KANSAS CORPORATION COMMISSION
ONE POINT STABLIZED OPEN FLOW OR DELIVERABILITY TEST

FORM G-2
(Rev.8/98)

TYPE TEST:
☒ Open Flow
☒ Deliverability

TEST DATE: 11-10-99 API No.

Company	Lease	Well Number
Horsehoe Operating Inc	Ross	3

County	Location	Section	TWP	RNG(E/W)	Acres Attributed
Greeley	NE/4	7	18s	39w	640

Field	Reservoir	Gas Gathering Connection
Bradshaw	Winfield	Cache Creek

Completion Date	Plug Back Total Depth	Packer Set at
9/17/80	2987	

Casing Size	Weight	Internal Diameter	Set at	Perforations	To
4.500	10.500	4.052	2999	2910	2927

Tubing Size	Weight	Internal Diameter	Set at	Perforations	To
2.375	4.700	1.995	2825		

Type Completion (Describe)	Type Fluid Production	Pump Unit or Traveling Plunger?
Single-gas	water	pumping unit

Producing Thru (Annulus/Tubing)	% Carbon Dioxide	% Nitrogen	Gas Gravity- Gg
casing	.067	49.466	.872

Vertical Depth (H)	Pressure Taps	Meter Run Size
2918	Flange	3.068

Pressure Buildup: Shut in	11/6/99 @ 8:15am	TAKEN	11/9/99 @ 10:50am
Well on Line: Started	11/9/99 @ 10:50am	TAKEN	11/10/99 @ 8:40am

OBSERVED SURFACE DATA

Static/ Dynamic Property	Orifice Size in.	Meter Pressure psig	Pressure Diff. In. H $_2$O	Flowing Temp. t.	WellHead Temp. t.	Casing WellHead Press. (P_w) (P_t) (P_c) psig	Casing psia	Tubing WellHead Press. (P_w) (P_t) (P_c) psig	Tubing psia	Duration (Hours)	Liquid Prod. Barrels
Shut-in						139	152			74.5	
Flow	.750	67.0	59.00	43		102	115			22.0	6.0

FLOW STREAM ATTRIBUTES

COEFFICIENT (F_b) Mcfd	(METER) PRESSURE psia	EXTENSION $\sqrt{P_m \times H_w}$	GRAVITY FACTOR Fg	FLOWING TEMP FACTOR Ft	DEVIATION FACTOR Fpv	RATE OF FLOW R Mcfd	GOR	G_m
2.740	80.4	68.87	1.0709	1.0168	1.0066	206	31598.9	.993

(OPEN FLOW)(DELIVERABILITY) CALCULATIONS

(P_c)^2 = 23.2 (P_w)^2 = 13.5 44.0 % (P_c - 14.4) + 14.4 = (P_a)^2 = 0.207 (P_d)^2 4.49

(P_c)^2 - (P_a)^2 or (P_c)^2 - (P_d)^2	(P_c)^2 - (P_w)^2	$\frac{(P_c)^2-(P_a)^2}{(P_c)^2-(P_w)^2}$ or $\frac{(P_c)^2-(P_d)^2}{(P_c)^2-(P_w)^2}$	LOG [ ]	Backpressure Curve Slope "n" ---- or ---- Assigned Standard Slope	n x LOG [ ]	Antilog	Open Flow Deliverability = R x Antilog Mcfd
23.05	9.77	2.360	.3728	.837	.3121	2.051	424
18.74	9.77	1.918	.2829	.837	.2368	1.725	356

OPEN FLOW 424 Mcfd @ 14.65 psia DELIVERABILITY 356 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 herein and that said report is true and correct. Executed this the 22 day of Nov, 19 99

Witness (if any)

For Company

For Commission

Checked by

Original - Wichita
Copy - Dodge
Copy - Horseshoe Operating Inc

I declare under penelty or 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 Horsehoe Operating Inc and that the foregoing information and statements contained on this application form are true and correct to the best of my knowledge and belief based upon gas production records and records of equipment installation and/or of type completion or upon use of the gas well herein named.

I hereby request a permanent exemption from open flow testing for the Ross 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 vacum at the present time; KCC approval Docket No. _____
- ☒ is incapable of producing at a daily rate in exess of 150 mcf/D

Date: 11-22-99

Signature: [signature]

Title: Tester

Instructions:

All active gas wells must have at least an original G-2 form on file with the conservation division. If a gas well meets 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 obtain a testing exemption.

At some point during the succeeding calendar year, wellhead shut-in pressure shall be 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.

The G-2 form conveying the newest shut-in pressure reading shall be filed with the Wichita office no later than thirty (30) days after the taking of the pressure reading. The form must be signed and dated on the front side as though it was a verified report of test results.

716-520-4500 J. Dixon

STATE OF KANSAS - CORPORATION COMMISSION

STABILIZED OPEN FLOW OR DELIVERABILITY TEST

TYPE TEST: 1-Point	INITIAL	ANNUAL X	SPECIAL	TEST DATE 9/16/92

COMPANY	LEASE	WELL NO.
J. Cecil Rhodes	Ross	3

COUNTY	LOCATION	SECTION	TWP	RNG	ACRES
Greeley	NE/4	7	18S	39W	640

FIELD	RESERVOIR	PIPELINE CONNECTION
Bradshaw	Winfield	Cache Creek

COMPLETION DATE	PLUG BACK TOTAL DEPTH	PACKER SET AT
9-17-80	2987	None

	SIZE	WT.	ID	SET AT	PERF.	TO
CASING	4½"	10.5	4.052	2999	2910	2927
TUBING	2-3/8"	4.7	1.995	2825	Open Ended	

TYPE COMPLETION (Describe)	TYPE FLUID PRODUCTION
Single Zone - Gas	Water

PRODUCING THRU	RESERVOIR TEMPERATURE F	BAR PRESS - Pa
Tubing	91°	14.4

GAS GRAVITY - Gg	%CARBON DIOXIDE	%NITROGEN	API GRAVITY OF LIQUID
.720	0	0	0

VERTICAL DEPTH (H)	TYPE METER CONN.	(METER RUN) (~~PROVER~~) SIZE
2919	Flange	3"

NO.	FLOW DATA: ORIFICE SIZE in.	PRESSURE psig	DIFF (hw)(hd)	FLOWING TEMP. t	TUBING DATA: PRESSURE psig	TEMP °F	CASING DATA: PRESSURE psig.	TEMP °F	DURATION HOURS
SI							282	60	72
1	3" x .750	201	13	60	216	60	258	60	24
2									
3									
4									
5									

RATE OF FLOW CALCULATIONS

NO.	COEFFICIENT (Fb) (Fp) Mcfd	EXTENSION $\sqrt{P_m \times h_w}$	PRESSURE psia	FLOWING TEMP. FACTOR Ft	GRAVITY FACTOR Fg	DEVIATION FACTOR Fpv	RATE OF FLOW Q Mcfd
1	2.740	52.92	215.40	1.0000	1.179	1.027	176
2							
3							
4							
5							

NO.	Pr	Temp.R	Tr	Z	Pw	$(P_w)^2$	$(P_c)^2-(P_w)^2$
1	.32	520	1.31	.949	272.4	74.20	13.65
2							
3							
4							
5							

G.O.R.		Mcf/Bbl
API Gravity		@60°F
Gg	.720	
Gm		.720
Pcr	668 psia	668 psia
Tcr	398 R	398 R

OPEN FLOW OR DELIVERABILITY CALCULATIONS

Pc 296.40 $(P_c)^2$ 87.85 Pd ______ $(P_d)^2$ ______ $(P_a)^2$ .207

$(P_c)^2-(P_a)^2$	$(P_c)^2-(P_w)^2$	$\frac{P_c^2-P_a^2}{P_c^2-P_w^2}$	$\left[\frac{P_c^2-P_a^2}{P_c^2-P_w^2}\right]^n$	WELLHEAD OPEN FLOW Mcfd	$(P_c)^2-(P_d)^2$	$\frac{P_c^2-P_d^2}{P_c^2-P_w^2}$	$\left[\frac{P_c^2-P_d^2}{P_c^2-P_w^2}\right]^n$	DELIVERABILITY Mcfd
87.64	13.65	6.42	4.74	834				

WELLHEAD OPEN FLOW	Mcfd @ 14.65 psia	ANGLE OF SLOPE	SLOPE, n
834		39.9	.837

REMARKS:

APPROVED BY COMMISSION	CONDUCTED BY	CALCULATED BY	CHECKED BY
	Warren Ochsner	Jim Dixon	Jim Dixon

FieldNotes

Company: Horseshoe Oper		Address:		95%
Wellname: Ross				90%
Location:		County: Greeley	St: Ks	85%
Formation:	Field/Pool:			80%
TD:	Casing size: 4 1/2	Tubing size: 2 3/8	Plug back depth:	
	Feet of:	Feet of:	Packer depth:	
Meter run size:	Orif (in)	Type meter connection:		
Gravity of Liquid:	Orif (in)	Producing through:		
Type of completion:		Mileage: 45 miles		

Date	Clk Tim	Tbg Pres	Csg Pres	Diff	Temp	Static/Prover	Wat Vol1	Oil Vol	Comment
yy/mm/dd	clock	psi	psi	in of H2O	F	PSI	bbl	bbl	
11-10-99	08:40	105	102	59	43°	67	39"		

FieldNotes

Casing press: 139

Company: Horseshoe Oper	Address:			95%	
Wellname: Ross				90%	
Location: 7-18S-39W	County: Greeley	St: KS		85%	118
Formation:	Field/Pool:			80%	
TD:	Casing size: 4 1/2	Tubing size: 2 3/8	Plug back depth:		
	Feet of:	Feet of:	Packer depth:		
Meter run size:	Orif (in) 3x 250	Type meter connection:			
Gravity of Liquid:	Orif (in)	Producing through:			
Type of completion:		Mileage: 40 miles from Scott City			

Date	Clk Tim	Tbg Pres	Csg Pres	Diff	Temp	Static/Prover	Wat Vol1	Oil Vol	Comment
yy/mm/dd	clock	psi	psi	in of H2O	F	PSI	bbl	bbl	
11-9-99	10:50 AM	139	139	0	55°	32	3'-7"		Tbg size 1.6"
PM	1:45	126	124	70	65°	50	3'-7"		

0-100 0-250

Shane