

Geological Report

Cooper Hiatt #18-1
SE, SE, SW Sec. 18, T31S, R8E
330' FSL; 2475' FWL
Cowley County, KS
API #15-035-24385-00-00

Used Geological for 18-1#
moved over soft from 18-1

Operator: B-C Steel, LLC, C/O Bert Carlson, 209 North Fry, Yates Center, KS, 66783.

Drilling Contractor: Hat Drilling. Midway Mud Rotary Rig #2.

Wellsite Geologist: Mark Brecheisen.

Dates Drilled: January 24th, 2011 to January 25th, 2011.

Size Hole: 8 1/4"

Total Depth: 2455'

Elevation: 1412'

Drilling Fluid: Freshwater bentonite and additives.

Surface Casing: 460' of 8-5/8" casing cemented with 150 sx of cement to surface.

Formation Tops: Formation tops were estimated from drill graph, hole lost, no electric logs ran.

Field Name: Radcliff, Northeast.

Status: To be plugged.

Oil Shows: Layton Sandstone @2040'-2100', Kansas City Limestone @2120'-2130', Swope Limestone @2262', Hertha Limestone @2275'.

Gas Shows: Layton Sandstone @2040'-2100', Kansas City Limestone @2120'-2130', Swope Limestone @2262', Hertha Limestone @2275', Cleveland Sandstone @2350', Altamont Limestone @2443'.

Water Encountered: No appreciable water encountered upon drilling.

On Location: January 24th, 2011, 7:50 am. Well Depth 1322'; left location @ TD, Well Depth of 2455' @ 11:00 am, January 25th, 2011.

Notes: Well cuttings were examined at rig and discarded. Samples of "zones of interest" were saved and examined with a binocular microscope and black light. Sample run not correlated to electric log since none were run.

- 0-1550': Samples not examined.
- 1550'-1570': Shale, medium to medium dark gray, trace limestone and sandstone, no fluorescence, no petroliferous odor or show.
- 1570'-1580': Shale (85%), silty to sandy, micaceous in part, fairly hard. Sandstone (15%), light to medium-gray, very fine to fine-grained, micaceous, argillaceous, with some shale laminae present, no fluorescence, no show.
- 1580'-1590': Shale, medium-dark gray, silty to sandy, micaceous, fairly hard, trace limestone, no fluorescence, no petroliferous odor or show.
- 1590'-1600': Shale (80%), medium-dark to dark gray, soft, silty in part, micaceous. Sandstone (20%), off-white to very light gray. Very fine to fine-grained, well sorted with sub-angular to sub-rounded grains, few traces of black bitumen on few samples. No fluorescence, no show.
- 1600'-1610': Shale, medium-dark gray, soft, greasy, slightly silty. Estimated Iatan Limestone Top @ 1609'.
- 1610'-1620': Shale (65%) Medium-dark to dark gray, soft, greasy to silty, micaceous in part, traces of red limestone present. Limestone (30%), pale to dark yellowish-brown, fine to coarse crystalline, hard, dense, no visible inter-crystalline porosity. Sandstone (5%), off-white to light gray, fine grained, well sorted with sub-angular to sub-rounded grains. Traces of black bitumen on few samples, no fluorescence, no petroliferous odor or show.
- 1620'-1630': Limestone, pale to dark yellowish-brown, fine to coarse crystalline with many calcite veins running throughout rock samples. Trace shale, 20% dull mottled mineral fluorescence, no show.
- 1630'-1650': Shale, dark gray, soft, micaceous, silty to sandy in part, trace limestone, 5% mottled variegated mineral fluorescence, no show.
- 1650'-1670': Shale, medium to medium-dark gray, silty to sandy. Sandstone, light to medium gray, fine grained, well sorted, sub-angular to sub angular grains, fairly hard, micaceous, no fluorescence, no show.
- 1670'-1700': Stalnakker Sandstone Section, off-white to medium-gray, very fine to fine grained. Well sorted with sub-rounded to well-rounded grains, very friable very clean, trace shale scattered throughout, traces of mottled dull yellow mineral fluorescence. No petroliferous odor or show.
- 1700'-1730': Shale, medium to dark gray, silty to sandy, micaceous, traces of sandstone present, no staining, no fluorescence, no petroliferous odor or show.
- 1730'-1750': Shale, medium to medium dark gray, sandy in part with some traces of laminated sand present. Limestone approximately 20%, dark yellowish brown, less than 2% even, medium bright yellow mineral fluorescence, no show, no petroliferous odor.

- 1750'-1760': Shale, medium to medium dark gray, silty to sandy, no fluorescence.
- 1760'-1810': Limestone, pale brown to yellowish brown to olive gray, fine crystalline, fair to good friability, mottled, good inter-crystalline porosity, approximately 30% mottled, very dull yellow mineral fluorescence. Approximate top of Lansing Group at 1760'.
- 1810'-1840': Shale, dark gray to pale green, silty, very soft, traces of limestone scattered throughout. At approximately 1834', a 15-unit gas kick was observed but quickly dropped back to base line.
- 1840'-1890': Limestone, yellowish-brown to olive-gray, fine to medium crystalline, mottled, fossiliferous, fair to good friability, traces of inter-crystalline porosity present, shale partings present. Overall, 40% even, very dull mineral fluorescence, no petrolierous odor or show. Between 1880' and 1890' a 15-unit gas kick was observed.
- 1890'-1950': Limestone, dark yellowish-brown, mottled, fine to coarse crystalline, fairly hard, shale scattered throughout interval. Overall, 10% even, medium-bright yellow mineral fluorescence.
- 1950'-2030': Shale, medium to medium-dark gray, slightly silty to sandy with few scattered sandstone laminae present, traces of limestone present, overall no fluorescence, no petrolierous odor or show.
- 2030'-2040': Limestone, dark yellowish-brown to olive-gray, fine to medium crystalline, visible pinpoint vugular porosity. Few samples exhibited medium-dark brown oil stain on the surface, broken samples showed no saturation, dark gray shale present, light to medium-gray sandstone present. Overall, trace of bright yellow mineral fluorescence. No petrolierous odor or show.
- 2040'-2100': Layton "A" and "B" Sandstone, light to medium gray, very fine to fine grained, very friable, micaceous, good inter-granular porosity, very faint oil stain on few samples, slight to fair flash odor in few samples, sandstone very loosely cemented, traces of shale present. Overall, 10% dull to medium-yellow hydrocarbon fluorescence. No cut, no real petrolierous odor or show. At 2056', showed a 15-unit gas kick, and at approximately 2065, a 35-unit gas kick was observed. At 2077' a 40-unit gas kick set off alarm, followed immediately by a second 85+ unit kick. At 2095', a 90+ unit gas kick was observed. At 2090'-2100', free oil was observed in sand samples cut with acid, slight brown oil stain on many samples, no cut with reagent. This section had a 40% even, bright yellow hydrocarbon fluorescence. Good to strong petrolierous odor, faint show.
- 2100'-2120': Limestone, pale yellow-brown to olive-gray, fine crystalline, fairly hard, no visible porosity, traces of shale and sandstone present. 60% even, bright yellow mineral fluorescence, no odor or show.
- 2120'-2130': Limestone, pale yellow-brown to olive-gray, fine to coarse crystalline, some vugular and oolitic porosity visible in rock, traces of oil in wet HCL cut, fair to good friability, oil stain in and around some vugs, no real saturation, 25% mottled to even, variegated hydrocarbon and mineral fluorescence. No cut, strong

petroliferous odor to sample, a 90 unit gas kick was observed after drilling this interval.

2130'-2260': Intermixed limestone and shale with no real porosity present, no petroliferous show of any kind, no odor. Overall, this interval displayed an estimated 25-30% pinpoint to mottled variegated mineral fluorescence.

2260'-2270': Limestone (50%), tan to olive-gray, trace of pinpoint, medium-brown oil stain on very few samples, no saturation, no cut. A 180+ unit gas kick was observed at 2262'. Overall, sample displayed trace of pinpoint to mottled bright yellow mineral fluorescence. Swope Limestone.

2270'-2280': Limestone (80%), tan to pale yellowish-brown, fine crystalline, good friability, few samples have medium-light brown, pinpoint to mottled oil stain on surfaces. Slight free oil show with HCL cut. Slow, uneven, poor milky blue cut with reagent on select samples. Good inter-crystalline porosity with pinpoint and vugular porosity exhibited on samples with oil stain. Approximately 7% mottled, bright yellow hydrocarbon fluorescence. Strong petroliferous odor to sample, poor show. Believe this to be a break in the Hertha Limestone. At 2275', hotwire went off 5X scale, stayed pegged on 5X scale for two minutes.

2280'-2340': Limestone, tan to pale yellowish-brown, fine crystalline, fair friability, sucrosic in part, no oil stain present, trace, pinpoint, bright yellow mineral fluorescence, no odor or show. Approximate base of Kansas City at 2325'.

2340'-2350': Shale, dark gray to black, Lenepah Limestone present in this sample. Traces of Cleveland Sandstone showing up in this sample, light gray, fine grained, well rounded and sorted. Overall, less than 10% variegated, pinpoint to even mineral fluorescence.

2350'-2400': Cleveland Sandstone section, light gray, very fine grained, well sorted and rounded, extremely friable, micritic in part, argillaceous in part, good inter-granular porosity, traces of medium-gray shale and limestone present throughout this interval. At approximately 2347' a 300-unit gas kick was observed, believed to be the Cleveland Sandstone.

2400'-2410': Limestone, tan to pale yellowish-brown, fine crystalline, mottled, sucrosic, fair inter-crystalline porosity, traces of medium to pale green shale, less than 3% dull, even, yellow mineral fluorescence. No petroliferous odor or show.

2410'-2420': Sandstone, very fine to fine grained, well sorted with sub-rounded to well-rounded grains, good friability, slightly micaceous, limestone and shale present in this interval, overall less than 7% even dull yellow mineral fluorescence.

2420'-2440': Shale, medium-dark gray, slightly silty, micaceous, 10% even dull yellow mineral fluorescence. No petroliferous odor or show.

2440'-2455': Limestone, tan to pale yellow-brown, fine to coarse crystalline, fairly friable, good inter-crystalline porosity in some samples, traces of black bitumen on few limestone samples, black shale present, carbonaceous with traces of vitrinite coal present.

Approximately 40% even to mottled, dull yellow mineral fluorescence. Slight flash odor observed, no show. At 2443', a 300-unit gas kick was observed.

TD 2455' @ 11:00 am, January 25th, 2011.



(Mark D. Brecheisen)