EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	**05-103-10690**	NAME/DESCRIP :	**FREEDOM UNIT 297-28A5**
LEASE #:	**120193068**		**BRADEN HEAD**
FIELD/AREA:	**PICEANCE CREEK - #68800**		

PROJECT NO. :	**202405126**	ANALYSIS NO. :	**02**
COMPANY NAME :	**CAERUS OIL & GAS LLC**	ANALYSIS DATE:	MAY 31, 2024 09:25
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 15, 2024 12:25
CUSTOMER REF:		TO:	MAY 15, 2024 12:30
PRODUCER :	CAERUS PICEANCE LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT
SAMPLE PRES. :	140	psig	PROBE :	
FLOW PRES. :		psig	CYLINDER NO. :	ECA-814
LAB PRES:		psig	SAMPLED BY :	PAUL HACKING
SAMPLE TEMP. :	66	ºf	SAMPLING COMPANY:	CAERUS OIL & GAS
AMBIENT TEMP.:		ºf	H2S BY STAIN TUBE:	ppm mol
H2O BY STAIN TUBE:		#/mmcf	CO2 BY STAIN TUBE:	Mol %

FIELD COMMENTS:

LAB COMMENTS: ***Possible trace of Olefins in sample.***

COMPONENT	MOLE %	MASS %	GPM @ 14.65	GPM @ 14.73
ALCOHOLS	0.0189	0.0334	0.0020	0.0020
HELIUM	0.01	0.00	---	---
HYDROGEN	0.02	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.06	0.09	---	---
CARBON DIOXIDE	7.16	16.59	---	---
METHANE	87.7833	74.1354	---	---
ETHANE	4.1938	6.6385	1.1181	1.1242
PROPANE	0.3694	0.8575	0.1019	0.1025
I-BUTANE	0.1218	0.3727	0.0400	0.0402
N-BUTANE	0.0379	0.1160	0.0120	0.0121
I-PENTANE	0.0299	0.1135	0.0120	0.0120
N-PENTANE	0.0080	0.0304	0.0030	0.0030
HEXANES PLUS	0.1870	1.0226	0.0700	0.0700
TOTALS	100.00000	100.00000	1.3590	1.3660

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0224	0.0921
TOLUENE	0.0257	0.1247
ETHYLBENZENE	0.0011	0.0062
XYLENES	0.0113	0.0631
TOTAL BTEX	0.0605	0.2861

**(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 :	889.0 /scf	893.8 /scf
	NET WET REAL :	873.5 /scf	878.3 /scf
HHV	GROSS DRY REAL :	985.4 /scf	990.8 /scf
	GROSS WET REAL :	968.2 /scf	973.6 /scf

NET HEATING VALUE (60 °F ideal reaction):	17792.5	**Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	19723.3	**Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.6543	
DENSITY	0.05005	**lbm/scf**
COMPRESSIBILITY FACTOR :	0.9977	
REGULAR WOBBE INDEX	1219.2	

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202405126	ANALYSIS NO. :	02
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	MAY 31, 2024 09:25
ACCOUNT NO. :		SAMPLE DATE :	MAY 15, 2024 12:25
PRODUCER :	CAERUS PICEANCE LLC	CYLINDER NO. :	ECA-814
LEASE NO. :	120193068	SAMPLED BY :	PAUL HACKING
NAME/DESCRIP :	FREEDOM UNIT 297-28A5 BRADEN HEAD		
FIELD DATA		SAMPLE TEMP. :	66
SAMPLE PRES. :	140	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	_ *ppm mol*		
COMMENTS :	***SPOT*** ***Possible trace of Olefins in sample.***		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.02	0.00
Carbon Dioxide	7.16	16.59
Nitrogen	0.06	0.09
Methane	87.7833	74.1354
Ethane	4.1938	6.6385
Propane	0.3694	0.8575
Isobutane	0.1218	0.3727
n-Butane	0.0379	0.1160
Isopentane	0.0282	0.1072
n-Pentane	0.0080	0.0304
Cyclopentane	0.0017	0.0063
n-Hexane	0.0053	0.0241
Cyclohexane	0.0072	0.0319
Other Hexanes	0.0229	0.1035
Heptanes	0.0196	0.1033
Methylcyclohexane	0.0128	0.0662
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0224	0.0921
Toluene	0.0257	0.1247
Ethylbenzene	0.0011	0.0062
Xylenes	0.0113	0.0631
C8+ Heavies	0.0587	0.4075
Subtotal	99.98110	99.96660
Oxygen/Argon	0.00	0.00
Alcohols	0.0189	0.0334
Total	100.00000	100.00000

Calculated Values BTU @ **14.65**		**Total Sample**	**C6+ Fraction**	**C8+ Fraction**	**C10+ Fraction**	
LHV	Net Dry Real:	889.0	5113.6	6315.7	7478.7	**Btu/scf**
	Net Wet Real:	873.5	5024.2	6205.3	7348.0	**Btu/scf**
HHV	Gross Dry Real:	985.4	5468.0	6788.3	8086.0	**Btu/scf**
	Gross Wet Real:	968.2	5372.4	6669.6	7944.6	**Btu/scf**
Other Calculated Values						
Regualr Wobbe Index*		1219.2	2884.8	3242.8	3577.1	**Btu/scf**
Net Heating Value (60 °F ideal reaction):		17792.5	18748.6	18933.1	18799.3	**Btu/lbm**
Gross Heating Value (60°F ideal reaction):		19723.3	20051.6	20346.3	20323.2	**Btu/lbm**
Molar Mass (MW):		18.99594	103.859	127.457	148.82	**g/mol**
Relative Density (AIR=1):		0.6543	3.5858	4.3999	5.1388	**SG**
Density:		0.05005	0.27368	0.33587	0.39217	**lbm/scf**
Compressiblity Factor:		0.9977	0.9959	0.9989	0.9997	**Z**
Liquid Volume real gas @:	**14.65**	17.3784	0.0698	0.0289	0.012	**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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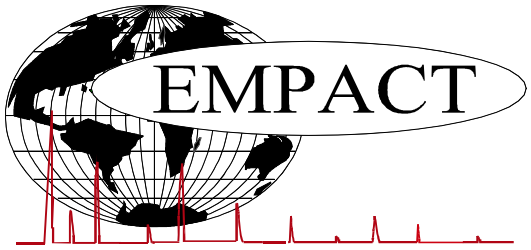

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PRIMARY DB KEY:	**05-103-10690**	NAME/DESCRIP :	**FREEDOM UNIT 297-28A5**
LEASE #:	**120193068**		**BRADEN HEAD**
FIELD/AREA:	**PICEANCE CREEK - #68800**		

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PRODUCER :	CAERUS PICEANCE LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	140 psig	PROBE :	
FLOW PRES. :	psig	CYLINDER NO. :	ECA-814
LAB PRES:	psig	SAMPLED BY :	PAUL HACKING
SAMPLE TEMP. :	66 ºf	SAMPLING COMPANY:	CAERUS OIL & GAS
AMBIENT TEMP.:	ºf	H2S BY STAIN TUBE:	_ ppm mol
H2O BY STAIN TUBE:	- #/mmcf	CO2 BY STAIN TUBE:	- Mol %
FIELD COMMENTS:			
LAB COMMENTS:	***Possible trace of Olefins in sample.***		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ **14.65**	GPM @ **14.73**
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.02	0.00	---	---
Oxygen/Argon	---	0.00	0.00	---	---
Nitrogen	---	0.06	0.09	---	---
Carbon Dioxide	---	7.16	16.59	---	---
Methane	P1	87.7833	74.1354	---	---
Ethane	P2	4.1938	6.6385	1.118	1.124
Propane	P3	0.3694	0.8575	0.102	0.103
i-Butane	I4	0.1218	0.3727	0.040	0.040
Methanol	X1	0.0178	0.0300	0.002	0.002
n-Butane	P4	0.0379	0.1160	0.012	0.012
2,2-Dimethylpropane	I5	0.0042	0.0160	0.002	0.002
i-Pentane	I5	0.0240	0.0912	0.009	0.009
Acetone	X3	0.0006	0.0018	0.000	0.000
i-Propanol	X3	0.0005	0.0016	0.000	0.000
n-Pentane	P5	0.0080	0.0304	0.003	0.003
2,2-Dimethylbutane	I6	0.0049	0.0222	0.002	0.002
Cyclopentane	N5	0.0017	0.0063	0.001	0.001
2,3-Dimethylbutane	I6	0.0022	0.0100	0.001	0.001
2-Methylpentane	I6	0.0071	0.0322	0.003	0.003
3-Methylpentane	I6	0.0042	0.0191	0.002	0.002
n-Hexane	P6	0.0053	0.0241	0.002	0.002
2,2-Dimethylpentane	I7	0.0008	0.0042	0.000	0.000
Methylcyclopentane	N6	0.0045	0.0200	0.002	0.002
2,4-Dimethylpentane	I7	0.0008	0.0042	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0004	0.0021	0.000	0.000
Benzene	A6	0.0224	0.0921	0.006	0.006
3,3-Dimethylpentane	I7	0.0007	0.0037	0.000	0.000
Cyclohexane	N6	0.0072	0.0319	0.002	0.002
2-Methylhexane	I7	0.0036	0.0190	0.002	0.002

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2,3-Dimethylpentane	I7	0.0010	0.0053	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0007	0.0036	0.000	0.000
3-Methylhexane	I7	0.0033	0.0174	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0008	0.0042	0.000	0.000
1t,3-Dimethylcyclopentane	N7	0.0008	0.0042	0.000	0.000
3-Ethylpentane	I7	0.0002	0.0011	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0012	0.0062	0.001	0.001
n-Heptane	P7	0.0046	0.0243	0.002	0.002
1c,2-Dimethylcyclopentane	N7	0.0002	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0128	0.0662	0.005	0.005
2,2-Dimethylhexane	I8	0.0005	0.0030	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0006	0.000	0.000
Ethylcyclopentane	N7	0.0004	0.0021	0.000	0.000
2,5-Dimethylhexane	I8	0.0006	0.0036	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0005	0.0030	0.000	0.000
2,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
3,3-Dimethylhexane	I8	0.0002	0.0012	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
Toluene	A7	0.0257	0.1247	0.009	0.009
2,3-Dimethylhexane	I8	0.0004	0.0024	0.000	0.000
2-Methylheptane	I8	0.0022	0.0132	0.001	0.001
4-Methylheptane	I8	0.0007	0.0042	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0006	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0019	0.0114	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0018	0.0106	0.001	0.001
3-Ethylhexane	I8	0.0002	0.0012	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0007	0.0042	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0004	0.0024	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0006	0.0035	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
n-Octane	P8	0.0039	0.0234	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0006	0.0035	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
2,2-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0008	0.0053	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0007	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0006	0.0035	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0018	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,5-Dimethylheptane	I9	0.0008	0.0054	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
Ethylbenzene	I8	0.0011	0.0062	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0077	0.0430	0.003	0.003
1,4-Dimethylbenzene (p-Xylene)	A8	0.0024	0.0134	0.001	0.001
3,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0007	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0014	0.000	0.000
4-Methyloctane	I9	0.0010	0.0067	0.001	0.001
2-Methyloctane	I9	0.0015	0.0101	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0007	0.000	0.000
3-Methyloctane	I9	0.0002	0.0014	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0014	0.0093	0.001	0.001
3,3-Diethylpentane	I9	0.0001	0.0007	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0012	0.0067	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0026	0.000	0.000
n-Nonane	P9	0.0046	0.0311	0.003	0.003
1,1-Methylethylcyclohexane	N9	0.0002	0.0013	0.000	0.000

i-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
2,4-Dimethyloctane	I10	0.0003	0.0023	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0020	0.000	0.000
3,3-Dimethyloctane	I10	0.0005	0.0037	0.000	0.000
n-Propylbenzene	A9	0.0007	0.0044	0.000	0.000
3,6-Dimethyloctane	I10	0.0004	0.0030	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0007	0.000	0.000
1,3-Methylethylbenzene	A9	0.0009	0.0057	0.001	0.001
1,4-Methylethylbenzene	A9	0.0003	0.0019	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0014	0.0088	0.001	0.001
2,3-Dimethyloctane	I10	0.0004	0.0030	0.000	0.000
5-Methylnonane	I10	0.0008	0.0060	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0013	0.000	0.000
2-Methylnonane	I10	0.0010	0.0075	0.001	0.001
3-Ethyloctane	I10	0.0002	0.0015	0.000	0.000
3-Methylnonane	I10	0.0009	0.0067	0.001	0.001
t-Butylbenzene	A10	0.0011	0.0078	0.001	0.001
i-Butylcyclohexane	N10	0.0001	0.0007	0.000	0.000
UnknownC9s	U9	0.0008	0.0054	0.000	0.000
n-Decane	P10	0.0041	0.0307	0.003	0.003
1,2,3-Trimethylbenzene	A9	0.0001	0.0006	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0004	0.0028	0.000	0.000
Sec-Butylcyclohexane	A10	0.0003	0.0022	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0008	0.000	0.000
1,3-Diethylbenzene	A10	0.0003	0.0021	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0002	0.0014	0.000	0.000
n-Butylbenzene	A10	0.0002	0.0014	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0004	0.0028	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0006	0.0043	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0007	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0004	0.0028	0.000	0.000
1,2-Ethyl-i-propylbenzene	A10	0.0002	0.0016	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0008	0.000	0.000
UnknownC10s	U10	0.0017	0.0127	0.001	0.001
n-Undecane	P11	0.0022	0.0181	0.001	0.001
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0007	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0001	0.0008	0.000	0.000
1,3-Di-i-propylbenzene	A11	0.0001	0.0008	0.000	0.000
sec-Pentylbenzene	A11	0.0001	0.0008	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0008	0.000	0.000
1,2-Di-n-propylbenzene	A11	0.0004	0.0034	0.000	0.000
1-t-Butyl-3,5-dimethylbenzene	A12	0.0001	0.0008	0.000	0.000
UnknownC11s	U11	0.0009	0.0074	0.001	0.001
n-Dodecane	P12	0.0015	0.0135	0.001	0.001
1,3,5-Triethylbenzene	A12	0.0002	0.0017	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0008	0.000	0.000
1,4-Methyl-n-pentylbenzene	A12	0.0002	0.0017	0.000	0.000
n-Hexylbenzene	A12	0.0002	0.0017	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0002	0.0016	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0007	0.000	0.000
UnknownC12s	U12	0.0008	0.0066	0.001	0.001
n-Tridecane	P13	0.0002	0.0020	0.000	0.000
UnknownC13s	U13	0.0012	0.0116	0.001	0.001
n-Tetradecane	P14	0.0001	0.0011	0.000	0.000
TOTAL		100.00000	100.00000	1.3590	1.3660

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0224	0.0921
TOLUENE	0.0257	0.1247
ETHYLBENZENE	0.0011	0.0062
XYLENES	0.0113	0.0631
TOTAL BTEX	0.0605	0.2861

**(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 :	889.0 /scf	893.8 /scf
	NET WET REAL :	873.5 /scf	878.3 /scf
HHV	GROSS DRY REAL :	985.4 /scf	990.8 /scf
	GROSS WET REAL :	968.2 /scf	973.6 /scf
	NET HEATING VALUE (60 °F ideal reaction):		17792.5 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		19723.3 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.6543
	DENSITY		0.05005 lb/scf
	COMPRESSIBILITY FACTOR :		0.9977
	REGULAR WOBBE INDEX		1219.2

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

					C6+factors
Net Dry Ideal BTU	5108.7 /scf	Relative Density - SG (Air=1)	3.5858		
Gross Dry Ideal BTU	5462.8 /scf	Z Compressiblity Factor	0.99592		0.99476
Net Dry Ideal BTU	18748.6 /lb	Density Factor	273.683	lbm/1000 ft3	
Gross Dry Ideal BTU	20051.6 /lb	Molar Mass or MW	103.859	g/mol	
		Volume Liquid Ideal gas	0.07	scf/gal	23.7

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.