Doc# 1310532

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PRIMARY DB KEY: NAME/DESCRIP : **JOHN CRAIG 10-10**
LEASE #:
FIELD/AREA:

PROJECT NO. :	**202103107**	ANALYSIS NO. :	**01**
COMPANY NAME :	**JWC ENERGY**	ANALYSIS DATE:	MARCH 19, 2021 10:05
OFFICE / BRANCH:	LIMON, CO	SAMPLE DATE :	MARCH 17, 2021 10:50
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	23 psig	PROBE :	NO
FLOW PRES. :	psig	CYLINDER NO. :	0708
LAB PRES:	psig	SAMPLED BY :	JOHN MOSER
SAMPLE TEMP. :	61 °f	SAMPLING COMPANY:	EMPACT
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	2.0 ppm
H2O BY STAIN TUBE:	- #/mmcf	CO2 BY STAIN TUBE:	- Mol %

FIELD COMMENTS:
LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.73	GPM @ 14.65
ALCOHOLS	0.0136	0.0155	0.0020	0.0020
HELIUM	0.55	0.08	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.12	0.14	---	---
NITROGEN	31.09	30.98	---	---
CARBON DIOXIDE	1.58	2.47	---	---
METHANE	37.7731	21.5575	---	---
ETHANE	10.5785	11.3155	2.8388	2.8234
PROPANE	11.5721	18.1527	3.1990	3.1816
I-BUTANE	1.4103	2.9160	0.4627	0.4602
N-BUTANE	3.3667	6.9612	1.0653	1.0595
I-PENTANE	0.6866	1.7593	0.2485	0.2471
N-PENTANE	0.6302	1.6175	0.2294	0.2281
HEXANES PLUS	0.6289	2.0348	0.2491	0.2480
TOTALS	100.00000	100.00000	8.2948	8.2499

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0228	0.0634
TOLUENE	0.0139	0.0456
ETHYLBENZENE	0.0016	0.0061
XYLENES	0.0038	0.0144
TOTAL BTEX	0.0421	0.1295

BTU @		14.73	14.65
LHV	NET DRY REAL :	1009.2 /scf	1003.7 /scf
	NET WET REAL :	991.7 /scf	986.2 /scf
HHV	GROSS DRY REAL :	1104.9 /scf	1098.9 /scf
	GROSS WET REAL :	1085.7 /scf	1079.7 /scf

NET HEATING VALUE (60 °F ideal reaction):	13557.2 **Btu/lbm**
GROSS HEATING VALUE (60°F ideal reaction):	14844.7 **Btu/lbm**
RELATIVE DENSITY (AIR=1):	0.9698
DENSITY	0.07407 **lbm/scf**
COMPRESSIBILITY FACTOR :	0.9964
REGULAR WOBBE INDEX	1115.3

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993)*
Mod ASTM D6730,GPA 2261 & GPA 2286.
(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	202103107	ANALYSIS NO. :	01
COMPANY NAME :	JWC ENERGY	ANALYSIS DATE:	MARCH 19, 2021 10:05
ACCOUNT NO. :		SAMPLE DATE :	MARCH 17, 2021 10:50
PRODUCER :		CYLINDER NO. :	0708
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	JOHN CRAIG 10-10		

FIELD DATA			SAMPLE TEMP. :	61
SAMPLE PRES. :	23		AMBIENT TEMP.:	
H2S BY STAIN TUBE:	2.0	*ppm*		
COMMENTS :	*SPOT*	*NO PROBE*		

Componet	Mole %	Wt %
Helium	0.55	0.08
Hydrogen	0.00	0.00
Carbon Dioxide	1.58	2.47
Nitrogen	31.09	30.98
Methane	37.7731	21.5575
Ethane	10.5785	11.3155
Propane	11.5721	18.1527
Isobutane	1.4103	2.9160
n-Butane	3.3667	6.9612
Isopentane	0.6460	1.6580
n-Pentane	0.6302	1.6175
Cyclopentane	0.0406	0.1013
n-Hexane	0.1117	0.3424
Cyclohexane	0.0529	0.1584
Other Hexanes	0.2441	0.7438
Heptanes	0.0883	0.3125
Methylcyclohexane	0.0402	0.1404
2,2,4 Trimethylpentane	0.0000	0.0000
Benzene	0.0228	0.0634
Toluene	0.0139	0.0456
Ethylbenzene	0.0016	0.0061
Xylenes	0.0038	0.0144
C8+ Heavies	0.0496	0.2078
Subtotal	99.86640	99.84450
Oxygen/Argon	0.12	0.14
Alcohols	0.0136	0.0155
Total	100.00000	100.00000

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

PRIMARY DB KEY:
LEASE #:
FIELD/AREA:

NAME/DESCRIP : **JOHN CRAIG 10-10**

PROJECT NO. :	**202103107**		ANALYSIS NO. :	**01**	
COMPANY NAME :	**JWC ENERGY**		ANALYSIS DATE:	MARCH 19, 2021 10:05	
OFFICE / BRANCH:	LIMON, CO		SAMPLE DATE :	MARCH 17, 2021 10:50	
CUSTOMER REF:			TO:		
PRODUCER :			EFFECTIVE DATE:		
FIELD DATA					
SAMPLE CYCLE:			SAMPLE TYPE:	SPOT	
SAMPLE PRES. :	23	psig	PROBE :	NO	
FLOW PRES. :		psig	CYLINDER NO. :	0708	
LAB PRES:		psig	SAMPLED BY :	JOHN MOSER	
SAMPLE TEMP. :	61	°f	SAMPLING COMPANY:	EMPACT	
AMBIENT TEMP.:		°f	H2S BY STAIN TUBE:	**2.0**	ppm
H2O BY STAIN TUBE:	-	#/mmcf	CO2 BY STAIN TUBE:	-	Mol %

FIELD COMMENTS:
LAB COMMENTS:

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ **14.73**	GPM @ **14.65**
Helium	---	0.55	0.08	---	---
Oxygen/Argon	---	0.12	0.14	---	---
Nitrogen	---	31.09	30.98	---	---
Carbon Dioxide	---	1.58	2.47	---	---
Methane	P1	37.7731	21.5575	---	---
Ethane	P2	10.5785	11.3155	2.839	2.823
Propane	P3	11.5721	18.1527	3.199	3.182
i-Butane	I4	1.4103	2.9160	0.463	0.460
Methanol	X1	0.0136	0.0155	0.002	0.002
n-Butane	P4	3.3667	6.9612	1.065	1.060
2,2-Dimethylpropane	I5	0.0062	0.0159	0.002	0.002
i-Pentane	I5	0.6398	1.6421	0.234	0.233
n-Pentane	P5	0.6299	1.6167	0.229	0.228
2,2-Dimethylbutane	I6	0.0040	0.0123	0.002	0.002
Cyclopentane	N5	0.0406	0.1013	0.012	0.012
2,3-Dimethylbutane	I6	0.0153	0.0469	0.006	0.006
2-Methylpentane	I6	0.1074	0.3292	0.044	0.044
3-Methylpentane	I6	0.0547	0.1677	0.022	0.022
UnknownC5s	U5	0.0003	0.0008	0.000	0.000
n-Hexane	P6	0.1117	0.3424	0.046	0.046
2,2-Dimethylpentane	I7	0.0011	0.0039	0.001	0.001
Methylcyclopentane	N6	0.0625	0.1871	0.022	0.022
2,4-Dimethylpentane	I7	0.0027	0.0096	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0002	0.0007	0.000	0.000
Benzene	A6	0.0228	0.0634	0.006	0.006
3,3-Dimethylpentane	I7	0.0004	0.0014	0.000	0.000
Cyclohexane	N6	0.0529	0.1584	0.018	0.018
2-Methylhexane	I7	0.0112	0.0399	0.005	0.005
2,3-Dimethylpentane	I7	0.0039	0.0139	0.002	0.002

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

1,1-Dimethylcyclopentane	N7	0.0039	0.0136	0.002	0.002
3-Methylhexane	I7	0.0124	0.0442	0.006	0.006
1c,3-Dimethylcyclopentane	N7	0.0065	0.0227	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0072	0.0252	0.003	0.003
3-Ethylpentane	I7	0.0007	0.0025	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0108	0.0377	0.005	0.005
UnknownC6s	U6	0.0002	0.0006	0.000	0.000
n-Heptane	P7	0.0251	0.0895	0.012	0.012
1c,2-Dimethylcyclopentane	N7	0.0004	0.0014	0.000	0.000
Methylcyclohexane	N7	0.0402	0.1404	0.016	0.016
2,2-Dimethylhexane	I8	0.0028	0.0114	0.001	0.001
Ethylcyclopentane	N7	0.0018	0.0063	0.001	0.001
2,5-Dimethylhexane	I8	0.0005	0.0020	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
2,4-Dimethylhexane	I8	0.0008	0.0032	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0020	0.0080	0.001	0.001
3,3-Dimethylhexane	I8	0.0002	0.0008	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0021	0.0084	0.001	0.001
Toluene	A7	0.0139	0.0456	0.005	0.005
2,3-Dimethylhexane	I8	0.0011	0.0045	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0002	0.0008	0.000	0.000
2-Methylheptane	I8	0.0046	0.0187	0.002	0.002
4-Methylheptane	I8	0.0011	0.0045	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0008	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0008	0.000	0.000
3-Methylheptane	I8	0.0022	0.0089	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0037	0.0148	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0016	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0015	0.0060	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0020	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0003	0.0012	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0003	0.0012	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0007	0.0028	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0016	0.0064	0.001	0.001
n-Octane	P8	0.0068	0.0276	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0007	0.0028	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0004	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0005	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0004	0.0016	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0019	0.0085	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0009	0.0041	0.000	0.000
2,4-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0010	0.0040	0.000	0.000
n-Propylcyclopentane	N8	0.0006	0.0024	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0016	0.0061	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0024	0.0091	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0019	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	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

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

4-Methyloctane	I9	0.0003	0.0014	0.000	0.000
2-Methyloctane	I9	0.0004	0.0018	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0009	0.000	0.000
3-Methyloctane	I9	0.0006	0.0027	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0009	0.0034	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0018	0.000	0.000
n-Nonane	P9	0.0015	0.0068	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0009	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0009	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0014	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0013	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0010	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0005	0.000	0.000
1,3-Methylethylbenzene	A9	0.0002	0.0009	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
5-Methylnonane	I10	0.0001	0.0005	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
2-Methylnonane	I10	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0014	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0009	0.0041	0.001	0.001
n-Decane	P10	0.0003	0.0015	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0004	0.0020	0.000	0.000
n-Undecane	P11	0.0001	0.0006	0.000	0.000
TOTAL		100.00000	100.00000	8.2948	8.2499

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0228	0.0634
TOLUENE	0.0139	0.0456
ETHYLBENZENE	0.0016	0.0061
XYLENES	0.0038	0.0144
TOTAL BTEX	0.0421	0.1295

(DETAILED HYDROCARBON ANALYSIS/NJ 1993)
Mod ASTM D6730,GPA 2261 & GPA 2286.
(CALC: GPA 2172, GPA 2145 & TP-17 @14.696 & 60 F)

BTU @		14.73	14.65
LHV	NET DRY REAL :	1009.2 /scf	1003.7 /scf
	NET WET REAL :	991.7 /scf	986.2 /scf
HHV	GROSS DRY REAL :	1104.9 /scf	1098.9 /scf
	GROSS WET REAL :	1085.7 /scf	1079.7 /scf
	NET HEATING VALUE (60 °F ideal reaction):		13557.2 Btu/lbm
	GROSS HEATING VALUE (60°F ideal reaction):		14844.7 Btu/lbm
	RELATIVE DENSITY (AIR=1):		0.9698
	DENSITY		0.07407 lb/scf
	COMPRESSIBILITY FACTOR :		0.9964
	REGULAR WOBBE INDEX		1115.3

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

Net Dry Ideal BTU	4570.5 /scf	Relative Density - SG (Air=1)	3.139	C6+factors
Gross Dry Ideal BTU	4916.8 /scf	Z Compressiblity Factor	0.99101	0.99048
Net Dry Ideal BTU	19280.9 /lb	Density Factor	239.581 lbm/1000 ft3	
Gross Dry Ideal BTU	20740.2 /lb	Molar Mass or MW	90.911 g/mol	
		Volume Liquid Ideal gas	0.248 scf/gal	24.3

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