

# KANSAS CORPORATION COMMISSION ONE POINT STABILIZED OPEN FLOW OR DELIVERABILITY TEST

Type Test:

- Open Flow  
 Deliverability

Test Date:  
1/06 to 1/07/11

API No. 15 - 077-21688-00-00

Company <b>Hart Energies</b>		Lease <b>Connie Sue</b>			Well Number <b>1</b>
County <b>Harper</b>	Location <del>ESWSE</del> <b>S2 NWSE</b>	Section <b>29</b>	TWP <b>31S</b>	RNG (EW) <b>09W</b>	Acres Attributed
Field <b>S2 NWSE</b>		Reservoir <b>Mississippian</b>	Gas Gathering Connection <b>Lumen-WWGG</b>		
Completion Date <b>7/20/10</b>		Plug Back Total Depth <b>4520 CIBP</b>	Packer Set at <b>none</b>		
Casing Size <b>5.5</b>	Weight	Internal Diameter	Set at <b>4850</b>	Perforations <b>4410</b>	To <b>4420</b>
Tubing Size <b>2.875</b>	Weight	Internal Diameter	Set at <b>1000</b>	Perforations <b>open</b>	To
Type Completion (Describe) <b>single</b>		Type Fluid Production <b>Oil &amp; SW</b>	Pump Unit or Traveling Plunger? Yes / No <b>No</b>		
Producing Thru (Annulus / Tubing) <b>Tubing</b>		% Carbon Dioxide <b>.0421</b>	% Nitrogen <b>33.4159</b>	Gas Gravity - G <sub>g</sub> <b>.739</b>	
Vertical Depth(H)		Pressure Taps <b>Flange</b>		(Meter Run) (Prover) Size <b>3"</b>	
Pressure Buildup: Shut in <b>1/03</b> 20 <b>11</b> at <b>10:00am</b> (AM) (PM) Taken <b>1/06</b> 20 <b>11</b> at <b>10:00 am</b> (AM) (PM)					
Well on Line: Started <b>1/06</b> 20 <b>11</b> at <b>10:15 am</b> (AM) (PM) Taken <b>1/07</b> 20 <b>11</b> at <b>1:15 pm</b> (AM) (PM)					

### OBSERVED SURFACE DATA

Duration of Shut-in **72** Hours

Static / Dynamic Property	Orifice Size (Inches)	Circle one: Meter Prover Pressure psig (Pm)	Pressure Differential in Inches H <sub>2</sub> O	Flowing Temperature t	Well Head Temperature t	Casing Wellhead Pressure (P <sub>w</sub> ) or (P <sub>c</sub> ) or (P <sub>e</sub> )		Tubing Wellhead Pressure (P <sub>w</sub> ) or (P <sub>t</sub> ) or (P <sub>e</sub> )		Duration (Hours)	Liquid Produced (Barrels)
						psig	psia	psig	psia		
Shut-in						1460	1474.4	1460	1474.4	72	
Flow	1.500	26.5	10.1	58		1314	1328.4	1314	1328.4	27	

### FLOW STREAM ATTRIBUTES

Plate Coefficient (F <sub>v</sub> ) (F <sub>p</sub> ) Mcfd	Circle one: Meter or Prover Pressure psia	Press Extension $\sqrt{P_m \times h}$	Gravity Factor F <sub>g</sub>	Flowing Temperature Factor F <sub>t</sub>	Deviation Factor F <sub>pv</sub>	Metered Flow R (Mcfd)	GOR (Cubic Feet/ Barrel)	Flowing Fluid Gravity G <sub>m</sub>
11.41	40.9	20.32	1.163	1.002		270		.739

### (OPEN FLOW) (DELIVERABILITY) CALCULATIONS

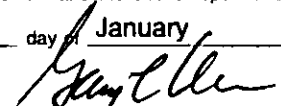
(P<sub>c</sub>)<sup>2</sup> = 2173.855 ; (P<sub>w</sub>)<sup>2</sup> = 1764.646 ; P<sub>d</sub> = \_\_\_\_\_ % (P<sub>c</sub> - 14.4) + 14.4 = \_\_\_\_\_ ; (P<sub>w</sub>)<sup>2</sup> = 0.207 ; (P<sub>e</sub>)<sup>2</sup> = \_\_\_\_\_

(P <sub>c</sub> ) <sup>2</sup> - (P <sub>w</sub> ) <sup>2</sup> or (P <sub>e</sub> ) <sup>2</sup> - (P <sub>w</sub> ) <sup>2</sup>	(P <sub>c</sub> ) <sup>2</sup> - (P <sub>w</sub> ) <sup>2</sup>	Choose formula 1 or 2: 1. P <sub>c</sub> <sup>2</sup> - P <sub>w</sub> <sup>2</sup> 2. P <sub>e</sub> <sup>2</sup> - P <sub>w</sub> <sup>2</sup> divided by: P <sub>c</sub> <sup>2</sup> - P <sub>w</sub> <sup>2</sup>	LOG of formula 1. or 2. and divide by: $\frac{P_c^2 - P_w^2}{P_c^2 - P_w^2}$	Backpressure Curve Slope = "n" or Assigned Standard Slope	n x LOG	Antilog	Open Flow Deliverability Equals R x Antilog (Mcfd)
2173.648	409.209	5.312	.7252	.901	.6534	4.51	1218

Open Flow **1218** Mcfd @ 14.65 psia X .50 = Deliverability **609** 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 28th day of January, 20 11.

\_\_\_\_\_  
Witness (if any)  
\_\_\_\_\_  
For Commission

  
\_\_\_\_\_  
For Company  
**GUY ALLEN**  
\_\_\_\_\_  
Checked by

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**FEB 02 2011**  
**KCC WICHITA**

STATE OF KANSAS - CORPORATION COMMISSION  
MULTIPOINT BACK PRESSURE TEST

FORM CG-1

TYPE TEST:  Initial  Annual  Special TEST DATE: 1/06/11

COMPANY: Hart Energies LEASE: Connie Sue WELL NO.: 1

COUNTY: Harper LOCATION: CSWSE SECTION: 29 TWP: 31S RNG: 09W ACRES: 1

FIELD: Miss PIPELINE CONNECTION: Lumen-WWGG

COMPLETION DATE: 7/20/10 PLUG BACK TOTAL DEPTH: 4520 CIBP PACKER SET AT: none

CASING SIZE: 5.5 WT. ID. SET AT: 4850 PERF. TO: 4420

TUBING SIZE: 2.875 WT. ID. SET AT: 1000 PERF. TO:

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

PRODUCING THRU tubing RESERVOIR TEMPERATURE F: BAR PRESS - P<sub>a</sub>: 14.4 Psia

GAS GRAVITY - G<sub>g</sub>: .739 % CARBON DIOXIDE: .0421 % NITROGEN: 33.4159 GRAVITY OF LIQUID:

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

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REMARKS: Tested into WWGG pipeline (250" EFM)

OBSERVED DATA

DURATION OF SHUT-IN: 72 HR.

RATE NO.	ORIFICE SIZE in.	(METER) (PROVER) PRESSURE psig	DIEP. (h <sub>w</sub> ) (h <sub>d</sub> )	FLOWING TEMP. t	WELL-HEAD TEMP. t	CASING WELLHEAD PRESS.		TUBING WELLHEAD PRESS.		DURATION HOURS	LIQUID PROD. Bbls.
						psig	(P <sub>w</sub> )(P <sub>i</sub> )(P <sub>c</sub> ) psia	psig	(P <sub>w</sub> )(P <sub>i</sub> )(P <sub>c</sub> ) psia		
SHUT IN						1460	1474.4	1460	1474.4	72	
1	1.500	27	5.8	53		1388	1402.4	1388	1402.4	.75	0
2	"	28.5	11.2	54		1353	1367.4	1353	1367.4	.75	0
3	"	29.5	18.7	55		1312	1326.4	1311	1325.4	.75	0
4	"	31	27.5	57		1271	1285.4	1268	1282.4	.75	0
5											

RATE OF FLOW CALCULATIONS

RATE NO.	COEFFICIENT (F <sub>d</sub> )(F <sub>p</sub> ) Meid	(METER) (PROVER) PRESSURE psia	EXTENSION $\sqrt{P_m \cdot h_w}$	GRAVITY FACTOR F <sub>g</sub>	FLOWING TEMP FACTOR F <sub>t</sub>	DEVIATION FACTOR F <sub>pv</sub>	RATE OF FLOW Q Meid	GOR	G <sub>m</sub>
1	11.41	41.4	15.49	1.163	1.007	---	207		
2	"	42.9	21.91	"	1.006	---	292		
3	"	43.9	28.65	"	1.005	---	382		
4	"	45.4	35.33	"	1.003	---	470		
5									

PRESSURE CALCULATIONS

RATE NO.	P <sub>i</sub> psia	P <sub>c</sub> psia	P <sub>w</sub> psia	(P <sub>c</sub> ) <sup>2</sup> THOUSANDS	(P <sub>w</sub> ) <sup>2</sup> THOUSANDS	PLOTING POINTS		% SHUT-IN 100 $\frac{P_w - P_a}{P_c - P_a}$
						(P <sub>c</sub> ) <sup>2</sup> - (P <sub>w</sub> ) <sup>2</sup> THOUSANDS	Q Meid	
1	1402.4	1474.4	1402.4	2173.8	1966.7	207.1	207	95.1
2	1367.4	"	1367.4	"	1869.8	304.0	292	92.7
3	1325.4	"	1326.4	"	1759.3	414.5	382	89.9
4	1282.4	"	1285.4	"	1652.2	521.6	470	87.2
5								

INDICATED WELLHEAD OPEN FLOW 1750 Meid @ 14.65 psia "n" = .901

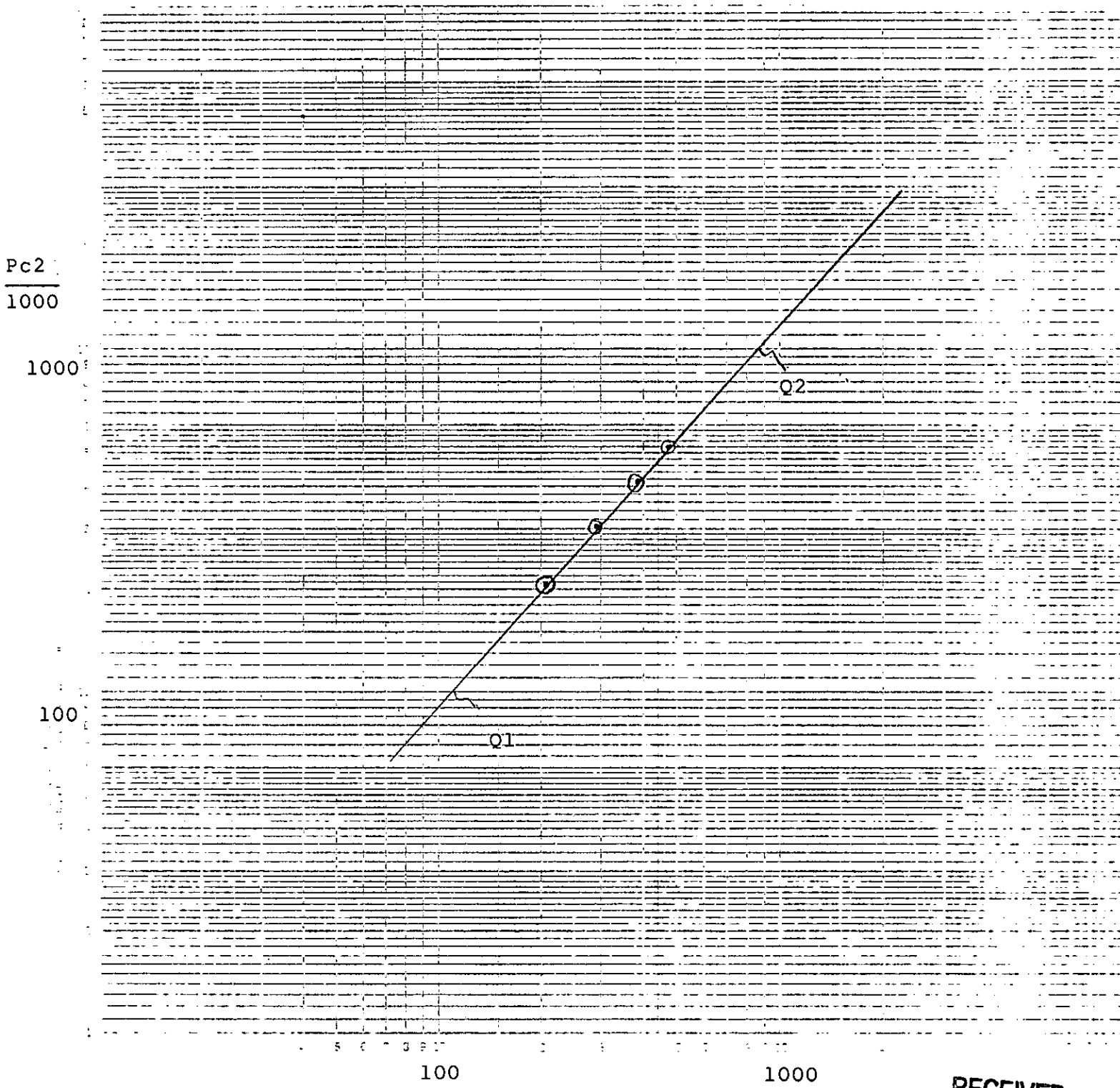
The undersigned authority, on behalf of the Company, states that he is duly authorized to make the above report and that he has knowledge of the facts stated therein, and that said report is true and correct.

Executed this the 28th day of January, 2011.

Witness (if any)  
For Commission

*Gary C. Allen*  
For Company  
CCH, INC.  
Checked by

Hart Energies - Connie Sue #1  
 CSWSE 29-31S-09W  
 Harper County  
 Tested 01/06/11



Q2 - 875 - Log: 2.942  
 Q1 - 110 - Log: 2.041

"n" = .901

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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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12/17/2010

## GAS ANALYSIS REPORT

<b>METER NUMBER :</b>	890239	<b>SAMPLE TYPE :</b>	SPOT
<b>METER NAME :</b>	CONNIE SUE	<b>SAMPLE DATE :</b>	12/02/2010
<b>METER ID :</b>	WEST WICHITA	<b>SAMPLE PRES / TEMP :</b>	26 / 67
<b>PRODUCER :</b>		<b>SAMPLED BY :</b>	FR
<b>COMPANY :</b>	LUMEN ENERGY	<b>EFFECTIVE DATE :</b>	11/01/2010

<u>COMPONENT</u>		<u>PERCENT</u>	<u>BTU VALUES @ 14.65</u>		<u>BTU VALUES @ 14.73</u>	
Helium	He	0.5013	REAL DRY	743.69	REAL DRY	747.75
Oxygen	O2	0.0000	REAL WET	730.68	REAL WET	734.67
Hydrogen Sulfide	H2S	0.0000				
Carbon Dioxide	CO2	0.0421				
Nitrogen	N2	33.4159				
Methane	C1	59.6775	<u>GPM VALUES @ 14.65</u>		<u>GPM VALUES @ 14.73</u>	
Ethane	C2	3.8321	C2	1.0187	C2	1.0243
Propane	C3	1.6460	C3	0.4507	C3	0.4532
I-Butane	iC4	0.1611	iC4	0.0524	iC4	0.0527
N-Butane	nC4	0.3937	nC4	0.1234	nC4	0.1241
I-Pentane	iC5	0.0831	iC5	0.0303	iC5	0.0304
N-Pentane	nC5	0.1045	nC5	0.0376	nC5	0.0378
Hexane Plus	C6+	0.1427	C6+	0.0619	C6+	0.0623
TOTALS		100.0000		1.7750		1.7848

### SPECIFIC GRAVITY

REAL DRY 0.7415  
REAL WET 0.7394

### COMPRESSIBILITY FACTOR

Z FACTOR DRY 0.9985  
Z FACTOR WET 0.9984

### GALLONS PER THOUSAND

#### GPM TOTALS @ 14.65

C2 + GPM 1.7750  
C3 + PGM 0.7563  
C4 + GPM 0.3056  
C5 + GPM 0.1298

#### GPM TOTALS @ 14.73

C2 + GPM 1.7848  
C3 + PGM 0.7605  
C4 + GPM 0.3073  
C5 + GPM 0.1305

COMMENTS :

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# FIELD DATA SHEET

Pumper:

Phone#:

Type Test:  Initial     Annual     Special    Test Date 1/6/11

Company HANT ENERGIES    Connection WW66

Field \_\_\_\_\_ Reservoir \_\_\_\_\_ Location \_\_\_\_\_

Completion Date \_\_\_\_\_ Total Depth \_\_\_\_\_ Plug Back TD \_\_\_\_\_ Elevation \_\_\_\_\_ Farm or Lease Name CONNIE SUE

Csg. Size \_\_\_\_\_ Wt. \_\_\_\_\_ d \_\_\_\_\_ Set At \_\_\_\_\_ Perforations: From \_\_\_\_\_ To \_\_\_\_\_ Well No. 1

Tbg. Size \_\_\_\_\_ Wt. \_\_\_\_\_ d \_\_\_\_\_ Set At \_\_\_\_\_ Perforations: From \_\_\_\_\_ To \_\_\_\_\_ Sec. Top - Blk Rgs - Sur

Type Completion (Describe) SINGLE    Packer Set At \_\_\_\_\_ County or Parish GRADY

Producing Thru F56    Reservoir Temp. F \_\_\_\_\_ Mean Annual Temp. F 60    Core. Press. - P 14.4    State \_\_\_\_\_

G<sub>g</sub> \_\_\_\_\_ % CO<sub>2</sub> \_\_\_\_\_ % N<sub>2</sub> \_\_\_\_\_ % H<sub>2</sub>S \_\_\_\_\_ Prover \_\_\_\_\_ Meter Run 3" Taps FLG

DATE	ELAP. TIME Time of Reading	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	
10:00	72	1460	1460						
10:15								1.500	Commence Test
:30		1395	1395		27	5.8	47		
:45		1390	1390		27	5.9	52		
:00		1388	1388		27	5.8	53		
:15		1377	1377		28.5	11.0	53		
:30		1364	1364		28.5	11.3	54		
:45		1353	1353		28.5	11.2	54		2.5 <sup>90</sup> 1423
:00		1330	1331		29	18.3	54		5.0 <sup>90</sup> 1387
:15		1319	1320		29	18.6	55		7.5 <sup>90</sup> 1350
:30		1311	1312		29.5	18.7	55		10.0 <sup>90</sup> 1314
									12.5 <sup>90</sup> 1277
:45		1288	1291		30.5	26.8	56		15.0 <sup>90</sup> 1241
:00		1280	1283		31	27.1	57		17.5 <sup>90</sup> 1204
:15		1268	1271		31	27.5	57		20.0 <sup>90</sup> 1168
									25.0 <sup>90</sup> 1095
1:30		1363	1363		24	10.9	62		Set Rate for 1. Point Test
1:15		1314	1314		26.5	16.1	58		1. Point Test 1/7/11
	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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