EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-10976**	NAME/DESCRIP :	**FEDERAL #2S-95-15-42BP**
LEASE #:	**05-103-10976**		**RIO BLANCO COUNTY #103**
FIELD/AREA:	**PICEANCE CREEK - #68800**		**BRAIDEN HEAD**

PROJECT NO. :	**202306008**	ANALYSIS NO. :	**02**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	JUNE 04, 2023 13:28
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 10, 2023 14:30
CUSTOMER REF:		TO:	
PRODUCER :	CAERUS PICEANCE LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	20	psig	PROBE :	NO
FLOW PRES. :		psig	CYLINDER NO. :	ECA-763
LAB PRES:		psig	SAMPLED BY :	NICK CROY
SAMPLE TEMP. :	64	ºf	SAMPLING COMPANY:	CAERUS OIL & GAS LLC
AMBIENT TEMP.:		ºf	H2S BY STAIN TUBE:	ppm mol
H2O BY STAIN TUBE:	-	#/mmcf	CO2 BY STAIN TUBE:	- Mol %

FIELD COMMENTS:

LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
GLYCOLS	0.0001	0.0004	0.0000	0.0000
ALCOHOLS	0.0032	0.0041	0.0000	0.0000
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	5.29	5.80	---	---
CARBON DIOXIDE	0.01	0.02	---	---
METHANE	62.2463	39.0998	---	---
ETHANE	11.8080	13.9022	3.1554	3.1726
PROPANE	13.1471	22.6995	3.6192	3.6390
I-BUTANE	4.0271	9.1649	1.3163	1.3234
N-BUTANE	1.9892	4.5271	0.6261	0.6295
I-PENTANE	0.4104	1.1579	0.1492	0.1500
N-PENTANE	0.2794	0.7893	0.1012	0.1017
HEXANES PLUS	0.7892	2.8348	0.3272	0.3289
TOTALS	100.00000	100.00000	9.2946	9.3451

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0022	0.0067
TOLUENE	0.0054	0.0195
ETHYLBENZENE	0.0006	0.0025
XYLENES	0.0035	0.0146
TOTAL BTEX	0.0117	0.0433

CALCULATED VALUES**

	BTU @	14.65	14.73
LHV	NET DRY REAL :	1306.2 /scf	1313.4 /scf
	NET WET REAL :	1283.4 /scf	1290.6 /scf
HHV	GROSS DRY REAL :	1433.2 /scf	1441.0 /scf
	GROSS WET REAL :	1408.1 /scf	1415.9 /scf

NET HEATING VALUE (60 °F ideal reaction):	19386.9	**Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	21273.8	**Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.8813	
DENSITY	0.06730	**lbm/scf**
COMPRESSIBILITY FACTOR :	0.9952	
REGULAR WOBBE INDEX	1524.0	

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

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

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202306008	ANALYSIS NO. :	02
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	JUNE 04, 2023 13:28
ACCOUNT NO. :		SAMPLE DATE :	MAY 10, 2023 14:30
PRODUCER :	CAERUS PICEANCE LLC	CYLINDER NO. :	ECA-763
LEASE NO. :	05-103-10976	SAMPLED BY :	NICK CROY
NAME/DESCRIP :	FEDERAL #2S-95-15-42BP RIO BLANCO COUNTY #103 BRAIDEN HEAD		
FIELD DATA		SAMPLE TEMP. :	64
SAMPLE PRES. :	20	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	*SPOT* *NO PROBE*		

Componet	Mole %	Wt %
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	0.01	0.02
Nitrogen	5.29	5.80
Methane	62.2463	39.0998
Ethane	11.8080	13.9022
Propane	13.1471	22.6995
Isobutane	4.0271	9.1649
n-Butane	1.9892	4.5271
Isopentane	0.3908	1.1041
n-Pentane	0.2794	0.7893
Cyclopentane	0.0196	0.0538
n-Hexane	0.1781	0.6010
Cyclohexane	0.0411	0.1354
Other Hexanes	0.3036	1.0207
Heptanes	0.1533	0.5995
Methylcyclohexane	0.0453	0.1742
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0022	0.0067
Toluene	0.0054	0.0195
Ethylbenzene	0.0006	0.0025
Xylenes	0.0035	0.0146
C8+ Heavies	0.0561	0.2607
Subtotal	99.99670	99.99550
Oxygen/Argon	0.00	0.00
Glycols	0.0001	0.0004
Alcohols	0.0032	0.0041
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	1306.2	4677.0	5885.5	7292.1	**Btu/scf**
	Net Wet Real:	1283.4	4595.2	5782.6	7164.6	**Btu/scf**
HHV	Gross Dry Real:	1433.2	5042.6	6332.4	7872.7	**Btu/scf**
	Gross Wet Real:	1408.1	4954.4	6221.7	7735.1	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1524.0	2814.4	3141.9	3532.9	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		19386.9	19357.3	19572.5	19241.7	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		21273.8	20863.6	21061.3	20764.6	**Btu/lbm**
Molar Mass (MW):		25.53922	91.726	117.792	144.623	**g/mol**
Relative Density (AIR=1):		0.8813	3.1679	4.0679	4.9934	**SG**
Density:		0.06730	0.24174	0.31042	0.38111	**lbm/scf**
Compressiblity Factor:		0.9952	0.9903	0.9976	0.9996	**Z**
Liquid Volume real gas @:	**14.65**	20.3242	0.326	0.0249	0.001	**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.

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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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	---	0.00	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	5.29	5.80	---	---
Carbon Dioxide	---	0.01	0.02	---	---
Methane	P1	62.2463	39.0998	---	---
Ethane	P2	11.8080	13.9022	3.155	3.173
Propane	P3	13.1471	22.6995	3.619	3.639
i-Butane	I4	4.0271	9.1649	1.316	1.323
Methanol	X1	0.0031	0.0039	0.000	0.000
n-Butane	P4	1.9886	4.5257	0.626	0.630
2,2-Dimethylpropane	I5	0.0396	0.1119	0.015	0.015
Ethanol	X2	0.0001	0.0002	0.000	0.000
i-Pentane	I5	0.3512	0.9922	0.128	0.129
UnknownC4s	U4	0.0006	0.0014	0.000	0.000
n-Pentane	P5	0.2794	0.7893	0.101	0.102
2,2-Dimethylbutane	I6	0.0136	0.0459	0.006	0.006
Cyclopentane	N5	0.0196	0.0538	0.006	0.006
2,3-Dimethylbutane	I6	0.0313	0.1056	0.013	0.013
2-Methylpentane	I6	0.1395	0.4707	0.058	0.058
3-Methylpentane	I6	0.0721	0.2433	0.029	0.029
n-Hexane	P6	0.1781	0.6010	0.073	0.074
2,2-Dimethylpentane	I7	0.0020	0.0078	0.001	0.001
Methylcyclopentane	N6	0.0471	0.1552	0.017	0.017
2,4-Dimethylpentane	I7	0.0087	0.0341	0.004	0.004
2,2,3-Trimethylbutane	I7	0.0015	0.0059	0.001	0.001
Benzene	A6	0.0022	0.0067	0.001	0.001
3,3-Dimethylpentane	I7	0.0019	0.0074	0.001	0.001
Cyclohexane	N6	0.0411	0.1354	0.014	0.014
2-Methylhexane	I7	0.0256	0.1004	0.012	0.012

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2,3-Dimethylpentane	I7	0.0134	0.0526	0.006	0.006
1,1-Dimethylcyclopentane	N7	0.0041	0.0158	0.002	0.002
3-Methylhexane	I7	0.0252	0.0989	0.012	0.012
1c,3-Dimethylcyclopentane	N7	0.0061	0.0235	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0053	0.0204	0.002	0.002
3-Ethylpentane	I7	0.0007	0.0027	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0088	0.0338	0.004	0.004
n-Heptane	P7	0.0478	0.1876	0.022	0.022
1c,2-Dimethylcyclopentane	N7	0.0006	0.0023	0.000	0.000
Methylcyclohexane	N7	0.0453	0.1742	0.018	0.018
2,2-Dimethylhexane	I8	0.0018	0.0081	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0013	0.000	0.000
Ethylcyclopentane	N7	0.0013	0.0050	0.001	0.001
2,5-Dimethylhexane	I8	0.0021	0.0094	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0020	0.0089	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0010	0.0044	0.000	0.000
3,3-Dimethylhexane	I8	0.0005	0.0022	0.000	0.000
Toluene	A7	0.0054	0.0195	0.002	0.002
2,3-Dimethylhexane	I8	0.0010	0.0045	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0002	0.0009	0.000	0.000
2-Methylheptane	I8	0.0057	0.0255	0.003	0.003
4-Methylheptane	I8	0.0016	0.0072	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0003	0.0013	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0009	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0035	0.0157	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0052	0.0228	0.003	0.003
3-Ethylhexane	I8	0.0005	0.0022	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0023	0.0101	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0006	0.0026	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0013	0.0057	0.001	0.001
1t,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
n-Octane	P8	0.0075	0.0336	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0015	0.0066	0.001	0.001
2,3,5-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,2-Dimethylheptane	I9	0.0004	0.0020	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0010	0.0049	0.001	0.001
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	0.0011	0.0048	0.000	0.000
n-Propylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0009	0.0045	0.001	0.001
3,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0006	0.0025	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0022	0.0092	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0009	0.0038	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0005	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0005	0.0025	0.000	0.000
2-Methyloctane	I9	0.0008	0.0040	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0001	0.0005	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0008	0.0040	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0004	0.0016	0.000	0.000

i-Butylcyclopentane	N9	0.0004	0.0020	0.000	0.000
n-Nonane	P9	0.0024	0.0121	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0005	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0010	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0014	0.000	0.000
Diethylene glycol	GL4	0.0001	0.0004	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
1,3-Methylethylbenzene	A9	0.0002	0.0009	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0005	0.0024	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0002	0.0011	0.000	0.000
2-Methylnonane	I10	0.0003	0.0017	0.000	0.000
3-Ethyloctane	I10	0.0002	0.0011	0.000	0.000
3-Methylnonane	I10	0.0003	0.0017	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0016	0.000	0.000
UnknownC9s	U9	0.0003	0.0015	0.000	0.000
n-Decane	P10	0.0010	0.0056	0.001	0.001
1,4-Methyl-i-propylbenzene	A10	0.0002	0.0011	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0003	0.0017	0.000	0.000
n-Undecane	P11	0.0003	0.0018	0.000	0.000
UnknownC11s	U11	0.0002	0.0012	0.000	0.000
n-Dodecane	P12	0.0001	0.0007	0.000	0.000
n-Tridecane	P13	0.0001	0.0007	0.000	0.000
n-Tetradecane	P14	0.0001	0.0008	0.000	0.000
TOTAL		100.00000	100.00000	9.2946	9.3451

BTEX COMPONENTS	MOLE%	WT%
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TOLUENE	0.0054	0.0195
ETHYLBENZENE	0.0006	0.0025
XYLENES	0.0035	0.0146
TOTAL BTEX	0.0117	0.0433

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	NET HEATING VALUE (60 °F ideal reaction):		19386.9	Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		21273.8	Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.8813	
	DENSITY		0.06730	lb/scf
	COMPRESSIBILITY FACTOR :		0.9952	
	REGULAR WOBBE INDEX		1524.0	

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

Net Dry Ideal BTU	4646.1 /scf	Relative Density - SG (Air=1)	3.1679	***C6+factors***
Gross Dry Ideal BTU	5009.3 /scf	**Z** Compressiblity Factor	0.99029	0.98973
Net Dry Ideal BTU	19357.3 /lb	Density Factor	241.736 lbm/1000 ft3	
Gross Dry Ideal BTU	20863.6 /lb	Molar Mass or MW	91.726 g/mol	
		Volume Liquid Ideal gas	0.327 scf/gal	23.4

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.*