8-17-24W

510 ORPHEUM BLDG.

walters drilling co.

WICHITA 2, KANSAS

AMherst 5-6683

October 22nd, 1962

GEOLOGICAL REPORT

WALTERS DRILLING CO. & BEARDMORE DRILLING CO.
TILLEY #2
C SE/4 SW/4 Section 8-17S-24W
Ness County, Kansas

CONTRACTOR: Walters Drilling Co.

ELEVATION: 2491 KB
2489 DF
2486 GL

COMMENCED: October 9, 1962
COMPLETED: October 21, 1962

CASING RECORD: 8-5/8" set @ 53' w/40 sacks cement
5-1/2" set @ 4451' w/100 sacks cement
Two stage tool @ 1571' w/329 sacks cement

CORES: #1 4340-52 in Fort Scott
#2 4423-34 in Conglomerate
#3 4436-51 in Mississippian
#4 4451-61 in Mississippian

DRILL STEM TESTS: #1 4344-52 in Fort Scott
#2 4448-61 in Mississippian

ELECTRICAL SURVEYS: None

SAMPLES: Samples were examined and drilling time was logged from 3600' to 4461', rotary total depth.

MEASUREMENTS: A pipe strap taken at 4352' tied within .18 foot of drillers measurements; casing tally also confirms this. All datums below are with reference to kelly bushing elevation.

Structural comparison is made below with the subject well, and the Tilley #1, a 40-acre location east in the C SE/4 SW/4 Section 8-17S-24W

FORMATION	TILLEY #2 2491 KB		TILLEY #1 2495 KB	
Blaine	1147	(+1344)	1154	(+1341)
Stone Corral	1772	(+ 719)	1779	(+ 716)
Heebner	3801	(-1310)	3815	(-1320)
Lansing	3843	(-1352)	3858	(-1363)
Base Kansas City	4134	(-1643)	4151	(-1656)
Pawnee	4261	(-1770)	4279	(-1784)
Fort Scott	4343	(-1852)	4358	(-1863)
Cherokee Shale	4367	(-1876)	4383	(-1888)
Conglomerate Chert	4416	(-1925)	4454	(-1959)
Mississippian	4442½	(-1951½)	4464	(-1969)
Total Depth	4461		4473	

ZONES OF INTEREST:

LANSING @ 3843:

3851-54 Limestone, white to light buff, very finely crystalline to sub-chalky, soft and flaky; trace very fine pinpoint porosity with no shows.

3882-88 Limestone, white, finely to medium crystalline, fossiliferous, vaguely oolitic, fairly dense to flaky, sub-chalky; some fine pinpoint and intercrystalline porosity with no shows.

3899-3906 Limestone, white to buff, finely to part medium crystalline, fossiliferous, some soft, chalky; poor very fine pinpoint porosity and no shows.

3925-28 Limestone, white to brown, soft and chalky to finely crystalline, flaky having little to no visible porosity and no staining.

3953-67 Limestone, light brown, finely crystalline, fossiliferous, oolicastic; very good oocastic porosity with no visible staining.

4034-37 Limestone, white to buff, very finely to sub-crystalline, fossiliferous, vaguely oolitic, most soft and chalky; having trace fine vugular porosity in few pieces, no shows.

4064-70 Limestone, cream to brown, some soft and chalky, most very finely to finely crystalline, oolicastic and sub-oolitic, with fair to good fossilcast and oocastic porosity and no shows.

4082-91 Limestone, light brown, very finely to finely crystalline, oolitic and oolicastic, with good oocastic porosity and no staining.

4123-27 Limestone, white to buff, finely crystalline to sub-crystalline soft and chalky; little to no visible porosity and no shows.

BASE KANSAS CITY @ 4134:

FORT SCOTT @ 4343:

Core #1 4340-52 (Full Recovery)

4340-41 Shale, black, carboniferous, fissile, fractured throughout.

4341-42 Shale, dark gray, carbonaceous, compact, calcareous in part, occasional trace brown concretionary limestone. Vertical frac top 6 inches.

4342-43'2" Shale, dark gray to gray-brown, carbonaceous, fairly compact, last two inches very calcareous, platy.

43'2"-44 Limestone, tan mottled gray in part, medium crystalline to very dense, hard, siliceous, fossiliferous, part vaguely oolitic, some re-crystallized areas; having no porosity and no shows.

4344-45	Limestone, tan mottled gray in part, medium crystalline to crypto-crystalline, some light gray completely re-crystallized areas; tight, dense, siliceous with spotted areas of fair fossil-cast and vugular porosity, uneven light brown saturation, and bleeding light brown live oil and gas. Fractured vertically. Poor to no reservoir.
4345-46'6"	Limestone, brown, finely to medium crystalline, dolomitized, fossiliferous, having good to excellent fossil-cast and vugular porosity, some relatively large calcite and selenite lined vugs; bleeding light brown oil and gas with light brown even saturation. Excellent reservoir.
4346'6'-47	Limestone, gray, very dense, hard, siliceous, slightly fossiliferous, part re-crystallized with calcite and pyrite filled spiculecasts; having no porosity and no shows. Fractured vertically.
4347-48	Limestone, finely banded light gray to gray-brown, crypto-crystalline, very dense, hard, siliceous, slightly fossiliferous, some finely disseminated pyrite crystals; having no visible porosity and no shows.
4348-49	Limestone as above with secondary calcite crystals and gray-green slightly calcareous compact shale partings in last 6 inches.
4349-50	Limestone, gray-brown and gray, crypto-crystalline, very dense, hard siliceous, fossiliferous, with shale partings as above in top few inches; having no porosity and no shows.
4350-51	Limestone, gray-brown, smooth, opaque, lithographic, extremely dense; some sparse gray calcareous shale seams and partings and re-crystallized calcite veins; having no porosity and no shows.
4351-51'8"	Limestone, gray-brown and gray, finely crystalline to very dense, hard, siliceous, part argillaceous, with finely disseminated secondary calcite crystals; no porosity and no shows.
51'8"-52	Shale, dark gray, platy, slightly carbonaceous, calcareous in part.

D.S.T. #1, 4344-52, Open 1 hour, good blow decreasing to fair, recovered 1460' gas in pipe, and 210' clean to muddy oil, no water. BHT 118 degrees.

Initial Shut In Pressure in 30 minutes	1354#
Initial Flow Pressure	31#
Final Flow Pressure	93#
Final Shut In Pressure in 60 minutes	1283#

4358-67	Limestone, cream to light gray-brown, finely to medium crystalline, dense, cherty to soft, flaky; "mealy"; having no visible porosity and no shows oil or gas in wet or dry samples.

CHEROKEE SHALE @ 4367:

4380-83 Limestone, white to light brown, finely crystalline, fairly dense, siliceous to soft, sub-chalky, part with trace fine pinpoint porosity; one or two pieces fairly dense lime with possible scattered light brown staining. Poor reservoir, non-commercial at this location.

CONGLOMERATE CHERT @ 4416:

4416-21 Chert, gray-white, yellow and tan, sub-translucent, fresh, sharp, to slightly leached and finely vugular, some fossil-casts; with medium to coarse clear to milky rounded quartz pebbles. Vugular chert with fairly abundant dark brown globules free oil, good odor, scattered dark brown to black staining and saturation.

4421-23 Dolomite, cream to brown, very finely sucrose to crystalline, having good fossil-cast porosity, dark brown globules free oil and dark brown saturation.

Core #2 4423-34 Full Recovery (Core Wedged at 4434)

4423-24 Chert, white to gray, fresh, sharp, sub-translucent, part vuggy; some fairly well leached, slightly tripolitic; vugular areas bleeding black tarry oil with very spotty saturation; occasional trace dolomite seams, very finely to finely crystalline, with fossil-cast and vugular porosity, bleeding dark brown to black tarry oil with spotty saturation. Vertical fracs filled with siliceous green clay shale throughout this foot. No reservoir.

4424-25 Chert, gray-white, some tan, fresh, sharp, sub-translucent to sub-opaque, spicular, part fairly well leached and finely vugular; top 3' and last 6" of this foot with scattered vugular and fossil-cast porosity, spotty saturation and bleeding black tarry oil. Vertical frac last 6". No reservoir.

4425-26 Chert, gray-white, sub-translucent, fresh, sharp to very slightly vugular in part; some white, opaque tripolitic chert with poor fine pinpoint and vugular porosity; having fairly abundant white silicified clay shale partings with finely disseminated rounded and frosted sand grains. Occasional trace black spotty saturation and bleeding dark brown to black tarry oil. Fracture at 25'8" bleeding oil. No reservoir.

4426-27 Chert, white to gray and some yellowish, sub-translucent, fresh, sharp, trace scattered vuggy porosity in few isolated spots, bleeding black tarry oil with spotty black saturation in top 2 inches, abundant greenish-white siliceous sub-waxy clay seams with finely disseminated rounded sand grains. No reservoir.

4427-28 Chert, gray-white, fresh, sharp, sub-translucent with trace very fine pinpoint porosity and trace very spotty saturation and bleeding black tarry oil; most with very abundant white mottled brown siliceous sandy clay shale partings and amber to yellow-orange translucent rounded chert pebbles in last 6 inches. Trace bleeding oil along vertical frac in top 6" of this foot. No reservoir.

4428-29 Chert, white to light gray banded dark gray, sub-translucent, fresh, sharp, few isolated fossil-casts and vugs; with fairly abundant white-gray siliceous sandy clay shale seams and partings with angular to sub-rounded colored chert pebbles. Trace spotty black staining and bleeding black tarry oil in and around shale-Chert contact. No reservoir.

4429-30 As above, possibly more fine-medium rounded sand grains and less chert fragments in shale seams and partings. Bleeding tarry black oil with spotty saturation in vuggy areas in top 6". Fourty-five degree angle frac @ 29½'-bleeding oil slightly. No reservoir.

4430-30'6" Chert, white, sub-translucent to sub-opaque, fresh, sharp, slightly spicular, having marble texture, occasional trace scattered spicule-cast porosity with slight dark brownish-black staining and very slight trace free oil. Fourty-five degree frac in this interval, bleeding oil slightly. No reservoir.

4430'6"-31'6' Shale, greenish-white mottled brown, siliceous, compact, part calcareous, slickensided, with finely disseminated rounded sand grains and sub-rounded chert fragments. One 45 degree fracture midway through this foot.

4431'6"-32 Chert, white to gray banded dark gray, sub-translucent, fresh, sharp, micro-fossiliferous, tight with no shows free oil or staining. Fourty-five degree angle fracture 31'8"-32'.

4432-33'6" Chert as above with occasional trace fine vugular and spicule-cast porosity with spotty black saturation and bleeding tarry oil very slightly @ 4432½; having white to gray siliceous shale seams as above and gray-green to dark gray-brown calcareous, sandy shale partings with finely disseminated sand grains and rounded chert pebbles. No reservoir.

33'6"-34 Chert, light gray to gray-brown, sub-translucent, fresh, sharp, with no porosity; highly fractured, some shale lined; bleeding oil slightly along fractures. No reservoir.

4434-36 (Drilled with bit) Mostly chert as above, some white-discolored pale green clay-shale.

Core #3 4436-51 Full Recovery

4436-37 Shale, black, carbonaceous to dark gray, with fine to medium rounded sand grains, trace red shale partings, and fairly abundant sub-rounded amber, clear, and gray chert pebbles.

4437-38 Shale as above, slightly calcareous, with some larger quartz pebbles, more sand grains, and occasional gray-white compact siliceous clay-shale partings.

4438-39 Shale, green, sub-waxy, slickensided; and black carbonaceous, fissile, with rounded chert pebbles and seams white, very fine grained, tight, glauconitic, rounded sandstone with inter-stitial white clay and scattered black asphalt staining. No reservoir.

4439-40 Clay-shale, maroon, soft, earthy to deep green, waxy, most with disseminated fine to medium rounded vari-colored sand grains and small to fairly large rounded chert fragments.

4440-41 Clay-shale, gray to dark gray, slickensided, sub-waxy in part, flaky; with rounded vari-colored chert nodules and fractured throughout. One 45 degree angle fracture @ 4440'.

4441-42 Massive quartz, clear, glassy, some fairly large crystalline quartz lined vugs, having gray-green sandy shale seams and partings with finely disseminated pyrite crystals. Fractured throughout.

4442-42'6" Shale, gray-brown, clayey, platy, sub-waxy in part, slickensided, with rare fine rounded sand grains.

MISSISSIPPIAN @ 4442± (Spergen)

4442'6"-43 Dolomite, greenish-gray, crypto-sucrose, very dense, hard, siliceous, having no visible porosity and no shows; with fairly abundant bright green waxy shale partings near top. No reservoir.

4443-43'4" Shale, bright green, waxy, trace chert and dolomite pebbles. Fourty-five degree fracture @ 43'2'.

4443'4"-5" Dolomite, gray-buff, very finely sucrose, fossiliferous, vaguely oolitic, with poor fossil-cast and vugular porosity; bleeding tarry black oil with dark uneven saturation. No reservoir.

4443'5"-9" Dolomite, gray-buff to brown, crypto-sucrose, fossiliferous, dense, hard, siliceous; having no porosity and no shows; occasional bright green clay-shale parting. No reservoir.

4443'9"-44' Dolomite, gray, very finely sucrose, fossiliferous, fairly dense, some poor fossil-cast and vugular porosity; with bright green waxy clay-shale partings. Matrix with spotty dark saturation and bleeding black tarry oil; live oil bleeding slightly from shale-dolomite contacts. No reservoir.

4444-45 Dolomite, light gray, crypto-crystalline, dense, siliceous, having no visible porosity; abundant bright green to greenish brown, sub-waxy, siliceous compact shale partings with fine rounded sand grains and clear quartz pebbles in last 6". Trace live oil in fracture @ 44'8'. No reservoir.

4445-46'2" Shale, gray-brown to green, waxy, compact, slickensided, part siliceous, with occasional fine granular, glauconitic dolomite pebbles and light gray-finely to crypto-crystalline, dense, hard, siliceous dolomite seams. Trace scattered inter-crystalline porosity and no shows. No reservoir.

4446'2"-47 Dolomite, light gray to greenish-gray, crypto-crystalline, extremely dense, hard, siliceous, few areas with finely disseminated pyrite crystals; having no porosity and no shows; light green sub-waxy slightly siliceous clay-shale partings with yellow, amber, and clear, rounded quartz pebbles and chert fragments. No reservoir.

4447-48 Dolomite, light gray, extremely dense, hard, siliceous, clean, with no visible porosity and no shows.

4448-48'4" Dolomite, gray, very finely sucrose, having poor fossilcast and vugular porosity with spotty uneven saturation and bleeding dark brown live oil; few bright green clay-shale partings; no reservoir.

4448'4"-6" Dolomite, gray, extremely dense, cherty, translucent, fractured, having no porosity and no shows. No reservoir.

4448'6"-49'6" Dolomite, greenish-gray, very finely sucrose, fossiliferous, fairly dense, siliceous, having poor to fair scattered vugular and fossil-cast porosity with spotty uneven saturation and bleeding dark brown oil; rare bright green mottled light gray sub-waxy clay-shale parting and clay filled vertical frac bleeding oil slightly @ 49'4". Poor to no reservoir.

4449'6"-51 Dolomite, cream to gray, very finely sucrose to crystalline, some small "sugary" areas, fossiliferous, having fair to good fossil-cast and vugular porosity, with dark brown uneven saturation and bleeding dark brown free oil; one ¼" dense, tight streak dolomite with trace pale green shale seam @ 4450'8". Fair reservoir.
1.5

Core #4 4451-61 (Full Recovery)

4451-52 Dolomite, greenish-gray, very finely sucrose to crystalline, tight siliceous at top; most with fair vugular and fossil-cast porosity, fairly even to spotty saturation and bleeding oil; trace thin dark gray-shale seam and vertical frac 4451'4" to 52'. Fair to good reservoir.
1.0

4452-53 Dolomite, cream to light gray, very finely to finely crystalline, sucrosic, slightly glauconitic, having good vugular and fossil-cast porosity to areas rather tight scattered porosity; bleeding dark brown live oil with fairly even saturation. Vertical fracture throughout. One ¼" shale seam @ 4452'10'. Good reservoir.
1.0

4453-54 Dolomite, white to gray, finely crystalline to crypto-crystalline, dense, hard, siliceous, tight to spotty areas of isolated poor fossil-cast and vugular porosity; bleeding oil slightly and having very spotty saturation. Fracture in last 4" of this foot. Little to no reservoir.
1.0

4354-55 Dolomite, greenish-gray, very finely crystalline to crypto-sucrose, tight, dense, siliceous in part; spotty areas with poor to fair vugular and fossil-cast porosity, uneven saturation, and bleeding oil. This foot rather streaked. Vertical frac in top 3". Poor to fair reservoir.
1.0

4355-56 (1.0) Dolomite, gray-green, very finely sucrose to finely crystalline, fossiliferous, "sugary" in part; having rare thin tight streaks; most with good fossil-cast inter-crystalline and vugular porosity, bleeding oil with nice even brown saturation; some rather spotty saturation top 6 inches. Fair to good reservoir.

4456-57 (1.0) Dolomite, gray-green, very finely sucrose to finely crystalline, fossiliferous, tight, compact rather dense in part; most "sugary" with good inter-crystalline vugular and fossil-cast porosity; having uneven saturation & bleeding dark brown oil. Thin green shale parting @ 4456½. Poor to good reservoir.

4457-58 (1.0) Dolomite, cream to greenish-gray, very finely to crypto-sucrose, tight, dense, siliceous, with poor pinpoint and vugular porosity; few scattered fossil-casts; having very spotty uneven saturation and bleeding oil slightly. Trace green shale seam at top of this interval. Poor reservoir.

4458-59 (1.0) Dolomite, gray to cream, very finely to finely crystalline, some medium crystalline, "sugary"; having good inter-crystalline, vugular and fossil-cast porosity, even brown saturation and bleeding dark brown free oil. Very good reservoir.

4459-60'2" (1'2") Dolomite, cream to gray-white, very finely sucrose to finely crystalline, fossiliferous, rare thin areas, tight to slightly porous; most with good fossil-cast, inter-crystalline and vugular porosity; "sugary" in part, with fairly even dark brown saturation and bleeding oil. Best part of this foot from 4459'4" to 8". Good to very good reservoir.

4460'2"-61 Clay-shale, pale green, siliceous, with abundant finely to medium rounded sand grains and small rounded quartz pebbles, slightly glauconitic; last 2" with trace greenish-gray very finely sucrose, fossiliferous dolomite with fair fossil-cast porosity; bleeding oil slightly with uneven saturation. Fractured vertically. No reservoir.

D.S.T. #2 4448-61 Open 2 hours, weak blow increasing to good, (blew off bottom of bucket in 20 minutes) recovered 925' clean to muddy 36 gravity oil. BHT 126 degrees.

Initial Shut In Pressure in 30 minutes	1301#
Initial Flow Pressure	46#
Final Flow Pressure	353#
Final Shut In Pressure in 60 minutes	1277#

Rotary Total Depth @ 4461

CONCLUSIONS AND RECOMMENDATIONS:

In the Tilley #2, shows of oil were encountered in the Fort Scott, Conglomerate Chert and Mississippian. The Fort Scott and Mississippian are the only commercial zones in the subject well at this location.

The Conglomerate Chert, which carried shows of oil from 4416 to 35 was shaley and lacking in the necessary porosity and permiability for commercial production at this location. This is evident because most of this interval was cored.

The Mississippian in the Tilley #2 was encountered 7 feet lower than the Dickman #1 and 17 feet higher than the Tilley #1. At total depth (minus 1970) the subject well is thought to be approximately 10' above the oil-water contact in the pool. Good reservoir conditions exist in the Mississippian for the most part. Of the total 18' of penetration made in this reservoir approximately 50% or 9 feet of this is "pay".

In view of the D.S.T. recoveries and pressures taken in the Mississippian, recommendation was made to set production casing at 4451 feet, ten feet off bottom.

At the appropriate time, perforations should be made in the Fort Scott from 4344-47 feet. From the core description, it is evident that of the 2½' of core which carried a show of oil, i.e. from 4344 to 46½, a net "pay" section of 1½' exists from 4445 to 46½.

Respectfully submitted,

Don W. Beauchamp

DON W. BEAUCHAMP - Geologist

DWB;vjt