



EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY:	05-045-19134	NAME/DESCRIP :	SGV FEDERAL #8-11D (8D)
LEASE #:	300115259, COC-58670		CASING
FIELD/AREA:	PARACHUTE - #67350		
PROJECT NO. :	202405083	ANALYSIS NO. :	05
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	MAY 20, 2024 08:41
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 9, 2024 9:00
CUSTOMER REF:		TO:	
PRODUCER :	CAERUS PICEANCE LLC	EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	74 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-755
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	44 °f	SAMPLING COMPANY:	CAERUS OIL & GAS LLC
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	- ppm mol
H2O BY STAIN TUBE:	- #/mmcf	CO2 BY STAIN TUBE:	- Mol %
FIELD COMMENTS:			
LAB COMMENTS:			

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.65</u>	<u>GPM @ 14.73</u>
ALCOHOLS	0.0084	0.0146	0.0010	0.0010
HELIUM	0.00	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.00	0.00	---	---
NITROGEN	0.09	0.13	---	---
CARBON DIOXIDE	1.13	2.66	---	---
METHANE	89.6729	76.8424	---	---
ETHANE	5.5080	8.8467	1.4682	1.4762
PROPANE	1.8022	4.2449	0.4947	0.4974
I-BUTANE	0.3469	1.0770	0.1129	0.1136
N-BUTANE	0.4185	1.2993	0.1319	0.1326
I-PENTANE	0.1809	0.6962	0.0650	0.0653
N-PENTANE	0.1451	0.5592	0.0520	0.0523
HEXANES PLUS	0.6971	3.6297	0.2930	0.2941
TOTALS	100.00000	100.00000	2.6187	2.6325

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>
BENZENE	0.0107	0.0447
TOLUENE	0.0288	0.1418
ETHYLBENZENE	0.0028	0.0159
XYLENES	0.0074	0.0419
TOTAL BTEX	0.0497	0.2443

	<u>BTU @ 14.65</u>	<u>14.73</u>
LHV NET DRY REAL :	1014.1 /scf	1019.7 /scf
NET WET REAL :	996.4 /scf	1002.0 /scf
HHV GROSS DRY REAL :	1121.7 /scf	1127.8 /scf
GROSS WET REAL :	1102.1 /scf	1108.2 /scf
NET HEATING VALUE (60 °F ideal reaction):	20596.9 Btu/lbm	20596.9 Btu/lbm
GROSS HEATING VALUE (60°F ideal reaction):	22780.3 Btu/lbm	22780.3 Btu/lbm
RELATIVE DENSITY (AIR=1):	0.6460	0.6460
DENSITY	0.04933 lbm/scf	0.04933 lbm/scf
COMPRESSIBILITY FACTOR :	0.9974	0.9974
REGULAR WOBBE INDEX	1396.3	1396.3

*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730,GPA 2261 & GPA 2286.

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

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



**EXTENDED NATURAL GAS ANALYSIS (*DHA)
GLYCALC INFORMATION**

PROJECT NO. :	202405083	ANALYSIS NO. :	05
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	MAY 20, 2024 08:41
ACCOUNT NO. :		SAMPLE DATE :	MAY 9, 2024 9:00
PRODUCER :	CAERUS PICEANCE LLC	CYLINDER NO. :	ECA-755
LEASE NO. :	300115259, COC-58670	SAMPLED BY :	MIKE KELLEY
NAME/DESCRIP :	SGV FEDERAL #8-11D (8D) CASING		

FIELD DATA		SAMPLE TEMP. :	44
SAMPLE PRES. :	74	AMBIENT TEMP.:	
H2S BY STAIN TUBE:	— ppm mol		
COMMENTS :	SPOT NO PROBE		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.00	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	1.13	2.66
Nitrogen	0.09	0.13
Methane	89.6729	76.8424
Ethane	5.5080	8.8467
Propane	1.8022	4.2449
Isobutane	0.3469	1.0770
n-Butane	0.4185	1.2993
Isopentane	0.1719	0.6625
n-Pentane	0.1451	0.5592
Cyclopentane	0.0090	0.0337
n-Hexane	0.0762	0.3508
Cyclohexane	0.0435	0.1956
Other Hexanes	0.1377	0.6297
Heptanes	0.1262	0.6721
Methylcyclohexane	0.0995	0.5219
2,2,4 Trimethylpentane	0.0001	0.0006
Benzene	0.0107	0.0447
Toluene	0.0288	0.1418
Ethylbenzene	0.0028	0.0159
Xylenes	0.0074	0.0419
C8+ Heavies	0.1642	1.0147
<u>Subtotal</u>	<u>99.99160</u>	<u>99.98540</u>
Oxygen/Argon	0.00	0.00
Alcohols	0.0084	0.0146
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

	<u>Total</u>	<u>C6+</u>	<u>C8+</u>	<u>C10+</u>
Calculated Values BTU @ <u>14.65</u>	Sample	Fraction	Fraction	Fraction
LHV Net Dry Real:	1014.1	4907.4	5771.9	7714.5 Btu/scf
Net Wet Real:	996.4	4821.6	5671.0	7579.6 Btu/scf
HHV Gross Dry Real:	1121.7	5276.2	6211.4	8269.1 Btu/scf
Gross Wet Real:	1102.1	5184.0	6102.8	8124.5 Btu/scf
Other Calculated Values				
Regualr Wobbe Index*	1396.3	2866.8	3117.9	3582.0 Btu/scf
Net Heating Value (60 °F ideal reaction):	20596.9	19349.2	19745.8	18959.3 Btu/lbm
Gross Heating Value (60°F ideal reaction):	22780.3	20803.1	21251.0	20323.6 Btu/lbm
Molar Mass (MW):	18.72118	97.45	115.055	155.241 g/mol
Relative Density (AIR=1):	0.6460	3.3650	3.9723	5.3602 SG
Density:	0.04933	0.25681	0.30319	0.40909 lbm/scf
Compressibility Factor:	0.9974	0.9936	0.9973	0.9998 Z
Liquid Volume real gas @: <u>14.65</u>	17.9287	0.2921	0.0817	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 underscore) indicates there was no tube pulled for H2S.

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



**EXTENDED NATURAL GAS ANALYSIS (*DHA)
DHA COMPONENT LIST**

PRIMARY DB KEY:	05-045-19134	NAME/DESCRIP :	SGV FEDERAL #8-11D (8D)
LEASE #:	300115259, COC-58670		CASING
FIELD/AREA:	PARACHUTE - #67350		
PROJECT NO. :	202405083	ANALYSIS NO. :	05
COMPANY NAME :	CAERUS OIL & GAS LLC	ANALYSIS DATE:	MAY 20, 2024 08:41
OFFICE / BRANCH:	PARACHUTE, CO	SAMPLE DATE :	MAY 9, 2024 9:00
CUSTOMER REF:		TO:	
PRODUCER :	CAERUS PICEANCE LLC	EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	74 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	ECA-755
LAB PRES:	psig	SAMPLED BY :	MIKE KELLEY
SAMPLE TEMP. :	44 °f	SAMPLING COMPANY:	CAERUS OIL & GAS LLC
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	- ppm mol
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	---	0.09	0.13	---	---
Carbon Dioxide	---	1.13	2.66	---	---
Methane	P1	89.6729	76.8424	---	---
Ethane	P2	5.5080	8.8467	1.468	1.476
Propane	P3	1.8022	4.2449	0.495	0.497
i-Butane	I4	0.3469	1.0770	0.113	0.114
Methanol	X1	0.0083	0.0142	0.001	0.001
n-Butane	P4	0.4185	1.2993	0.132	0.133
2,2-Dimethylpropane	I5	0.0039	0.0150	0.001	0.001
i-Pentane	I5	0.1680	0.6475	0.061	0.061
n-Pentane	P5	0.1451	0.5592	0.052	0.052
t-Butanol	X4	0.0001	0.0004	0.000	0.000
2,2-Dimethylbutane	I6	0.0058	0.0267	0.002	0.002
Cyclopentane	N5	0.0090	0.0337	0.003	0.003
2,3-Dimethylbutane	I6	0.0113	0.0520	0.005	0.005
2-Methylpentane	I6	0.0532	0.2449	0.022	0.022
3-Methylpentane	I6	0.0287	0.1321	0.012	0.012
n-Hexane	P6	0.0762	0.3508	0.031	0.031
2,2-Dimethylpentane	I7	0.0017	0.0091	0.001	0.001
Methylcyclopentane	N6	0.0387	0.1740	0.014	0.014
2,4-Dimethylpentane	I7	0.0035	0.0188	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0007	0.0037	0.000	0.000
Benzene	A6	0.0107	0.0447	0.003	0.003
3,3-Dimethylpentane	I7	0.0012	0.0064	0.001	0.001
Cyclohexane	N6	0.0435	0.1956	0.015	0.015
2-Methylhexane	I7	0.0192	0.1028	0.009	0.009
2,3-Dimethylpentane	I7	0.0049	0.0262	0.002	0.002

1,1-Dimethylcyclopentane	N7	0.0035	0.0184	0.001	0.001
3-Methylhexane	I7	0.0175	0.0937	0.008	0.008
1c,3-Dimethylcyclopentane	N7	0.0071	0.0372	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0064	0.0335	0.003	0.003
3-Ethylpentane	I7	0.0007	0.0037	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0104	0.0545	0.005	0.005
2,2,4-Trimethylpentane	I8	0.0001	0.0006	0.000	0.000
n-Heptane	P7	0.0451	0.2414	0.021	0.021
1c,2-Dimethylcyclopentane	N7	0.0007	0.0037	0.000	0.000
Methylcyclohexane	N7	0.0995	0.5219	0.040	0.040
2,2-Dimethylhexane	I8	0.0023	0.0141	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0002	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0034	0.0178	0.001	0.001
2,5-Dimethylhexane	I8	0.0023	0.0141	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0020	0.0122	0.001	0.001
2,4-Dimethylhexane	I8	0.0003	0.0018	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0021	0.0126	0.001	0.001
3,3-Dimethylhexane	I8	0.0007	0.0043	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	0.0288	0.1418	0.010	0.010
2,3-Dimethylhexane	I8	0.0023	0.0141	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0003	0.0018	0.000	0.000
2-Methylheptane	I8	0.0137	0.0836	0.007	0.007
4-Methylheptane	I8	0.0040	0.0244	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0004	0.0025	0.000	0.000
3,4-Dimethylhexane	I8	0.0004	0.0025	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0006	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0006	0.000	0.000
3-Methylheptane	I8	0.0092	0.0561	0.005	0.005
1c,2t,3-Trimethylcyclopentane	N8	0.0212	0.1271	0.011	0.011
3-Ethylhexane	I8	0.0009	0.0055	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0081	0.0486	0.004	0.004
1,1-Dimethylcyclohexane	N8	0.0025	0.0150	0.001	0.001
2,2,5-Trimethylhexane	I9	0.0003	0.0020	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0009	0.0054	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0008	0.0048	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0010	0.0060	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0002	0.0012	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0003	0.0020	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0077	0.0462	0.004	0.004
1t,3-Dimethylcyclohexane	N8	0.0007	0.0042	0.000	0.000
n-Octane	P8	0.0458	0.2795	0.023	0.023
1c,4-Dimethylcyclohexane	N8	0.0069	0.0413	0.004	0.004
i-Propylcyclopentane	I8	0.0005	0.0030	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0006	0.0041	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0002	0.0014	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0003	0.0020	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0002	0.0012	0.000	0.000
2,2-Dimethylheptane	I9	0.0022	0.0151	0.001	0.001
1,1,4-Trimethylcyclohexane	N9	0.0091	0.0614	0.005	0.005
2,2,3-Trimethylhexane	I9	0.0013	0.0089	0.001	0.001
2,4-Dimethylheptane	I9	0.0004	0.0027	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
Ethylcyclohexane	N8	0.0020	0.0120	0.001	0.001
n-Propylcyclopentane	N8	0.0017	0.0102	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0006	0.0041	0.000	0.000
2,5-Dimethylheptane	I9	0.0010	0.0068	0.001	0.001
3,3-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0014	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
Ethylbenzene	I8	0.0028	0.0159	0.001	0.001

1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0007	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0046	0.0261	0.002	0.002
1,4-Dimethylbenzene (p-Xylene)	A8	0.0023	0.0130	0.001	0.001
3,4-Dimethylheptane (2)	I9	0.0004	0.0027	0.000	0.000
4-Methyloctane	I9	0.0002	0.0014	0.000	0.000
2-Methyloctane	I9	0.0002	0.0014	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0002	0.0013	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0005	0.0028	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0013	0.000	0.000
n-Nonane	P9	0.0009	0.0061	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0001	0.0007	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0007	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0006	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0008	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0026	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0013	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0013	0.000	0.000
2-Methylnonane	I10	0.0002	0.0015	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0036	0.000	0.000
UnknownC9s	U9	0.0003	0.0020	0.000	0.000
n-Decane	P10	0.0001	0.0008	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0007	0.000	0.000
UnknownC10s	U10	0.0001	0.0008	0.000	0.000
n-Undecane	P11	0.0001	0.0009	0.000	0.000
UnknownC11s	U11	0.0001	0.0009	0.000	0.000
n-Dodecane	P12	0.0001	0.0009	0.000	0.000
UnknownC12s	U12	0.0001	0.0009	0.000	0.000
n-Tridecane	P13	0.0001	0.0010	0.000	0.000
UnknownC13s	U13	0.0001	0.0010	0.000	0.000
n-Tetradecane	P14	0.0001	0.0011	0.000	0.000
n-Hexadecane	P16	0.0001	0.0012	0.000	0.000
TOTAL		100.00000	100.00000	2.6187	2.6325

CALCULATED VALUES**

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.65	14.73
BENZENE	0.0107	0.0447	LHV NET DRY REAL :	1014.1 /scf	1019.7 /scf
TOLUENE	0.0288	0.1418	NET WET REAL :	996.4 /scf	1002.0 /scf
ETHYLBENZENE	0.0028	0.0159	HHV GROSS DRY REAL :	1121.7 /scf	1127.8 /scf
XYLENES	0.0074	0.0419	GROSS WET REAL :	1102.1 /scf	1108.2 /scf
TOTAL BTEX	0.0497	0.2443	NET HEATING VALUE (60 °F ideal reaction):		20596.9 Btu/lbm
			GROSS HEATING VALUE (60°F ideal reaction):		22780.3 Btu/lbm
			RELATIVE DENSITY (AIR=1):		0.6460
			DENSITY		0.04933 lb/scf
			COMPRESSIBILITY FACTOR :		0.9974
			REGULAR WOBBE INDEX		1396.3

*(DETAILED HYDROCARBON ANALYSIS/NJ 1993)

Mod ASTM D6730,GPA 2261 & GPA 2286.

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

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

Net Dry Ideal BTU	4891.4 /scf	Relative Density - SG (Air=1)	3.365	C6+ factors
Gross Dry Ideal BTU	5258.9 /scf	Z Compressibility Factor	0.99361	0.99289
Net Dry Ideal BTU	19349.2 /lb	Density Factor	256.812 lbm/1000 ft3	
Gross Dry Ideal BTU	20803.1 /lb	Molar Mass or MW	97.45 g/mol	
		Volume Liquid Ideal gas	0.293 scf/gal	23.5

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.

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.