

GEOLOGICAL REPORT

WALTERS DRILLING CO. & BEARDMORE DRILLING COMPANY

Dickman No. 5

C SW NW Section 17-17S-24W

Ness County, Kansas

Contractor:	Walters Drilling Co.	Elevation:	2477 KB
Commenced:	December 3, 1962		2475 DF
Completed:	December 14, 1962		
Casing:	8 5/8" @114' with 80 sacks		
Cores:	#1 - 4440 - 4450	Mississippian	(Core analyses by
	#2 - 4450 - 4455	Mississippian	Ivan Stuber of
	#3 - 4455 - 4470	Mississippian	Kansas Cores)

Drill-Stem Tests:	#1 - 4319 - 4362	Fort Scott
	#2 - 4439 - 4455	Mississippian (packer failed)
	4444 - 4455	Mississippian

Electrical Surveys: None

Drilling Time Saved: 5' drilling time kept from 115' - 1050', 1150' - 1725', & 1800' - 3600'
1' drilling time kept from 1050' - 1150', 1725' - 1800', & 3600' to 4470' R. T. D.

Samples Saved: Samples were examined and logged from 3700' to 4470' R. T. D. However, 10' samples were saved from 2400' to 4200' and 5' samples were saved from 4200' to 4470' R. T. D.

Measurements: All depths and data below are with reference to kelly bushing elevation. A pipe strap was taken and no depth changes were made.

Geological Data: Listed below are formation tops, pertinent zones of porosity, shows of oil, and results of drill-stem tests and core analyses.

<u>Formation</u>	<u>Sample Tops</u>
Blaine	1121 (+1356)
Stone Corral	1748 (+ 725) + 729
Heebner	3790 (-1313)
Lansing	3830 (-1353)
Base Kansas City	4123 (-1646)
Pawnee	4255 (-1778)
Fort Scott	4337 (-1860)
Conglomerate	4408 (-1931)
Reworked Mississippian	4437 (-1960)
Mississippian (Warsaw)	4446 (-1969)
Total Depth	4470 (-1183) - 1993
	1993

Sample Descriptions:

Lansing @3830

- 3834 - 3841: Limestone, white to cream with some tan, fine crystalline, fossiliferous, dense, with much white to tan semi-transparent to opaque chert. Poor to scattered pin point porosity, with no shows.
- 3871-3875: Limestone white to cream, finely crystalline to fine sucrosic in part, oolitic in part, fossiliferous, with much white chert. Poor porosity, somewhat chalky, with no shows.
- 3943 - 3952: Limestone, tan to brown finely crystalline to fine sucrosic, oolitic, with some white to tan opaque to sub-opaque chert. Fair to good oolitic porosity, with no shows.
- 3999 - 4006: Limestone, cream to tan, fine crystalline, dense, with much milky to bone white chert, trace of oolitic limestone. Fair pin point and oolitic porosity with no shows of oil.
- 4054 - 4058: Limestone, white to cream, fine crystalline to fine sucrosic, oolitic in part, slightly chalky with some chert. Scattered to poor oolitic porosity with no shows.
- 4074 - 4078: Limestone, gray to tan, fine to medium crystalline, dense to slightly chalky in part, with much white chert. Scattered oolitic porosity with no shows.

Fort Scott @4337

- 4339 - 4341: Limestone, light gray to buff, fine crystalline to fine sucrosic at base of zone, trace of white chert, fossiliferous. Fair to good pin point and fossil-cast porosity, with a fair show of free oil, fair odor, light even saturation and good fluorescence. Fair to good light staining in dry samples.
- 4456 - 4460: Limestone, cream to buff fine crystalline, fossiliferous, with light gray, speckled, opaque chert, with fair to good pin point and fossil-cast porosity, fair show of free oil, few pieces with light saturation and light even staining, faint odor.

Drill-stem Test #1

4319 - 4362: Open 1 hour, weak building to strong blow, recovered 2460' gas in pipe, 180' oil cut mud, 60' mud cut oil, 480' slightly mud cut oil. BHT 116° IBHP 1351#/30 minutes. FBHP 1330#/60 minutes. IFP 94# FFP 274#.

Reworked Mississippian @4437'

- 4437 - 4440: Dolomite, gray to buff fine crystalline to partly fine sucrosic, mostly dense with much white, very soft chalky dolomitic limestone at top of interval. Fair to poor pin point and vuggy porosity with few globules of free dark oil, spotted medium to dark staining, good odor with very spotty fluorescence.

Core Description:

Core No. 1 - 4440 - 4441: Full recovery.

- 4440-4441: Predominantly light gray-green crystalline quartz with interbedded light green waxy shales, bleeding some water, sulfurous odor, and no oil show. Same greenish gray to buff fine crystalline to fine sucrosic dolomite near base with poor pin point and vuggy porosity and no shows of oil.

- 4441 - 4442: Shale, gray to green, slightly dolomitic and light gray shaly dolomite, interbedded and laminated. No apparent porosity and no shows of oil.
- 4442 - 4444: Predominantly gray to buff, very fine crystalline to fine sucrosic, mostly dense, tight dolomite with white irregular size and shape quartz inclusions throughout and streaks of green waxy shale, some with slicken sides. Streaks of vugular and pin-point porosity in dolomite with no shows of free oil, no staining, but having very light spotted fluorescence.
- 4444 - 4446: Shale, light gray-green, clayey, sub-waxy, slightly dolomitic, with some crystalline quartz inclusions and isolated dolomite fragments up to baseball size, some slickensides in shale partings. Most dolomite fragments barren, few with very light spotted staining and light spotty fluorescence, slight sulphurous and oil odor. No show of free oil.

Mississippian (Warsaw) @4446

-1969

- 4446 - 4446 1/2: Dolomite, gray-green, fine crystalline, dense with isolated quartz inclusions. No apparent porosity and no shows of oil.
- 4446 1/2 - 4447: Dolomite, gray, fine crystalline to fine sucrosic with good pinpoint and vuggy porosity, bleeding free oil, well saturated and stained, good oil odor.
- 4447 - 4448: Dolomite, cream to buff, fine crystalline to fine sucrosic, with some white to clear quartz inclusions. Overall fair to good pinpoint and vuggy porosity with streaks of dense, non-porous dolomite. Porous zones bleeding free oil, well saturated, and well stained.
- 4448 - 4449: Dolomite, cream to buff, fine crystalline to fine sucrosic with thin shale partings and quartz inclusions throughout. Fair pinpoint and vuggy porosity, no free oil bleeding, some spotted light staining with spotty light fluorescence. A two to three-inch green shale layer was present at 4448 1/2.
- 4449 - 4450: Dolomite, cream to buff, very fine crystalline, dense, tight. No apparent porosity, with poor pinpoint and vuggy porosity when viewed microscopically. No show of free oil, very light spotted staining with light fluorescence in stained areas.
- Core No. 2 - 4450 - 4455: Full recovery.
- 4450 - 4451: Dolomite, cream to buff, fine crystalline to fine sucrosic, dense, fossiliferous, pyritic. Mostly dense, tight, with thin streak fair to poor pinpoint and fossil-cast porosity in lower part, bleeding few globules free dark oil and water, spotted light to medium staining.
- 4451 - 4452: Dolomite, mostly light gray to buff, fine to very fine crystalline, dense, tight, with very poor pinpoint porosity, couple thin sections of good to fair pinpoint porosity bleeding few droplets oil, with traces of light spotted staining around isolated pinpoint pore holes. Few thin shale partings throughout section.
- 4452 - 4453' 8": Dolomite, gray to buff, fine crystalline, dense, tight, with very poor porosity. No shows of oil.
- 4453' 8" - 4454' 4": Dolomite, gray, to buff, fine crystalline to fine sucrosic, very fossiliferous, dense. Fair pinpoint and fossil cast porosity, with some droplets oil bleeding on outside of core with increase of oil bleeding on inside of fresh break. Spotted staining.

4454' 4" - 4454' 8":

Dolomite, gray to buff, fine crystalline, dense, tight, with two thin shale partings, very poor porosity, no show of free oil, with spotty very light staining.

4454' 8" - 4455':

Dolomite, gray to buff, fine crystalline to fine sucrosic, dense, fossiliferous, fair pinpoint and fossil cast porosity, bleeding few globules free oil, fair to spotted staining.

(-1978)

Drill-stem Test #2

4444 - 4455: Open 1 hour, weak building to fair blow, recovered 40' oil cut mud, 150' mud cut oil, 120' water. BHT 129°. IBHP 1316#/30 minutes, FBHP 1308#/60 minutes, IFP 46#, FFP 147#.

Core No. 3 - 4455 - 4470: Full recovery.

4455 - 4456: Dolomite, gray to tan, fine crystalline to fine sucrosic in part, mostly dense, tight, fossiliferous. Some pinpoint and vuggy porosity 4455 - 55 1/2 with few pores bleeding droplets of oil and water, light staining through much of core with some light saturation. Some vertical and irregular fractures 4455 - 55 1/2.

4456 - 4457: Dolomite as above, with an increase of porosity and a few large (up to golf ball size) vugs, few small pores bleeding oil and water. Much of core bleeding water.

4457 - 4458: Dolomite, gray to buff, fine crystalline, fossiliferous, with fair pinpoint and fossil-cast porosity, some vugs and few thin zones of good porosity bleeding droplets of oil and water, most of core bleeding water, mostly barren of staining. Thin shale streak at 4458'.

4458 - 4458 1/2:

Dolomite, gray, fine crystalline, dense, fossiliferous, poor overall porosity, with some pinpoint and fossil-cast porosity. Spotted dark oil staining, no show of free oil.

4458 1/2 - 4459:

Dolomite, gray to buff, fine crystalline to fine sucrosic, fossiliferous, with good pinpoint, vuggy, and fossil-cast porosity, bleeding much free oil and water, fair saturated and well stained, good odor.

4459 - 4459 1/2:

Dolomite, gray to buff, fine crystalline, dense, fossiliferous tight, no show of free oil with spotty light staining, mostly along small vertical and horizontal fractures.

4459 1/2 - 4460:

Dolomite, buff-tan, fine crystalline, dense, with poor to fair pinpoint and vugular porosity. No show of free oil, with spotted dark to black asphaltic stain.

4460 - 4461: Dolomite, gray to tan, fine crystalline to fine sucrosic, fossiliferous, overall, dense, tight, with thin streaks of good pinpoint and fossil-cast porosity, few globules of dark tarry oil, dark stain in porous streaks. Barren in other areas.

4461 - 4462 1/2:

Dolomite, tan, fine crystalline to fine sucrosic, dense, tight. Poor pin point porosity with some dark asphaltic staining along thin hair line fractures. No show of free oil with few spots medium to dark stain.

4462 1/2 - 4463:

Dolomite, gray, very fine crystalline, dense, very fossiliferous, poor overall porosity, with some isolated vugs and fossil casts. Very slight show of free dark tarry oil, spotty dark to asphaltic staining.

4463 - 4464: Dolomite, gray to buff, fine crystalline to fine sucrosic

in part, dense to very tight, fossiliferous, with streaks fair to good pinpoint and vugular and fossil-cast porosity. Slight show of black tarry oil, much dark asphaltic staining.

- 4464 - 4465: Dolomite buff to tan, fine crystalline to fine sucrosic in part, fossiliferous in part. Poor to fair overall porosity with thin streaks good vugular and some fossil-cast porosity. No show of free oil with few streaks of dark asphaltic staining near top.
- 4465 - 4466: Dolomite mostly tan and as above with porosity as above, and a few large isolated vugs. No show of oil.
- 4466 - 4467: Dolomite, gray to buff, with a few thin green streaks of dolomite, fine crystalline, dense, fair vugular and pinpoint porosity with a few large isolated vugs. Some horizontal fractures or bedding planes with thin shale partings. No show of free oil, trace of dark asphaltic stain.
- 4467 - 4468: Dolomite, gray to buff, fine crystalline, fossiliferous with glauconite specks throughout. Fair overall porosity with streaks, good vugular and fossil-cast porosity. No show of oil.
- 4468 - 4469 1/2: Dolomite, gray to greenish gray-buff, fine crystalline to fine sucrosic, fossiliferous and glauconitic. Good vugular and fossil-cast porosity. No show of oil.
- 4469 1/2 - 4470: Dolomite, mostly gray to buff with some cream, fine crystalline to fine sucrosic in part, very dense, tight. Poor pinpoint porosity, no show of oil.

Rotary Total Depth - 4470 (-1993)

Conclusions and Recommendations:

A re-worked or "rubble zone" of Mississippian was encountered in the #5 Dickman which was not present in either of the offsets. Possibly due to erosion and slumping and then subsequent filling of the cracks and fractures with clay and shale, very poor porosity and no permeability was developed in this section.

The top of the Mississippian was encountered at a (-1969) datum; this was 35 feet low to the Dickman No. 3 and 26 feet low to the Dickman No. 2. Although the oil-water contact is approximately a (-1980) datum in the Dickman pool, core analysis, which indicates one foot of pay above this datum, and the results of drill-stem test No. 2, indicated that the reservoir conditions existing in this test were not sufficient to attempt a Mississippian completion.

The Fort Scott in the Dickman No. 5 was 6 feet low to the Dickman No. 3 and 10 feet low to the Dickman No. 2, the north offset. Due to its low structural position with these wells it was decided that it would not be prudent to complete the Dickman No. 5 as a Fort Scott producer.

It was recommended that the Dickman No. 5 be plugged and abandoned and was completed as a dry hole December 14, 1962.

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Geologist