EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #:		NAME/DESCRIP :	**STEAMBOAT HANSEN 8-10 SALES GAS**
PROJECT NO. :	**201701044**	ANALYSIS NO. :	**03**
COMPANY NAME :	**NIGHTHAWK PRODUCTION CO**	ANALYSIS DATE:	JANUARY 18, 2017 09:30
OFFICE / BRANCH:	HIGHLANDS RANCH, CO	SAMPLE DATE :	JANUARY 11, 2017 08:50
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT	
SAMPLE PRES. :	25	psig	CYLINDER NO. :	1894	
LAB PRES:		psig	SAMPLED BY :	GALE MCENDREE	
SAMPLE TEMP. :	85	ºf	SAMPLING COMPANY:	EMPACT	
AMBIENT TEMP.:		ºf	H2S BY STAIN TUBE:	**14**	ppm
H2O BY STAIN TUBE:	-	#/mmcf	CO2 BY STAIN TUBE:	-	Mol %

FIELD COMMENTS: NO PROBE

LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
ALCOHOLS	0.0009	0.0018		
HELIUM	0.54	0.07	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.36	0.37	---	---
NITROGEN	49.6600	44.9900	---	---
CARBON DIOXIDE	2.54	3.61	---	---
METHANE	25.96560	13.47330	---	---
ETHANE	3.3218	3.2301	0.8906	0.8857
PROPANE	6.0012	8.5578	1.6575	1.6485
I-BUTANE	1.5109	2.8399	0.4955	0.4929
N-BUTANE	4.8622	9.1390	1.5369	1.5286
I-PENTANE	1.2975	3.0242	0.4724	0.4699
N-PENTANE	1.7462	4.0743	0.6343	0.6308
HEXANES PLUS	2.1937	6.6196	0.9223	0.9179
TOTALS	100.00000	100.00000	6.6095	6.5743

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0051	0.0129
TOLUENE	0.0049	0.0146
ETHYLBENZENE	0.0006	0.0021
XYLENES	0.0035	0.0121
TOTAL BTEX	0.0141	0.0417

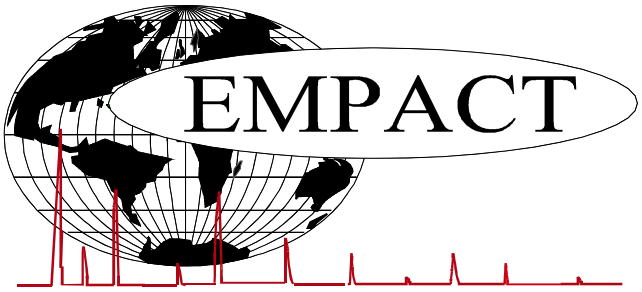
BTU @		14.730	14.650
LOW	NET DRY REAL :	840.3 /scf	835.8 /scf
	NET WET REAL :	825.7 /scf	821.2 /scf
HIGH	GROSS DRY REAL :	916.5 /scf	911.5 /scf
	GROSS WET REAL :	900.6 /scf	895.6 /scf
	NET DRY REAL :	10339.4 /lb	10283.2 /lb
	GROSS DRY REAL :	11283.6 /lb	11222.3 /lb

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

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

RELATIVE DENSITY (AIR=1): 1.0666

COMPRESSIBILITY FACTOR : 0.99716

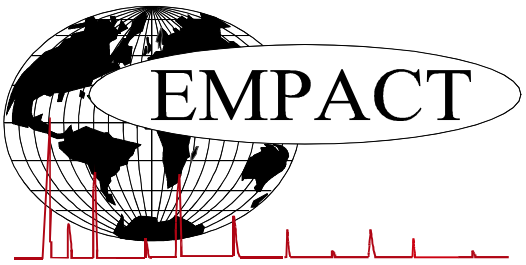


EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201701044	ANALYSIS NO. :	03
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 18, 2017 09:30
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 11, 2017 08:50
PRODUCER :		CYLINDER NO. :	1894
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	STEAMBOAT HANSEN 8-10 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	85
SAMPLE PRES. :	25	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

Componet	Mole %	Wt %
Helium	0.54	0.07
Hydrogen	0.00	0.00
Carbon Dioxide	2.54	3.61
Nitrogen	49.66	44.99
Methane	25.96560	13.47330
Ethane	3.3218	3.2301
Propane	6.0012	8.5578
Isobutane	1.5109	2.8399
n-Butane	4.8622	9.1390
Isopentane	1.2498	2.9160
n-Pentane	1.7462	4.0743
Cyclopentane	0.0477	0.1082
n-Hexane	0.5097	1.4205
Cyclohexane	0.1319	0.3590
Other Hexanes	0.6992	1.9387
Heptanes	0.4358	1.4054
Methycyclohexane	0.1362	0.4325
2,2,4 Trimethylpentane	0.0021	0.0078
Benzene	0.0051	0.0129
Toluene	0.0049	0.0146
Ethylbenzene	0.0006	0.0021
Xylenes	0.0035	0.0121
C8+ Heavies	0.2647	1.0140
Subtotal	99.63910	99.62820
Oxygen/Argon	0.36	0.37
Alcohols	0.0009	0.0018
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201701044	ANALYSIS NO. :	03
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 18, 2017 09:30
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 11, 2017 08:50
PRODUCER :		CYLINDER NO. :	1894
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	STEAMBOAT HANSEN 8-10 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	85
SAMPLE PRES. :	25	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
Helium	---	0.54	0.07	---	---
Oxygen/Argon	---	0.36	0.37	---	---
Nitrogen	---	49.66	44.99	---	---
Carbon Dioxide	---	2.54	3.61	---	---
Methane	P1	25.96560	13.47330	---	---
Ethane	P2	3.3218	3.2301	0.891	0.886
Propane	P3	6.0012	8.5578	1.658	1.649
i-Butane	I4	1.5109	2.8399	0.496	0.493
n-Butane	P4	4.8622	9.1390	1.537	1.529
2,2-Dimethylpropane	I5	0.0124	0.0289	0.005	0.005
i-Pentane	I5	1.2374	2.8871	0.453	0.451
i-Propanol	X3	0.0009	0.0018	0.000	0.000
n-Pentane	P5	1.7450	4.0715	0.634	0.631
2,2-Dimethylbutane	I6	0.0076	0.0212	0.003	0.003
Cyclopentane	N5	0.0477	0.1082	0.014	0.014
2,3-Dimethylbutane	I6	0.0264	0.0736	0.011	0.011
2-Methylpentane	I6	0.1662	0.4632	0.069	0.069
3-Methylpentane	I6	0.3385	0.9434	0.139	0.138
UnknownC5s	U5	0.0012	0.0028	0.000	0.000
n-Hexane	P6	0.5097	1.4205	0.210	0.209
2,2-Dimethylpentane	I7	0.0002	0.0007	0.000	0.000
Methylcyclopentane	N6	0.1531	0.4167	0.054	0.054
2,4-Dimethylpentane	I7	0.0082	0.0266	0.004	0.004
2,2,3-Trimethylbutane	I7	0.0006	0.0019	0.000	0.000
Benzene	A6	0.0051	0.0129	0.001	0.001
3,3-Dimethylpentane	I7	0.0005	0.0016	0.000	0.000
Cyclohexane	N6	0.1319	0.3590	0.045	0.045
2-Methylhexane	I7	0.0452	0.1465	0.021	0.021
2,3-Dimethylpentane	I7	0.0141	0.0457	0.006	0.006
1,1-Dimethylcyclopentane	N7	0.0141	0.0448	0.006	0.006
3-Methylhexane	I7	0.0655	0.2122	0.030	0.030
1c,3-Dimethylcyclopentane	N7	0.0248	0.0787	0.011	0.011
1t,3-Dimethylcyclopentane	N7	0.0199	0.0632	0.009	0.009
3-Ethylpentane	I7	0.0054	0.0175	0.002	0.002
1t,2-Dimethylcyclopentane	N7	0.0468	0.1486	0.022	0.022

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2,2,4-Trimethylpentane	I8	0.0021	0.0078	0.001	0.001
UnknownC6s	U6	0.0074	0.0206	0.003	0.003
n-Heptane	P7	0.1647	0.5337	0.076	0.076
1c,2-Dimethylcyclopentane	N7	0.0035	0.0111	0.002	0.002
Methylcyclohexane	N7	0.1362	0.4325	0.055	0.055
2,2-Dimethylhexane	I8	0.0115	0.0425	0.005	0.005
1,1,3-Trimethylcyclopentane	N7	0.0017	0.0062	0.001	0.001
Ethylcyclopentane	N7	0.0061	0.0194	0.002	0.002
2,5-Dimethylhexane	I8	0.0022	0.0081	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0005	0.0018	0.000	0.000
2,4-Dimethylhexane	I8	0.0040	0.0148	0.002	0.002
1c,2t,4-Trimethylcyclopentane	N8	0.0092	0.0334	0.004	0.004
3,3-Dimethylhexane	I8	0.0007	0.0026	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0137	0.0497	0.006	0.006
2,3,4-Trimethylpentane	I8	0.0002	0.0007	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0049	0.0146	0.002	0.002
2,3-Dimethylhexane	I8	0.0037	0.0137	0.002	0.002
2-Methyl-3-ethylpentane	I8	0.0014	0.0052	0.001	0.001
1,1,2-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
2-Methylheptane	I8	0.0261	0.0964	0.013	0.013
4-Methylheptane	I8	0.0062	0.0229	0.003	0.003
3-Methyl-3-ethylpentane	I8	0.0013	0.0048	0.001	0.001
3,4-Dimethylhexane	I8	0.0010	0.0037	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0006	0.0022	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0003	0.0011	0.000	0.000
3-Methylheptane	I8	0.0077	0.0285	0.004	0.004
1c,2t,3-Trimethylcyclopentane	N8	0.0216	0.0784	0.011	0.011
3-Ethylhexane	I8	0.0037	0.0137	0.002	0.002
1t,4-Dimethylcyclohexane	N8	0.0062	0.0225	0.003	0.003
1,1-Dimethylcyclohexane	N8	0.0014	0.0051	0.001	0.001
2,2,5-Trimethylhexane	I9	0.0003	0.0012	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0017	0.0062	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0014	0.0051	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0038	0.0138	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0004	0.0017	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0063	0.0229	0.003	0.003
1c,2c,3-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
UnknownC7s	U7	0.0145	0.0470	0.007	0.007
n-Octane	P8	0.0423	0.1563	0.022	0.022
1c,4-Dimethylcyclohexane	N8	0.0023	0.0083	0.001	0.001
i-Propylcyclopentane	I8	0.0002	0.0007	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0003	0.0012	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0005	0.0021	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0006	0.0025	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0010	0.0036	0.001	0.001
2,2-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0077	0.0314	0.004	0.004
2,2,3-Trimethylhexane	I9	0.0034	0.0141	0.002	0.002
2,4-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
4,4-Dimethylheptane	I9	0.0011	0.0046	0.001	0.001
Ethylcyclohexane	N8	0.0028	0.0102	0.001	0.001
n-Propylcyclopentane	N8	0.0015	0.0054	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0004	0.0016	0.000	0.000
2,5-Dimethylheptane	I9	0.0007	0.0029	0.000	0.000
3,3-Dimethylheptane	I9	0.0006	0.0025	0.000	0.000
3,5-Dimethylheptane	I9	0.0004	0.0017	0.000	0.000
2,6-Dimethylheptane	I9	0.0004	0.0017	0.000	0.000

1,1,3-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
Ethylbenzene	I8	0.0006	0.0021	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0017	0.0070	0.001	0.001
2,3-Dimethylheptane	I9	0.0004	0.0017	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0018	0.0062	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0006	0.0021	0.000	0.000
3,4-Dimethylheptane	I9	0.0009	0.0037	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0008	0.0033	0.000	0.000
4-Ethylheptane	I9	0.0004	0.0017	0.000	0.000
4-Methyloctane	I9	0.0018	0.0075	0.001	0.001
2-Methyloctane	I9	0.0018	0.0075	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0006	0.0025	0.000	0.000
3-Ethylheptane	I9	0.0006	0.0025	0.000	0.000
3-Methyloctane	I9	0.0026	0.0108	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0011	0.0045	0.001	0.001
1,1,2-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
3,3-Diethylpentane	I9	0.0003	0.0012	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0011	0.0038	0.000	0.000
i-Butylcyclopentane	N9	0.0013	0.0053	0.001	0.001
UnknownC8s	U8	0.0011	0.0041	0.001	0.001
n-Nonane	P9	0.0091	0.0377	0.005	0.005
1,1-Methylethylcyclohexane	N9	0.0015	0.0061	0.001	0.001
i-Propylbenzene	A9	0.0010	0.0039	0.000	0.000
i-Propylcyclohexane	N9	0.0004	0.0016	0.000	0.000
2,2-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
2,4-Dimethyloctane	I10	0.0003	0.0014	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0012	0.0049	0.001	0.001
3,3-Dimethyloctane	I10	0.0003	0.0014	0.000	0.000
n-Propylbenzene	A9	0.0013	0.0050	0.001	0.001
3,6-Dimethyloctane	I10	0.0005	0.0023	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0005	0.0023	0.000	0.000
1,3-Methylethylbenzene	A9	0.0005	0.0019	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0008	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0005	0.0019	0.000	0.000
2,3-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
5-Methylnonane	I10	0.0008	0.0037	0.000	0.000
1,2-Methylethylbenzene	A9	0.0006	0.0023	0.000	0.000
2-Methylnonane	I10	0.0001	0.0005	0.000	0.000
3-Ethyloctane	I10	0.0001	0.0005	0.000	0.000
3-Methylnonane	I10	0.0005	0.0023	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0007	0.0030	0.000	0.000
i-Butylcyclohexane	N10	0.0003	0.0014	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0005	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0004	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0004	0.000	0.000
UnknownC9s	U9	0.0107	0.0444	0.006	0.006
n-Decane	P10	0.0025	0.0115	0.002	0.002
1,2,3-Trimethylbenzene	A9	0.0002	0.0008	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0004	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0005	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0006	0.0026	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
n-Butylbenzene	A10	0.0002	0.0009	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0004	0.000	0.000

t-Decahydronaphthalene	A9	0.0001	0.0005	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
UnknownC10s	U10	0.0044	0.0202	0.003	0.003
n-Undecane	P11	0.0008	0.0040	0.001	0.001
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0004	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0004	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0005	0.000	0.000
2-Methylindan	A11	0.0001	0.0004	0.000	0.000
Naphthalene	A10	0.0001	0.0004	0.000	0.000
UnknownC11s	U11	0.0010	0.0050	0.001	0.001
n-Dodecane	P12	0.0003	0.0017	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0001	0.0005	0.000	0.000
n-Tridecane	P13	0.0001	0.0006	0.000	0.000
n-Hexadecane	P16	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	6.6095	6.5743

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0051	0.0129
TOLUENE	0.0049	0.0146
ETHYLBENZENE	0.0006	0.0021
XYLENES	0.0035	0.0121
TOTAL BTEX	0.0141	0.0417

	BTU @	14.730	14.650
LOW	NET DRY REAL :	840.3 **/scf**	835.8 **/scf**
	NET WET REAL :	825.7 **/scf**	821.2 **/scf**
HIGH	GROSS DRY REAL :	916.5 **/scf**	911.5 **/scf**
	GROSS WET REAL :	900.6 **/scf**	895.6 **/scf**
	NET DRY REAL :	10339.4 **/lb**	10283.2 **/lb**
	GROSS DRY REAL :	11283.6 **/lb**	11222.3 **/lb**

RELATIVE DENSITY (AIR=1): 1.0666

COMPRESSIBILITY FACTOR : 0.99716

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

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