EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-045-06943**	NAME/DESCRIP :	**I10 PARKER RANCH 10-9**
LEASE #:	**05-045-06943**		**BRAIDEN HEAD**
FIELD/AREA:			

PROJECT NO. :	**202107021**	ANALYSIS NO. :	**06**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	JULY 08, 2021 11:14
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	JUNE 30, 2021
CUSTOMER REF:		TO:	
PRODUCER :	CAERUS OIL & GAS LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	108	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-724
LAB PRES:		psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	73	ºf	SAMPLING COMPANY:	COG
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
HELIUM	0.05	0.01	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.02	---	---
NITROGEN	2.96	4.56	---	---
CARBON DIOXIDE	0.00	0.00	---	---
METHANE	88.8973	78.3383	---	---
ETHANE	5.2972	8.7495	1.4120	1.4197
PROPANE	1.5874	3.8450	0.4357	0.4381
I-BUTANE	0.3315	1.0584	0.1079	0.1085
N-BUTANE	0.3524	1.1251	0.1109	0.1115
I-PENTANE	0.1444	0.5718	0.0530	0.0532
N-PENTANE	0.1128	0.4470	0.0410	0.0412
HEXANES PLUS	0.2570	1.2749	0.1000	0.1003
TOTALS	100.00000	100.00000	2.2605	2.2725

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0032	0.0137
TOLUENE	0.0006	0.0030
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
TOTAL BTEX	0.0038	0.0167

**(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 :	971.5 /scf	976.8 /scf
	NET WET REAL :	954.5 /scf	959.8 /scf
HHV	GROSS DRY REAL :	1075.5 /scf	1081.4 /scf
	GROSS WET REAL :	1056.7 /scf	1062.6 /scf

NET HEATING VALUE (60 °F ideal reaction):	20277.5	**Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	22446.7	**Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6285	
DENSITY	0.04797	**lbm/scf**
COMPRESSIBILITY FACTOR :	0.9976	
REGULAR WOBBE INDEX	1357.6	

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202107021	ANALYSIS NO. :	06
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	JULY 08, 2021 11:14
ACCOUNT NO. :		SAMPLE DATE :	JUNE 30, 2021
PRODUCER :	CAERUS OIL & GAS LLC	CYLINDER NO. :	ECA-724
LEASE NO. :	05-045-06943	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	I10 PARKER RANCH 10-9 BRAIDEN HEAD		
FIELD DATA		SAMPLE TEMP. :	73
SAMPLE PRES. :	108	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm*		
COMMENTS :	***SPOT*** ***NO PROBE***		

Componet	Mole %	Wt %
Helium	0.05	0.01
Hydrogen	0.00	0.00
Carbon Dioxide	0.00	0.00
Nitrogen	2.96	4.56
Methane	88.8973	78.3383
Ethane	5.2972	8.7495
Propane	1.5874	3.8450
Isobutane	0.3315	1.0584
n-Butane	0.3524	1.1251
Isopentane	0.1388	0.5502
n-Pentane	0.1128	0.4470
Cyclopentane	0.0056	0.0216
n-Hexane	0.0489	0.2315
Cyclohexane	0.0271	0.1253
Other Hexanes	0.0906	0.4264
Heptanes	0.0546	0.2991
Methylcyclohexane	0.0283	0.1527
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0032	0.0137
Toluene	0.0006	0.0030
Ethylbenzene	0.0000	0.0000
Xylenes	0.0000	0.0000
C8+ Heavies	0.0036	0.0226
Subtotal	99.99000	99.98000
Oxygen/Argon	0.01	0.02
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	971.5	4592.8	5737.2	#DIV/0!	**Btu/scf**
	Net Wet Real:	954.5	4512.5	5636.9	#DIV/0!	**Btu/scf**
HHV	Gross Dry Real:	1075.5	4945.2	6183.7	#DIV/0!	**Btu/scf**
	Gross Wet Real:	1056.7	4858.8	6075.6	#DIV/0!	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1357.6	2783.4	3102.6	#DIV/0!	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		20277.5	19308.9	19715.4	#DIV/0!	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		22446.7	20794.3	21249.1	#DIV/0!	**Btu/lbm**
Molar Mass (MW):		18.20366	90.316	115.037	#DIV/0!	**g/mol**
Relative Density (AIR=1):		0.6285	3.1178	3.9719	#DIV/0!	**SG**
Density:		0.04797	0.23800	0.30314	#DIV/0!	**lbm/scf**
Compressiblity Factor:		0.9976	0.9907	0.9968	#DIV/0!	**Z**
Liquid Volume real gas @:	**14.65**	17.5698	0.0997	0	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.

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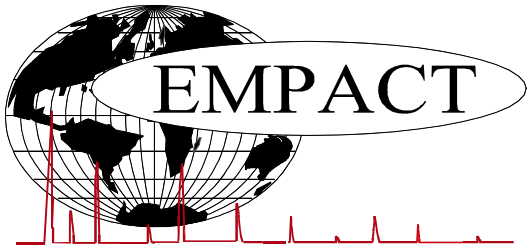

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-045-06943**	NAME/DESCRIP :	**I10 PARKER RANCH 10-9**
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SAMPLE PRES. :	108 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-724
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	73 ºf	SAMPLING COMPANY:	COG
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	---	0.05	0.01	---	---
Oxygen/Argon	---	0.01	0.02	---	---
Nitrogen	---	2.96	4.56	---	---
Methane	P1	88.8973	78.3383	---	---
Ethane	P2	5.2972	8.7495	1.412	1.420
Propane	P3	1.5874	3.8450	0.436	0.438
i-Butane	I4	0.3315	1.0584	0.108	0.109
n-Butane	P4	0.3524	1.1251	0.111	0.112
2,2-Dimethylpropane	I5	0.0040	0.0159	0.002	0.002
i-Pentane	I5	0.1348	0.5343	0.049	0.049
n-Pentane	P5	0.1128	0.4470	0.041	0.041
2,2-Dimethylbutane	I6	0.0042	0.0199	0.002	0.002
Cyclopentane	N5	0.0056	0.0216	0.002	0.002
2,3-Dimethylbutane	I6	0.0076	0.0360	0.003	0.003
2-Methylpentane	I6	0.0367	0.1738	0.015	0.015
3-Methylpentane	I6	0.0190	0.0899	0.008	0.008
n-Hexane	P6	0.0489	0.2315	0.020	0.020
2,2-Dimethylpentane	I7	0.0005	0.0027	0.000	0.000
Methylcyclopentane	N6	0.0231	0.1068	0.008	0.008
2,4-Dimethylpentane	I7	0.0020	0.0110	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0004	0.0022	0.000	0.000
Benzene	A6	0.0032	0.0137	0.001	0.001
3,3-Dimethylpentane	I7	0.0007	0.0038	0.000	0.000
Cyclohexane	N6	0.0271	0.1253	0.009	0.009
2-Methylhexane	I7	0.0093	0.0512	0.004	0.004
2,3-Dimethylpentane	I7	0.0028	0.0154	0.001	0.001
1,1-Dimethylcyclopentane	N7	0.0019	0.0103	0.001	0.001
3-Methylhexane	I7	0.0082	0.0452	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0030	0.0162	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0027	0.0146	0.001	0.001

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3-Ethylpentane	I7	0.0003	0.0016	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0044	0.0237	0.002	0.002
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0178	0.0980	0.008	0.008
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0283	0.1527	0.011	0.011
2,2-Dimethylhexane	I8	0.0003	0.0019	0.000	0.000
Ethylcyclopentane	N7	0.0004	0.0021	0.000	0.000
2,5-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0006	0.0030	0.000	0.000
2,3-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
2-Methylheptane	I8	0.0004	0.0025	0.000	0.000
4-Methylheptane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0002	0.0013	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0004	0.0025	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0007	0.0044	0.000	0.000
1c,4-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
n-Nonane	P9	0.0002	0.0014	0.000	0.000
TOTAL		100.00000	100.00000	2.2605	2.2725

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0032	0.0137
TOLUENE	0.0006	0.0030
ETHYLBENZENE	0.0000	0.0000
XYLENES	0.0000	0.0000
TOTAL BTEX	0.0038	0.0167

*(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
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	NET WET REAL :	954.5 /scf	959.8 /scf
HHV	GROSS DRY REAL :	1075.5 /scf	1081.4 /scf
	GROSS WET REAL :	1056.7 /scf	1062.6 /scf
	NET HEATING VALUE (60 °F ideal reaction):		20277.5 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		22446.7 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6285
	DENSITY		0.04797 lb/scf
	COMPRESSIBILITY FACTOR :		0.9976
	REGULAR WOBBE INDEX		1357.6

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

Net Dry Ideal BTU	4564.5 /scf	Relative Density - SG (Air=1)	3.1178		C6+factors
Gross Dry Ideal BTU	4914.7 /scf	Z Compressiblity Factor	0.99073		0.99027
Net Dry Ideal BTU	19308.9 /lb	Density Factor	237.998	lbm/1000 ft3	
Gross Dry Ideal BTU	20794.3 /lb	Molar Mass or MW	90.316	g/mol	
		Volume Liquid Ideal gas	0.1	scf/gal	24.4

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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