EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #:		NAME/DESCRIP :	**CRAIG 4-4 SALES GAS**
PROJECT NO. :	**201701044**	ANALYSIS NO. :	**10**
COMPANY NAME :	**NIGHTHAWK PRODUCTION CO**	ANALYSIS DATE:	JANUARY 19, 2017 16:30
OFFICE / BRANCH:	HIGHLANDS RANCH, CO	SAMPLE DATE :	JANUARY 10, 2017 11:10
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT	
SAMPLE PRES. :	40	psig	CYLINDER NO. :	1846	
LAB PRES:		psig	SAMPLED BY :	GALE MCENDREE	
SAMPLE TEMP. :	47	ºf	SAMPLING COMPANY:	EMPACT	
AMBIENT TEMP.:		ºf	H2S BY STAIN TUBE:	**<0.5**	ppm
H2O BY STAIN TUBE:	-	#/mmcf	CO2 BY STAIN TUBE:	-	Mol %

FIELD COMMENTS: NO PROBE; WELL HEAD SAMPLE; ZERO PRESSURE ON METER LINE

LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
HELIUM	0.19	0.02	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.06	0.06	---	---
NITROGEN	15.1600	13.2900	---	---
CARBON DIOXIDE	0.22	0.30	---	---
METHANE	44.42240	22.30370	---	---
ETHANE	10.8667	10.2260	2.9245	2.9086
PROPANE	11.2667	15.5482	3.1232	3.1062
I-BUTANE	1.9016	3.4590	0.6265	0.6230
N-BUTANE	5.9219	10.7719	1.8783	1.8681
I-PENTANE	3.1057	6.9782	1.1056	1.0996
N-PENTANE	3.4508	7.7918	1.2579	1.2511
HEXANES PLUS	3.4242	9.2512	1.4020	1.3944
TOTALS	100.00000	100.00000	12.3180	12.2510

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0517	0.1264
TOLUENE	0.0044	0.0127
ETHYLBENZENE	0.0001	0.0003
XYLENES	0.0008	0.0026
TOTAL BTEX	0.0570	0.1420

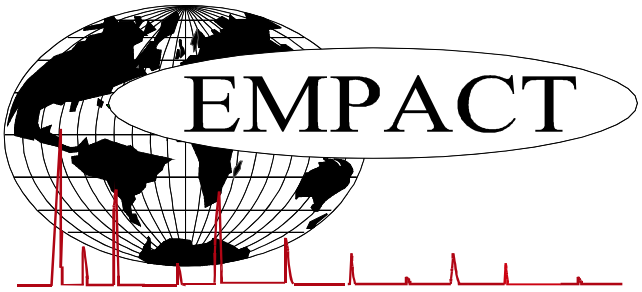
	BTU @	14.730	14.650
LOW	NET DRY REAL :	1480.9 **/scf**	1472.9 **/scf**
	NET WET REAL :	1455.2 **/scf**	1447.1 **/scf**
HIGH	GROSS DRY REAL :	1616.7 **/scf**	1607.9 **/scf**
	GROSS WET REAL :	1588.6 **/scf**	1579.8 **/scf**
	NET DRY REAL :	17595.7 **/lb**	17500.2 **/lb**
	GROSS DRY REAL :	19212.2 **/lb**	19107.9 **/lb**

(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*

RELATIVE DENSITY (AIR=1): 1.1022

COMPRESSIBILITY FACTOR : 0.99359



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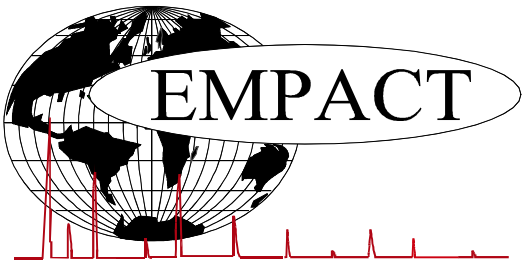
GLYCALC INFORMATION

PROJECT NO. :	201701044	ANALYSIS NO. :	10
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 19, 2017 16:30
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 10, 2017 11:10
PRODUCER :		CYLINDER NO. :	1846
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	CRAIG 4-4 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	47
SAMPLE PRES. :	40	AMBIENT TEMP.:	
COMMENTS :	NO PROBE; WELL HEAD SAMPLE; ZERO PRESSURE ON METER LINE SPOT		

Componet	Mole %	Wt %
Helium	0.19	0.02
Hydrogen	0.01	0.00
Carbon Dioxide	0.22	0.30
Nitrogen	15.16	13.29
Methane	44.42240	22.30370
Ethane	10.8667	10.2260
Propane	11.2667	15.5482
Isobutane	1.9016	3.4590
n-Butane	5.9219	10.7719
Isopentane	2.5609	5.7824
n-Pentane	3.4508	7.7918
Cyclopentane	0.5448	1.1958
n-Hexane	1.6981	4.5797
Cyclohexane	0.0100	0.0264
Other Hexanes	1.6092	4.3378
Heptanes	0.0281	0.0873
Methycyclohexane	0.0052	0.0160
2,2,4 Trimethylpentane	0.0005	0.0018
Benzene	0.0517	0.1264
Toluene	0.0044	0.0127
Ethylbenzene	0.0001	0.0003
Xylenes	0.0008	0.0026
C8+ Heavies	0.0161	0.0602
Subtotal	99.94000	99.94000
Oxygen/Argon	0.06	0.06
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201701044	ANALYSIS NO. :	10
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 19, 2017 16:30
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 10, 2017 11:10
PRODUCER :		CYLINDER NO. :	1846
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	CRAIG 4-4 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	47
SAMPLE PRES. :	40	AMBIENT TEMP.:	
COMMENTS :	NO PROBE; WELL HEAD SAMPLE; ZERO PRESSURE ON METER LINE SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
Helium	---	0.19	0.02	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.06	0.06	---	---
Nitrogen	---	15.16	13.29	---	---
Carbon Dioxide	---	0.22	0.30	---	---
Methane	P1	44.42240	22.30370	---	---
Ethane	P2	10.8667	10.2260	2.925	2.909
Propane	P3	11.2667	15.5482	3.123	3.106
i-Butane	I4	1.9016	3.4590	0.627	0.623
n-Butane	P4	5.9219	10.7719	1.878	1.868
2,2-Dimethylpropane	I5	0.0098	0.0221	0.004	0.004
i-Pentane	I5	2.5511	5.7603	0.939	0.934
n-Pentane	P5	3.4491	7.7879	1.258	1.251
2,2-Dimethylbutane	I6	0.0151	0.0407	0.006	0.006
Cyclopentane	N5	0.5448	1.1958	0.162	0.162
2,3-Dimethylbutane	I6	0.0631	0.1702	0.026	0.026
2-Methylpentane	I6	0.5466	1.4742	0.228	0.227
3-Methylpentane	I6	0.9384	2.5308	0.385	0.383
UnknownC5s	U5	0.0017	0.0039	0.001	0.001
n-Hexane	P6	1.6981	4.5797	0.703	0.699
Methylcyclopentane	N6	0.0348	0.0917	0.012	0.012
2,4-Dimethylpentane	I7	0.0005	0.0016	0.000	0.000
2,2,3-Trimethylbutane	I7	0.0001	0.0003	0.000	0.000
Benzene	A6	0.0517	0.1264	0.014	0.014
Cyclohexane	N6	0.0100	0.0264	0.003	0.003
2-Methylhexane	I7	0.0011	0.0034	0.001	0.001
2,3-Dimethylpentane	I7	0.0009	0.0028	0.000	0.000
1,1-Dimethylcyclopentane	N7	0.0014	0.0043	0.001	0.001
3-Methylhexane	I7	0.0037	0.0116	0.002	0.002
1c,3-Dimethylcyclopentane	N7	0.0027	0.0083	0.001	0.001
1t,3-Dimethylcyclopentane	N7	0.0022	0.0068	0.001	0.001
3-Ethylpentane	I7	0.0004	0.0013	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0056	0.0172	0.003	0.003
2,2,4-Trimethylpentane	I8	0.0005	0.0018	0.000	0.000
UnknownC6s	U6	0.0112	0.0302	0.005	0.005

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n-Heptane	P7	0.0047	0.0147	0.002	0.002
1c,2-Dimethylcyclopentane	N7	0.0004	0.0012	0.000	0.000
Methylcyclohexane	N7	0.0052	0.0160	0.002	0.002
2,2-Dimethylhexane	I8	0.0005	0.0018	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0001	0.0003	0.000	0.000
Ethylcyclopentane	N7	0.0008	0.0025	0.000	0.000
2,5-Dimethylhexane	I8	0.0001	0.0003	0.000	0.000
2,4-Dimethylhexane	I8	0.0002	0.0007	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0006	0.0021	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0003	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0011	0.0039	0.001	0.001
Toluene	A7	0.0044	0.0127	0.001	0.001
2,3-Dimethylhexane	I8	0.0001	0.0003	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0001	0.0003	0.000	0.000
2-Methylheptane	I8	0.0012	0.0043	0.001	0.001
4-Methylheptane	I8	0.0002	0.0007	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0003	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0003	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0003	0.000	0.000
3-Methylheptane	I8	0.0003	0.0011	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0008	0.0028	0.000	0.000
3-Ethylhexane	I8	0.0002	0.0007	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0003	0.0011	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0001	0.0003	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0005	0.0018	0.000	0.000
2,2,4-Trimethylhexane	I9	0.0001	0.0004	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0003	0.0011	0.000	0.000
1c,2c,3-Trimethylcyclopentane	N8	0.0001	0.0003	0.000	0.000
UnknownC7s	U7	0.0035	0.0110	0.002	0.002
n-Octane	P8	0.0009	0.0032	0.000	0.000
1c,4-Dimethylcyclohexane	N8	0.0003	0.0011	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0003	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0003	0.0012	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
Ethylcyclohexane	N8	0.0003	0.0011	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
Ethylbenzene	I8	0.0001	0.0003	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0005	0.0020	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0004	0.0013	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0003	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0004	0.000	0.000
4-Methyloctane	I9	0.0001	0.0004	0.000	0.000
2-Methyloctane	I9	0.0001	0.0004	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0004	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0004	0.000	0.000
3-Methyloctane	I9	0.0002	0.0008	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0004	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0003	0.0010	0.000	0.000
i-Butylcyclopentane	N9	0.0001	0.0004	0.000	0.000
UnknownC8s	U8	0.0001	0.0003	0.000	0.000
n-Nonane	P9	0.0003	0.0012	0.000	0.000

1,1-Methylethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
i-Propylbenzene	A9	0.0002	0.0008	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0004	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0004	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0008	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
5-Methylnonane	I10	0.0001	0.0004	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0002	0.0008	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0004	0.000	0.000
UnknownC9s	U9	0.0010	0.0040	0.001	0.001
n-Decane	P10	0.0001	0.0004	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0004	0.000	0.000
UnknownC10s	U10	0.0006	0.0027	0.000	0.000
UnknownC11s	U11	0.0001	0.0005	0.000	0.000
TOTAL		100.00000	100.00000	12.3190	12.2520

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0517	0.1264
TOLUENE	0.0044	0.0127
ETHYLBENZENE	0.0001	0.0003
XYLENES	0.0008	0.0026
TOTAL BTEX	0.0570	0.1420

	BTU @	14.730	14.650
LOW	NET DRY REAL :	1480.9 **/scf**	1472.9 **/scf**
	NET WET REAL :	1455.2 **/scf**	1447.1 **/scf**
HIGH	GROSS DRY REAL :	1616.7 **/scf**	1607.9 **/scf**
	GROSS WET REAL :	1588.6 **/scf**	1579.8 **/scf**
	NET DRY REAL :	17595.7 **/lb**	17500.2 **/lb**
	GROSS DRY REAL :	19212.2 **/lb**	19107.9 **/lb**
	RELATIVE DENSITY (AIR=1):		1.1022
	COMPRESSIBILITY FACTOR :		0.99359

(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

**(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730*