-Hexane	0.2868	0.9999
Cyclohexane	0.1180	0.4018
Other Hexanes	0.7123	2.4646
Heptanes	0.9271	3.7258
Methylcyclohexane	0.1205	0.4786
2,2,4 Trimethylpentane	0.0012	0.0055
Benzene	0.0079	0.0250
Toluene	0.0054	0.0202
Ethylbenzene	0.0019	0.0082
Xylenes	0.0043	0.0185
C8+ Heavies	0.1482	0.7023
<u>Subtotal</u>	<u>97.48890</u>	<u>96.74790</u>
Oxygen/Argon	2.51	3.25
Alcohols	0.0011	0.0021
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

*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.*



## EXTENDED NATURAL GAS ANALYSIS (\*DHA)

### DHA COMPONENT LIST

PRIMARY DB KEY:  
LEASE #:  
FIELD/AREA:

NAME/DESCRIP : **ORCA 44-19**  
**WELLHEAD GAS**

PROJECT NO. : **201905051**  
COMPANY NAME : **FREMONT PETROLEUM CORP**  
OFFICE / BRANCH: **FLORENCE, CO**  
CUSTOMER REF:  
PRODUCER :

ANALYSIS NO. : **09**  
ANALYSIS DATE: MAY 10, 2019 10:33  
SAMPLE DATE : MAY 7, 2019 14:40  
TO:  
EFFECTIVE DATE

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE:  
SAMPLE PRES. : 0.35 psig  
FLOW PRES. : psig  
LAB PRES: psig  
SAMPLE TEMP. : 52 °f  
AMBIENT TEMP.: °f  
H2O BY STAIN TUBE: - #/mmcf  
FIELD COMMENTS:  
LAB COMMENTS:

SAMPLE TYPE: SPOT  
PROBE : NO  
CYLINDER NO. : 1956  
SAMPLED BY : GALE MCENDREE  
SAMPLING COMPANY: EMPACT  
H2S BY STAIN TUBE: **BDL** ppm  
CO2 BY STAIN TUBE: - Mol %

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.73	GPM @ 14.65
Helium	---	0.07	0.01	---	---
Hydrogen	---	0.11	0.01	---	---
Oxygen/Argon	---	2.51	3.25	---	---
Nitrogen	---	10.68	12.10	---	---
Carbon Dioxide	---	1.97	3.51	---	---
Methane	P1	67.33430	43.70030	---	---
Ethane	P2	4.0981	4.9852	1.099	1.093
Propane	P3	5.4888	9.7916	1.517	1.508
i-Butane	I4	1.1926	2.8043	0.391	0.389
n-Butane	P4	2.2914	5.3880	0.725	0.721
2,2-Dimethylpropane	I5	0.0022	0.0064	0.001	0.001
Ethanol	X2	0.0011	0.0021	0.000	0.000
i-Pentane	I5	1.0154	2.9638	0.372	0.370
n-Pentane	P5	0.8236	2.4040	0.300	0.298
2,2-Dimethylbutane	I6	0.0034	0.0119	0.001	0.001
Cyclopentane	N5	0.0789	0.2239	0.023	0.023
2,3-Dimethylbutane	I6	0.0344	0.1199	0.014	0.014
2-Methylpentane	I6	0.2734	0.9532	0.114	0.113
3-Methylpentane	I6	0.1698	0.5920	0.069	0.069
n-Hexane	P6	0.2868	0.9999	0.119	0.118
2,2-Dimethylpentane	I7	0.0008	0.0032	0.000	0.000
Methylcyclopentane	N6	0.2310	0.7865	0.083	0.082
2,4-Dimethylpentane	I7	0.0158	0.0640	0.007	0.007
2,2,3-Trimethylbutane	I7	0.0011	0.0045	0.001	0.001
Benzene	A6	0.0079	0.0250	0.002	0.002
3,3-Dimethylpentane	I7	0.0008	0.0032	0.000	0.000

Cyclohexane	N6	0.1180	0.4018	0.040	0.040
2-Methylhexane	I7	0.0657	0.2663	0.030	0.030
2,3-Dimethylpentane	I7	0.1040	0.4216	0.047	0.047
1,1-Dimethylcyclopentane	N7	0.0268	0.1064	0.011	0.011
3-Methylhexane	I7	0.1556	0.6308	0.071	0.071
1c,3-Dimethylcyclopentane	N7	0.0938	0.3726	0.043	0.043
1t,3-Dimethylcyclopentane	N7	0.0929	0.3690	0.043	0.043
3-Ethylpentane	I7	0.0042	0.0170	0.002	0.002
1t,2-Dimethylcyclopentane	N7	0.1899	0.7543	0.088	0.087
2,2,4-Trimethylpentane	I8	0.0012	0.0055	0.001	0.001
UnknownC6s	U6	0.0003	0.0011	0.000	0.000
n-Heptane	P7	0.1390	0.5635	0.064	0.064
1c,2-Dimethylcyclopentane	N7	0.0059	0.0234	0.003	0.003
Methylcyclohexane	N7	0.1205	0.4786	0.048	0.048
2,2-Dimethylhexane	I8	0.0089	0.0411	0.004	0.004
1,1,3-Trimethylcyclopentane	N7	0.0024	0.0109	0.001	0.001
2,5-Dimethylhexane	I8	0.0017	0.0079	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0003	0.0014	0.000	0.000
2,4-Dimethylhexane	I8	0.0024	0.0111	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0084	0.0382	0.004	0.004
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0059	0.0268	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0012	0.0055	0.001	0.001
Toluene	A7	0.0054	0.0202	0.002	0.002
2,3-Dimethylhexane	I8	0.0019	0.0088	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0020	0.0092	0.001	0.001
1,1,2-Trimethylcyclopentane	N8	0.0004	0.0018	0.000	0.000
2-Methylheptane	I8	0.0113	0.0522	0.006	0.006
4-Methylheptane	I8	0.0030	0.0139	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0004	0.0019	0.000	0.000
3,4-Dimethylhexane	I8	0.0005	0.0023	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0004	0.0018	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
3-Methylheptane	I8	0.0025	0.0116	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0101	0.0458	0.005	0.005
3-Ethylhexane	I8	0.0019	0.0088	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0036	0.0163	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0007	0.0032	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0018	0.0082	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0019	0.0086	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0045	0.0204	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0051	0.0231	0.003	0.003
UnknownC7s	U7	0.0284	0.1151	0.013	0.013
n-Octane	P8	0.0148	0.0684	0.008	0.008
1c,4-Dimethylcyclohexane	N8	0.0025	0.0114	0.001	0.001
i-Propylcyclopentane	I8	0.0002	0.0009	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0003	0.0015	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0011	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0002	0.0011	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0005	0.0026	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0013	0.0059	0.001	0.001
1,1,4-Trimethylcyclohexane	N9	0.0046	0.0235	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0018	0.0094	0.001	0.001
2,4-Dimethylheptane	I9	0.0004	0.0021	0.000	0.000
4,4-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
Ethylcyclohexane	N8	0.0028	0.0127	0.001	0.001
n-Propylcyclopentane	N8	0.0011	0.0050	0.000	0.000

1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0006	0.0031	0.000	0.000
3,3-Dimethylheptane	I9	0.0006	0.0031	0.000	0.000
3,5-Dimethylheptane	I9	0.0004	0.0021	0.000	0.000
2,6-Dimethylheptane	I9	0.0005	0.0026	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0004	0.0020	0.000	0.000
Ethylbenzene	I8	0.0019	0.0082	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0012	0.0061	0.001	0.001
2,3-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0009	0.0039	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0027	0.0116	0.001	0.001
3,4-Dimethylheptane	I9	0.0005	0.0026	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0007	0.0036	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
4-Methyloctane	I9	0.0011	0.0057	0.001	0.001
2-Methyloctane	I9	0.0013	0.0068	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0003	0.0015	0.000	0.000
3-Ethylheptane	I9	0.0004	0.0021	0.000	0.000
3-Methyloctane	I9	0.0015	0.0078	0.001	0.001
1,2-Dimethylbenzene (o-Xylene)	A8	0.0007	0.0030	0.000	0.000
i-Butylcyclopentane	N9	0.0012	0.0061	0.001	0.001
UnknownC8s	U8	0.0080	0.0370	0.004	0.004
n-Nonane	P9	0.0042	0.0218	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0007	0.0036	0.000	0.000
i-Propylbenzene	A9	0.0011	0.0053	0.000	0.000
i-Propylcyclohexane	N9	0.0004	0.0020	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,6-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	0.0008	0.0041	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
n-Propylbenzene	A9	0.0007	0.0034	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0011	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0007	0.0041	0.000	0.000
1,3-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,4-Methylethylbenzene	A9	0.0003	0.0015	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	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0043	0.0223	0.002	0.002
n-Decane	P10	0.0002	0.0011	0.000	0.000
UnknownC10s	U10	0.0014	0.0081	0.001	0.001
n-Undecane	P11	0.0001	0.0007	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0002	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	5.4161	5.3869

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0079	0.0250
TOLUENE	0.0054	0.0202
ETHYLBENZENE	0.0019	0.0082
XYLENES	0.0043	0.0185
TOTAL BTEX	0.0195	0.0719

BTU @		14.73	14.65
LOW	NET DRY REAL :	1098.0 /scf	1092.1 /scf
	NET WET REAL :	1078.9 /scf	1073.0 /scf
HIGH	GROSS DRY REAL :	1206.7 /scf	1200.1 /scf
	GROSS WET REAL :	1185.7 /scf	1179.1 /scf
	NET DRY REAL :	16919.3 /lb	16827.4 /lb
	GROSS DRY REAL :	18592.0 /lb	18491.1 /lb
	RELATIVE DENSITY (AIR=1):		0.8526
	DENSITY		0.06513 lb/scf
	COMPRESSIBILITY FACTOR :		0.99670
	REGULAR WOBBE INDEX		1303.8

\*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730, GPA 2261 & GPA 2286.

(CALC: GPA 2172, GPA 2145 & TP-17 @ 14.696 & 60 F)

**C6+ Fraction of DHA Gas Analysis @60°F, 14.696 psia**

Net Dry Ideal BTU	<u>4755</u> /scf	Relative Density - SG (Air=1)	<u>3.2367</u>	<b><u>C6+ factors</u></b>
Gross Dry Ideal BTU	<u>5124</u> /scf	Z Compressibility Factor	<u>0.99186</u>	<u>0.99135</u>
Net Dry Ideal BTU	<u>19789.6</u> /lb	Density Factor	<u>247.03</u> lbm/1000 ft3	
Gross Dry Ideal BTU	<u>21326.5</u> /lb	Molar Mass or MW	<u>93.74</u> g/mol	
		Volume Liquid Ideal gas	<u>0.983</u> scf/gal	<u>23.3</u>

***This hexanes plus fraction may be applied in place of published C6+ factors. The Z & GPM need additional calc for C6+ factors.  
#DIV/0 or 0 (zero) will appear in this section when there is no hexanes plus in the sample to calculate C6+ factors.***

*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.*