



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

**MAIN PAGE**

PRIMARY DB KEY:	<b>05-045-13000</b>	NAME/DESCRIP :	<b>Unocal 13D-9D</b>
LEASE #:	<b>05-045-13000</b>		<b>U2 Pad</b>
FIELD/AREA:			<b>Surface Casing</b>
PROJECT NO. :	<b>202103020</b>	ANALYSIS NO. :	<b>03</b>
COMPANY NAME :	<b>CAERUS OIL &amp; GAS LLC</b>	ANALYSIS DATE:	<b>MARCH 03, 2021 12:51</b>
OFFICE / BRANCH:	<b>PARACHUTE, CO</b>	SAMPLE DATE :	<b>MARCH 1, 2021 14:00</b>
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	<b>SPOT</b>
SAMPLE PRES. :	psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	<b>1L TEDLAR</b>
LAB PRES:	psig	SAMPLED BY :	<b>BRETT MIDDLETON</b>
SAMPLE TEMP. :	°f	SAMPLING COMPANY:	<b>CAERUS OIL &amp; GAS LLC</b>
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	<b>- ppm</b>
H2O BY STAIN TUBE:	<b>- #/mmcf</b>	CO2 BY STAIN TUBE:	<b>- Mol %</b>
FIELD COMMENTS:			
LAB COMMENTS:			

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.65</u>	<u>GPM @ 14.73</u>
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	15.49	19.47	---	---
NITROGEN	55.18	60.73	---	---
CARBON DIOXIDE	0.03	0.05	---	---
METHANE	27.9099	17.5914	---	---
ETHANE	0.8788	1.0381	0.2334	0.2347
PROPANE	0.2669	0.4624	0.0728	0.0732
I-BUTANE	0.0530	0.1210	0.0170	0.0171
N-BUTANE	0.0820	0.1872	0.0259	0.0261
I-PENTANE	0.0323	0.0914	0.0110	0.0110
N-PENTANE	0.0270	0.0765	0.0100	0.0100
HEXANES PLUS	0.0501	0.1820	0.0170	0.0170
<b>TOTALS</b>	<b>100.00000</b>	<b>100.00000</b>	<b>0.3871</b>	<b>0.3891</b>

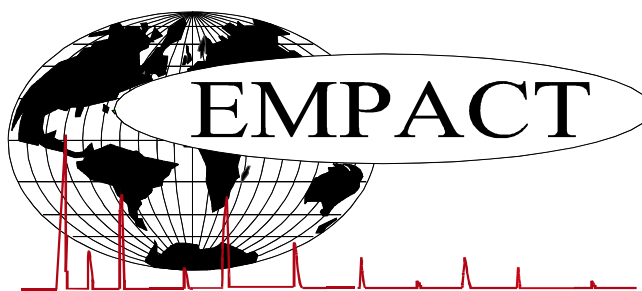
<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>	<u>BTU @ 14.65</u>	<u>14.73</u>
BENZENE	0.0023	0.0071	<b>LHV NET DRY REAL :</b>	<b>281.5 /scf</b>
TOLUENE	0.0005	0.0018		<b>283.1 /scf</b>
ETHYLBENZENE	0.0001	0.0004	<b>NET WET REAL :</b>	<b>278.2 /scf</b>
XYLENES	0.0001	0.0004	<b>HHV GROSS DRY REAL :</b>	<b>312.1 /scf</b>
<b>TOTAL BTEX</b>	<b>0.0030</b>	<b>0.0097</b>	<b>GROSS WET REAL :</b>	<b>306.6 /scf</b>
			<b>NET HEATING VALUE (60 °F ideal reaction):</b>	<b>4216.5 Btu/lbm</b>
			<b>GROSS HEATING VALUE (60°F ideal reaction):</b>	<b>4673.4 Btu/lbm</b>
			<b>RELATIVE DENSITY (AIR=1):</b>	<b>0.8784</b>
			<b>DENSITY</b>	<b>0.06708 lbm/scf</b>
			<b>COMPRESSIBILITY FACTOR :</b>	<b>0.9992</b>
			<b>REGULAR WOBBE INDEX</b>	<b>333.7</b>

*\*(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. :	202103020	ANALYSIS NO. :	03
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	MARCH 03, 2021 12:51
ACCOUNT NO. :		SAMPLE DATE :	MARCH 1, 2021 14:00
PRODUCER :		CYLINDER NO. :	1L TEDLAR
LEASE NO. :	05-045-13000	SAMPLED BY :	BRETT MIDDLETON
NAME/DESCRIP :	Unocal 13D-9D U2 Pad Surface Casing		

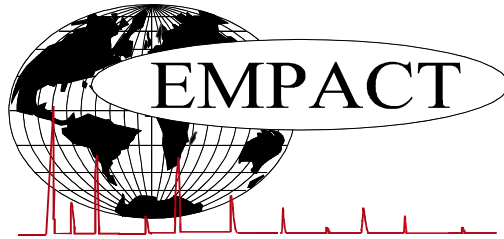
\*\*\*FIELD DATA\*\*\*

SAMPLE PRES. :		SAMPLE TEMP. :	
H2S BY STAIN TUBE:	- ppm	AMBIENT TEMP.:	
COMMENTS :	<i>SPOT</i>		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	0.03	0.05
Nitrogen	55.18	60.73
Methane	27.9099	17.5914
Ethane	0.8788	1.0381
Propane	0.2669	0.4624
Isobutane	0.0530	0.1210
n-Butane	0.0820	0.1872
Isopentane	0.0310	0.0878
n-Pentane	0.0270	0.0765
Cyclopentane	0.0013	0.0036
n-Hexane	0.0080	0.0271
Cyclohexane	0.0030	0.0099
Other Hexanes	0.0172	0.0582
Heptanes	0.0094	0.0369
Methylcyclohexane	0.0040	0.0154
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0023	0.0071
Toluene	0.0005	0.0018
Ethylbenzene	0.0001	0.0004
Xylenes	0.0001	0.0004
C8+ Heavies	0.0055	0.0248
<u>Subtotal</u>	<u>84.51000</u>	<u>80.53000</u>
<u>Oxygen/Argon</u>	<u>15.49</u>	<u>19.47</u>
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

**BDL - Below Detection Limit. The H2S LOS has a detection limit of 0.25 ppm. A \_ (an underscore) indicates there was no tube pulled for H2S.**

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**EXTENDED NATURAL GAS ANALYSIS (#DHA)**  
**DHA COMPONENT LIST**

PRIMARY DB KEY:       **05-045-13000**                   NAME/DESCRIP :   **Unocal 13D-9D**  
LEASE #:               **05-045-13000**                   **U2 Pad**  
FIELD/AREA:   **Surface Casing**

PROJECT NO. :       **202103020**                   ANALYSIS NO. :   **03**  
COMPANY NAME :      **CAERUS OIL & GAS LLC**                   ANALYSIS DATE:   **MARCH 03, 2021 12:51**  
OFFICE / BRANCH:    **PARACHUTE, CO**                   SAMPLE DATE :   **MARCH 1, 2021 14:00**  
CUSTOMER REF:   TO:  
PRODUCER :   EFFECTIVE DATE:

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

SAMPLE CYCLE:   SAMPLE TYPE:     **SPOT**  
SAMPLE PRES. :                                       psig                PROBE :  
FLOW PRES. :                                       psig                CYLINDER NO. :   **1L TEDLAR**  
LAB PRES:   psig                SAMPLED BY :     **BRETT MIDDLETON**  
SAMPLE TEMP. :                                      °F                 SAMPLING COMPANY:   **CAERUS OIL & GAS LLC**  
AMBIENT TEMP.:                                     °F                 H2S BY STAIN TUBE:       -     ppm  
H2O BY STAIN TUBE:                               -                 CO2 BY STAIN TUBE:       -     Mol %  
FIELD COMMENTS:  
LAB COMMENTS:

<u>COMPONENT</u>	<u>PIANO #</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.65</u>	<u>GPM @ 14.73</u>
Oxygen/Argon	---	15.49	19.47	---	---
Nitrogen	---	55.18	60.73	---	---
Carbon Dioxide	---	0.03	0.05	---	---
Methane	P1	27.9099	17.5914	---	---
Ethane	P2	0.8788	1.0381	0.233	0.235
Propane	P3	0.2669	0.4624	0.073	0.073
i-Butane	I4	0.0530	0.1210	0.017	0.017
n-Butane	P4	0.0820	0.1872	0.026	0.026
2,2-Dimethylpropane	I5	0.0010	0.0028	0.000	0.000
i-Pentane	I5	0.0300	0.0850	0.011	0.011
n-Pentane	P5	0.0270	0.0765	0.010	0.010
2,2-Dimethylbutane	I6	0.0009	0.0031	0.000	0.000
Cyclopentane	N5	0.0013	0.0036	0.000	0.000
2,3-Dimethylbutane	I6	0.0014	0.0048	0.001	0.001
2-Methylpentane	I6	0.0077	0.0261	0.003	0.003
3-Methylpentane	I6	0.0040	0.0136	0.002	0.002
n-Hexane	P6	0.0080	0.0271	0.003	0.003
2,2-Dimethylpentane	I7	0.0002	0.0008	0.000	0.000
Methylcyclopentane	N6	0.0032	0.0106	0.001	0.001
2,4-Dimethylpentane	I7	0.0004	0.0016	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0023	0.0071	0.001	0.001
3,3-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Cyclohexane	N6	0.0030	0.0099	0.001	0.001
2-Methylhexane	I7	0.0016	0.0063	0.001	0.001
2,3-Dimethylpentane	I7	0.0006	0.0024	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0003	0.0011	0.000	0.000
3-Methylhexane	I7	0.0015	0.0059	0.001	0.001
1c,3-Dimethylcyclopentane	N7	0.0004	0.0015	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0005	0.0019	0.000	0.000
3-Ethylpentane	I7	0.0001	0.0004	0.000	0.000

1t,2-Dimethylcyclopentane	N7	0.0007	0.0027	0.000	0.000
n-Heptane	P7	0.0026	0.0103	0.001	0.001
1c,2-Dimethylcyclopentane	N7	0.0001	0.0004	0.000	0.000
Methylcyclohexane	N7	0.0040	0.0154	0.002	0.002
2,2-Dimethylhexane	I8	0.0002	0.0009	0.000	0.000
Ethylcyclopentane	N7	0.0002	0.0008	0.000	0.000
2,5-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0005	0.0018	0.000	0.000
2,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0006	0.0027	0.000	0.000
4-Methylheptane	I8	0.0002	0.0009	0.000	0.000
3-Methylheptane	I8	0.0004	0.0018	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0005	0.0022	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0009	0.000	0.000
n-Octane	P8	0.0008	0.0036	0.000	0.000
1c,4-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0003	0.0015	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0004	0.000	0.000
Ethylbenzene	I8	0.0001	0.0004	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0001	0.0004	0.000	0.000
2-Methyloctane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0001	0.0005	0.000	0.000
n-Nonane	P9	0.0002	0.0010	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0005	0.000	0.000
n-Decane	P10	0.0001	0.0006	0.000	0.000
<b>TOTAL</b>		<b>100.0000</b>	<b>100.0000</b>	<b>0.3871</b>	<b>0.3891</b>

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0023	0.0071	LHV NET DRY REAL :	281.5 /scf	283.1 /scf
TOLUENE	0.0005	0.0018	NET WET REAL :	276.6 /scf	278.2 /scf
ETHYLBENZENE	0.0001	0.0004	HHV GROSS DRY REAL :	312.1 /scf	313.8 /scf
XYLENES	0.0001	0.0004	GROSS WET REAL :	306.6 /scf	308.3 /scf
TOTAL BTEX	0.0030	0.0097	NET HEATING VALUE (60 °F ideal reaction):		4216.5 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		4673.4 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.8784
			DENSITY		0.06708 lb/scf
			COMPRESSIBILITY FACTOR :		0.9992
			REGULAR WOBBE INDEX		333.7

\*(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	4661.2 /scf	Relative Density - SG (Air=1)	3.1955	<b>C6+ factors</b>
Gross Dry Ideal BTU	5015.8 /scf	Z Compressibility Factor	0.99128	0.99061
Net Dry Ideal BTU	19295.5 /lb	Density Factor	243.906 lbm/1000 ft3	
Gross Dry Ideal BTU	20764.4 /lb	Molar Mass or MW	92.559 g/mol	
		Volume Liquid Ideal gas	0.017 scf/gal	24

**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.**

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