

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

Type Test:

- Open Flow  
 Deliverability

(See Instructions on Reverse Side)

Test Date:  
11/04/2003

API No. 15  
023-20518-00-00

Company <b>NOBLE ENERGY, INC</b>		Lease <b>ZWEYGARDT</b>		Well Number <b>11-05</b>	
County <b>CHEYENNE</b>	Location <b>NWNW</b>	Section <b>5</b>	TWP <b>4S</b>	RNG (E/W) <b>41</b>	Acres Attributed
Field <b>CHERRY CREEK</b>		Reservoir <b>NIOBRARA</b>		Gas Gathering Connection <b>BITTER CREEK PIPELINE</b>	
Completion Date <b>11/07/2003</b>		Plug Back Total Depth <b>1552</b>		Packer Set at	
Casing Size <b>4 1/2"</b>	Weight <b>10.5#</b>	Internal Diameter <b>4.052</b>	Set at <b>1597'</b>	Perforations <b>1442</b>	To <b>1460</b>
Tubing Size	Weight	Internal Diameter	Set at	Perforations	To
Type Completion (Describe) <b>SINGLE (GAS)</b>		Type Fluid Production <b>NONE</b>		Pump Unit or Traveling Plunger? Yes / No <b>NO</b>	
Producing Thru (Annulus / Tubing) <b>CASING</b>		% Carbon Dioxide		% Nitrogen	
Vertical Depth(H) <b>1621</b>		Pressure Taps		Gas Gravity - G <sub>g</sub> <b>0.6</b>	
Pressure Buildup: Shut in <b>11/04</b> 20 <b>03</b> at _____ (AM) (PM) Taken <b>11/04</b> 20 <b>03</b> at _____ (AM) (PM)					
Well on Line: Started <b>11/07</b> 20 <b>03</b> at <b>1:35</b> (AM) (PM) Taken _____ 20 _____ at _____ (AM) (PM)					

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**OBSERVED SURFACE DATA**

Duration of Shut-in \_\_\_\_\_ 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>i</sub> ) or (P <sub>c</sub> )		Tubing Wellhead Pressure (P <sub>w</sub> ) or (P <sub>i</sub> ) or (P <sub>c</sub> )		Duration (Hours)	Liquid Produced (Barrels)
						psig	psia	psig	psia		
Shut-in						254		NA			
Flow	3/8	125		60		265		NA		24	0

**FLOW STREAM ATTRIBUTES**

Plate Coefficient (F <sub>b</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>tt</sub>	Deviation Factor F <sub>pv</sub>	Metered Flow R (Mcfd)	GOR (Cubic Feet/ Barrel)	Flowing Fluid Gravity G <sub>m</sub>

**(OPEN FLOW) (DELIVERABILITY) CALCULATIONS**

(P<sub>c</sub>)<sup>2</sup> = \_\_\_\_\_ ∴ (P<sub>w</sub>)<sup>2</sup> = \_\_\_\_\_ ∴ P<sub>a</sub> = \_\_\_\_\_ % (P<sub>c</sub> - 14.4) + 14.4 = \_\_\_\_\_ ∴ (P<sub>a</sub>)<sup>2</sup> = 0.207  
(P<sub>o</sub>)<sup>2</sup> = \_\_\_\_\_

(P <sub>c</sub> ) <sup>2</sup> - (P <sub>a</sub> ) <sup>2</sup> or (P <sub>c</sub> ) <sup>2</sup> - (P <sub>o</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>a</sub> <sup>2</sup> 2. P <sub>c</sub> <sup>2</sup> - P <sub>o</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: $\left[ \frac{P_c^2 - P_w^2}{P_c^2 - P_a^2} \right]$	Backpressure Curve Slope = "n" ----- or Assigned Standard Slope	n x LOG $\left[ \frac{P_c^2 - P_w^2}{P_c^2 - P_a^2} \right]$	Antilog	Open Flow Deliverability Equals R x Antilog (Mcfd)

Open Flow Mcfd @ 14.65 psia Deliverability 85 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 12TH day of November, 20 03.

\_\_\_\_\_  
Witness (if any)

\_\_\_\_\_  
For Commission

*Patricia Jacobs*  
\_\_\_\_\_  
For Company

\_\_\_\_\_  
Checked by

I declare under penalty of perjury under the laws of the state of Kansas that I am authorized to request exempt status under Rule K.A.R. 82-3-304 on behalf of the operator NOBLE ENERGY, INC. and that the foregoing pressure information and statements contained on this application form are true and correct to the best of my knowledge and belief based upon available production summaries and lease records of equipment installation and/or upon type of completion or upon use being made of the gas well herein named.

I hereby request a one-year exemption from open flow testing for the ZWEYGARDT 11-05 gas well on the grounds that said well:

(Check one)

- is a coalbed methane producer
- is cycled on plunger lift due to water
- is a source of natural gas for injection into an oil reservoir undergoing ER
- is on vacuum at the present time; KCC approval Docket No. \_\_\_\_\_
- is not capable of producing at a daily rate in excess of 250 mcf/D

I further agree to supply to the best of my ability any and all supporting documents deemed by Commission staff as necessary to corroborate this claim for exemption from testing.

Date: 11/12/03

Signature: Patricia Janeke

Title: REGULATORY SPECIALIST III

**Instructions:** If a gas well meets one of the eligibility criteria set out in KCC regulation K.A.R. 82-3-304, the operator may complete the statement provided above in order to claim exempt status for the gas well.

At some point during the current calendar year, wellhead shut-in pressure shall have been measured after a minimum of 24 hours shut-in/buildup time and shall be reported on the front side of this form under **OBSERVED SURFACE DATA**. Shut-in pressure shall thereafter be reported yearly in the same manner for so long as the gas well continues to meet the eligibility criterion or until the claim of eligibility for exemption **IS** denied.

The G-2 form conveying the newest shut-in pressure reading shall be filed with the Wichita office no later than December 31 of the year for which it's intended to acquire exempt status for the subject well. The form must be signed and dated on the front side as though it was a verified report of annual test results.

### MULTIPOINT BACK PRESSURE TEST

Test Type ;	INITIAL	State;	Kansas	Test Date;	11/04/03
Company ;	Noble Energy Inc.	Lease ;	Zweygart	Well No. ;	11 5
County ;	Cheyenne	Location ;	NVNW/4,8EC.5-T48-R41W	Acres ;	
Field ;	Cherry Creek	Reservoir ;	Nebraska	Pipeline Conn.	None
Completion Date ;		PBTD ;	1552	Packer Set ;	
Casing Size ;	4 1/2" Wt. ; 10.5#	Set @ ;	1597	Perfs. ;	N/A
Tubing Size ;	None Wt. ;	Set @ ;		Perfs ;	N/A
Type of Completion ;	Single Gas	Type Fluid Prod ;	None		
Producing Thru ;	Casing	Reservoir Temp. F ;	-	Bar. Press. ;	13 PSI
Gas Gravity ;	.6 (est)	% CO2 ; - % N2 ;	-	Liquid API Grav	N/A
Vertical Depth ;	1460	Type Meter Conn. ;	None	Prover Size ;	2"

Remarks: Used 2" critical flow prover & dead weight tester.

Rate No.	Orifice Size in.	Prover Press. psig	Flowing Temp. deg. F	Casing Wellhead Pressure		Shut-in Hrs.:		Liquid Prod. bbls.
				psig	psia	hrs.		
Shut-in	blank	264	-	264	277	0		0
1	11/64	254	58	254	267	1		0
2	1/4	245	59	245	258	1		0
3	11/32	232	60	232	245	1		0
4	7/16	214	62	214	227	1		0
5	13/32	102	54	102	115	24		0

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#### RATE OF FLOW CALCULATIONS

Rate No.	Coefficient mcf/d	Prover Press. psia	Gravity Factor Fg	Temp. Factor Ft	Deviation Factor Fpv	Rate of Flow Q mcf/d
1	0.5000	267	1.291	1.0019	1.0205	176
2	1.1150	258	1.291	1.0010	1.0198	379
3	2.0350	245	1.291	1.0000	1.0188	656
4	3.4850	227	1.291	0.9981	1.0174	1040
5	2.8066	115	1.291	1.0058	1.0087	438

1.664

#### PRESSURE CALCULATIONS

Rate No.	Pc psia	Pw psia	Pc^2 /1000	Pw^2 /1000	Pc^2-Pw^2 /1000	Q mcf/d	Shut-in %
1	277	267	76.7	71.3	5.4	176	96.21
2	277	258	76.7	66.6	10.2	379	92.80
3	277	245	76.7	60.0	16.7	656	87.88
4	277	227	76.7	51.5	25.2	1040	81.06
5	277	115	76.7	13.2	63.5	438	38.64

INDICATED WELLHEAD OPEN FLOW = 543.45 Mcfd "n" = 1.16

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 5th day of November, 2003.

Wayne Mahon For Excell Drilling Co.

Signed: Wayne Mahon Title: Field Technician