

**OPERATOR**

Company: TDI, INC  
 Address: 1310 BISON ROAD  
 HAYS, KANSAS 67601

Contact Geologist: TOM DENNING  
 Contact Phone Nbr: 785-628-2593  
 Well Name: VIRGINIA # 2  
 Location: SE SW NE NE SEC.16-T15S-R19W  
 API: 15-051-26,878-00-00  
 Pool: IN FIELD  
 State: KANSAS

Field: VIRGINIA  
 Country: USA



Scale 1:240 Imperial

Well Name: VIRGINIA # 2  
 Surface Location: SE SW NE NE SEC.16-T15S-R19W  
 Bottom Location:  
 API: 15-051-26,878-00-00  
 License Number: 4787  
 Spud Date: 7/10/2017 Time: 2:30 PM  
 Region: ELLIS COUNTY  
 Drilling Completed: 7/16/2017 Time: 7:47 PM  
 Surface Coordinates: 1005' FNL & 755' FEL  
 Bottom Hole Coordinates:  
 Ground Elevation: 2009.00ft  
 K.B. Elevation: 2019.00ft  
 Logged Interval: 2800.00ft To: 3638.00ft  
 Total Depth: 3638.00ft  
 Formation: CONGLOMERATE SAND  
 Drilling Fluid Type: CHEMICAL/FRESH WATER GEL

**SURFACE CO-ORDINATES**

Well Type: Vertical  
 Longitude: -99.4328024  
 Latitude: 38.752057  
 N/S Co-ord: 1005' FNL  
 E/W Co-ord: 755' FEL

**LOGGED BY**

Company: SOLUTIONS CONSULTING, INC.  
 Address: 108 W 35TH  
 HAYS, KS 67601

Phone Nbr: (785) 639-1337  
 Logged By: GEOLOGIST

Name: HERB DEINES

**CONTRACTOR**

Contractor: SOUTHWIND DRILLING INC.

Rig #: 1  
 Rig Type: MUD ROTARY  
 Spud Date: 7/10/2017  
 TD Date: 7/16/2017

Time: 2:30 PM  
 Time: 7:47 PM

**ELEVATIONS**

K.B. Elevation: 2019.00ft  
 K.B. to Ground: 10.00ft

Ground Elevation: 2009.00ft

**NOTES**

RECOMMENDATION TO RUN PRODUCTION CASING BASED ON RESULTS OF DST # 3 AND LOG ANALYSIS.

OPEN HOLE LOGGING BY PIONEER ENERGY SERVICES:DUAL INDUCTION LOG, DUAL COMPENSATED POROSITY LOG, MICRORESISTIVITY LOG.

DRILL STEM TESTING BY TRILOBITE TESTING INC: THREE (3) CONVENTIONAL TESTS.

**VIRGINIA # 2**  
**SE SW NE NE**  
**SEC.16-15S-19W**  
**2019'KB**

**VIRGINIA # 1**  
**SW NE NW NE**  
**SEC.16-15-19W**  
**KB 2024'**

**WILLIE # 1**  
**NW SE SE SE**  
**SEC.9-15-19W**  
**KB 2043'**

<u>FORMATION</u>	<u>LOG TOPS</u>	<u>LOG TOPS</u>	<u>LOG TOPS</u>
Anhydrite	1235 +784	+ 784	+ 785
B-Anhydrite	1271 +748	+ 747	+ 749
Topeka	2993 - 974	- 970	- 969
Heebner Sh.	3267-1248	-1244	-1246
Toronto	3294-1275	-1266	-1268
LKC	3318-1299	-1291	-1293
BKC	3562-1543	-1537	-1540
Arbuckle	NOT REACHED	-1627	-1620
RTD	3638-1619	-1726	-1707

**SUMMARY OF DAILY ACTIVITY**

7-10-17 Spud 2:30 PM,  
 7-11-17 895', drilling, set 8 5/8" surface casing to 1250' w/ 375 sxs SMD,  
 WOC 12 hrs, slope 1 degree.  
 7-12-17 1250', WOC, drill plug at 9:00 AM  
 7-13-17 2118', drilling  
 7-14-17 2815', drilling, displaced 2847' to 2878'  
 7-15-17 3350' drilling, CFS 3300', short trip, CFS 3375', DST # 1 3305' to  
 3375', slope 1 degree at 3375'

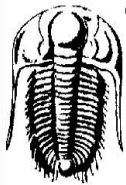
7-16-17

3535', drilling, CFS 3535', DST # 2 3486' to 3535', TIWB, CFS 3638',

RTD @ 7:47PM, DST # 3 3618' to 3638' conglomerate sand

7-17-17

3638', finish DST # 3, log behind DST # 3, TIWB, LDDP, run production casing and cement bottom stage



**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

TDI Inc  
 1310 Bison RD  
 Hays Ks 67601-9696  
 ATTN: Tom Denning Herb Dei

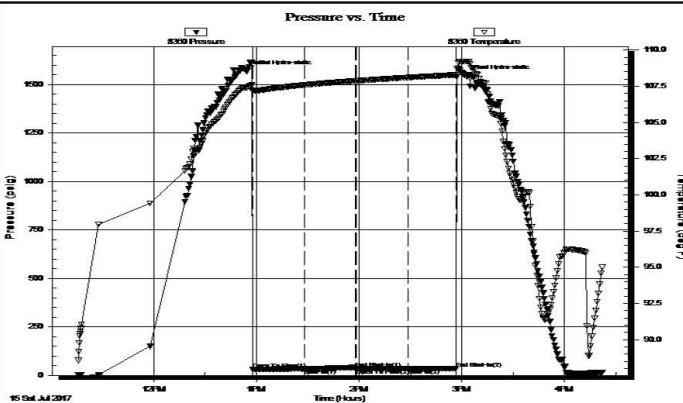
**16-15s-19w Ellis**  
**Virginia #2**  
 Job Ticket: 63975 **DST#: 1**  
 Test Start: 2017.07.15 @ 11:16:04

**GENERAL INFORMATION:**

Formation: **LKC C-D**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 12:57:44  
 Time Test Ended: 16:21:58  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ray Schwager  
 Unit No: 77  
**Interval: 3305.00 ft (KB) To 3375.00 ft (KB) (TVD)**  
 Total Depth: 3375.00 ft (KB) (TVD)  
 Reference Elevations: 2019.00 ft (KB)  
 2009.00 ft (CF)  
 Hole Diameter: 7.85 inches Hole Condition: Fair  
 KB to GR/CF: 10.00 ft

**Serial #: 8360 Inside**  
 Press@RunDepth: 34.50 psig @ 3309.00 ft (KB)  
 Capacity: 8000.00 psig  
 Start Date: 2017.07.15 End Date: 2017.07.15  
 Last Calib.: 2017.07.15  
 Start Time: 11:16:04 End Time: 16:21:58  
 Time On Btm: 2017.07.15 @ 12:54:44  
 Time Off Btm: 2017.07.15 @ 15:02:44

**TEST COMMENT:** 30-IFP-w k bl died in 15 min  
 30-ISIP-no bl  
 30-FFP-no bl  
 30-FSIP-no bl



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1567.79	107.42	Initial Hydro-static
3	32.31	107.16	Open To Flow (1)
34	33.77	107.58	Shut-In(1)
64	35.66	107.87	End Shut-In(1)
64	35.60	107.87	Open To Flow (2)
94	34.50	108.10	Shut-In(2)
122	35.39	108.29	End Shut-In(2)
128	1544.27	109.20	Final Hydro-static

**Recovery**

Length (ft)	Description	Volume (bbl)
5.00	Mud	0.07

**Gas Rates**

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

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Hays Ks 67601-9696  
ATTN: Tom Denning Herb Dei

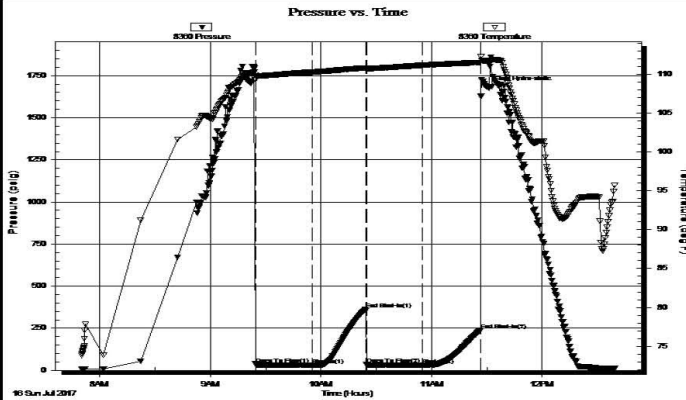
**16-15s-19w Ellis**  
**Virginia #2**  
Job Ticket: 63001 **DST#: 2**  
Test Start: 2017.07.16 @ 07:50:09

**GENERAL INFORMATION:**

Formation: **LKC J-K**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 09:24:34  
Time Test Ended: 12:39:18  
Interval: **3486.00 ft (KB) To 3535.00 ft (KB) (TVD)**  
Total Depth: 3535.00 ft (KB) (TVD)  
Hole Diameter: 7.85 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Ray Schwager  
Unit No: 77  
Reference Elevations: 2019.00 ft (KB)  
2009.00 ft (CF)  
KB to GR/CF: 10.00 ft

**Serial #: 8360 Inside**  
Press@RunDepth: 32.16 psig @ 3499.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2017.07.16 End Date: 2017.07.16 Last Calib.: 2017.07.16  
Start Time: 07:50:09 End Time: 12:39:18 Time On Btm: 2017.07.16 @ 09:22:04  
Time Off Btm: 2017.07.16 @ 11:30:49

**TEST COMMENT:** 30-IFP-surface bl, died in 12 min  
30-ISIP-no bl  
30-FFP-no bl  
30-FSIP-no bl



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1703.45	110.14	Initial Hydro-static
3	34.84	109.78	Open To Flow (1)
34	32.23	110.27	Shut-In(1)
62	362.93	110.80	End Shut-In(1)
63	34.08	110.70	Open To Flow (2)
93	32.16	111.14	Shut-In(2)
125	238.49	111.51	End Shut-In(2)
129	1680.93	111.72	Final Hydro-static

**Recovery**

Length (ft)	Description	Volume (bbl)
5.00	SOCM 1%O99%M	0.07

**Gas Rates**

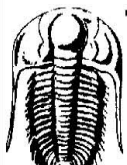
Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

\* Recovery from multiple tests

Trilobite Testing, Inc

Ref. No: 63001

Printed: 2017.07.16 @ 14:15:53



**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

TDI Inc  
1310 Bison RD  
Hays Ks 67601-9696

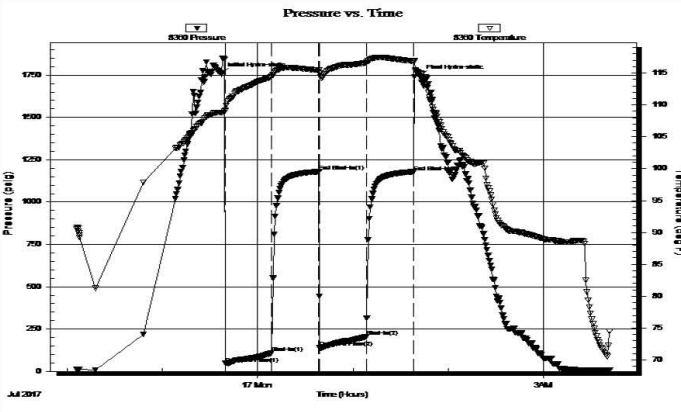
**16-15s-19w Ellis**  
**Virginia #2**  
Job Ticket: 63002 **DST#: 3**

**GENERAL INFORMATION:**

Formation: **Congl Sd**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 23:39:34  
 Time Test Ended: 03:42:03  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Ray Schwager  
 Unit No: 77  
 Interval: **3618.00 ft (KB) To 3638.00 ft (KB) (TVD)**  
 Total Depth: 3638.00 ft (KB) (TVD)  
 Hole Diameter: 7.85 inches Hole Condition: Fair  
 Reference Elevations: 2019.00 ft (KB)  
 2009.00 ft (CF)  
 KB to GR/CF: 10.00 ft

**Serial #: 8360 Inside**  
 Press@RunDepth: 205.82 psig @ 3619.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2017.07.16 End Date: 2017.07.17  
 Start Time: 22:05:54 End Time: 03:42:03  
 Time On Btm: 2017.07.16 @ 23:37:04  
 Time Off Btm: 2017.07.17 @ 01:42:34

TEST COMMENT: 30-IFP-BOB in 7 min  
 30-ISIP-1 1/2" bl bk  
 30-FFP-BOB in 7 min  
 30-FSIP-1/2" bl bk



PRESSURE SUMMARY			
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1759.13	108.78	Initial Hydro-static
3	46.30	109.10	Open To Flow (1)
32	109.56	114.44	Shut-In(1)
62	1179.97	115.42	End Shut-In(1)
62	140.13	114.93	Open To Flow (2)
92	205.82	116.63	Shut-In(2)
121	1178.79	116.86	End Shut-In(2)
126	1742.08	114.94	Final Hydro-static

Recovery		
Length (ft)	Description	Volume (bbt)
390.00	OO	5.47
124.00	GMO 20%G30%M50%O	1.74
0.00	100' GIP	0.00

\* Recovery from multiple tests

Gas Rates			
	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

Trilobite Testing, Inc

Ref. No: 63002

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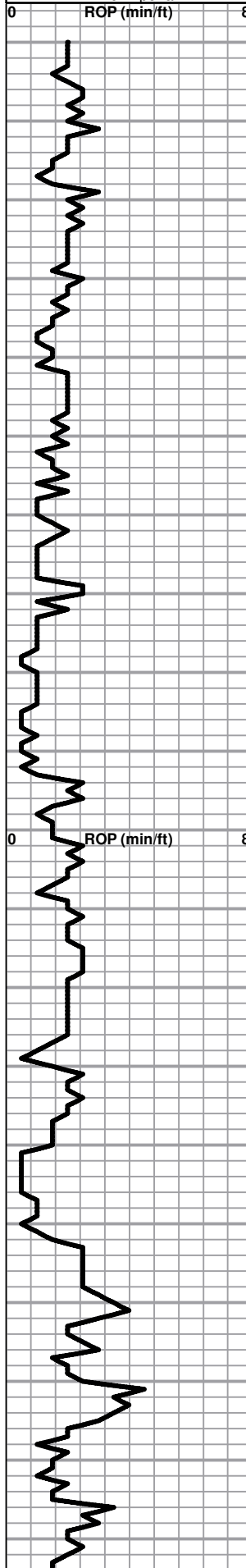
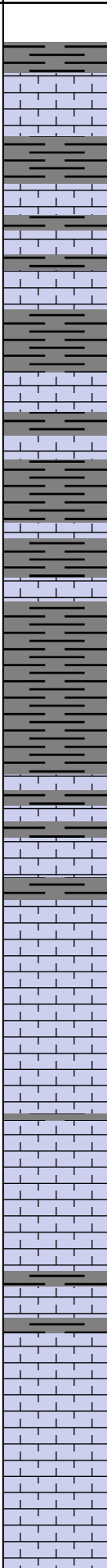
**ROCK TYPES**

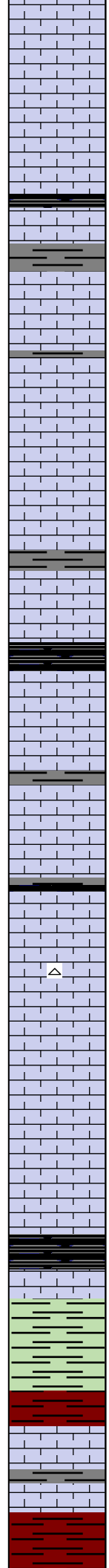
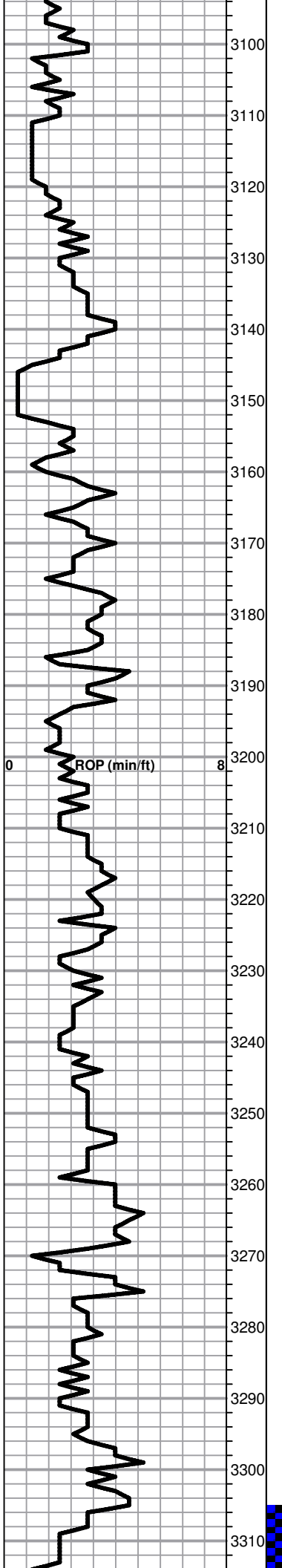
- △ Cht vari
- Lmst fw>7
- shale, gry
- Ss
- Dol Lime
- Lscongl
- Carbon Sh
- shale, red
- Lmst fw<7
- shale, grn

**ACCESSORIES**

- MINERAL  
△ Chert White
- FOSSIL  
⊕ Oomoldic

Curve Track #1 ROP (min/ft)	—	Intervals	IV	W		Curve Track #3
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Cored Interval DST Interval	Depth   DST	Litholog	Oil Sho	Geological Descriptions
<p>1:240 Imperial</p>  <p>ROP (min/ft)</p>	<p>1:240 Imperial</p> <p>0 8</p> <p>2900</p> <p>2910</p> <p>2920</p> <p>2930</p> <p>2940</p> <p>2950</p> <p>2960</p> <p>2970</p> <p>2980</p> <p>2990</p> <p>3000</p> <p>3010</p> <p>3020</p> <p>3030</p> <p>3040</p> <p>3050</p> <p>3060</p> <p>3070</p> <p>3080</p> <p>3090</p>		<p>BEGIN 1' DRILL TIME FROM 2900' TO RTD BEGIN 10' WET AND DRY SAMPLES FROM 2950' TO RTD</p> <p><b>ANHYDRITE TOP 1235+784</b> <b>ANHYDRITE BASE 1271+748</b></p> <p>Lime, med brn-med grayish brn, fnxln, fossiliferous</p> <p>Lime, lt-med brn, fnxln, slightly fossiliferous, lot of transition limestone types</p> <p>Lime, med brn-med grayish brn, fnxln, fossiliferous</p> <p>Lime, med brn, fnxln, fossiliferous, fusulinids</p> <p>Lime, lt brn, fnxln</p> <p>Shale, lt-med gray, soft blocky</p> <p><b><u>TOPEKA 2993-974</u></b></p> <p>Lime, lt-med brn, fnxln, slightly fossiliferous</p> <p>Lime, crm-lt brn, fnxln, slight bedded chalk, slightly fossiliferous</p> <p>Lime, lt-med brn, fn-vfxln</p> <p>Lime, crm-lt brn, fnxln with increasing chalk cotent</p> <p>Lime,lt brn, fnxln with fine grainstone in part, NFO, no odor, lt wet cut in part</p> <p>Lime, lt-med brn-grayish brn, fnxln</p> <p>Lime, lt-med grayish brn, fn-vfxln, slightly fossiliferous</p> <p>Lime, lt-med brn, fnxln-chalky granular, NS</p> <p>Lime, lt-med brn, fnxln-granular with chalk</p>	<p>1:240 Imperial</p> <p>8 5/8" SURFACE CASING SET TO 1250' W/ 375 SXS SMP</p> <p>SLOPE 1 DEGREE @1250'</p>



Lime, lt-med brn, fnxln with sticky chalk in part

Lime, lt-med brn, fnxln-granular with chalk, lt chalk wash

Lime, lt brn, fnxln-granular with chalk  
Shale, black carbonaceous, blocky

Lime, lt-med brn, fn-vfxln

Lime, crm-lt brn, vfxln, lithographic

○ Lime, crm-lt brn, fn-vfxln grading into soft grainstone with bedded chalk. NFO, no odor, few chips with lt wet cut

Lime, lt-med brn, fn-vfxln

Lime, lt-med brn-lt gray, fn-vfxln

Shale, lt gray, soft mud

Lime, crm-lt brn, fn-vfxln

Shale, black carbonaceous, fissile, blocky

Lime, lt gray-lt brn, fn-vfxln

Lime, lt brn, fnxln, soft chalk with lt white wash

Lime, lt-lt grayish brn, fnxln with soft chalk matrix in part

○ Lime, lt brn, fnxln, NFO, no odor, 1 chip with trace of free oil on crush in soft grainstone

△ Lime, lt brn, fn-vfxln, bedded chalk

Lime, crm-lt brn, fnxln, bedded chalk, slightly fossiliferous

Lime, lt brn, fn-vfxln

Lime, lt-med brn, fn-vfxln

**HEEBNER SHALE 3267-1248**

Shale, black carbonaceous, fissile, blocky  
Lime, lt-med brn, fn-micro xln

Shale, dove gray-lime green, soft mud

**TORONTO 3294-1275**

Lime, crm-white, fn-micro xln, NS

Lime, white-crm, fn-micro xln

Shale, red-reddish brn, soft with red wash

**LKC 3318-1299**

Lime, lt brn-lt gray, fn-micro xln

Lime, lt-med brn-med gray, fn-micro xln

Lime, crm-lt brn, fn-vfxln with few oomoldic chips with spotty stain

Lime, lt-med brn-lt gray, fnxln

Lime, lt brn-lt gray, slightly dolomitic in part, scattered pinpoint vuggy porosity, lt spotty stain in few fossil casts and oomolds, NFO, no odor

Lime, crm-lt brn, fn-vfxln

Shale, black carbonaceous, blocky  
Lime, lt gray, fn-vfxln

Lime, crm-lt brn, fnxln, slightly fossiliferous with trace of stain, NFO, no odor

Lime, crm, fnxln

Lime, crm, fn-vfxln, slight bedded chalk, NS

Lime, crm-tan, fn-vfxln

Lime, crm-lt brn, fn-micro xln

Shale, gray-black carbonaceous, blocky  
Lime, lt-med brn, vfxln

Lime, crm-lt brn, fn-micro xln, slightly granular in part with trace of spotty staining, NFO or odor

Lime, crm-lt brn, fn-vfxln

Lime, lt-med brn, fn-vfxln

Lime, crm-tan, fn-micro xln, trace of stain, NFO or odor

Lime, crm-lt brn, fn-micro xln

Lime, crm-lt brn, fn-micro xln

Lime, lt brn, oomoldic, scattered to saturated staining, very lt odor, NFO

Lime, crm-tan, fn-micro xln

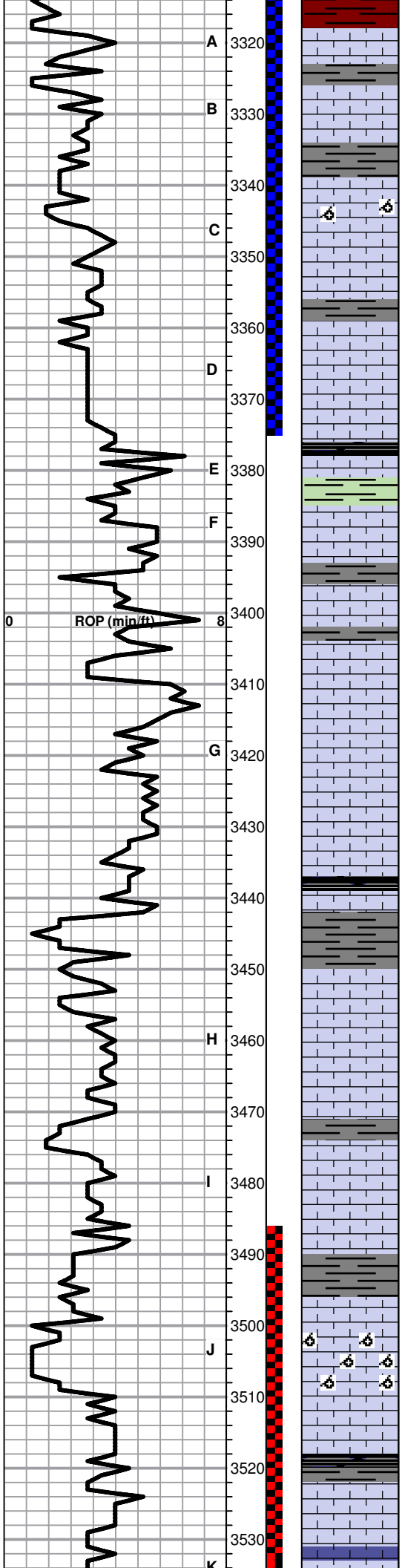
Shale, gray-black carbonaceous, blocky

Lime, crm-lt brn, fn-vfxln, trace of lt staining in fn granular chips

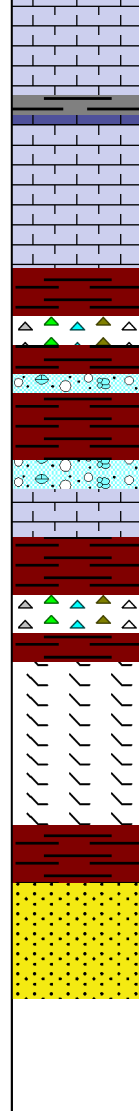
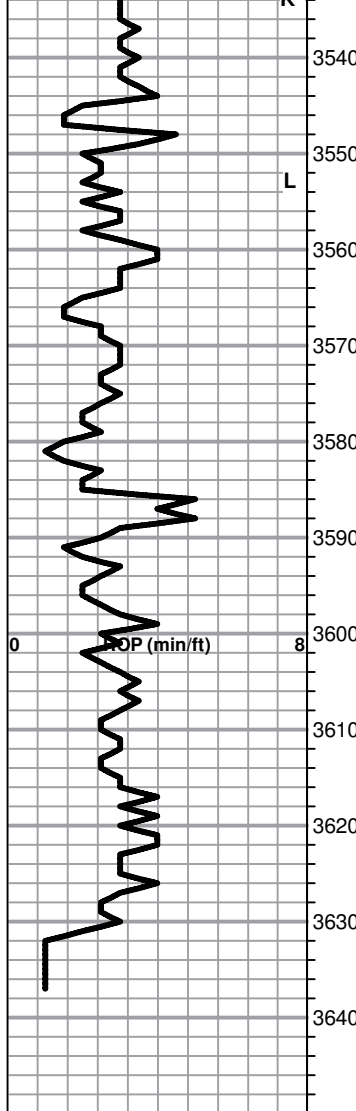
DST # 1 3305' TO 3375' SEE HEADER FOR TEST SUMMARY

SLOPE 1 DEGREE @3375'

DST # 2 3486' TO 3535' SEE HEADER FOR TEST SUMMARY







Lime, lt brn-very lt gray, fn-micro xln

Lime, crm-lt brn, fn-micro xln

Lime, lt brn, fn-micro xln

**BKC 3562-1543**

Shale, red-reddish brn, soft blocky with lt red wash scattered chips of red chert rubble

Lime, clastic, crm-lt gray, fn xln with red shale specks

Lime, crm, fnxln-granular, clastic in part with red shale staining

Shale, reddish brn, soft blocky with lt red wash

Lime, crm, fnxln, slightly dolomitic with orange chert fragments

Lime, white-lt brn, fn-micro xln, slightly dolomitic

Shale, red soft mud

**CONGLOMERATE SAND 3626-1607**

○ Sandstone, fine grained, poorly sorted with white clay cementing grading into fair sorted, quartz sandstone, friable, scattered to saturated staining, lt odor and SFO

**RTD 3638-1619 LTD 3637-1618**

5 1/2" 15.5# production casing set to 3636' w/150 sxs EA2, 30 sxs in rathole, 20 sxs in mousehole.

DST # 3 3618' TO 3638' SEE HEADER FOR TEST SUMMARY