

# Jeff Christian

PETROLEUM GEOLOGIST  
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## GEOLOGISTS REPORT

DRILLING TIME AND SAMPLE LOG

<p>OPERATOR: MIREN DRILLING COMPANY          LEASE: CULWELL, D. # 1-30          LOCATION: 2000 FSL &amp; 2020 FWL          SEC: 30 TWP: 1 S RNC: 36 W          COUNTY: RAWLINS STATE: KANSAS          FIELD: BRUUM NORTH          ARI: 15-155-20918          CONTRACTOR: COMPANY TOOLS RIG NO: 14          DRILLING STARTED: 02/01/03 COMPLETION: 02/11/03          MUD DISPLACED: 3461' MUD TYPE: CHEMICAL          DRILLING TIME KEPT FROM: 3370' TO RTD          SWAMER SAVED FROM: 3370' TO RTD          SWAMER EXAMINED FROM: 3370' TO RTD          GEOLOGICAL SUPERVISION FROM: 3310' TO RTD</p>	<p>EL ELEVATIONS          HB: 3285'          CL: 3275'          MEASUREMENTS FROM FACE          CASING RECORD          CONDUIT NUMBER          Casing: 13 3/8" @ 25'          W/ 225 SX @ 4850'          11 1/2" @ 4950'</p>
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FORMATION NAME	LOG	SAMPLE
TOP	DATUM	TOP
DEPTH	DATUM	DEPTH
ANHYDRITE	3189' (-96)	3199' (-87)
NEVA	3166' (-98)	3176' (-88)
FORAKER	3178' (-99)	3184' (-89)
TOPEKA	3199' (-71)	4008' (-84)
LANSING	4214' (-92)	4215' (-93)
STARK	4430' (-114)	4431' (-114)
BKC	4482' (-119)	4483' (-119)
PAWNEE	461' (-136)	4608' (-133)
CHEROKEE	481' (-140)	4892' (-147)
TOTAL DEPTH	4770' (-148)	4770' (-148)

DATE	7:00 AM DEPTH	REMARKS
2/1/13	MIRT	SPUD 8:00 pm
2/2/13	254'	WOC dev. 3/4 deg.
2/3/13	1430'	DRL6.
2/4/13	2680'	DRL6.
2/5/13	3500'	DRL6.
2/6/13	4020'	DRL6.
2/7/13	4155'	DRL6.
2/8/13	4290'	TOH for DST # 3
2/9/13	4400'	OB w/ DST # 4
2/10/13	4435'	WO Wind after DST # 5
2/11/13	4730'	DRL6. RTD 4770' @ 8:15 am dev. 2 deg. Run Electric Logs

**Remarks**  
 4 1/2" production casing set to further test the Lansing Kansas City formation.  
 Electric log measurements correlate about even to 1' high compared to rotary measurements.  
 Sample tops adjusted to the electric log.  
 Samples deposited at the Kansas Geological Survey.  
 Respectfully Submitted,  
*Jeff Christian*  
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