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**BEREXCO INC.  
CUTTER #7  
NWSENE SECTION 1 T31S-R35W  
STEVENS COUNTY, KANSAS**

**GEOLOGIST  
WILLIAM B. BYNOG**

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## FORMATION TOPS

| FORMATION            | DEPTH (LOGS) |
|----------------------|--------------|
| TOPEAKA              | 3604(-683)   |
| HEEBNER              | 3964(-1043)  |
| TORONTO              | 3980(-1059)  |
| LANSING A            | 4036(-1115)  |
| LANSING B            | 4078(-1157)  |
| LANSING C            | 4126(-1205)  |
| LANSING D            | 4164(-1243)  |
| LANSING G            | 4330(-1409)  |
| LANSING H            | 4356(-1435)  |
| LANSING I            | 4432(-1511)  |
| KANSAS CITY A        | 4534(-1613)  |
| KANSAS CITY B        | 4582(-1661)  |
| MARMATON A           | 4686(-1765)  |
| MARMATON B           | 4726(-1805)  |
| PAWNEE               | 4824(-1903)  |
| FORT SCOTT           | 4868(-1947)  |
| CHEROKEE SHALE       | 4890(-1969)  |
| BASAL CHEROKEE       | 5128(-2207)  |
| MORROW               | 5246(-2325)  |
| LOWER MORROW         | 5328(-2407)  |
| CHESTER POROSITY     | 5544(-2623)  |
| SAINT LOUIS POROSITY | 5662(-2741)  |

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## LITHOLOGY

### HEEBNER

- 3965-70 Shale black, firm, carbonaceous  
3970-80 Shale gray, gray green, soft  
3980-4020 Limestone tan, hard, dense  
4020-36 Shale as above

### LANSING A ZONE

- 4036-70 Limestone gray, hard, chalky, poor porosity, no show  
4070-80 Shale as above

### LANSING B

- 4080-90 Dolomite/Limestone buff, firm, microsucrosic, fossil, poor-fair porosity, even brown stain, good cut  
4090-4100 Shale as above  
4100-26 Limestone white, firm, chalky

### C ZONE

- 4126-50 Grainstone tan, firm, oolitic, very good moldic porosity, no stain or cut  
4150-65 Limestone tan, very hard, dense, cryptocrystalline

### D ZONE

- 4165-90 Limestone white, cream, soft-firm, microsucrosic, chalky, poor-fair intercrystalline porosity, no show  
4190-4200 Limestone buff, hard, dense, some Chert white  
4200-10 Limestone buff, firm, very fossiliferous, good porosity, no show

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- 4210-20 Shale as above
- 4220-50 Limestone cream, firm, fossiliferous, chalky, fair porosity, no show
- 4250-60 Limestone buff, hard, v chalky, poor porosity, abundant Chert white
- 4260-4310 Limestone buff, firm, microsucrosic, fossiliferous, chalky, fair porosity, no show, some Chert white
- 4310-30 Limestone gray, tan, very hard, dense, abundant Chert white

G ZONE

- 4330-50 Grainstone light brown, firm, oolitic, good moldic porosity, no show
- 4350-55 Limestone buff, hard, dense

H ZONE

- 4355-75 Limestone light brown, cream, hard, dense, poor porosity, no show
- 4375-4405 Limestone as above becoming very hard, dense, no show
- 4405-15 Limestone tan, firm, very fossiliferous, microcrystalline, poor-some fair porosity, no show, Chert white
- 4415-30 Limestone gray, very hard, dense

I ZONE

- 4430-40 Limestone light brown, soft, very fossiliferous, poor-fair porosity, good vuggy porosity, spotty-even brown stain, good cut, show free oil
- 4440-70 Limestone pale gray, hard, chalky, poor porosity, no show
- 4470-4510 Limestone pale gray, tan, dense, some Chert white
- 4510-30 Shale black, hard, carbonaceous

KANSAS CITY A

- 4530-40 Limestone gray, hard, dense
- 4540-50 Grainstone buff, firm, oolitic, good moldic porosity, spotty-even brown stain & bright yellow fluorescence, good cut & odor

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4550-70 Limestone white, hard, chalky, dense

4570-80 Shale black, hard, carbonaceous

#### KANSAS CITY B

4580-95 Limestone gray, hard, poor porosity, no show

4590-4610 Grainstone gray, firm, oolitic, fair moldic porosity, very spotty brown faint stain, weak cut

4610-30 Limestone gray brown, hard, dense, no show

4630-90 Shale as above

#### MARMATON A

4690-4710 Limestone white, firm, fossiliferous, oolitic, fair moldic porosity, spotty brown stain, weak cut

4710-25 Limestone buff, hard, dense

#### MARMATON B

4725-50 Grainstone buff, soft-firm, oolitic, good moldic porosity, spotty brown stain, good cut & odor

4750-4810 Limestone light gray, hard, chalky, poor porosity, no show

4810-25 Shale dark gray, gray black, hard, carbonaceous

#### PAWNEE

4825-40 Limestone white, firm, chalky, fossiliferous, poor-fair porosity, spotty yellow fluorescence, very faint stain, weak cut

4840-60 Limestone tan, hard, dense

4860-70 Shale as above

#### FORT SCOTT

4870-80 Limestone buff, firm, chalky, fossiliferous, oolitic, poor-fair vuggy porosity, no show

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4880-90 Limestone buff, hard, cryptocrystalline, no show

**CHEROKEE SHALE**

4890-4900 Shale black, hard, carbonaceous

4900-40 Shale as above with interbedded Limestone as above

4940-50 Limestone light gray brown, tan, very hard, dense, shaly

4950-5000 Shale black, hard, carbonaceous

5000-20 Limestone gray brown, very hard, dense

5020-40 Shale gray black, firm, carbonaceous

5040-70 Limestone as above

5070-5130 Shale as above

**BASAL CHEROKEE**

5130-40 Dolomite light brown, hard, microsucrosic, sandy in part, poor-fair vuggy porosity, even light brown stain, bright yellow fluorescence, good cut

5140-40 Limestone gray brown, very hard, dense, chalky, no show

5140-5240 Shale as above with thin interbedded Limestone as above

**MORROW**

5240-70 Sandstone translucent, friable-firm, medium-coarse grain, sub angular, poorly sorted, trace glauconitic, good porosity, even brown stain, bright yellow fluorescence, good cut & odor

5270-90 Shale light-medium gray, gray black, firm, abundant Pyrite nodules

5290-5330 Limestone white, light gray, hard, chalky, glauconitic, some sandy

**LOWER MORROW**

5330-50 Limestone white, gray, firm, chalky, sandy, very fine grain, very spotty brown stain, weak cut

5350-5450 Shale as above

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- 5450-70 Limestone pale gray, firm, dense, chalky, poor porosity, no show
- 5470-75 Sandstone light gray, hard, fine grain, rounded, well sorted, clay filled calcareous cement, tight, spotty brown stain, weak cut
- 5475-5525 Limestone gray, hard, dense, no show
- 5525-30 Sandstone light brown, hard, very fine grain, dense calcareous cement, poor porosity, spotty brown stain, weak cut
- 5530-40 Limestone white, firm, chalky, abundant Pyrite nodules

**CHESTER POROSITY**

- 5540-55 Sandstone light brown, firm, fine grain, rounded, well sorted, poor-fair porosity, spotty-even brown stain & bright yellow fluorescence, good cut & odor
- 5555-70 Limestone white, firm, sandy as above, glauconitic, tight, spotty brown stain, weak cut
- 5570-80 Limestone as above, no show
- 5580-5610 Sandstone white, hard, very fine grain, limestone matrix, tight, no show
- 5610-20 Limestone white, firm, chalky, very sandy, fine grain, tight, no show

**SAINT LOUIS**

- 5620-30 Sandstone translucent, very hard, fine-medium grain, rounded, well sorted, calcareous matrix, slightly glauconitic, poor porosity, very spotty brown stain, slow cut
- 5630-60 Limestone white, hard, dense, chalky, abundant Chert white

**SAINT LOUIS POROSITY**

- 5660-70 Limestone white, firm, oolitic, very chalky, slightly sandy, poor porosity, dull yellow fluorescence, no show
- 5670-5700 Limestone light gray, hard, very hard, dense, some sandy, poor porosity, abundant Chert white, no show
- 5700-50 Limestone as above, increase sandy, no show

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## SUMMARY AND CONCLUSION

Berexco's, Cutter # 7 was drilled to a total depth of 5750 feet testing the Lansing Kansas City, Marmaton, Pawnee, Fort Scott, Cherokee, Morrow, Chester and Saint Louis Formations. Cutter # 7 was an offset to old production in Cutter Field discovered in the late 1960s. Our major objectives were the Lansing Kansas City, Marmaton, Morrow and Chester Formations. Secondary objectives were the Pawnee, Fort Scott and Saint Louis Formations.

There were twelve drill stem tests in this well and most were productive zones. The first good hydrocarbon show was in the Lansing B zone at 4078 feet. This zone was associated with a good drilling break and came in flat to Cutter #6 with poor to fair porosity development and a good hydrocarbon show. The Lansing B zone was tested on Drill stem test #1 recovering only 40 feet of gas cut mud and low pressures, indicative of a tight reservoir. The Lansing I zone at 4425 feet had a fair hydrocarbon show with spotty to even stain and a good drilling break. A decision was made to continue drilling and evaluate the Lansing I zone from electric logs.

The Kansas City A zone at 4534 feet was a well developed Grainstone associated with a good drilling break and even oil staining. This zone was tested on Drill stem test #2 recovering 100 feet of gas, oil and water cut gassy mud. The Kansas City B zone at 4594 feet had a fair drilling break with fair moldic porosity, spotty brown stain and a good cut. Drill stem test # 3 recovered gas to surface 15 minutes at a rate of 171 MCFPD and 190 feet of mud.

The Upper Marmaton A zone at 4686 was associated with multiple thin fair drilling breaks, spotty brown stain and weak cuts. The upper Marmaton was tested on Drill stem test # 4 recovering gas to surface in 5 minutes at a rate of 346 MCFPD and 90 feet of oil cut mud. The Lower Marmaton B zone at 4726 also had a very good drilling break with good moldic porosity, spotty brown stain and a good cut. This zone was tested on Drill stem test # 5 recovering gas to surface in 6 minutes but too small to measure and 100 feet of oil and gas cut mud.

The Pawnee at 4824 feet was associated with a fair drilling break, fair porosity development and a weak cut in a chalky fossiliferous limestone. Drill stem test # 6 recovered gas to surface in 1 minute at a rate of 2713 MCFPD and 120 feet of mud with a scum of oil.

The Fort Scott at 4868 was associated with a good drilling break, fair porosity development also in a chalky fossiliferous limestone. This zone was tested on Drill stem test # 7 recovering gas to surface in 1 minute at a rate of 5157 MCFPD with trace condensate.

Our next test was in the Basal Cherokee section at 5128 feet. This zone had a poor drilling break with poor porosity development, even stain and a good cut. Drill stem test

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# 8 tested gas to surface in 6 minutes at a rate of 11 MCFPD and 93 feet of gas and mud cut oil.

The Morrow Sand at 5246 feet was associated with a fair drilling break but good porosity development and good staining, even though it has been heavily produced for years. Drill stem test # 9 recovered gas to surface at end of final flow, 93 feet of gas and oil cut mud and 186 feet of gas and oil cut mud with low pressures, indicative of past production.

The Lower Morrow at 5328 feet had a poor drilling break with spotty stain and poor porosity development. Drill stem test # 10 recovered only 20 feet of mud with very low pressures indicating a tight reservoir.

The Upper Chester at 5474-78 feet had a poor sample show with spotty brown stain in fine grained tight sandstone, too tight to run a drill stem test. Drilling continued to the main Chester porosity zone at 5540-55 feet with a good drilling break, poor to fair development and a good cut. The Upper Chester zone and the main Chester porosity zone were both tested on Drill stem test #11 recovering 2000 feet of gas in pipe and 70 feet of gas and oil cut mud.

The Saint Louis porosity zone at 5662 feet was a poorly developed, slightly oolitic, very chalky limestone with no stain or cut. Drill stem test # 12 recovered only 50 feet of gas and mud cut oil, no water.

Logs recorded poor to good porosity development with high resistivity suggesting productive zones as the drill stem test indicated. A decision was made to run 5 ½ production casing on the favorable log calculations and Drill stem test.

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