EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: **05-077-05155** NAME/DESCRIP : **KENNON #1 OP15**
LEASE #: **05-077-05155**
FIELD/AREA:

PROJECT NO. : **202107030** ANALYSIS NO. : **02**
COMPANY NAME : **CAERUS OIL & GAS LLC** ANALYSIS DATE: JULY 27, 2021 13:40
OFFICE / BRANCH: PARACHUTE, CO SAMPLE DATE : JULY 22, 2021
CUSTOMER REF: TO:
PRODUCER : CAERUS OIL & GAS LLC EFFECTIVE DATE:

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

SAMPLE CYCLE: SAMPLE TYPE: SPOT
SAMPLE PRES. : 78 psig PROBE : NO
FLOW PRES. : psig CYLINDER NO. : ECA-813
LAB PRES: psig SAMPLED BY : JESSE D. LATHAM (DUSTY)
SAMPLE TEMP. : 88 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	0.0005	0.0014	0.0000	0.0000
HELIUM	0.01	0.00	---	---
HYDROGEN	0.07	0.01	---	---
OXYGEN/ARGON	0.01	0.02	---	---
NITROGEN	0.99	1.65	---	---
CARBON DIOXIDE	0.01	0.03	---	---
METHANE	95.1040	90.6376	---	---
ETHANE	3.1989	5.7142	0.8522	0.8568
PROPANE	0.4035	1.0570	0.1109	0.1115
I-BUTANE	0.0834	0.2879	0.0270	0.0271
N-BUTANE	0.0274	0.0946	0.0090	0.0090
I-PENTANE	0.0323	0.1383	0.0110	0.0110
N-PENTANE	0.0010	0.0043	0.0000	0.0000
HEXANES PLUS	0.0590	0.3547	0.0210	0.0210
TOTALS	100.00000	100.00000	1.0311	1.0364

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0055	0.0255
TOLUENE	0.0007	0.0038
ETHYLBENZENE	0.0007	0.0044
XYLENES	0.0024	0.0151
TOTAL BTEX	0.0093	0.0488

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*
Mod ASTM D6730,GPA 2261 & GPA 2286.

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

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	932.2 /scf	937.3 /scf
	NET WET REAL :	915.9 /scf	921.0 /scf
HHV	GROSS DRY REAL :	1033.9 /scf	1039.5 /scf
	GROSS WET REAL :	1015.8 /scf	1021.4 /scf

NET HEATING VALUE (60 °F ideal reaction):	21052.2 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	23351.5 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.5805
DENSITY	0.04435 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9979
REGULAR WOBBE INDEX	1358.3

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202107030	ANALYSIS NO. :	02
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	JULY 27, 2021 13:40
ACCOUNT NO. :		SAMPLE DATE :	JULY 22, 2021
PRODUCER :	CAERUS OIL & GAS LLC	CYLINDER NO. :	ECA-813
LEASE NO. :	05-077-05155	SAMPLED BY :	JESSE D. LATHAM (DUSTY)
NAME/DESCRIP :	KENNON #1 OP15		

FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	78	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.07	0.01
Carbon Dioxide	0.01	0.03
Nitrogen	0.99	1.65
Methane	95.1040	90.6376
Ethane	3.1989	5.7142
Propane	0.4035	1.0570
Isobutane	0.0834	0.2879
n-Butane	0.0274	0.0946
Isopentane	0.0321	0.1375
n-Pentane	0.0010	0.0043
Cyclopentane	0.0002	0.0008
n-Hexane	0.0004	0.0020
Cyclohexane	0.0009	0.0045
Other Hexanes	0.0131	0.0670
Heptanes	0.0083	0.0492
Methylcyclohexane	0.0025	0.0146
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0055	0.0255
Toluene	0.0007	0.0038
Ethylbenzene	0.0007	0.0044
Xylenes	0.0024	0.0151
C8+ Heavies	0.0245	0.1686
Subtotal	99.98950	99.97860
Oxygen/Argon	0.01	0.02
Alcohols	0.0005	0.0014
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	932.2	5019.9	5632.9	7170.4	**Btu/scf**
	Net Wet Real:	915.9	4932.1	5534.4	7045.1	**Btu/scf**
HHV	Gross Dry Real:	1033.9	5389.1	6051.5	7721.8	**Btu/scf**
	Gross Wet Real:	1015.8	5294.9	5945.7	7586.8	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1358.3	2874.3	3041.0	3493.4	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		21052.2	19323.9	19588.9	19176.4	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		23351.5	20746.2	21050.4	20651.0	**Btu/lbm**
Molar Mass (MW):		16.83195	101.226	114.803	142.282	**g/mol**
Relative Density (AIR=1):		0.5805	3.4952	3.9635	4.9126	**SG**
Density:		0.04435	0.26676	0.30251	0.37493	**lbm/scf**
Compressiblity Factor:		0.9979	0.9940	0.9973	0.9996	**Z**
Liquid Volume real gas @:	**14.65**	17.1791	0.0209	0.011	0	**gal/1000 scf**

**** The Wobbe pressure base in the number considered is based upon the given Pb of the HHV above.***

#DIV/0 or 0 (zero) will appear in the Calculated Value Section when there is no C6+, C8+ or C10+ in the sample to calculate these factors.

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.

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

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-077-05155**	NAME/DESCRIP :	**KENNON #1 OP15**
LEASE #:	**05-077-05155**		
FIELD/AREA:			
PROJECT NO. :	**202107030**	ANALYSIS NO. :	**02**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	JULY 27, 2021 13:40
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JULY 22, 2021
CUSTOMER REF:		TO:	
PRODUCER :	CAERUS OIL & GAS LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	78 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-813
LAB PRES:	psig	SAMPLED BY :	JESSE D. LATHAM (DUSTY)
SAMPLE TEMP. :	88 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**
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.07	0.01	---	---
Oxygen/Argon	---	0.01	0.02	---	---
Nitrogen	---	0.99	1.65	---	---
Carbon Dioxide	---	0.01	0.03	---	---
Methane	P1	95.1040	90.6376	---	---
Ethane	P2	3.1989	5.7142	0.852	0.857
Propane	P3	0.4035	1.0570	0.111	0.112
i-Butane	I4	0.0834	0.2879	0.027	0.027
n-Butane	P4	0.0274	0.0946	0.009	0.009
2,2-Dimethylpropane	I5	0.0036	0.0154	0.001	0.001
Ethanol	X2	0.0005	0.0014	0.000	0.000
i-Pentane	I5	0.0285	0.1221	0.010	0.010
n-Pentane	P5	0.0010	0.0043	0.000	0.000
2,2-Dimethylbutane	I6	0.0040	0.0205	0.002	0.002
Cyclopentane	N5	0.0002	0.0008	0.000	0.000
2,3-Dimethylbutane	I6	0.0039	0.0200	0.002	0.002
2-Methylpentane	I6	0.0006	0.0031	0.000	0.000
3-Methylpentane	I6	0.0032	0.0164	0.001	0.001
n-Hexane	P6	0.0004	0.0020	0.000	0.000
Methylcyclopentane	N6	0.0014	0.0070	0.000	0.000
2,4-Dimethylpentane	I7	0.0017	0.0101	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0006	0.0036	0.000	0.000
Benzene	A6	0.0055	0.0255	0.002	0.002
3,3-Dimethylpentane	I7	0.0007	0.0042	0.000	0.000
Cyclohexane	N6	0.0009	0.0045	0.000	0.000
2-Methylhexane	I7	0.0002	0.0012	0.000	0.000
2,3-Dimethylpentane	I7	0.0019	0.0113	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0005	0.0029	0.000	0.000
3-Methylhexane	I7	0.0003	0.0018	0.000	0.000

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

1c,3-Dimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0003	0.0017	0.000	0.000
3-Ethylpentane	I7	0.0003	0.0018	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0005	0.0029	0.000	0.000
n-Heptane	P7	0.0006	0.0036	0.000	0.000
Methylcyclohexane	N7	0.0025	0.0146	0.001	0.001
2,2-Dimethylhexane	I8	0.0012	0.0081	0.001	0.001
Ethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
2,5-Dimethylhexane	I8	0.0014	0.0095	0.001	0.001
2,4-Dimethylhexane	I8	0.0006	0.0041	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0011	0.0073	0.001	0.001
3,3-Dimethylhexane	I8	0.0002	0.0014	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0007	0.0047	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0007	0.0038	0.000	0.000
2,3-Dimethylhexane	I8	0.0005	0.0034	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0002	0.0014	0.000	0.000
2-Methylheptane	I8	0.0005	0.0034	0.000	0.000
4-Methylheptane	I8	0.0002	0.0014	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0002	0.0014	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0004	0.0027	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0013	0.0087	0.001	0.001
3-Ethylhexane	I8	0.0001	0.0006	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0004	0.0027	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0014	0.0093	0.001	0.001
3c-Ethylmethylcyclopentane	N8	0.0002	0.0013	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0034	0.0227	0.002	0.002
UnknownC7s	U7	0.0003	0.0018	0.000	0.000
n-Octane	P8	0.0013	0.0088	0.001	0.001
1c,4-Dimethylcyclohexane	N8	0.0008	0.0053	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0006	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0008	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0005	0.0033	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0009	0.0068	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0019	0.0145	0.001	0.001
Ethylcyclohexane	N8	0.0011	0.0073	0.000	0.000
n-Propylcyclopentane	N8	0.0014	0.0093	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0015	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0008	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0002	0.0015	0.000	0.000
Ethylbenzene	I8	0.0007	0.0044	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0088	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0006	0.0038	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0008	0.000	0.000
4-Methyloctane	I9	0.0001	0.0008	0.000	0.000
2-Methyloctane	I9	0.0001	0.0008	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0008	0.000	0.000
3-Methyloctane	I9	0.0001	0.0008	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0004	0.0025	0.000	0.000
n-Nonane	P9	0.0001	0.0008	0.000	0.000
UnknownC9s	U9	0.0005	0.0038	0.000	0.000
n-Decane	P10	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	1.0311	1.0364

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0055	0.0255	LHV NET DRY REAL :	932.2 /scf	937.3 /scf

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

TOLUENE	0.0007	0.0038
ETHYLBENZENE	0.0007	0.0044
XYLENES	0.0024	0.0151
TOTAL BTEX	0.0093	0.0488

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*
Mod ASTM D6730,GPA 2261 & GPA 2286.

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

	NET WET REAL :	915.9 **/scf**	921.0 **/scf**
HHV	GROSS DRY REAL :	1033.9 **/scf**	1039.5 **/scf**
	GROSS WET REAL :	1015.8 **/scf**	1021.4 **/scf**
	NET HEATING VALUE (60 °F ideal reaction):		21052.2 **Btu/lbm**
	GROSS HEATING VALUE (60°F ideal reaction):		23351.5 **Btu/lbm**
	RELATIVE DENSITY (AIR=1):		0.5805
	DENSITY		0.04435 **lb/scf**
	COMPRESSIBILITY FACTOR :		0.9979
	REGULAR WOBBE INDEX		1358.3

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

Net Dry Ideal BTU	5005.6 **/scf**	Relative Density - SG (Air=1)	3.4952		***C6+factors***
Gross Dry Ideal BTU	5373.7 **/scf**	**Z** Compressiblity Factor	0.99403		0.99302
Net Dry Ideal BTU	19323.9 **/lb**	Density Factor	266.762	**lbm/1000 ft3**	
Gross Dry Ideal BTU	20746.2 **/lb**	Molar Mass or MW	101.226	**g/mol**	
		Volume Liquid Ideal gas	0.021	**scf/gal**	23.2

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.

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