

KANSAS CORPORATION COMMISSION ONE POINT STABILIZED OPEN FLOW OR DELIVERABILITY TEST

Type Test:

- Open Flow
 Deliverability

Test Date: 5/15 to 5/16/12

API No. 15 - 007 - 23506 - 00 - 00

Company Hart Energies		Lease Griffin		Well Number 1	
County Barber	Location CSESW	Section 22	TWP 34S	RNG (E/W) 10W	Acres Attributed
Field Hazelton South		Reservoir Mississippian		Gas Gathering Connection Lumen-WWGG	
Completion Date 4/03/10		Plug Back Total Depth 4800		Packer Set at none	
Casing Size 5.5	Weight	Internal Diameter	Set at 4840	Perforations 4651	To 4671
Tubing Size 2.875	Weight	Internal Diameter	Set at 4640	Perforations	To
Type Completion (Describe) single		Type Fluid Production Oil & SW		Pump Unit or Traveling Plunger? Yes / No Yes-pump unit	
Producing Thru (Annulus / Tubing) annulus		% Carbon Dioxide .135		% Nitrogen 1.364	
Vertical Depth(H)		Pressure Taps Flange		(Meter Run) (Prover) Size 3"	
Pressure Buildup: Shut in <u>5/11</u> 20 <u>12</u> at <u>9:30 am</u> (AM) (PM) Taken <u>5/15</u> 20 <u>12</u> at <u>9:30 am</u> (AM) (PM)					
Well on Line: Started <u>5/15</u> 20 <u>12</u> at <u>9:45 am</u> (AM) (PM) Taken <u>5/16</u> 20 <u>12</u> at <u>9:45 am</u> (AM) (PM)					

OBSERVED SURFACE DATA

Duration of Shut-in **96** Hours

Static / Dynamic Property	Orifice Size (inches)	Circle one: Meter Prover Pressure psig (Pm)	Pressure Differential in Inches H ₂ O	Flowing Temperature t	Well Head Temperature t	Casing Wellhead Pressure (P _w) or (P _i) or (P _c)		Tubing Wellhead Pressure (P _w) or (P _i) or (P _c)		Duration (Hours)	Liquid Produced (Barrels)
						psig	psia	psig	psia		
Shut-in						353	367.4			96	
Flow	1.500	38.4	49.0	64		301	315.4			24	

FLOW STREAM ATTRIBUTES

Plate Coefficient (F _b) (F _p) Mcfd	Circle one: Meter or Prover Pressure psia	Press Extension $\sqrt{P_m \times h}$	Gravity Factor F _g	Flowing Temperature Factor F _{tt}	Deviation Factor F _{pv}	Metered Flow R (Mcfd)	GOR (Cubic Feet/ Barrel)	Flowing Fluid Gravity G _m
11.41	52.8	50.86	1.241	.9962	-----	717		.649

(OPEN FLOW) (DELIVERABILITY) CALCULATIONS

(P_c)² = 134.982 ; (P_w)² = 99.477 ; P_g = _____ % (P_c - 14.4) + 14.4 = _____ ; (P_w)² = 0.207 ; (P_g)² = _____

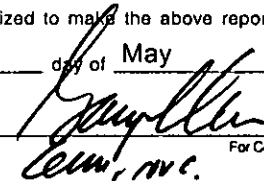
(P _c) ² - (P _w) ² or (P _c) ² - (P _g) ²	(P _c) ² - (P _w) ²	Choose formula 1 or 2: 1. P _c ² - P _w ² 2. P _c ² - P _g ² divided by: P _c ² - P _w ²	LOG of formula 1, or 2, and divide by: $\left[\frac{P_c^2 - P_w^2}{P_c^2 - P_w^2} \right]$	Backpressure Curve Slope = "n" ----- Assigned Standard Slope	n x LOG $\left[\frac{P_c^2 - P_w^2}{P_c^2 - P_w^2} \right]$	Antilog	Open Flow Deliverability Equals R x Antilog (Mcfd)
134.775	35.505	3.796	.5793	.758	.4391	2.75	1972

Open Flow **1972** Mcfd @ 14.65 psia X .50 = Deliverability **986** Mcfd @ 14.65 psia

The undersigned authority, on behalf of the Company, states that he is duly authorized to make the above report and that he has knowledge of the facts stated therein, and that said report is true and correct. Executed this the 21st day of May, 20 12.

Witness (if any)

For Commission



For Company
Checked by

RECEIVED

MAY 23 2012

KCC WICHITA

STATE OF KANSAS - CORPORATION COMMISSION
MULTIPOINT BACK PRESSURE TEST

FORM CG-1 Rev.

TYPE TEST: Initial Annual Special TEST DATE: 5/15/12

COMPANY: Hart Energies LEASE: Griffin WELL NO.: 1

COUNTY: Barber LOCATION: SESW SECTION: 22 TWP: 34S RNG (E/W): 10W ACRES: 1

API WELL NUMBER: 15- RESERVOIR: Miss PIPELINE CONNECTION: Lumen-WWGG

COMPLETION DATE: 4/03/10 PLUG BACK TOTAL DEPTH: 4800 PACKER SET AT: none

CASING SIZE: 5.5 WT. ID. SET AT: 4840 PERF. TO: 4671

TUBING SIZE: 2.875 WT. ID. SET AT: 4640 PERF. TO: 4671

TYPE COMPLETION (Describe): single TYPE FLUID PRODUCTION: Oil/SW

PRODUCING THRU: casing RESERVOIR TEMPERATURE °F: BAR PRESS -P, 14.4 Psia

GAS GRAVITY -G_s: .649 % CARBON DIOXIDE: .135 % NITROGEN: 1.364 API GRAVITY OF LIQUID

VERTICAL DEPTH (H): TYPE METER CONNECTION: flange (METER RUN) (PROVER) SIZE: 3"

REMARKS: Tested into Lumen pipeline (250" EFM)

RATE NO.	ORIFICE SIZE in	(METER) (PROVER) PRESSURE Psig	DIFF. (h _w) (h _s)	FLOWING TEMP t	WELL-HEAD TEMP. t	CSG WELLHEAD PRESS. Psig		TBG WELLHEAD PRESS. Psig		FLOW DURATION (HOURS)	LIQUID PROD. Bblr.
						(P _w)(P _s)	(P _w)(P _s)	(P _w)(P _s)	(P _w)(P _s)		
SHUT IN						353	367.4			96	
1	1.500	28.0	11.1	73		335	349.4			.75	
2	"	32.1	28.2	68		318	332.4			.75	
3	"	36.4	50.0	71		297	311.4			.75	
4	"	42.6	72.6	70		270	284.4			.75	
5											

RATE NO.	COEFFICIENT (F ₁) (F ₂) Mcfd	(METER) (PROVER) PRESSURE Psia	PRESS EXTENSION $\sqrt{P_w \cdot h_w}$	GRAVITY FACTOR F _g	FLOWING TEMP FACTOR F _t	DEVIATION FACTOR F _{pr}	RATE OF FLOW Q Mcfd	GOR (n ³ /Bbl)	G _s
2	"	46.5	36.21	"	.9924	---	509		
3	"	50.8	50.39	"	.9896	---	706		
4	"	57.0	64.32	"	.9905	---	902		
5									

RATE NO.	P _i Psia	P _c Psia	P _w Psia	(P _i) ² THOUSANDS	(P _c) ² THOUSANDS	PLOTTING POINTS		% SHUT-IN 100 $\frac{(P_w - P_c)}{(P_c - P_i)}$
						(P _i) ² - (P _c) ² THOUSANDS	Q Mcfd	
1		367.4	349.4	134.9	122.1	12.8	303	95.1
2		"	332.4	"	110.4	24.5	509	90.5
3		"	311.4	"	96.9	38.0	706	84.7
4		"	284.4	"	80.8	54.1	902	77.4
5								

INDICATED WELLHEAD OPEN FLOW 1800 Mcfd @ 14.65 Psia "n" = .758

The undersigned authority, on behalf of the Company, states that he is duly authorized to make the above report and that he has knowledge of the facts stated herein, and that said report is true and correct. Executed this the 21st day of May 2012.

Witness (if any) _____
For Commission _____

For Company *[Signature]*
WCM, INC.
Checked By _____

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Hart Energies - Griffin #1
SESW 22-34S-10W
Barber County
Tested 5/15/12

$\frac{Pc2}{1000}$

10

100

Q2 - 1100 - Log: 3.041
Q1 - 192 - Log: 2.283

"n" = .758

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MEASUREMENT SOLUTIONS INC.

6705 East 81st Street Suite 155 Tulsa, OK 74133
Telephone 918-493-2700 Fax 918-493-2704

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3/9/2012

GAS ANALYSIS REPORT

METER NUMBER :	890234	SAMPLE TYPE :	SPOT
METER NAME :	GRIFFIN # 1	SAMPLE DATE :	02/06/2012
METER ID :	WEST WICHITA	SAMPLE PRES / TEMP :	56 / 80
PRODUCER :	LUMEN ENERGY	SAMPLED BY :	CW
COMPANY :	LUMEN ENERGY	EFFECTIVE DATE :	03/01/2012

<u>COMPONENT</u>	<u>PERCENT</u>	<u>BTU VALUES @ 14.65</u>		<u>BTU VALUES @ 14.73</u>	
Helium He	0.0687	REAL DRY	1128.32	REAL DRY	1134.48
Oxygen O2	0.0000	REAL WET	1108.57	REAL WET	1114.63
Hydrogen Sulfide H2S	0.0000				
Carbon Dioxide CO2	0.1351				
Nitrogen N2	1.3642				
Methane C1	88.5566	<u>GPM VALUES @ 14.65</u>		<u>GPM VALUES @ 14.73</u>	
Ethane C2	5.5035	C2	1.4630	C2	1.4710
Propane C3	2.3761	C3	0.6507	C3	0.6542
I-Butane iC4	0.3223	iC4	0.1048	iC4	0.1054
N-Butane nC4	0.7422	nC4	0.2327	nC4	0.2340
I-Pentane iC5	0.2064	iC5	0.0751	iC5	0.0756
N-Pentane nC5	0.2567	nC5	0.0925	nC5	0.0930
Hexane Plus C6+	0.4682	C6+	0.2031	C6+	0.2043
TOTALS	100.0000		2.8219		2.8375

SPECIFIC GRAVITY

REAL DRY 0.6489
REAL WET 0.6485

COMPRESSIBILITY FACTOR

Z FACTOR DRY 0.9974
Z FACTOR WET 0.9973

GALLONS PER THOUSAND

GPM TOTALS @ 14.65

C2 + GPM 2.8219
C3 + PGM 1.3589
C4 + GPM 0.7082
C5 + GPM 0.3707

GPM TOTALS @ 14.73

C2 + GPM 2.8375
C3 + PGM 1.3665
C4 + GPM 0.7123
C5 + GPM 0.3729

COMMENTS :

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FIELD DATA SHEET

Pumper:

Phone#:

Type Test: Initial Annual Special Test Date **5/15/12**

Company **HART ENERGIES, LLC** Connection **CUMEN-WINGG**

Field **Miss** Reservoir **Miss** Location **SESW**

Completion Date Total Depth Plug Back TD Elevation Form or Lease Name **GRiffin**

Csg. Size W. d Set At Perforations: From To Well No. **1**

Tbg. Size W. d Set At Perforations: From To Sec. **22** Top-Alk **345** Reg-Sw **10W**

Type Completion (Describe) **SINGLE** Packer Set At County or Parish **LAUREN**

Producing Thru **CASING** Reservoir Temp. F Mean Annual Temp. F **60** Dero. Press. - P **14.4** State **KS**

G_v **.649** % CO₂ **.135** % N₂ **1.364** % H₂S Prover Motor Run **3"** Tops **FLC**

DATE	ELAP. TIME	WELLHEAD WORKING PRESSURE			METER OR PROVER				REMARKS (Include liquid production data: Type - API Gravity - Amount)
		Tbg. Psig	Csg. Psig	Δ P	Pressure Psig	Diff.	Temp. F	Orifice	
4:37	46		353						
9:45							1.500		COMMENCED TEST
:00			344		23.1	3.5	70		STARTED P. UNIT
:15			339		26.4	4.9	70		
:30			335		28.0	11.1	73		
:45			330		31.5	24.0	69		
:00			324		31.8	28.7	69		2.5 ⁹⁰ 344
:15			318		32.1	28.2	68		5.0 ⁹⁰ 335
:30			311		34.9	51.3	70		7.5 ⁹⁰ 326
:45			304		35.3	50.5	70		10.0 ⁹⁰ 318
:00			297		36.4	50.0	71		12.5 ⁹⁰ 309
:15			286		40.9	73.2	71		15.0 ⁹⁰ 300
:30			277		41.8	72.9	70		18.5 ⁹⁰ 291
:45			270		42.6	72.6	70		20.0 ⁹⁰ 282
1:00			310		43.4	45.2	72		25.0 ⁹⁰ 265
4:45			301		38.4	49.0	64		
0.0									
0.5									Begin 30 minute wellhead buildup
1.0									
1.5									
2.0									
3.0									
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									
15.0									
20.0									
25.0									
30.0									

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