

Application for permit to drill this test was filed with the U. S. Geological Survey on November 16, 1971. The test was drilled out from surface on December 9, 1971. On December 15, 1971, a drill stem test was taken in the Dakota D sand. The test interval was 4885-4932. The drill stem test (Exhibit 1) showed the following:

"Recovery in Pipe

4885 Formation water, slightly gas-cut = 49.58 Bbl.
1st Flow - Strong blow throughout period.
2nd Flow - Tool opened with a strong blow, decreasing slightly after 15 minutes. Gas to surface in 20 minutes, not enough to measure. Water flowed in 25 minutes. RW 1.75 at 70' - 3250 PPM."

Sufficient gas was observed by the operator to separate from the flowing water during the test to continually burn.

Thereafter, drilling continued to 4968 feet. Dual Induction - Laterlog and Formation Density Logs were run on December 15, 1971.

The well was plugged on December 16, 1971 as a dry hole - abandonment report was filed with the U. S. Geological Survey dated January 20, 1972.

Based upon further analysis of logs, operator determined to re-enter the hole and do additional logging. Re-entry plans were approved by the U. S. Geological Survey on February 25, 1972 (Exhibit 2). The hole was re-entered on or about February 29, 1972 and the old hole was reamed out to the prior T D of 4968. Operator ran a Borehole Compensated Sonic Log and Gamma Ray and Compensated Neutron & Sonic Log on March 1, 1972. 4½ inch (O. D.) casing

Note: All depths are as determined by logger.

was set on March 2, 1972 (Exhibit 3).

The well was perforated on March 24, 1972, with two shots per foot from 4918-4930 in the Dakota D-2 zone.

The well flowed water to surface, as well as a small volume of gas which the operator was unable to measure due to fact gas was in solution with water and only separated at surface. The gas upon separating will burn creating a flame which the undersigned estimated to be of sufficient size to constitute between one-third to one-half MCF an hour of gas (10 to 12 MCF per day). Water flowed at the approximate rate of 6 to 8 barrels per hour (150 to 200 barrels of water per day). A water analysis is attached as Exhibit 4.

After the hole was re-entered, during an 8-hour swabbing period, the unit operator estimated 40 bbls. of water per hour was being swabbed. During swabbing, water in the tubing was not lowered below 1000 feet from surface. Visual estimates of the amount of gas obtained during swabbing operations was estimated to approximate a daily rate of 100 MCF removed with water produced at an estimated daily rate of 950 bbls.¹ per day.

It was felt that if the water in the tubing was drawn down, more gas would be made. Flow rate, estimated maximum gas-water ratio, 1 MCF to 20 barrels of water. Swab rate, estimated maximum gas-water ratio 1 MCF to $9\frac{1}{2}$ barrels of water.

The ratio of water to gas observed during initial flowing does not appear to have changed during subsequent periods when well has been allowed to flow for limited periods.

1. A previous report contained a typographical error and referred to 95 barrels of water per day rate instead of 950.

After the swabbing operations were completed, it was felt that the test should not be immediately plugged, but that casing and tubing should be allowed to remain in the hole in order to observe flow from time to time to determine if the water-gas ratio would change. No observable change has yet been noted.

Operator desires to continue observation of the test hole by flowing from time to time, and if the observations indicate a favorable change in the gas-water ratio, to conduct additional testing by doing additional swabbing or to attempt to clean water from hole by use of liquid nitrogen or other means to obtain maximum information to determine whether additional drilling should be conducted in area.

In conclusion, tests have not established that gas can be produced and marketed at even a price of \$1.25 an MCF (estimated cost of producing gas by coal gasification method). Plugging of well has been postponed due to National shortage of gas in order to obtain maximum information due to presence of gas as discussed and estimated above. Due to water volume this well should not be classified as a gas well nor should the lease be classified as within a known Geological structure.

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