EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

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

PROJECT NO. :	**202103019**	ANALYSIS NO. :	**06**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	MARCH 04, 2021 14:19
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MARCH 1, 2021 09:30
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	26	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-717
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	24	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:

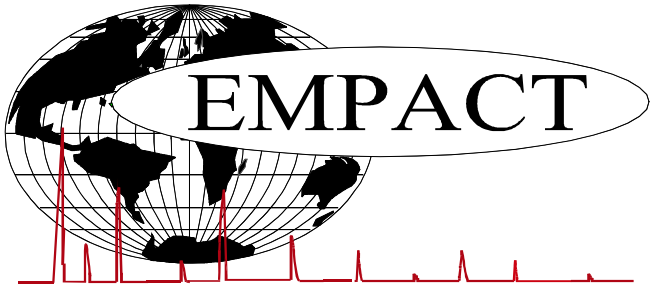
COMPONENT	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
ALCOHOLS	0.0053	0.0128	0.0010	0.0010
HELIUM	0.00	0.00	---	---
HYDROGEN	2.47	0.29	---	---
OXYGEN/ARGON	0.10	0.19	---	---
NITROGEN	1.63	2.67	---	---
CARBON DIOXIDE	0.01	0.03	---	---
METHANE	89.8320	84.2120	---	---
ETHANE	4.2155	7.4070	1.1229	1.1291
PROPANE	1.1278	2.9060	0.3097	0.3114
I-BUTANE	0.2350	0.7982	0.0769	0.0773
N-BUTANE	0.1974	0.6705	0.0619	0.0623
I-PENTANE	0.0815	0.3435	0.0290	0.0291
N-PENTANE	0.0383	0.1615	0.0140	0.0141
HEXANES PLUS	0.0572	0.3085	0.0170	0.0170
TOTALS	100.00000	100.00000	1.6324	1.6413

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0009	0.0041
TOLUENE	0.0007	0.0037
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0003	0.0018
TOTAL BTEX	0.0020	0.0102

	BTU @	14.65	14.73
LHV	NET DRY REAL :	936.6 /scf	941.7 /scf
	NET WET REAL :	920.2 /scf	925.3 /scf
HHV	GROSS DRY REAL :	1038.3 /scf	1044.0 /scf
	GROSS WET REAL :	1020.1 /scf	1025.8 /scf

NET HEATING VALUE (60 °F ideal reaction):	20804.5 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23065.7 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.5905
DENSITY	0.04509 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9978
REGULAR WOBBE INDEX	1352.5

**(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. :	06
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	MARCH 04, 2021 14:19
ACCOUNT NO. :		SAMPLE DATE :	MARCH 1, 2021 09:30
PRODUCER :		CYLINDER NO. :	ECA-717
LEASE NO. :	05-045-13000	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	Unocal 13D-9D U2 Pad Braidenhead		
FIELD DATA		SAMPLE TEMP. :	24
SAMPLE PRES. :	26	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	2.47	0.29
Carbon Dioxide	0.01	0.03
Nitrogen	1.63	2.67
Methane	89.8320	84.2120
Ethane	4.2155	7.4070
Propane	1.1278	2.9060
Isobutane	0.2350	0.7982
n-Butane	0.1974	0.6705
Isopentane	0.0802	0.3382
n-Pentane	0.0383	0.1615
Cyclopentane	0.0013	0.0053
n-Hexane	0.0080	0.0403
Cyclohexane	0.0026	0.0128
Other Hexanes	0.0273	0.1370
Heptanes	0.0085	0.0495
Methylcyclohexane	0.0025	0.0143
2,2,4 Trimethylpentane	0.0002	0.0013
Benzene	0.0009	0.0041
Toluene	0.0007	0.0037
Ethylbenzene	0.0001	0.0006
Xylenes	0.0003	0.0018
C8+ Heavies	0.0061	0.0431
Subtotal	99.89470	99.79720
Oxygen/Argon	0.10	0.19
Alcohols	0.0053	0.0128
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:	**05-045-13000**	NAME/DESCRIP :	**Unocal 13D-9D**
LEASE #:	**05-045-13000**		**U2 Pad**
FIELD/AREA:			**Braidenhead**
PROJECT NO. :	**202103019**	ANALYSIS NO. :	**06**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	MARCH 04, 2021 14:19
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MARCH 1, 2021 09:30
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	26 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-717
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	24 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	PIANO #	MOLE %	MASS %	GPM @ **14.65**	GPM @ **14.73**
Hydrogen	---	2.47	0.29	---	---
Oxygen/Argon	---	0.10	0.19	---	---
Nitrogen	---	1.63	2.67	---	---
Carbon Dioxide	---	0.01	0.03	---	---
Methane	P1	89.8320	84.2120	---	---
Ethane	P2	4.2155	7.4070	1.123	1.129
Propane	P3	1.1278	2.9060	0.310	0.311
i-Butane	I4	0.2350	0.7982	0.077	0.077
Methanol	X1	0.0034	0.0064	0.000	0.000
n-Butane	P4	0.1967	0.6681	0.062	0.062
2,2-Dimethylpropane	I5	0.0035	0.0148	0.001	0.001
i-Pentane	I5	0.0767	0.3234	0.028	0.028
Acetone	X3	0.0019	0.0064	0.001	0.001
UnknownC4s	U4	0.0007	0.0024	0.000	0.000
n-Pentane	P5	0.0383	0.1615	0.014	0.014
2,2-Dimethylbutane	I6	0.0024	0.0121	0.001	0.001
Cyclopentane	N5	0.0013	0.0053	0.000	0.000
2,3-Dimethylbutane	I6	0.0031	0.0156	0.001	0.001
2-Methylpentane	I6	0.0120	0.0604	0.005	0.005
3-Methylpentane	I6	0.0060	0.0302	0.002	0.002
n-Hexane	P6	0.0080	0.0403	0.003	0.003
Methylcyclopentane	N6	0.0038	0.0187	0.001	0.001
2,4-Dimethylpentane	I7	0.0007	0.0041	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0003	0.0017	0.000	0.000
Benzene	A6	0.0009	0.0041	0.000	0.000
Cyclohexane	N6	0.0026	0.0128	0.001	0.001
2-Methylhexane	I7	0.0010	0.0058	0.000	0.000
2,3-Dimethylpentane	I7	0.0008	0.0047	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0008	0.0046	0.000	0.000

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3-Methylhexane	I7	0.0015	0.0088	0.001	0.001
1c,3-Dimethylcyclopentane	N7	0.0004	0.0023	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
3-Ethylpentane	I7	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0005	0.0029	0.000	0.000
2,2,4-Trimethylpentane	I8	0.0002	0.0013	0.000	0.000
n-Heptane	P7	0.0019	0.0111	0.001	0.001
Methylcyclohexane	N7	0.0025	0.0143	0.001	0.001
2,2-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
2,5-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0013	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	0.0007	0.0037	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0004	0.0027	0.000	0.000
4-Methylheptane	I8	0.0001	0.0006	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0001	0.0006	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0005	0.0033	0.000	0.000
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0013	0.000	0.000
n-Octane	P8	0.0004	0.0027	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0008	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0008	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
Ethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Propylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0008	0.000	0.000
Ethylbenzene	I8	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0002	0.0012	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0006	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0008	0.000	0.000
2-Methyloctane	I9	0.0001	0.0008	0.000	0.000
n-Nonane	P9	0.0001	0.0008	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0007	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0014	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0007	0.000	0.000
t-Butylbenzene	A10	0.0004	0.0032	0.000	0.000
UnknownC9s	U9	0.0001	0.0008	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0003	0.0025	0.000	0.000
1t-M-2-(4MP)cyclopentane	P12	0.0001	0.0010	0.000	0.000
n-Dodecane	P12	0.0001	0.0010	0.000	0.000
n-Tridecane	P13	0.0001	0.0010	0.000	0.000
TOTAL		100.00000	100.00000	1.6324	1.6413

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0009	0.0041
TOLUENE	0.0007	0.0037
ETHYLBENZENE	0.0001	0.0006
XYLENES	0.0003	0.0018
TOTAL BTEX	0.0020	0.0102

**(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 :	936.6 /scf	941.7 /scf
	NET WET REAL :	920.2 /scf	925.3 /scf
HHV	GROSS DRY REAL :	1038.3 /scf	1044.0 /scf
	GROSS WET REAL :	1020.1 /scf	1025.8 /scf

NET HEATING VALUE (60 °F ideal reaction):	20804.5 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	23065.7 Btu/lbm
RELATIVE DENSITY (AIR=1):	0.5905
DENSITY	0.04509 lb/scf
COMPRESSIBILITY FACTOR :	0.9978
REGULAR WOBBE INDEX	1352.5

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

Net Dry Ideal BTU	4674.3 /scf	Relative Density - SG (Air=1)	3.1954	***C6+factors***
Gross Dry Ideal BTU	5033.8 /scf	**Z** Compressiblity Factor	0.99022	0.9894
Net Dry Ideal BTU	19323.5 /lb	Density Factor	243.887 lbm/1000 ft3	
Gross Dry Ideal BTU	20807.8 /lb	Molar Mass or MW	92.549 g/mol	
		Volume Liquid Ideal gas	0.017 scf/gal	23.1

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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