EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-07868**	NAME/DESCRIP :	**Unocal 24-9DRD**
LEASE #:	**05-045-07868**		**U2 Pad**
FIELD/AREA:			**Casing**

PROJECT NO. :	**202103019**	ANALYSIS NO. :	**03**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	MARCH 05, 2021 07:18
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MARCH 1, 2021 08:30
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

*****FIELD DATA*****

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	345	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-794
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	23	ºf	SAMPLING COMPANY:	CAERUS OIL & GAS LLC
AMBIENT TEMP.:		ºf	H2S BY STAIN TUBE:	- ppm
H2O BY STAIN TUBE:	-	#/mmcf	CO2 BY STAIN TUBE:	- Mol %

FIELD COMMENTS:

LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
ALCOHOLS	0.0182	0.0320	0.0020	0.0020
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.08	0.12	---	---
CARBON DIOXIDE	4.76	11.52	---	---
METHANE	90.9458	80.1914	---	---
ETHANE	3.3554	5.5455	0.8942	0.8991
PROPANE	0.4780	1.1585	0.1309	0.1316
I-BUTANE	0.1180	0.3769	0.0390	0.0392
N-BUTANE	0.0716	0.2288	0.0230	0.0231
I-PENTANE	0.0398	0.1576	0.0140	0.0141
N-PENTANE	0.0202	0.0801	0.0070	0.0070
HEXANES PLUS	0.1130	0.5892	0.0420	0.0420
TOTALS	100.00000	100.00000	1.1521	1.1581

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0042	0.0180
TOLUENE	0.0036	0.0182
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0010	0.0057
TOTAL BTEX	0.0089	0.0425

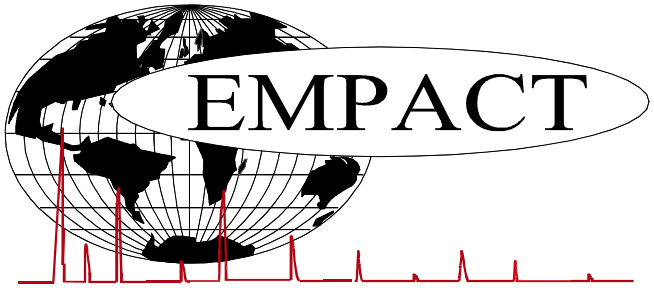
	BTU @	14.65	14.73
LHV	NET DRY REAL :	904.5 **/scf**	909.5 **/scf**
	NET WET REAL :	888.7 **/scf**	893.7 **/scf**
HHV	GROSS DRY REAL :	1003.1 **/scf**	1008.6 **/scf**
	GROSS WET REAL :	985.6 **/scf**	991.1 **/scf**

NET HEATING VALUE (60 °F ideal reaction):	18893.3	**Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	20950.7	**Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6273	
DENSITY	0.04794	**lbm/scf**
COMPRESSIBILITY FACTOR :	0.9977	
REGULAR WOBBE INDEX	1267.6	

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*

Mod ASTM D6730,GPA 2261 & GPA 2286.

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



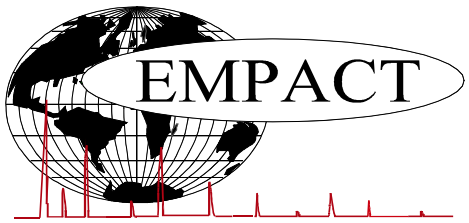
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202103019	ANALYSIS NO. :	03
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	MARCH 05, 2021 07:18
ACCOUNT NO. :		SAMPLE DATE :	MARCH 1, 2021 08:30
PRODUCER :		CYLINDER NO. :	ECA-794
LEASE NO. :	05-045-07868	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	Unocal 24-9DRD U2 Pad Casing		
FIELD DATA		SAMPLE TEMP. :	23
SAMPLE PRES. :	345	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	4.76	11.52
Nitrogen	0.08	0.12
Methane	90.9458	80.1914
Ethane	3.3554	5.5455
Propane	0.4780	1.1585
Isobutane	0.1180	0.3769
n-Butane	0.0716	0.2288
Isopentane	0.0388	0.1538
n-Pentane	0.0202	0.0801
Cyclopentane	0.0010	0.0038
n-Hexane	0.0137	0.0649
Cyclohexane	0.0083	0.0384
Other Hexanes	0.0309	0.1454
Heptanes	0.0242	0.1322
Methylcyclohexane	0.0127	0.0685
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0042	0.0180
Toluene	0.0036	0.0182
Ethylbenzene	0.0001	0.0006
Xylenes	0.0010	0.0057
C8+ Heavies	0.0143	0.0973
Subtotal	99.98180	99.96800
Oxygen/Argon	0.00	0.00
Alcohols	0.0182	0.0320
Total	100.00000	100.00000

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



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-045-07868**	NAME/DESCRIP :	**Unocal 24-9DRD**
LEASE #:	**05-045-07868**		**U2 Pad**
FIELD/AREA:			**Casing**
PROJECT NO. :	**202103019**	ANALYSIS NO. :	**03**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	MARCH 05, 2021 07:18
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MARCH 1, 2021 08:30
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	345 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-794
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	23 °f	SAMPLING COMPANY:	CAERUS OIL & GAS LLC
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	- ppm
H2O BY STAIN TUBE:	- #/mmcf	CO2 BY STAIN TUBE:	- Mol %
FIELD COMMENTS:			
LAB COMMENTS:			

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ **14.65**	GPM @ **14.73**
Nitrogen	---	0.08	0.12	---	---
Carbon Dioxide	---	4.76	11.52	---	---
Methane	P1	90.94580	80.19140	---	---
Ethane	P2	3.3554	5.5455	0.894	0.899
Propane	P3	0.4780	1.1585	0.131	0.132
i-Butane	I4	0.1180	0.3769	0.039	0.039
Methanol	X1	0.0182	0.0320	0.002	0.002
n-Butane	P4	0.0716	0.2288	0.023	0.023
2,2-Dimethylpropane	I5	0.0025	0.0099	0.001	0.001
i-Pentane	I5	0.0363	0.1439	0.013	0.013
n-Pentane	P5	0.0202	0.0801	0.007	0.007
2,2-Dimethylbutane	I6	0.0022	0.0104	0.001	0.001
Cyclopentane	N5	0.0010	0.0038	0.000	0.000
2,3-Dimethylbutane	I6	0.0030	0.0142	0.001	0.001
2-Methylpentane	I6	0.0114	0.0540	0.005	0.005
3-Methylpentane	I6	0.0064	0.0303	0.003	0.003
n-Hexane	P6	0.0137	0.0649	0.006	0.006
2,2-Dimethylpentane	I7	0.0007	0.0038	0.000	0.000
Methylcyclopentane	N6	0.0079	0.0365	0.003	0.003
2,4-Dimethylpentane	I7	0.0011	0.0060	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0003	0.0016	0.000	0.000
Benzene	A6	0.0042	0.0180	0.001	0.001
3,3-Dimethylpentane	I7	0.0004	0.0022	0.000	0.000
Cyclohexane	N6	0.0083	0.0384	0.003	0.003
2-Methylhexane	I7	0.0044	0.0242	0.002	0.002
2,3-Dimethylpentane	I7	0.0011	0.0060	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0009	0.0048	0.000	0.000
3-Methylhexane	I7	0.0038	0.0209	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0012	0.0065	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0013	0.0070	0.001	0.001
3-Ethylpentane	I7	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0018	0.0097	0.001	0.001
n-Heptane	P7	0.0065	0.0358	0.003	0.003
1c,2-Dimethylcyclopentane	N7	0.0001	0.0005	0.000	0.000
Methylcyclohexane	N7	0.0127	0.0685	0.005	0.005
2,2-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
Ethylcyclopentane	N7	0.0004	0.0021	0.000	0.000

EMPACT Analytical Systems, Inc 365 S. Main Street, Brighton, CO 80601 303-637-0150

2,5-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
2,4-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0036	0.0182	0.001	0.001
2,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0006	0.0038	0.000	0.000
4-Methylheptane	I8	0.0002	0.0013	0.000	0.000
3-Methylheptane	I8	0.0005	0.0031	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0007	0.0043	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0003	0.0019	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
n-Octane	P8	0.0009	0.0057	0.000	0.000
1c,4-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0006	0.0035	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0011	0.000	0.000
4-Methyloctane	I9	0.0001	0.0007	0.000	0.000
2-Methyloctane	I9	0.0001	0.0007	0.000	0.000
3-Methyloctane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0002	0.0011	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Nonane	P9	0.0003	0.0021	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0005	0.0039	0.000	0.000
1,3-Methylethylbenzene	A9	0.0018	0.0119	0.001	0.001
1,4-Methylethylbenzene	A9	0.0008	0.0053	0.000	0.000
2-Methylnonane	I10	0.0006	0.0047	0.000	0.000
t-Butylbenzene	A10	0.0026	0.0192	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0004	0.0026	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0008	0.0059	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0001	0.0008	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	1.1521	1.1581

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0042	0.0180
TOLUENE	0.0036	0.0182
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0010	0.0057
TOTAL BTEX	0.0089	0.0425

(DETAILED HYDROCARBON ANALYSIS/NJ 1993)
Mod ASTM D6730,GPA 2261 & GPA 2286.
(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)

	BTU @	14.65	14.73
LHV	NET DRY REAL :	904.5 /scf	909.5 /scf
	NET WET REAL :	888.7 /scf	893.7 /scf
HHV	GROSS DRY REAL :	1003.1 /scf	1008.6 /scf
	GROSS WET REAL :	985.6 /scf	991.1 /scf
	NET HEATING VALUE (60 °F ideal reaction):		18893.3 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		20950.7 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6273
	DENSITY		0.04794 lb/scf
	COMPRESSIBILITY FACTOR :		0.9977
	REGULAR WOBBE INDEX		1267.6

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

				C6+factors
Net Dry Ideal BTU	4729.8 /scf	Relative Density - SG (Air=1)	3.2806	0.99173
Gross Dry Ideal BTU	5082.5 /scf	Z Compressiblity Factor	0.99268	
Net Dry Ideal BTU	19004.4 /lb	Density Factor	250.393 lbm/1000 ft3	
Gross Dry Ideal BTU	20420.5 /lb	Molar Mass or MW	95.023 g/mol	
		Volume Liquid Ideal gas	0.042 scf/gal	23.9

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.