

**REPUBLIC NATURAL GAS COMPANY**  
**INDIVIDUAL WELL HISTORY — ENGINEERING DEPARTMENT**

WELL NO. 1 LEASE Fox LOCATION 2130' from North

Line and 1980' from East Line of Section 3, T 35S, R 30W.

FIELD Wildcat COUNTY Meade STATE Kansas

| DATE                  | HISTORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5-31-57               | Rigged up and spudded in. Contractor - Moran Brothers, Incorporated. Drilled 12-1/4" hole to 625'. Reamed to 15" to 625'.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 6- 2-57               | Ran 19 joints (598.31') of 10-3/4" 32.75#, Range 2, H-40, 8 rd. thd., new, seamless casing. Bottom joint belled. Set at 609.06' K.B. Top of collar 3' below ground level. Cemented with 370 sacks of regular cement with 2% gel and 186 cubic feet of Strata Crete (6). Cement circulated to surface. Pumped plug to 556' K.B. at 4:45 A.M.                                                                                                                                                                                                                                        |
| 6- 3-57 to<br>6- 6-57 | Drilled to 2610'. Used four 9-7/8" bits. Used 41 sacks Salt gel and 14 sacks Magcogel from 2260' to 2610'.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6- 7-57               | Ran Schlumberger Laterolog Survey to 2606'. Laid down 4-1/2" drill pipe. Ran 81 joints (2584') of 7-5/8", 26.40 J-55, Range 2 and 3, new, seamless casing with Larkin guide on bottom and Larkin float collar on top of bottom joint. Set at 2594' K.B. Centralizers at 2580.25', 2524.93', 2442.29' and 2368.50' K.B.. Cemented with 100 sacks regular cement with 4% gel and 100 cubic feet Strata Crete (6). Pumped plug to 2566' at 5:45 P.M.                                                                                                                                  |
| 6- 8-57               | Ran temperature survey. Approximate top of cement at 1860'.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6- 9-57<br><br>to     | Drilled to 3117' with three 6-3/4" bits. Ran Drill Stem Test No. 1. Tested interval from 3090' to 3117' (Council Grove). Tool open one hour. Had gas to surface in 5 minutes, mud in 10 minutes, water in 36 minutes. Maximum gas gauge: 2862 MCF in 20 minutes.<br>Recovered 70' salt water.<br><br>Initial Flow Pressure 600 psi<br>Final Flow Pressure 690 psi<br>20 Minute BHP 885 psi<br>Final Hydrostatic Pressure 1,875 psi<br>Bottom Hole Temperature 112° F.                                                                                                              |
| 6-12-57               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6-13-57<br><br>to     | Drilled to 4425' with five 6-3/4" bits. Ran Drill Stem Test No. 2. Tested interval from 4410' to 4425' (Toronto). Tool open 32 minutes. Had gas to surface in 1-1/2 minutes, mud and oil in 5-1/2 minutes. Maximum gas gauge: 5665 MCF in 10 minutes.<br>Recovered 180' of free oil and 10' of salt water.<br>Oil gravity - 45° API at 60° F. (corrected).<br><br>Initial Flow Pressure 1,430 psi<br>Final Flow Pressure 1,390 psi<br>20 Minute BHP 1,560 psi<br>Initial Hydrostatic Pressure 2,270 psi<br>Final Hydrostatic Pressure 2,270 psi<br>Bottom Hole Temperature 116° F. |
| 6-16-57               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6-17-57<br><br>to     | Drilled to 5091' with five 6-3/4" bits. Ran Drill Stem Test No. 3. Tested interval from 5077' to 5091' (Checkerboard Line). Tool opened one hour. Had weak blow of air throughout test. Recovered 560' of muddy, slightly gas cut salt water.<br><br>Initial Flow Pressure 90 psi<br>Maximum Flow Pressure 355 psi<br>20 Minute BHP 1,765 psi<br>Initial Hydrostatic Pressure 2,530 psi<br>Final Hydrostatic Pressure 2,470 psi                                                                                                                                                    |
| 6-20-57               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

REPUBLIC NATURAL GAS COMPANY  
INDIVIDUAL WELL HISTORY — ENGINEERING DEPARTMENT

WELL NO. 1 LEASE Fox LOCATION \_\_\_\_\_

FIELD \_\_\_\_\_ COUNTY \_\_\_\_\_ STATE \_\_\_\_\_

| DATE               | HISTORY                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6-21-57            | Drilled to 5224' with two 6-3/4" bits.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6-22-57            | Ran Drill Stem Test No. 4. Tested interval from 5204' to 5224' (Marmaton). Tool open 1-1/2 hours. Had gas to surface in 6 minutes. Maximum gas gauge: 66 MCF in 20 min. Recovered 900' of oil and 600' of salt water. Oil gravity - 40.7° API at 60° F.<br><br>Initial Flow Pressure 105 psi<br>Final Flow Pressure 295 psi<br>20 Minute BHP 700 psi<br>Initial Hydrostatic Pressure 2,450 psi<br>Final Hydrostatic Pressure 2,325 psi<br>Bottom Hole Temperature 119° F. |
| 6-23-57            | Drilled to 5387' with two 6-3/4" bits.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6-24-57            | Ran Drill Stem Test No. 5. Tested interval from 5363' to 5373' (Lower Marmaton). Tool open 1 hour. Had weak blow of air throughout test. Recovered 20' of slightly oil and gas cut mud.<br><br>Initial Flow Pressure 35 psi<br>Final Flow Pressure 35 psi<br>20 Minute BHP 390 psi<br>Initial Hydrostatic Pressure 2,545 psi<br>Final Hydrostatic Pressure 2,530 psi<br>Bottom Hole Temperature 120° F.                                                                   |
| 6-25-57 to 6-26-57 | Drilled to 5811' with four 6-3/4" bits.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 6-27-57            | Ran Drill Stem Test No. 6. Tool stopped at 2800'. Pulled tool, replaced packers, ran back to bottom, tool plugged. Pulled tool, went back to bottom, circulated to condition hole.                                                                                                                                                                                                                                                                                        |
| 6-28-57            | Ran Drill Stem Test No. 6-A. Tested interval from 5803' to 5811' (Morrow). Tool open 1 hour. Gas to surface in 2 minutes. Maximum gas gauge: 947 MCF in 30 minutes. Recovered 1 quart of distillate.<br><br>Initial Flow Pressure 120 psi<br>Final Flow Pressure 140 psi<br>Initial 30 Minute BHP 2,025 psi<br>Final 30 Minute BHP 2,000 psi<br>Initial Hydrostatic Pressure 2,725 psi<br>Final Hydrostatic Pressure 2,710 psi                                            |
| 6-29-57            | Drilled to 5865' with one 6-3/4" bit (No. 28). Ran Drill Stem Test No. 7. Tested interval from 5850' to 5865' (Morrow). Tool open 1 hour. Had steady blow of air throughout test. Recovered 20' of mud.<br><br>Initial Flow Pressure 20 psi<br>Final Flow Pressure 20 psi<br>Initial 30 Minute BHP 1,425 psi<br>Final 30 Minute BHP 1,675 psi<br>Initial Hydrostatic Pressure 2,815 psi<br>Final Hydrostatic Pressure 2,815 psi<br><br>Reran Bit No. 28.                  |

REPUBLIC NATURAL GAS COMPANY  
INDIVIDUAL WELL HISTORY — ENGINEERING DEPARTMENT

WELL NO. 1 LEASE Fox LOCATION \_\_\_\_\_

FIELD \_\_\_\_\_ COUNTY \_\_\_\_\_ STATE \_\_\_\_\_

DATE

HISTORY

6-30-57

Drilled to 5908'. Ran Drill Stem Test No. 8. Tested interval from 5893' to 5908' (Basal Morrow). Tool open 1 hour. Gas to surface in 2 minutes, water cushion and mud in 42 minutes. Maximum gas gauge: 2494 MCF in 15 min. Recovered show of distillate.

Initial Flow Pressure 615 psi  
Final Flow Pressure 615 psi  
Initial 30 Minute BHP 2,050 psi  
Final 30 Minute BHP 1,975 psi  
Initial Hydrostatic Pressure 2,865 psi  
Final Hydrostatic Pressure 2,915 psi

7- 1-57

to

7- 3-57

Drilled to 6241' with four 6-3/4" bits. Strapped out in tension. Corrected T.D.: 6237'. Ran Schlumberger electric log to 6234'.

7- 4-57

Laid down drill pipe. Ran 190 joints (5970.16') of 4-1/2", 9.5#, J-55, 8 rd. thd., Range 2, new, seamless casing with Larkin guide shoe on bottom and Larkin float collar on top of bottom joint. Set at 5981' K.B. Centralizers at 5949', 5886', 5854', 5770', 5739', 5214', 5183', 4530', 4465', 4404', 3113' and 3081'. Halliburton Multi-Stage Cementing (DV) Tool run at 4497.74'. First stage consisted of 88 sacks of regular cement with 4% gel and 88 cubic feet Strata Crete (6). Second stage consisted of 128 sacks of regular cement with 4% gel and 128 cubic feet of Strata Crete (6). Pumped plug down at 3:25 P.M.

7- 5-57

Ran temperature survey. Approximate top of cement at 2925'.

7- 9-57

to

7-12-57

Moved in and rigged up cable tools. Contractor - Napco Drilling and Well Servicing Company. Bailed mud and drilled out DV tool.

7-13-57

Ran McCullough Radiation Log to 5918'. Perforated Morrow from 5889' to 5896' and from 5793' to 5797' with 4 jets per foot. Well kicked off without swabbing. Gauged 2123 MCF after 2-1/2 hour blow down. Acidized with 500 gallons Dowell mud acid. Swabbed to 3000', well kicked off and flowed.

7-14-57

Fracture treated with 12,000 gallons Petrojel and 11,500 pounds sand followed by 1,500 gallons oil spacer, 34 rubber coated nylon balls, 1,500 gallons oil spacer, 6,000 gallons Petrojel and 5,500 pounds sand. Flushed with 3,500 gallons oil. Treating pressure - 2,500 psi. Master gate cut out. Killed well with 107 barrels diesel fuel and 3/4 barrels oil base mud. Changed gate.

7-15-57

Flowed back mud to pit. Gas gauge in 1-1/2 hours - 13,714 MCF.

7-16-57

Tested well at rate of 4,800 MCF per day on 28/64" choke. Casing pressure 1,060 psi.

7-17-57

Killed well with 100 barrels of heavy mud. Set Baker Model DA production packer at 5753'. Set DR plug in packer. Bailed mud to 1000'.

7-18-57

Perforated Toronto from 4402' to 4408' with 4 jets per foot. Unloaded mud to pits. 15 minute gas gauge after unloading 3952 MCF. Treated with 500 gallons mud acid. Swabbed twice. Produced at rate of 20 barrels oil per hour, GOR 2000, 1/2" choke.

REPUBLIC NATURAL GAS COMPANY  
INDIVIDUAL WELL HISTORY — ENGINEERING DEPARTMENT

WELL NO. 1 LEASE Fox LOCATION \_\_\_\_\_

FIELD \_\_\_\_\_ COUNTY \_\_\_\_\_ STATE \_\_\_\_\_

DATE

HISTORY

6-30-57

Drilled to 5908'. Ran Drill Stem Test No. 8. Tested interval from 5893' to 5908' (Basal Morrow). Tool open 1 hour. Gas to surface in 2 minutes, water cushion and mud in 42 minutes. Maximum gas gauge: 2494 MCF in 15 min. Recovered show of distillate.

Initial Flow Pressure 615 psi  
Final Flow Pressure 615 psi  
Initial 30 Minute BHP 2,050 psi  
Final 30 Minute BHP 1,975 psi  
Initial Hydrostatic Pressure 2,865 psi  
Final Hydrostatic Pressure 2,915 psi

7- 1-57  
to  
7- 3-57

Drilled to 6241' with four 6-3/4" bits. Strapped out in tension. Corrected T.D.: 6237'. Ran Schlumberger electric log to 6234'.

7- 4-57

Laid down drill pipe. Ran 190 joints (5970.16') of 4-1/2", 9.5#, J-55, 8 rd. thd., Range 2, new, seamless casing with Larkin guide shoe on bottom and Larkin float collar on top of bottom joint. Set at 5981' K.B. Centralizers at 5949', 5886', 5854', 5770', 5739', 5214', 5183', 4530', 4465', 4404', 3113' and 3081'. Halliburton Multi-Stage Cementing (DV) Tool run at 4497.74'. First stage consisted of 88 sacks of regular cement with 4% gel and 88 cubic feet Strata Crete (6). Second stage consisted of 128 sacks of regular cement with 4% gel and 128 cubic feet of Strata Crete (6). Pumped plug down at 3:25 P.M.

7- 5-57

Ran temperature survey. Approximate top of cement at 2925'.

7- 9-57  
to  
7-12-57

Moved in and rigged up cable tools. Contractor - Napco Drilling and Well Servicing Company. Bailed mud and drilled out DV tool.

7-13-57

Ran McCullough Radiation Log to 5918'. Perforated Morrow from 5889' to 5896' and from 5793' to 5797' with 4 jets per foot. Well kicked off without swabbing. Gauged 2123 MCF after 2-1/2 hour blow down. Acidized with 500 gallons Dowell mud acid. Swabbed to 3000', well kicked off and flowed.

7-14-57

Fracture treated with 12,000 gallons Petrojel and 11,500 pounds sand followed by 1,500 gallons oil spacer, 34 rubber coated nylon balls, 1,500 gallons oil spacer, 6,000 gallons Petrojel and 5,500 pounds sand. Flushed with 3,500 gallons oil. Treating pressure - 2,500 psi. Master gate cut out. Killed well with 107 barrels diesel fuel and 3/4 barrels oil base mud. Changed gate.

7-15-57

Flowed back mud to pit. Gas gauge in 1-1/2 hours - 13,714 MCF.

7-16-57

Tested well at rate of 4,800 MCF per day on 28/64" choke. Casing pressure 1,060 psi.

7-17-57

Killed well with 100 barrels of heavy mud. Set Baker Model DA production packer at 5753'. Set DR plug in packer. Bailed mud to 1000'.

7-18-57

Perforated Toronto from 4402' to 4408' with 4 jets per foot. Unloaded mud to pits. 15 minute gas gauge after unloading - 3952 MCF. Treated with 500 gallons mud acid. Swabbed twice. Produced at rate of 20 barrels oil per hour, GOR 2000, 1/2" choke.

SCALE 1"=

# WELL HISTORY - ENGINEERING DEPARTMENT

ELEVATION:

WELL NO. 1 LEASE Fox

LOCATION 150' S of C SW NE

Section 3-35S-30W

FIELD Wildcat

COUNTY Meade

STATE

Kansas

| DATE           | DEPTH |    | FORMATION | PARTICULARS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|-------|----|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | FROM  | TO |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 7-19-57        |       |    |           | Killed well with mud. Pulled DR plug with tubing. Ran tubing with Baker landing nipple on bottom, Otis type J landing nipple immediately above and Garrett circulating valve (open) at 4406'. Swabbed well in.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 7-20-57        |       |    |           | Set Otis Type J plug in Otis landing nipple, shutting off Morrow formation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 7-21-57        |       |    |           | Flowed 26 bbls. oil, 39 bbls. water in 10 hrs. on 20/64" choke. Gas rate - 1000 MCF per day. GOR - 16 MCF/bbl. Tubing pressure - 720 psi, casing pressure - 1050 psi. Released rig and shut well in.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 7-23-57        |       |    |           | Produced 69 bbls. oil and 70 bbls. water in 9 1/2 hrs. on 1/2" choke, gas rate - 625 MCF per day. GOR - 3.6 MCF/bbl. Tubing pressure 573 psi, casing pressure 1050 psi.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 7-24-57        |       |    |           | Produced 30 bbls. oil and 27 bbls. water in 24 hrs. on 1/4" choke. Gas rate - 500 MCF per day. GOR - 16.7 MCF/bbl. Tubing pressure - 840 psi, casing pressure - 1115 psi. Shut well in.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 8-27-57        |       |    |           | Pulled Otis Type J plug and closed ports in circulating valve. Well is now dually completed with Morrow production through tubing and Toronto production through casing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 9-57 and 10-57 |       |    |           | Set surface equipment and connected to Colorado Interstate Gas Company pipeline.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 11-26-57       |       |    |           | Produced first gas into pipeline at 5:00 p.m. Flowed 2,706 MCF gas and 20 bbls. distillate in 42 hrs. on 23/64" choke and 885 psi tubing pressure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1-27-58        |       |    |           | Ran 4 point back pressure test with bottom hole pressure bomb at 5743'. Using bottom hole pressure bomb pressures, n = .62 and open flow = 2100 MCF. Using tubing pressures, n = .634 and open flow = 2075 MCF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 6-28-60        |       |    |           | 18 day SITP - 1097 psi DW. SICP - 1142 psi DW. Reacidized Morrow perforations 5889' - 5896' and 5793' - 5797' with 2500 gals mud acid. Dropped 30 ball sealers after 1000 gals. acid in. Displaced with treated water. No pressure change when balls hit perforations. Maximum treating pressure 1200 psi. Average treating pressure 800 psi. Overall treatment rate - 3.2 bbls. per min. Pressure dropped to 0 psi immediately upon stopping pumps. Pressured up on tubing with casing pressure and rocked well in after 3 attempts. Gauges:<br>15 min. - 1990 MCF      45 min. - 1924 MCF<br>20 min. - 1956 MCF      60 min. - 1890 MCF<br>30 min. - 1924 MCF      150 min. - 1439 MCF<br>Shut in. |
| 6-29-60        |       |    |           | 16 1/2 hr. SITP - 1098 psi. Blew well to air, gauges as follows:<br>15 min. - 1528 MCF      45 min. - 1703 MCF<br>20 min. - 1528 MCF      60 min. - 1703 MCF<br>30 min. - 1626 MCF      1733 MCF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

CORRECT

B. V. Cox, Jr.  
ENGINEER

APPROVED

C. J. Peattie  
SUPERINTENDENT

PAGE NO. 4

WELL HISTORY - ENGINEERING DEPARTMENT

ELEVATION: WELL NO. 1 LEASE Fox LOCATION 150' S of C SW NE  
Section 3-35E-30W  
FIELD Wildcat COUNTY Meade STATE Kansas

| DATE                | DEPTH |    | FORMATION | PARTICULARS                                                                                                                                                                                                                                                                                                                    |
|---------------------|-------|----|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | FROM  | TO |           |                                                                                                                                                                                                                                                                                                                                |
| 6-29-60 (Continued) |       |    |           | Started making fluid after 12 min. Shut in over-night.                                                                                                                                                                                                                                                                         |
| 6-30-60             |       |    |           | 14 hr. SITP - 1089 psi. SICP - 861 psi. Blew well to air, gauges as follows: 15 min. - 2023 MCF, 20 min. - 1924 MCF, 30 min. - 1853 MCF, 45 min. - 1822 MCF, 60 min. - 1779 MCF, 7 hrs. - 1779 MCF. Started making fluid after 25 min. Shut in overnight.                                                                      |
| 7-1-60              |       |    |           | 18 hr. SITP - 1081 psi. SICP - 860 psi. Blew well to air, gauges as follows:<br>15 min. - 2240 MCF                      45 min. - 2023 MCF<br>20 min. - 2180 MCF                      60 min. - 1990 MCF<br>30 min. - 2118 MCF                      3 hrs. - 1924 MCF<br>Started making fluid after 25 min. Shut in @ 1:00p.m. |
| 7-5-60              |       |    |           | 93 hr. SITP - 1092 psi, SICP - 850 psi. Blew well to air, gauges as follows:<br>15 min. - 2466 MCF                      45 min. - 2268 MCF<br>20 min. - 2379 MCF                      60 min. - 2241 MCF<br>30 min. - 2299 MCF                      Shut in.<br>Had light mist to surface in 28 min.                           |
| 7-18-60             |       |    |           | Ran 4 point back pressure test. Slope - .383.<br>Calculated open flow potential - 1100 MCF/day.<br><br>Completed 2-9-61.                                                                                                                                                                                                       |

CORRECT: B. V. Co. Jr.  
ENGINEER

APPROVED: C. P. Peattie  
SUPERINTENDENT