

**Jeff Christian**  
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Wichita, Kansas

**GEOLOGISTS' REPORT**  
DRILLING TIME AND SAMPLE LOG

OPERATOR **MURKIN DRILLING COMPANY**  
LEASE **CULWELL 'J' # 1-19**  
LOCATION **2310 FNL & 495' FEL**

SEC. **19** TWPSP **2 S** RANG **37 W**  
COUNTY **CHEYENNE** STATE **KANSAS**

API **15-023-21482-00-00**  
FIELD **15-023-21482-00-00**

CONTRACTOR **COMPANY TOOLS** RIG NO. **3**  
DRILLING STARTED **04/07/2019** COMPLETED **04/11/2019**  
MUD DISPLACED **3636'** MUD TYPE **CHEMICAL**  
DRILLING TIME KEPT FROM **3990'** TO RTD  
SAMPLES SAVED FROM **3990'** TO RTD  
SAMPLES EXAMINED FROM **3990'** TO RTD  
GEOLOGICAL SUPERVISION FROM **3897'** TO RTD

MEASUREMENTS FROM U.S. CASING RECORD  
Surfaced **8.5 ft @ 330'**  
W/ 2.95 SK  
Production **1 1/2" @ 4908'**  
W/ 520 SK

ELEVATIONS  
RB **3389'**  
TEL **3384'**

FORMATION LOG SAMPLE DATE  
ANHYDRITE 3270' (-119) 3272' (-117) 3404' (-85)  
BASE ANHYDRITE 3302' (-87) 3404' (-85) 3404' (-85)  
TOPEKA 4077' (-688) 4083' (-694) 4083' (-694)  
OREAD 4228' (-839) 4231' (-842) 4231' (-842)  
LANING 4306' (-917) 4307' (-918) 4307' (-918)  
STARK 4531' (-1142) 4536' (-1147) 4536' (-1147)  
MOUND CITY 4582' (-1193) 4582' (-1193) 4582' (-1193)  
FT SCOTT 4712' (-1323) 4721' (-1332) 4721' (-1332)  
OAKLEY 4787' (-1398) 4794' (-1405) 4794' (-1405)  
TOTAL DEPTH 4912' (-1523) 4910' (-1521) 4910' (-1521)

DATE	7:00 AM DEPTH	REMARKS
4/2/19	MIRT	SPUD @ 6:15 pm
4/3/19	330'	WOC dev. 1/2 deg.
4/4/19	1750'	DRLG.
4/5/19	3210'	DRLG.
4/6/19	4040'	DRLG dev. 2 deg @ 3897'
4/7/19	4230'	DRLG.
4/8/19	4390'	DRLG dev. 1.25 deg @ 4260'
4/9/19	4452'	OB w/ DST # 4
4/10/19	4540'	TOH w/ DST # 5
4/11/19	4865'	RTD 4910' @ 9:15 am dev. 1.25 deg. Finished logging @ 6:30 pm

**Remarks**  
5 1/2" production casing set to further test the Lansing / Kansas Cty, Marmaton and Cherokee formations.  
Electric log measurements correlate about 2' high compared to rotary measurements.  
Sample tops corrected to the electric log.  
Samples delivered to the Kansas Geological Survey in Wichita.  
Respectfully Submitted,  
*Jeff Christian*  
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