

**OPERATOR**

Company: HERTEL OIL COMPANY LLC  
 Address: 704 E 12TH STREET  
 HAYS, KANSAS 67601

Contact Geologist: MIKE HERTEL  
 Contact Phone Nbr: 785-628-2445  
 Well Name: JACOBS - WERTH UNIT # 1  
 Location: SE NE SE NW, SEC 4-T15S-R18W  
 API: 15-051-26,741-00-00  
 Pool:  
 State: KANSAS

Field: RUDER NORTH  
 Country: USA

**Scale 1:240 Imperial**

Well Name: JACOBS - WERTH UNIT # 1  
 Surface Location: SE NE SE NW, SEC 4-T15S-R18W  
 Bottom Location:  
 API: 15-051-26,741-00-00  
 License Number: 33625  
 Spud Date: 10/3/2014 Time: 8:41 AM  
 Region: ELLIS COUNTY  
 Drilling Completed: 10/7/2014 Time: 11:45 PM  
 Surface Coordinates: 1865' FNL & 2510' FWL  
 Bottom Hole Coordinates:  
 Ground Elevation: 2019.00ft  
 K.B. Elevation: 2027.00ft  
 Logged Interval: 2900.00ft To: 3750.00ft  
 Total Depth: 3750.00ft  
 Formation: ARBUCKLE  
 Drilling Fluid Type: CHEMICAL/FRESH WATER GEL

**SURFACE CO-ORDINATES**

Well Type: Vertical  
 Longitude: -99.328273  
 Latitude: 38.7788799  
 N/S Co-ord: 1865' FNL  
 E/W Co-ord: 2510' FWL

**LOGGED BY**

Company: SOLUTIONS CONSULTING, INC.  
 Address: 108 WEST 35TH STREET  
 HAYS, KANSAS 67601

Phone Nbr: 785-625-3380  
 Logged By: GEOLOGIST

Name: HERB DEINES/SPENCER STAAB

**CONTRACTOR**

Contractor: DISCOVERY DRILLING INC.  
 Rig #: 3  
 Rig Type: MUD ROTARY  
 Spud Date: 10/3/2014 Time: 8:41 AM  
 TD Date: 10/7/2014 Time: 11:45 PM  
 Rig Release: 10/8/2014 Time: 9:00 PM

**ELEVATIONS**

K.B. Elevation: 2027.00ft Ground Elevation: 2019.00ft  
 K.B. to Ground: 8.00ft

**NOTES**

RECOMMENDATION TO RUN PRODUCTION CASING TO FURTHER TEST THE ARBUCKLE BASED ON FAVORABLE STRUCTURE AND LOG ANALYSIS

NO DRILL STEM TESTS WERE RAN ON THIS WELL

**FORMATION TOPS SUMMARY**

	<b>JACOBS-WERTH UNIT 1 SE NE SE NW SEC.4-15S-18W 2019'GL 2027'KB</b>	<b>RUDER #A-1 NW SE NW SEC.4-15-18W KB 2021'</b>	<b>OLDHAM # 2 NW NE NW SEC.4-15-18W KB 2024</b>
<u>FORMATION</u>	<u>LOG TOPS</u>	<u>LOG TOPS</u>	<u>LOG TOPS</u>
Anhydrite	1208+ 819	+ 824	+ 825
B-Anhydrite	1246+ 781	+ 787	+ 786
Topeka	3018 - 991	- 982	- 976
Heebner Sh.	3277-1250	-1247	-1234
Toronto	3297-1270	-1269	-1254
LKC	3331-1304	-1302	-1284
BKC	3557-1530	-1537	-1528
Marmaton	3597-1570	-1571	-1558
Congl. Sand	None	-1597	-1600
Arbuckle	3627-1600	-1643	-1609
RTD	3750-1723	-1653	-1610

**SUMMARY OF DAILY ACTIVITY**

10-03-14	RU, spud, set 8 5/8" surface casing to 222' w/ 150 sxs common 2%gel 3%CC, plug down 7:15PM, WOC 8 hrs
10-04-14	623', drill plug 3:15 AM
10-05-14	2160', drilling
10-06-14	2885', drilling, displaced 2566'-2592'
10-07-14	3260', drilling, RTD 3750' @11:45 PM
10-08-14	3750', short trip, CCH, TOWB, logs, LDDP, run production casing


**ROCK TYPES**

Clystcol	Lmst fw7>	Carbon Sh	Lscongl
Dolprim	shale, grn	shale, red	Dol Lime
Lmst fw<7	shale, gry	Shcol	

**ACCESSORIES**

**MINERAL**

- ▲ Chert, dark
- △ Chert White

**FOSSIL**

- ⊕ Oolite
- ⊕ Oomoldic

**OTHER SYMBOLS**

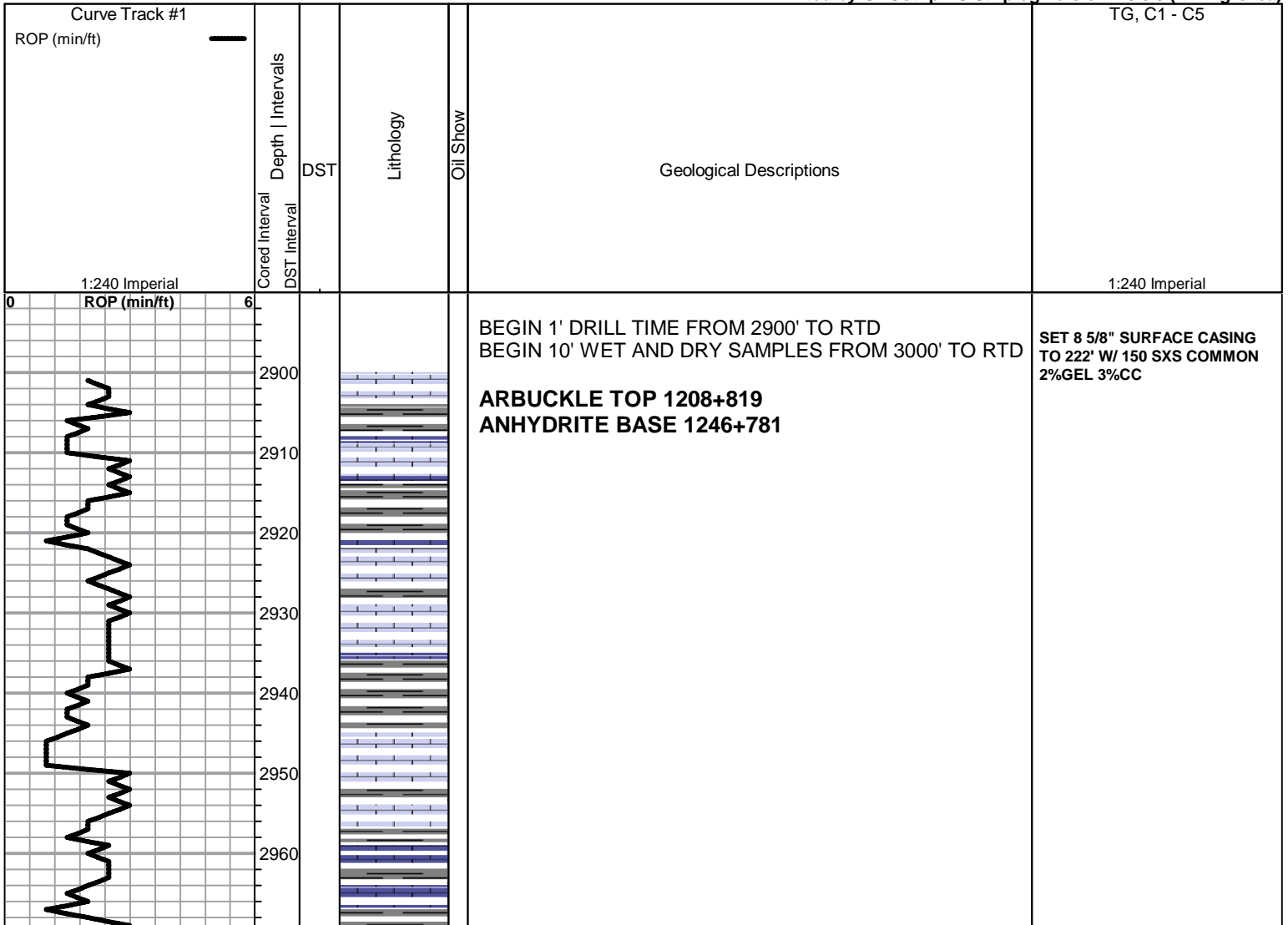
**Oil Show**

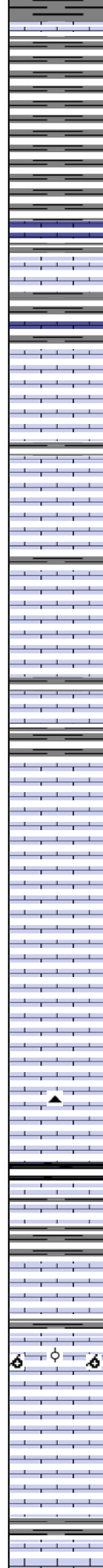
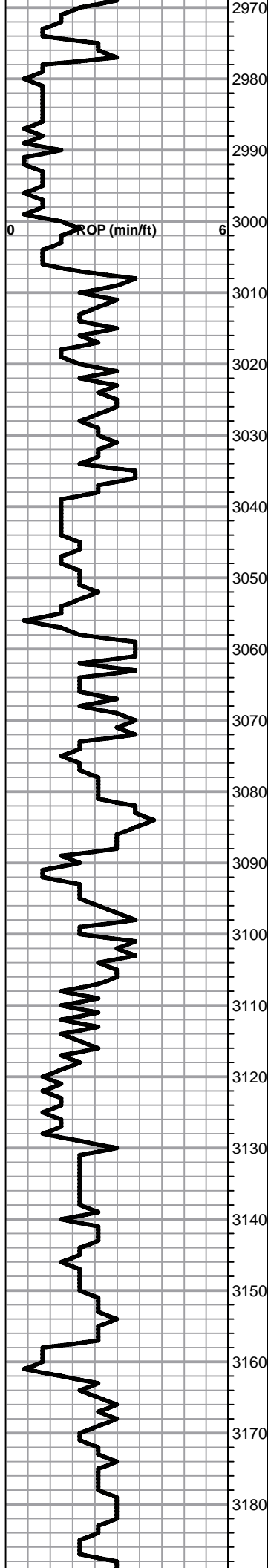
- Good Show
- Fair Show
- Poor Show
- Spotted or Trace
- Questionable Stn
- D Dead Oil Stn
- Fluorescence
- \* Gas

**DST**

- DST Int
- DST alt
- Core
- tail pipe

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Shale, lt-med gray, soft blocky

Lime, lt-med gray, fnxln

**TOPEKA 3018-991**

Lime, crm, fnxln, slightly fossiliferous, slight bedded chalk

Lime, crm-tan, fn-vfxln, slightly fossiliferous, bed chalk with sticky clumps

Lime, lt-med grayish brn, fnxln

Lime, lt-med gray, fnxln  
Shale, lt gray, soft blocky

Lime, lt brn, granular, bedded chalk, NS

Lime, lt-med grayish brn, fnxln

Lime, lt-med gray, fnxln-vfxln  
Shale, lt gray, soft sticky, argillaceous

Lime, lt-med grayish brn, fnxln, slightly fossiliferous

Lime, med-dark brn, fnxln-granular, slightly fossiliferous, NS

Lime, med-dark gray, granular-fnxln

Lime, med grayish brn, fn-vfxln

Lime, lt-med brn, fnxln-granular,

Lime, crm, fnxln-granular with increasing chalk matrix with bed chalk

Lime, crm, granular, lot of bedded chalk

Shale, black carbonaceous, blocky

Lime, lt brn, fnxln-slightly granular

Shale, med gray, soft blocky

Lime, lt brn, fnxln

Lime, crm-tan, fn-vfxln

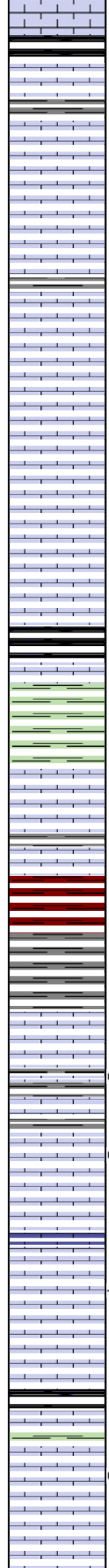
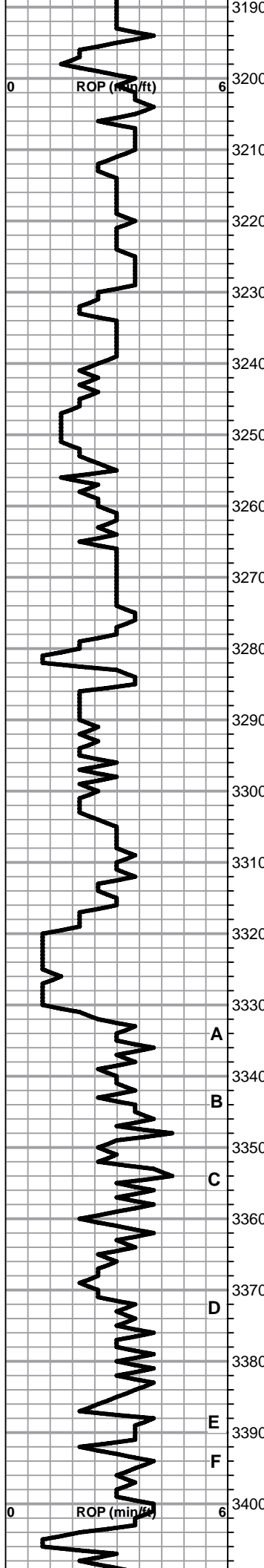


Lime, crm-tan, fnxln, oomoldic in part, NS

Lime, lt-med brn, fnxln

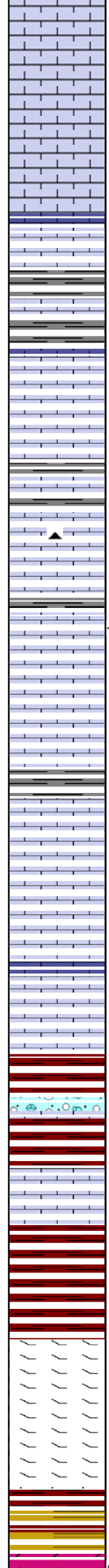
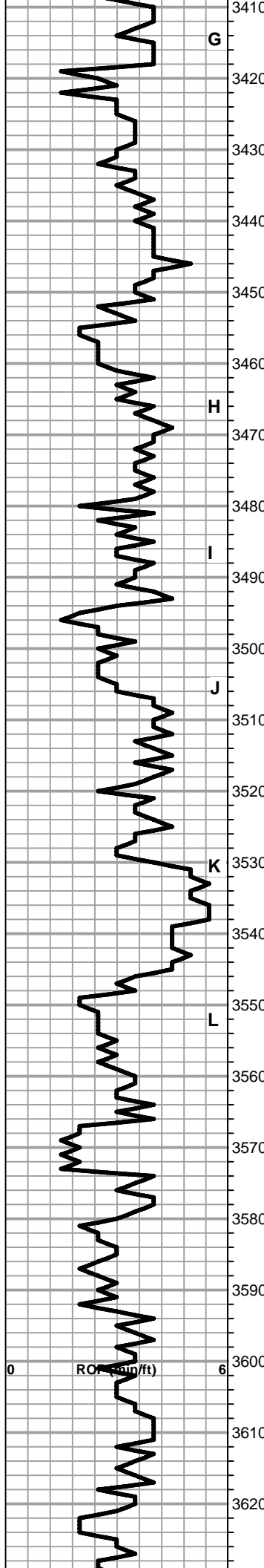
Lime, crm, fnxln

Lime, lt-med brn, fnxln with micro xln in part

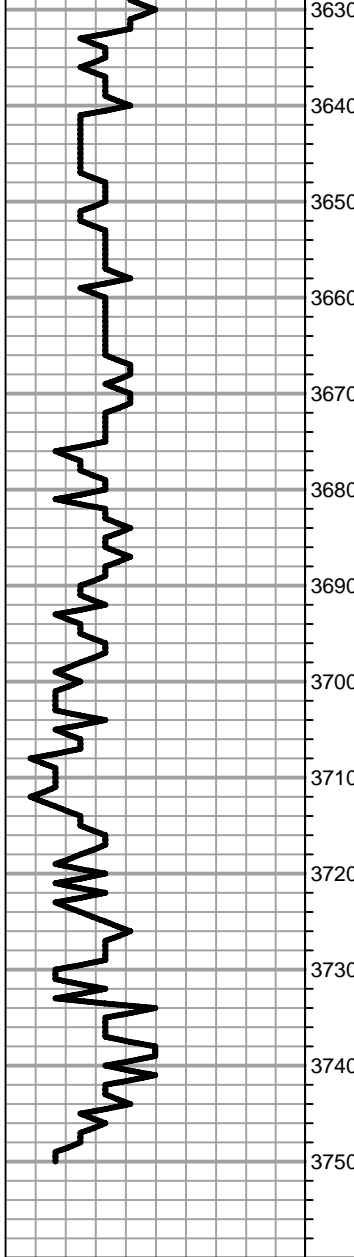


Shale, black carbonaceous, fissile, blocky  
 Lime, lt-med gray, fnxln, slightly fossiliferous  
 Lime, med brn, fnxln, slightly fossiliferous  
 Lime, lt-med brn, fnxln  
 Lime, lt-med grayish brn, fnxln  
 Lime, med brn-grayish brn, fnxln  
 Lime, lt-dark brn, fnxn-granular  
 Lime, crm, fnxln  
 Lime, lt-med brn, fnxln  
 Lime, lt-med brn, fn-vfxln  
**HEEBNER SHALE 3277-1250**  
 Shale, black carbonaceous, fissile, blocky  
 Lime, lt-med brn, fn-vfxln  
 Shale, dove gray-lime green, soft mud-soft blocky  
**TORONTO 3297-1270**  
 Lime, white-crm, fnxln-granular, bedded chalk in part, NS  
 Lime, lt-med brn, fn-vfxln, NS  
 Shale, red, soft with red wash  
 Shale, lt gray, soft mud-soft blocky  
**LKC 3331-1304**  
 Lime, lt-med brn, fnxln, one chip spotty stain, vlt odor  
 Lime, lt-med brn, fn-vfxln  
 Lime, lt-med brn, fnxln-oomoldic/oolitic, spotty stain  
 Lime, crm-lt brn, fnxln, slightly fossiliferous, NS  
 Lime, crm-tan, fnxln, NS  
 Lime, lt brn, fnxln, few chips with slight stain and vlt odor.  
 Shale, black carbonaceous, blocky  
 Lime, crm-lt brn, fnxln, spotty staining in part, NFO  
 Lime, crm-lt brn, fnxln, slightly fossiliferous, oomoldic in part, NS

A  
 B  
 C  
 D  
 E  
 F



- 3410 Lime, crm-tan, fn-vfxln
- 3420 Lime, crm-tan, fn-vfxln
- 3430 Lime, lt brn, fn-vfxln
- 3440 Lime, crm-tan, fn-vfxln
- 3450 Shale, med-dark gray, soft-firm blocky
- 3460 Lime, med-dark, brn, fn-vfxln
- 3470 Lime, lt-med brn, fn-vfxln, slight bedded chalk
- 3480 Shale, grayish green, soft blocky
- 3480 Lime, lt grayish brn, fnxln
- 3490 Lime, lt brn, fnxln
- 3500 \* Lime, crm-tan, fnxln-granular, lt odor, NFO
- 3510 Lime, tan-lt brn, fnxln with scattered oomoldic chips
- 3520 Lime, tan-lt brn, fn-vfxln
- 3530 Lime, lt-med brn-lt grayish brn, fnxln, NS
- 3540 Lime, tan-lt brn, fn-vfxln
- 3550 Lime, crm-tan, fn-vfxln
- 3560 **BKC 3557-1530**  
Shale, red, soft with lt red wash
- 3570 Lime, crm-tan, fnxln
- 3580 Lime, crm-tan, fn-vfxln
- 3590 Shale, red, soft with red wash
- 3600 **MARMATON 3597-1570**  
Lime, crm-tan, fnxln, dolomitic, orange chert fragments
- 3610 Lime, crm-tan, fnxln, dolomitic
- 3620 Lime, crm-tan-lt brn, fnxln
- 3620 Shale, vari color, soft sticky to firm blocky
- ARBUCKLE 3627-1600**



Dolomite, buff, fnxln-granular, fn-med grain, lt staining with  
 lt odor improving with depth  
 Dolomite, buff, granular, sucrosic, good-strong odor and  
 saturated staining  
 Dolomite, buff-tan, granular with decreasing stain and odor  
 Dolomite, buff-tan, granular-fnxln  
 Dolomite, buff-tan, granular-fnxln  
 Dolomite, tan-lt brn, granular, fnxln  
 Dolomite, tan-lt brn, fnxln-granular  
 Dolomite, tan-lt brn, fnxln  
 Dolomite, tan-lt brn, fnxln-granular  
 Dolomite, tan-lt brn, granular  
 Dolomite, tan-lt brn, granular  
 Dolomite, tan-lt brn, fnxln  
 Dolomite, tan-lt brn, fnxln-granular in part  
 Dolomite, tan-lt brn, fnxln  
**RTD 3750-1723      LTD 3750-1723**

HISTORIC OIL/WATER  
 CONTACT 3644-1617