



Scale 1:240 (5"=100') Imperial
Measured Depth Log

Well Name: WasseMiller #1-10
Well Id:
Location: Sec 10 T11S R34W, Logan County, Kansas
License Number: 15-109-21589
Spud Date: April 02, 2019
Surface Coordinates: 689' Fsl & 675' Fwl
Region: Wildcat
Drilling Completed: April 11th 2019

Bottom Hole
Coordinates:
Ground Elevation (ft): 3170' K.B. Elevation (ft): 3175'
Logged Interval (ft): 3800' To: 4800' Total Depth (ft): 4800'
Formation: Atoka Lansing
Type of Drilling Fluid: Natural Chemical

Printed by WellSight LogViewer from WellSight Systems 1-800-447-1534 www.WellSight.com

OPERATOR

Company: YOUNGSTOWN OPERATING, LLC
Address: 14612 Hertz Quail Springs Parkwy
Oklahoma City, Okla. 73134
Co. Geo: Michael Bone

GEOLOGIST

Name: Edwin W. Grieves/ Tim Hedrick
Company: Grieves and Company
Address: PO Box 3125
Edmond, Oklahoma 73083-3125
CELL PH. 405-836-9027

MUD REPORTS

DATE	4/5	4/6	4/7	4/8	4/9	4/10	4/11
DEPTH	2998	3660	4120	4316	4341	4648	4719
WT.	9.3	8.8	9.0	9.3	9.3	9.3	9.5
VIS	30	56	58	73	63	52	58
PV		18	19	19	17	14	15
YP		14	15	16	15	19	23
GS		8/19	10/26	11/34	11/27	5/30	12/35
PH	7.0	11.5	11.0	11.0	10.5	10.5	11.5
WL		6.4	7.2	8.0	8.0	7.2	9.6
CAKE	1	1	1	1/32	1/32	1/32	1/32
CHL	47K	2.4K	2.8K	3.5K	4.2K	4.5K	6K
CAL	HVY	10	60	80	80	80	80
LCM	1	1	1	1	1	1.5	1

SRVY- 3/4 DEG@323' /3/4DEG@4316'/ 1 DEG @ 4800'

CIRC POINTS-

1. 3890 - 20/40/60 MIN
2. 3950'- 20/40/60
3. 4120'- 20/40/60
4. 4260'- 20/40/60
5. 4290'- 20/40/60
6. 4316'- 20/40/60
7. 4344'- 20/40/60
8. 4620'- 20/40/60
9. 4655' -20/40/20
- 10.4675' -20/40/60
- 11.4710' -20/40/60
- 12.4800' -20/40/60



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Youngstown Operating
14612 Hertz Quail Springs Parkway
Oklahoma City, Ok 73134
ATTN:

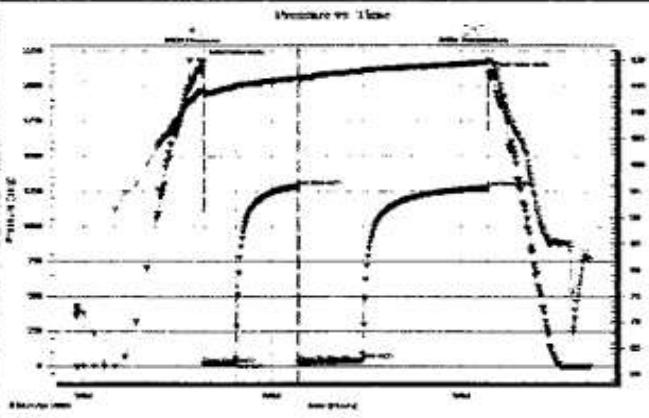
10-11-34 Logan, Ks
Wassemiller 1-10
Job Ticket: 65169 **DST#: 1**
Test Start: 2019.04.08 @ 02:53:24

GENERAL INFORMATION:

Formation: **Lansing E**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 04:55:24
Time Test Ended: 11:02:54
Interval: **4310.00 ft (KB) To 4361.00 ft (KB) (TVD)**
Total Depth: 4361.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good
Test Type: Conventional Bottom Hole (Initial)
Tester: Brandon Turley
Unit No: 79
Reference Elevations: 3179.00 ft (KB)
3174.00 ft (CF)
KB to GRVCF: 5.00 ft

Serial #: 8166 Outside
Press@RunDepth: 44.43 psig @ 4315.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2019.04.08 End Date: 2019.04.08
Start Time: 02:53:24 End Time: 11:02:54
Time On Btm: 2019.04.08 @ 04:53:54
Time Off Btm: 2019.04.08 @ 09:26:24

TEST COMMENT: IF: 1/2 blow built to 2.
IS: No return.
FF: Surface blow built to 3/4.
FS: No return.



PRESSURE SUMMARY			
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2178.18	114.23	Initial Hydro-static
2	17.07	113.66	Open To Flow (1)
31	28.05	115.00	Shut-in(1)
91	1285.22	116.51	End Shut-in(1)
92	29.04	116.22	Open To Flow (2)
152	44.43	117.77	Shut-in(2)
272	1276.00	119.61	End Shut-in(2)
273	2086.58	119.96	Final Hydro-static

Recovery		
Length (ft)	Description	Volume (bbl)
60.00	ocm 2%o 98% m	0.30
2.00	ocm 10%o 90% m	0.01

Gas Rates			
	Core (Mcf)	Pressure (psig)	Gas Rate (Mcfus)



**TRIOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Youngstown Operating
14812 Hertz Dual Springs Parkway
Oklahoma City, Ok 73134
ATTN:

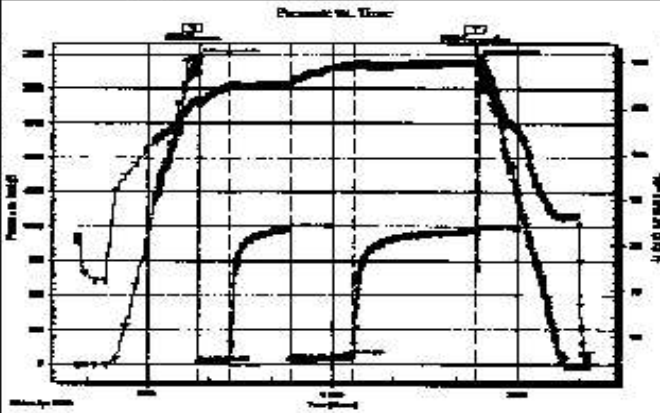
10-11-34 Logan, Ks
Wassamiller 1-10
Job Ticket: 85170 DSTF:2
Test Start: 2018.04.08 @ 19:51:07

GENERAL INFORMATION:

Formation: Lansing F
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 21:49:37
Time Test Ended: 04:11:07
Test Type: Conventional Bottom Hole (Reset)
Tester: Brandon Turkey
Unit No: 79
Interval: 4318.00 ft (KB) To 4341.00 ft (KB) (TYD)
Reference Elevation: 3179.00 ft (KB)
Total Depth: 4318.00 ft (KB) (TYD)
Reference Elevation: 3174.00 ft (CF)
Hole Diameter: 7.85 Inches Hole Condition: Good
KB to GRVCF: 5.00 ft

Serial #: B165 Outside
Press @ RunDepth: 82.55 psig @ 4321.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2019.04.08 End Date: 2019.04.09 Last Calls: 2019.04.09
Start Time: 19:51:07 End Time: 04:11:07 Time On Bore: 2019.04.08 @ 21:49:37
Time Off Bore: 2019.04.09 @ 02:22:07

TEST COMMENT: IF: 1/4 blow bull to 2 1/2.
IS: No return.
FS: Surface blow bull to 1 3/4.
FS: No return.



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2200.70	111.92	Initial Hydro-static
1	17.08	111.27	Open To Flow (1)
31	32.51	114.88	Shut-In (1)
90	983.48	115.67	End Shut-In (1)
91	34.21	115.10	Open To Flow (2)
151	62.56	118.34	Shut-In (2)
272	975.28	120.10	End Shut-In (2)
274	2165.00	116.83	Final Hydro-static

Recovery

Length (ft)	Description	Vel (in/s)
60.00	flow 80% w 40% m	0.30
60.00	warm oil spots 15% w 85% m	0.32
1.00	free oil 100% w	0.01

Gas Rates

Choke (Inches)	Pressure (psig)	Gas Rate (Mcfd)

* Recovery time multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Youngstown Operating
14612 Hertz Quail Springs Parkway
Oklahoma City, Ok 73134
ATTN:

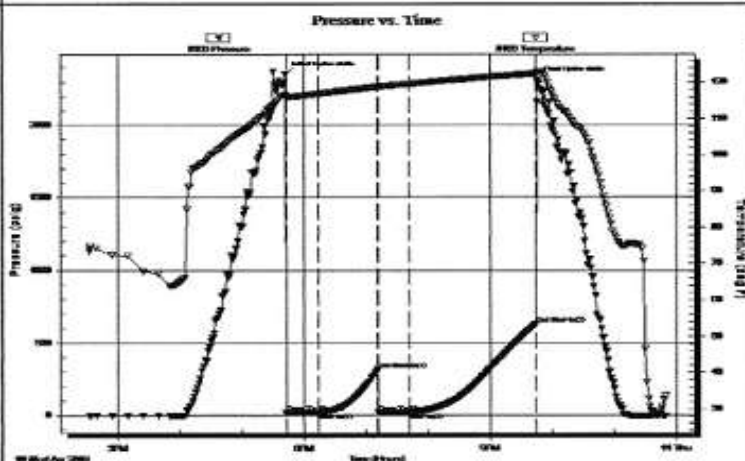
10-11-34 Logan, Ks
Wassemiller 1-10
Job Ticket: 65171 **DST#: 3**
Test Start: 2019.04.10 @ 14:32:01

GENERAL INFORMATION:

Formation: **Atoka**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 17:42:31
Time Test Ended: 23:50:31
Interval: **4612.00 ft (KB) To 4675.00 ft (KB) (TVD)**
Total Depth: **4675.00 ft (KB) (TVD)**
Hole Diameter: **7.88 inches** Hole Condition: Good
Test Type: Conventional Bottom Hole (Reset)
Tester: Brandon Turley
Unit No: 79
Reference Elevations: 3179.00 ft (KB)
3174.00 ft (CF)
KB to GR/CF: 5.00 ft

Serial #: 8166 Outside
Press@RunDepth: 20.48 psig @ 4617.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2019.04.10 End Date: 2019.04.10 Last Calib.: 2019.04.10
Start Time: 14:32:01 End Time: 23:50:31 Time On Btm: 2019.04.10 @ 17:42:01
Time Off Btm: 2019.04.10 @ 21:45:31

TEST COMMENT: IF: 1/2 blow built to 2 3/4.
IS: No return.
FF: No blow.
FS: No return.



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2352.04	116.64	Initial Hydro-static
1	17.14	116.06	Open To Flow (1)
32	18.39	116.87	Shut-in(1)
89	312.10	118.79	End Shut-in(1)
90	19.59	118.93	Open To Flow (2)
119	20.48	119.60	Shut-in(2)
242	628.86	122.47	End Shut-in(2)
244	2316.68	123.08	Final Hydro-static

Recovery

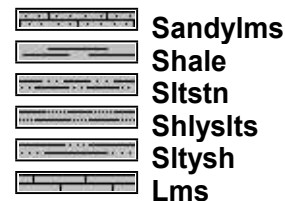
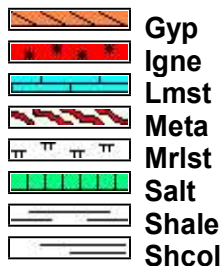
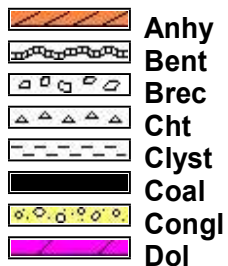
Length (ft)	Description	Volume (bbl)
10.00	mud 100% m	0.05

* Recovery from multiple tests

Gas Rates

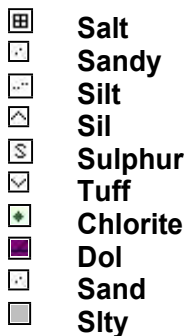
	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

ROCK TYPES

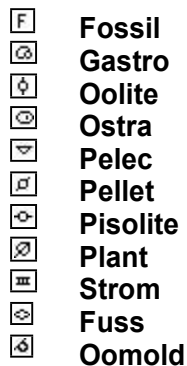
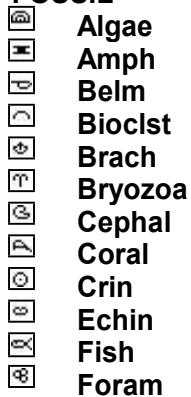


ACCESSORIES

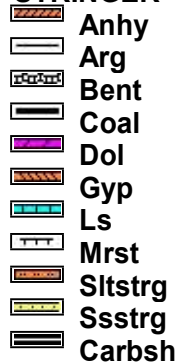
MINERAL



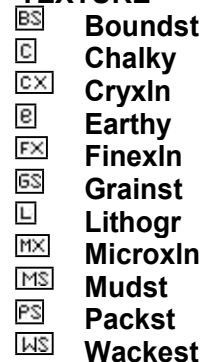
FOSSIL



STRINGER

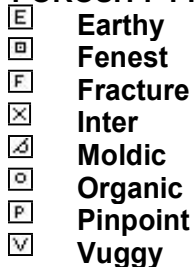


TEXTURE



OTHER SYMBOLS

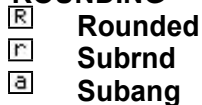
POROSITY TYPE



SORTING



ROUNDING



OIL SHOWS

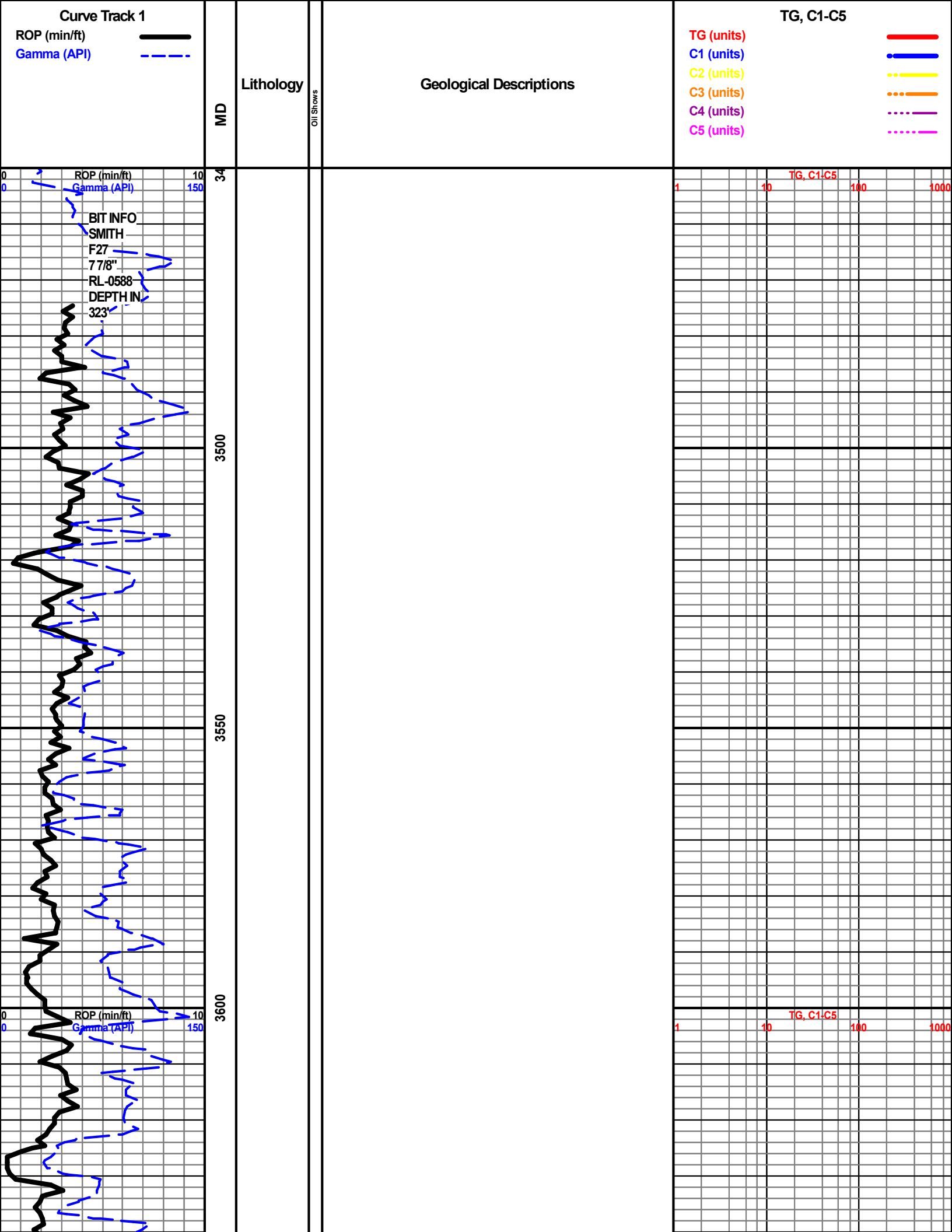


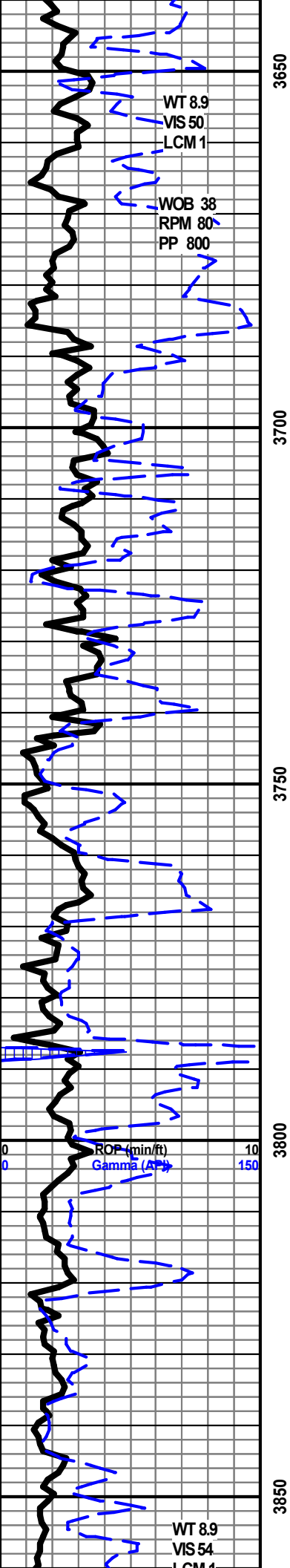
INTERVALS



EVENTS





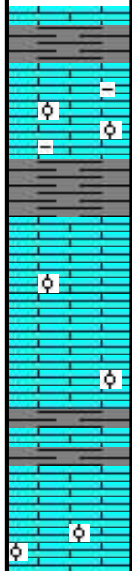


3650
3700
3750
3800
3850

WT 8.9
VIS 50
LCM 1

WOB 38
RPM 80
PP 800

ROP (min/ft)
Gamma (API)



START UNIT @ 3475'

SAMPLES START @ 3800'

START APRIL 5TH 2019

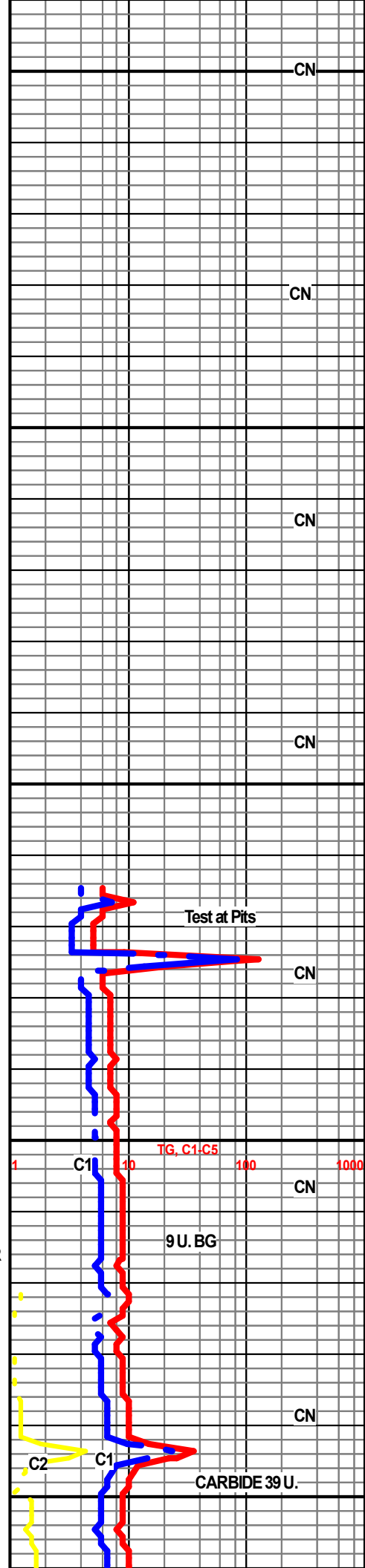
SH- LT TO MED GY-SLI TO EXTREMELY CALC GRADING TO SHALY LS

LS- LT GY- SHLYT GRAYISH TAN & TAN, CRYPTO TO VV/FN-XLN, SUB SUCRO TO SUCRO & PACKSTONE SLI TR TO V/OOLITIC, LT TO LT YEL FLUOR, NO CUTS,ABDT PR TO TR FR MICRO PP POR & POSS INTER-XLN POR IP

3821-3865 INTERBED LS-1. LS-LT GY TO TAN IP, SLI INTO EXTREMELY SHLY : CRYPTO-VV/FN-XLN,S-SUCRO SUCRO & PACKSTONE,V/DUL YEL FLUOR IP, NO CUT NO VIS POR

2.LS- HVY TR WHT TO CRM & TN,GY IP, CRYPTO-VV/FN-XLN SUB SUCRO TO SUCRO & PACKSTONE, TR PHNTM OOLITES,SLI TR OOLITIC, DLL LT TO LT YEL FLUOR, NO CUT, HVY TR POOR MICRO PP POR

WT 8.9
VIS 54
LCM 1



CN
CN
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CN

Test at Pits

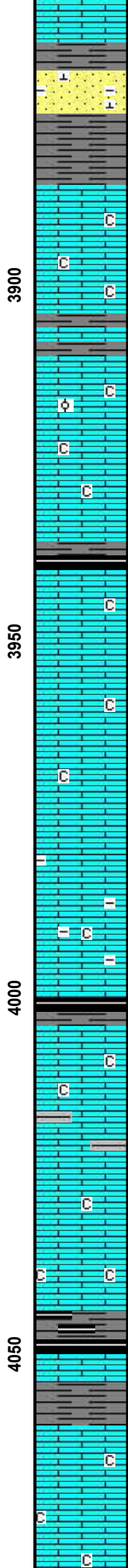
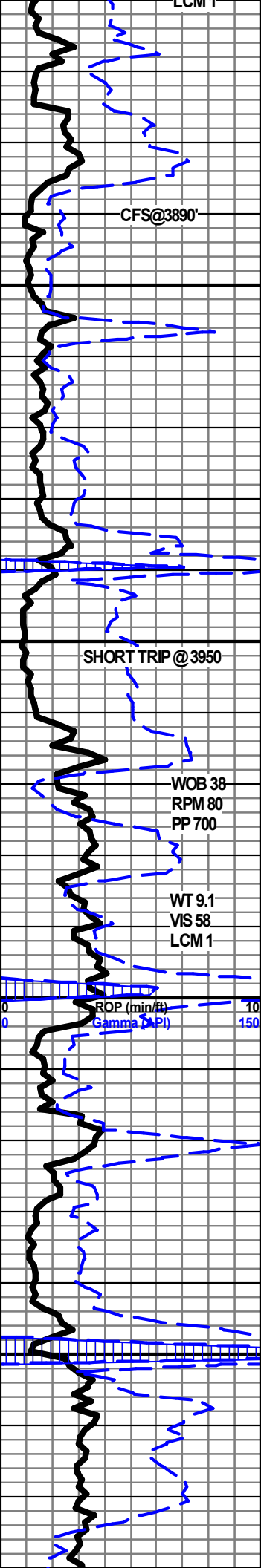
9U.BG

CARBIDE 39U.

1 C1 10 TG, C1-C5 100 1000

C2

C1



3865-3870- SH- LT TO MED GY, V/ CALC TO SHLY LS

3870-3875' SS-VERY VERY FINE GRAIN, ANG, FAIR TO GOOD SORTING, CLAY FILLED IP, SLI TO FRLY CALC IP, V/DUL YEL FLUOR, NO CUT, ABDT PR FR GD TO TR EXCEL MICRO PP & INTERGRAIN POR

3875-3885' SH- LT TO MED GY- SLI TO EXTREMELY CALC GRDNG TO SHLY LS

3885' -3904' LS- HVY TR TO ABDT WHT TO CRM CHLK & TAN: CRYPTO TO VV/FN-XLN, SUB SUCRO TO SUCRO & PCKSTONE, DUL LT TO LT YEL FLUOR, NO CUT, HVY TR PR TO TR FR MICRO PP POR

3906-3934' LS-ABDT TO EXTREMABDT WHT TO CRM CHLK & TAN: CRYPTO TO VV/FN-XLN, SUB SUCRO TO SUCRO & PCKSTONE, TR PHNTM OOLITIC DUL LT TO LT YEL FLUOR, NO CUT, ABDT PR TO FR TR GD MICRO PP POR & POSS INTER-XLN POR

SH- BLK SFT CARB & MED TO DK GY IP

3940-3962' LS-ABDT WHT TO CRM CHLK & TAN GRYISH IP, VV/FN-XLN, SUB SUCRO TO SUCRO, DLL YEL TO V/ SLI TR YEL FLUOR, NO CUT, ABDT PR TO FR TO TR GOOD MICRO PP POR & POSS INTER-XLN POR IP

3962 -3999' INTERBEDDED LS
1. LS- TR WHT TO CRM CHLK -CHLK & TAN GRAYISH IP, CRYPTO-VV/FN-XLN, SUB SUCRO SUCRO & PCKSTONE, LT YEL FLUOR, NO CUT, PR MICRO PP POR

2. LS- LT TO MED GY SLI TO FRLY SHLY, TAN: CRYPTO TO VV/FN-XLN, SUB SUCRO TO SUCRO & PCKSTONE, DUL LT TO LT YEL FLUOR, NO CUT, NO VIS POR

SH- MED TO V/DK GY -SLI TO V/ CALC TO V/DK GY TO BLK SFT CARB

4004-4016' LS-ABDT WHT TO CRM CHLK & TAN, CRYPTO TO VV/FN-XLN, SUB SUCRO TO SUCRO & PCKSTONE, DUL LT TO LT YEL FLUOR, NO CUT, TR PR MICRO PP POR IN SUCRO

4016-4028' LS-LT TO MED GY, SLI TO FRLY SHLY, CRYPTO-VV/FN-XLN, TR V/DUL YEL FLUOR, NO CUT NO VIS POR

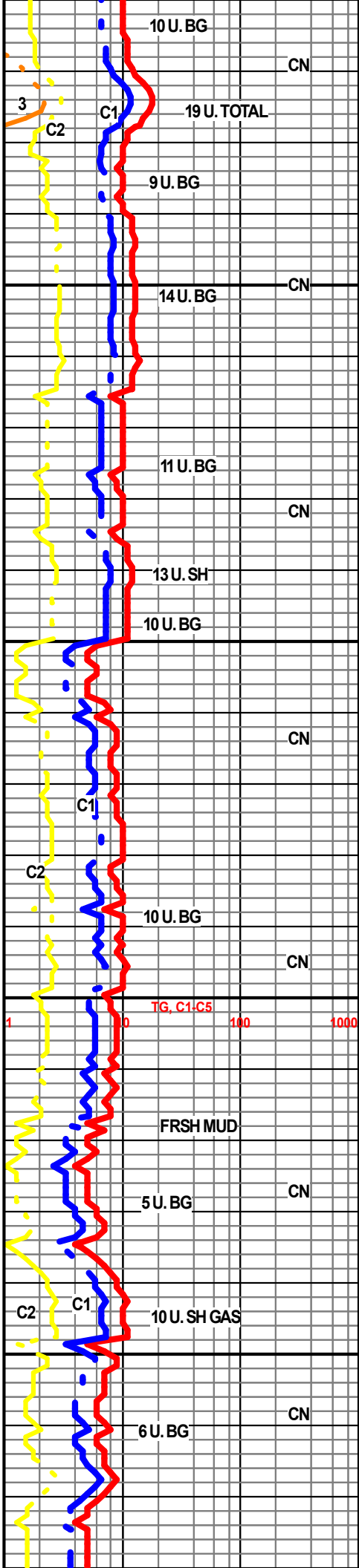
4028-4025 LS-EXTR ABDT WHT TO CRM CHLK, & TAN: CRYPTO TO VV/FN-XLN, SUB SUCRO TO HVY TRSUCRO & TR PCKSTONE, DUL LT TO LT YEL FLUOR, TR MICRO PPPOR IP

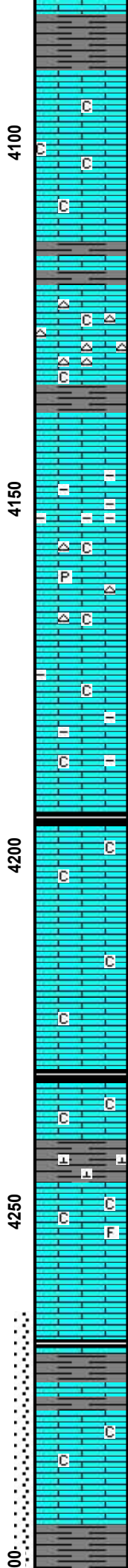
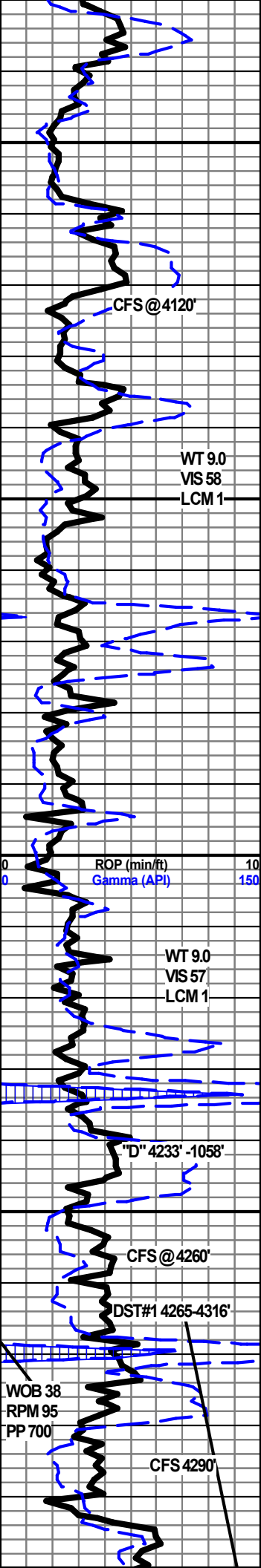
BASE HEEBNER 4051' -876'

4045-4051 SH- BLK SFT CARB TO MED TO V/DK GY

4051-4061' SH- LT TO MED GY, HVY TR RED TO BRNSH & TR RED CLAY FILLED SILTS

4061-4081- LS- SLI TR WHT TO CRM CHLK, TN GRYISH IP, CRYPTO TO VV/FN-XLN, SUB SUCRO TO PCKSTONE, DUL LT TO LT YEL FLUOR IP, NO CUT, NO VIS POR





4081-4089' SH- RED V/SFT MUSHY WET

TORONTO 4089' - 914'

4089-4108' LS-TR WHT TO CRM CHLK, TAN AND LT GY, CRYPTO TO VV/FN-XLN, SUB SUCRO TO PCKSTONE, HVYTR S-LITHO, DUL LT TO LT YEL FLUOR IP, NO CUT, NO VIS POR

4108-4120, LS-TR WHT TO CRM CHLK, TAN CRYPTO TO TR VV/FN-XLN, TR SUB SUCRO, PACKSTONE, TR S-LITHOGRAPHIC, DLL YEL FLUOR, NO CUT, NO VIS POR, TR RED BRN GY SHALES

LANSING 4120' - 945'

4120-4134- LS HVY TR WHT TO CRM CHLK, TAN GRAYISH IP, TAN, CRYPTO TO VV/FN-XLN, SUB SUCRO TO SUCRO & PACKSTONE, TR SUB LITHOGRAPHIC, DUL LT TO LT YEL FLUOR, NO CUT, NO VIS POR, ABDT CHERT LT GY TO TAN OPQUE

4134-4139 SH-RED BRN TR GY, V/SFT MUSHY WHEN WET

4139-4153' LS- LT GY TO LT TN, CRYPTO-VV/FN-XLN, SUB SUCRO & PACKSTONE, DLL LT YEL FLUOR, NO CUT, SLI TR V/PR MICRO PP POR, W/ ABDT SH REDS BRNS GRY SOFT MUSHY WHEN WET

4153-4164' -LS-ABDT WHT TO CRM CHLK & TAN TO GRAYISH IP, CRYPTO-VV/FN-XLN, DLL YEL TO YEL FLUOR, NO CUT, TR PYRITE, HVY TR PR TO TR FR MICRO PP POR W/ TR CHERT WHT GY TN OPQUE

4164-4195' LS LT GY, TR WHT TO CRM CHLK, TANISH, CRYPTO-VV/FN-XLN, SUB SUCRO, SUB CHLKY, PACKSTONE & TR SUB LITHOGRAPHIC, DLL YEL FLUOR, NO CUT. TR DOS STAIN SLI TR PR TO FR MICRO PP POR, W/ SCATTERED THIN INTERBEDS MED TO DK GY SH

SH-BLK SFT CARB

4195-4206 - LS- HVY TRABDT WHT TO CRM CHLK, TAN, CRYPTO TO VV/FN-XLN, SUB CHLKY SUB SUCRO & PACKSTONE, DLL LT YEL FLUOR, NO CUT, NO VIS POR

4206-4231-LS-TR WHT TO CRM CHLK, TAN GRY IP, CRYPTO TO VV/FN-XLN, SUB SUCRO, SUB CHLKY AND PACKSTONE, DLL YEL FLO, NO VIS POR

MUNCIE CREEK 4231' - 1056'

SH- V/DK GY TO BLK SFT CARB

4233-4239' LS-SIMILAR TO 4206-4231

4239-4246 SH- RED GREEN TR GRY, V/ SFT MUSHY WHEN WET & LS SIMILAR TO 4233-4239

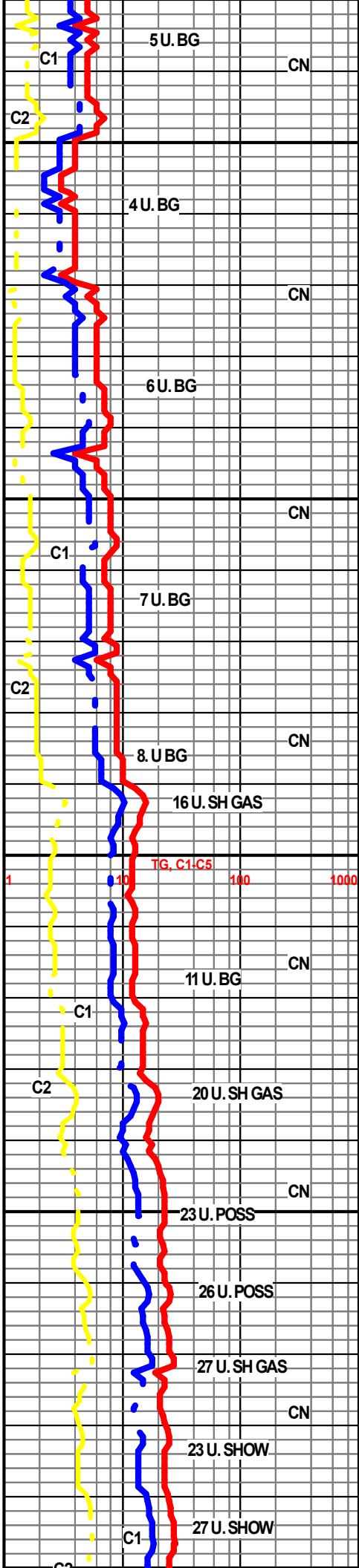
4246-4253' LS-SLI TR WHT TO CRM CHLK, TAN TO LT GY, CRYPTO-VV/FN-XLN TR SUB SUCRO TO TR SUB CHLKY, SUB SUCRO & PACKSTONE, V/DLL YEL FLUOR IP, NO CUT, NO VIS POR, TR FOSS, V/ SLI TR BLK ASPHLT STN IN (1 ROCK), NO FLO

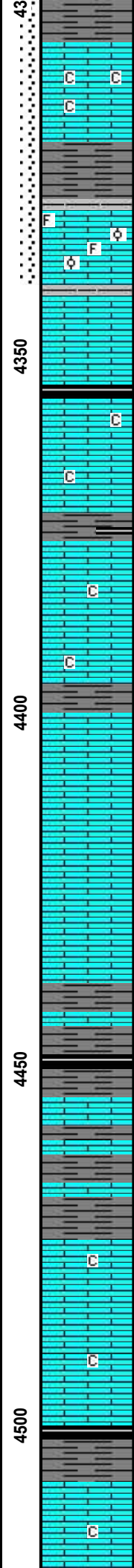
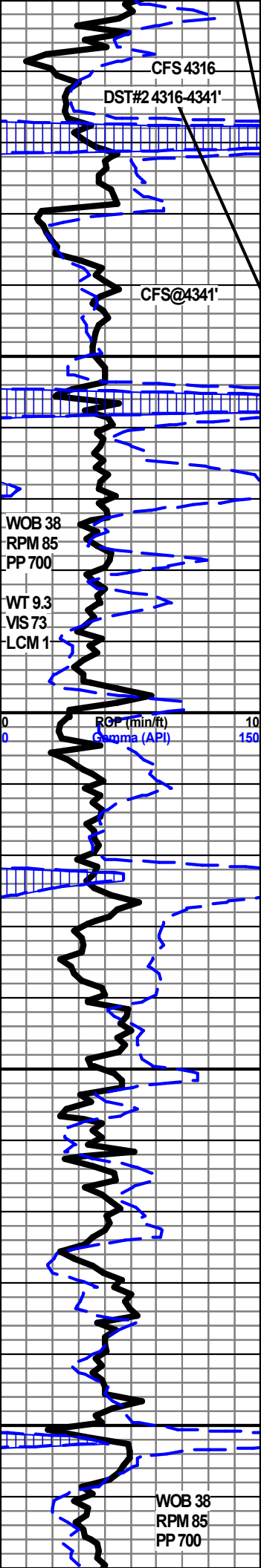
4253-4268 LS- TAN GY IP, CRYPTO-VV/FN-XLN, TR SUB CHLKY, TR SUB SUCRO, PACKSTONE & SUB LITHOGRAPHIC, DLL LT YEL FLUOR, NO CUT, NO VIS POR

4268-4269 SH- V/DK GY TO BLK SFT CARB

4269-4278 SH- GREEN RED & GY, V/ SFT & MUSHY WHEN WET, W/ ABDT LS SIMILAR TO 4253' TO 4268'

4278-4294' LS- ABDT WHT TO CRM CHLK, TAN TO TR LT GY, W/ TR SPTTD BRN OIL STN, TR F-MED-XLN, SUB SUCRO SUB CHLKY & SUCRO, TR PACKSTONE, STAIN HAS DUL GLDEN TO GLDN YEL FLUOR, W/FLSH TO EXCEL STRMING CUTS, TR PR FR TO GD & SI TR EXCEL PP TO VUGULAR POR, SLI TR PR TO FR INTER-XLN POR IP





4293-4307-SH- LT TO MED GY- V/SFT MSHY WET

4307-4316- LSABDT WHT TO CRM CHLK, TAN TOLT GY
CRYPTO-VV/FN-XLN, SUB CHLKY, SUB SUCRO TO TR
SUCRO,PACKSTONE & TR SUB LITHOGRAPHIC, V/DLL YEL
FLUOR, NO CUT, NO VIS POR

LANSING "F" 4329-1154'

4329'4338'- LS - CRM CRM TO TAN W/ABDT EVEN TO SPOTTED
BRN OIL STN ,CRYPTO -VV/FN-XLN,TR SUB CHLKY SUB
SUCRO TO V/SUCRO, DLL GLDN TO BRIT GLDNYEL FLUOR,
FLUSH TO GD STRMING CUTS,ABDT PR TO FR GD TO HVY TR
EXCEL MICRO PP POR & TR SMLL VUGULAR POR,&PROBTR
INTER-XLN POR, STRNG OIL ODOR & TR PHNTM OOLITES

SH-MED TO DK GY TO BLK SFT CARB

4353-4374 -LS TR WHT TO CRM CHLK & TAN GRYISH TAN TR
GY, CRYPTO-VV/FN-XLN, DLL YEL FLUOR , NO CUT NO VIS
POR, SUB CHLKY, SUB SUCRO & PACKSTONE TR
S-LITHOGRAPGIC

4374-4376- SH-V/DK GY TO BLK

4376-4399 LS-TR WHT TO CRM CHLK & LT TAN , CRYPTO TO
VV/FN-XLN,TR S-CHLKY SUB SUCRO PACKSTONE & S-LITHO,
DL YEL FLUOR, NO CUT, NO VIS POR

4396-4399- SH-V/DK GY TO BLK CARB

4399-4438, LS- LT GY TR LT TANTO TAN , CRYPTO TO
VV/FN-XLN,TR S-CHLKY SUB SUCRO, DLL YEL FLUOR, NO
CUT, NO VIS POR

4438-4448 SH-REDS BRNS GRYS W/LS CRM TO GY ,
CRYPTO-XLN, S-CHLKY, DLL YEL FLUOR IP, NO CUT, NO VIS
POR

4448-4453' SH W/ LS SIMILAR TO 4438-4453

4453-4457- LS-TAN GRYISH IP,CRYPTO TO VV/FN-XLN,TR SUB
SUCRO,PACKSTONE AND S-LITHO' DLL YEL FLUOR IP, NO
CUT, NO VIS POR

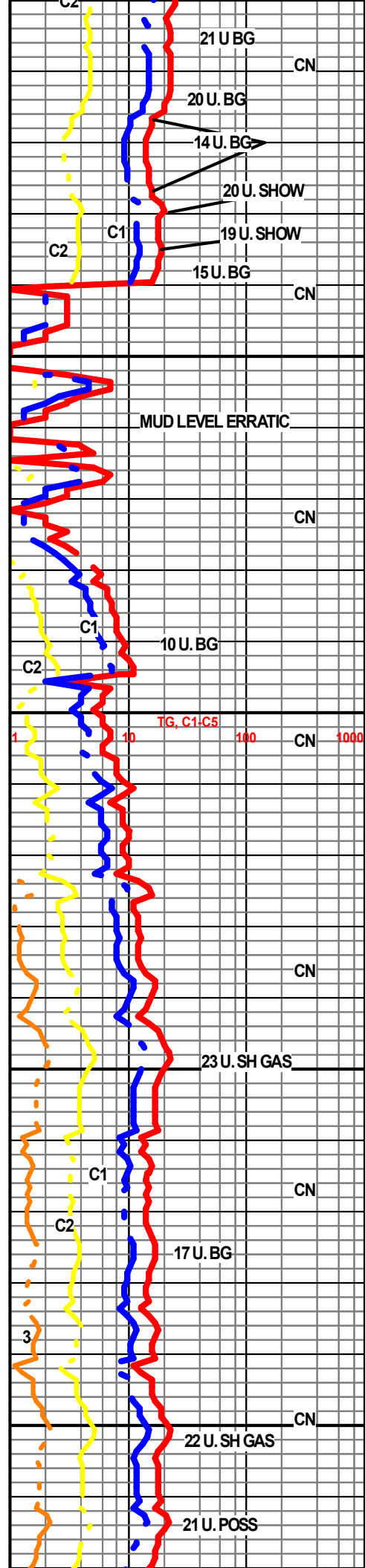
4457-4474 SH- REDS BRNS & GRAYS W/ ABDT CRM SUB CHLK & TANS, CRYPTO
TO VV/FN-XLN, SUB SUCRO & PACKSTONE, TR SUB LITHO, DLL YEL FLUOR IP,
NO CUT, NO VIS POR

4474-4479 LS-TR WHT TO CRM CHLK & LT TAN , CRYPTO TO VV/FN-XLN,TR
S-CHLKY SUB SUCRO PACKSTONE, DLL YEL FLUOR, NO CUT, NO VIS POR
W/WIDELY SCATTERED, LIGHT SPTTD W/BRN OIL STN, DLL YELGLDN
FLUOR,FAINTS TYRMING CUTS IN SUCRO ROCK-TR PR MICRO PP POR POSS
INTER-XLN POR IP

4479-4500 LS-TR WHT TO CRM CHLK & LT TAN , CRYPTO TO
VV/FN-XLN,TR S-CHLKY, TR SUB SUCRO PACKSTONE & TR
S-LITHO, DLL YEL FLUOR IP'S, NO CUT, NO VIS POR

4500-4506 SH- BLK SFT CARB TO MED TO DK GY

4506-4530- LS- LT GRY TO TAN, CRYPTO-VV/FN-XLN,TR SUB
SUCRO, TR SUB CHLKY & PCKSTN, DLL LT YEL FLUOR IP'S,
NO CUT, NO VIS POR



WT 9.4
VIS 66
LCM 1

CHEROKEE 4533' -1358'

4530-4533-SH-DK GY TO BLK SFT CARB

4533-4545- LS-TAN GRAYISH TAN TO LT GY, CRYPTO-VV/FN-XLN, TR SUB CHLKY TO SUB SUCRO & PACKSTN, TR PHNTOM OOLITIC, DLL YEL FLUOR TO SLI YEL FLUOR, NO CUT, NO VIS POR, W/ABDT SH REDS MED TO V/ DK GRY AND BRNS

4545-4557' LS-TAN TO GRAYISH TAN TO TR LT GY, CRYPTO-VV/FN-XLN, SUB CHLK, SUB SUCRO, & PCKSTONE, DLL YEL FLUOR, NO CUT, SLI TR W/ DOS, NO VIS POR

4557-4562' SH-BLK BLK TO VDK GRY

4562-4592' INTERBEDDED LS & SHALES 1. LS-CRM TO TAN, CRYPTO-VV/FN-XLN, SUB CHLK TO SUB SUCRO & PACKSTONE, TR S-LITHO, DLL LT YEL TO TR LT YEL FLUOR, NO CUT, NO VIS POR, W/SLI TR CHERT LT GY OPQUE

SHALES -REDS BRNS DK GY

4592-4594' SH-V/DKGY TO BLK CARB

4594-4603 & SH SIMILAR 4562-4592 W/TR GREEN SH

4603-4605 SH-V/DK GY TO BLACK CARB

4605-4615 SH-REDS BRNS GRAY GREEN W/TR TAN TO GRAY CRYPTO-VV/FN-XLN SUB CHLK SUB SUCRO & PCKSTONE TR S-LITHO, SLI TR BRN TO BLK SPTTD OIL STN, VV/DLL YEL FLUOR, V/SLW MLKY CUT, V/PR PP POR

4615-4625' INTERBEDDED LS & SH, 1. LS-LT GRY TO TAN CRYPTO-VV/FN-XLN TR SUB CHLKY, TR SUB SUCRO PACKSTONE & SUB LITHO, DLL YEL FLUOR IP, NO CUT, NO VIS POR

4626-4629 LS-LT GY TO TAN CRYPTO-VV/FN-XLN TR SUB CHLKY TR SUB SUCRO PACKSTONE TR S-LITHO, DLL YEL FLUOR, NO CUT, NO VIS POR, TR CHERT LT GRY OPQUE

4629-4635' LS-SIMILAR TO 4625-4629 W. HVY TR SH -GRY RED & BRN

4635-4646' LS-TAN TO GRY TAN, CRYPTO-VV/FN-XLN, DLL YEL FLUOR, NO CUT, NO VIS POR & ABDT EVEN SPTTD BRN TO BLK OILSTN W/ DLL GLDN TO GLDN YEL FLUOR, W/ FLSH TO EXCEL STRMING CUTS, ABDT PR TR GD TO EXCEL MICRO PP, SM VJUG POR & PROB INTER-XLN POR IP, SHOW ROCK SUB SUCRO TO SUCRO TR PCKSTN HVY TR CHERT GY TAN OPQUE

4646-4655- LS-SIMILAR 4635-4646 W/ONLY SLI TR W/ SHOWS & TR SH-RED BRNS GRAY

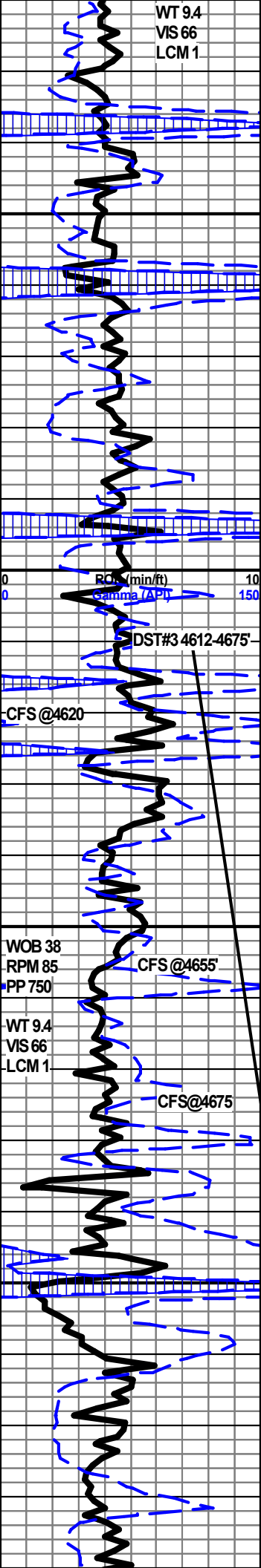
4655-4666' LS-TAN GRY IP, CRYPTO-VV/FN-XLN, TR SUB CHLK, PACKSTONE, TR S-LITHO, DLL YEL FLUOR, NO CUT, NO POR, W TR SPTTD TO EVEN BRN OILSTN, DLL GLDN TO GLDN YEL FLUOR, FLSH TO GD STRMING CUTS, TR PR TO FR MICRO PP POR & POSS SLI TR W/INTER-XLN POR, W/ TR CHERT GRY TO TAN OPQUE

4666-4684 LS-LT GRY TO TAN, CRYPTO-VV/FN-XLN, SUB-CHLK, TR SUB SUCRO, PCKSTN & SUB LITHO, V/DLL YEL FLUOR, NO CUT NO VIS POR, W/HVY TR TO ABDT SH-RED BRNS GRAYS

4684-4700' INTERBEDDED LS & SHALES LS-TR WHT TO CRM CHLK & TAN TR GRY CRYPTO-VV/FN-XLN, TR SUB CHLK, TR SUB SUCRO PACKSTONE & S-LITHO, DLL YEL TO SLI TRY EL FLUOR, NO CUT NO VIS POR, TR TO EXTREME ABDT CHERT ORANG TAN CRM, SH-MED GY SFT MSHY RED BRN GREEN IP

4700-4711- QUTZ SDST- WHTISH GRY TO V/ LT GY- COARSE TO MED FINE IP GRADING TO SILTST IN BOTTOM, ANG GRDNG TO SUB RND, PR TO FR SRT, EXTREMELY ABDT CLAY FILLED, CARBONACEOUS SPECKS & PARTINGS, NO FLUOR, NO CUT, COARSE TO MED GRAIN HAS TR GD TO EXCEL INTER GRAIN POR, HVY TR TO ABDT LOOSE QUTZ GRAINS, CLEAR TO FRSTY GRAINS

4711-4725-LS- INTE RBEDDED LS W/CHERT & SH SIMILAR 4684-4700



4530-4533-SH-DK GY TO BLK SFT CARB

4533-4545- LS-TAN GRAYISH TAN TO LT GY, CRYPTO-VV/FN-XLN, TR SUB CHLKY TO SUB SUCRO & PACKSTN, TR PHNTOM OOLITIC, DLL YEL FLUOR TO SLI YEL FLUOR, NO CUT, NO VIS POR, W/ABDT SH REDS MED TO V/ DK GRY AND BRNS

4545-4557' LS-TAN TO GRAYISH TAN TO TR LT GY, CRYPTO-VV/FN-XLN, SUB CHLK, SUB SUCRO, & PCKSTONE, DLL YEL FLUOR, NO CUT, SLI TR W/ DOS, NO VIS POR

4557-4562' SH-BLK BLK TO VDK GRY

4562-4592' INTERBEDDED LS & SHALES 1. LS-CRM TO TAN, CRYPTO-VV/FN-XLN, SUB CHLK TO SUB SUCRO & PACKSTONE, TR S-LITHO, DLL LT YEL TO TR LT YEL FLUOR, NO CUT, NO VIS POR, W/SLI TR CHERT LT GY OPQUE

SHALES -REDS BRNS DK GY

4592-4594' SH-V/DKGY TO BLK CARB

4594-4603 & SH SIMILAR 4562-4592 W/TR GREEN SH

4603-4605 SH-V/DK GY TO BLACK CARB

4605-4615 SH-REDS BRNS GRAY GREEN W/TR TAN TO GRAY CRYPTO-VV/FN-XLN SUB CHLK SUB SUCRO & PCKSTONE TR S-LITHO, SLI TR BRN TO BLK SPTTD OIL STN, VV/DLL YEL FLUOR, V/SLW MLKY CUT, V/PR PP POR

4615-4625' INTERBEDDED LS & SH, 1. LS-LT GRY TO TAN CRYPTO-VV/FN-XLN TR SUB CHLKY, TR SUB SUCRO PACKSTONE & SUB LITHO, DLL YEL FLUOR IP, NO CUT, NO VIS POR

4626-4629 LS-LT GY TO TAN CRYPTO-VV/FN-XLN TR SUB CHLKY TR SUB SUCRO PACKSTONE TR S-LITHO, DLL YEL FLUOR, NO CUT, NO VIS POR, TR CHERT LT GRY OPQUE

4629-4635' LS-SIMILAR TO 4625-4629 W. HVY TR SH -GRY RED & BRN

4635-4646' LS-TAN TO GRY TAN, CRYPTO-VV/FN-XLN, DLL YEL FLUOR, NO CUT, NO VIS POR & ABDT EVEN SPTTD BRN TO BLK OILSTN W/ DLL GLDN TO GLDN YEL FLUOR, W/ FLSH TO EXCEL STRMING CUTS, ABDT PR TR GD TO EXCEL MICRO PP, SM VJUG POR & PROB INTER-XLN POR IP, SHOW ROCK SUB SUCRO TO SUCRO TR PCKSTN HVY TR CHERT GY TAN OPQUE

4646-4655- LS-SIMILAR 4635-4646 W/ONLY SLI TR W/ SHOWS & TR SH-RED BRNS GRAY

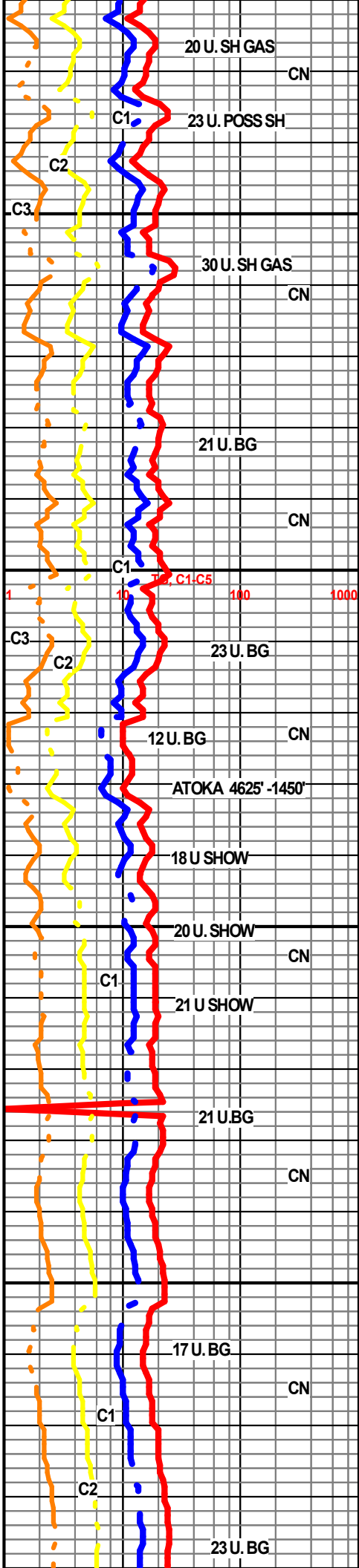
4655-4666' LS-TAN GRY IP, CRYPTO-VV/FN-XLN, TR SUB CHLK, PACKSTONE, TR S-LITHO, DLL YEL FLUOR, NO CUT, NO POR, W TR SPTTD TO EVEN BRN OILSTN, DLL GLDN TO GLDN YEL FLUOR, FLSH TO GD STRMING CUTS, TR PR TO FR MICRO PP POR & POSS SLI TR W/INTER-XLN POR, W/ TR CHERT GRY TO TAN OPQUE

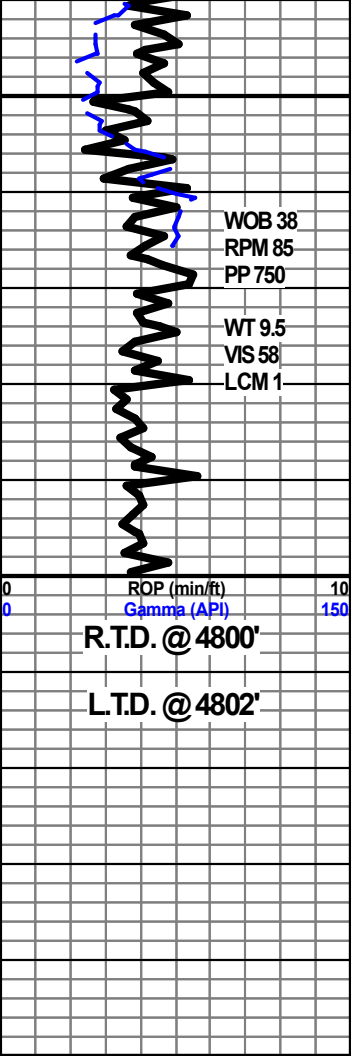
4666-4684 LS-LT GRY TO TAN, CRYPTO-VV/FN-XLN, SUB-CHLK, TR SUB SUCRO, PCKSTN & SUB LITHO, V/DLL YEL FLUOR, NO CUT NO VIS POR, W/HVY TR TO ABDT SH-RED BRNS GRAYS

4684-4700' INTERBEDDED LS & SHALES LS-TR WHT TO CRM CHLK & TAN TR GRY CRYPTO-VV/FN-XLN, TR SUB CHLK, TR SUB SUCRO PACKSTONE & S-LITHO, DLL YEL TO SLI TRY EL FLUOR, NO CUT NO VIS POR, TR TO EXTREME ABDT CHERT ORANG TAN CRM, SH-MED GY SFT MSHY RED BRN GREEN IP

4700-4711- QUTZ SDST- WHTISH GRY TO V/ LT GY- COARSE TO MED FINE IP GRADING TO SILTST IN BOTTOM, ANG GRDNG TO SUB RND, PR TO FR SRT, EXTREMELY ABDT CLAY FILLED, CARBONACEOUS SPECKS & PARTINGS, NO FLUOR, NO CUT, COARSE TO MED GRAIN HAS TR GD TO EXCEL INTER GRAIN POR, HVY TR TO ABDT LOOSE QUTZ GRAINS, CLEAR TO FRSTY GRAINS

4711-4725-LS- INTE RBEDDED LS W/CHERT & SH SIMILAR 4684-4700





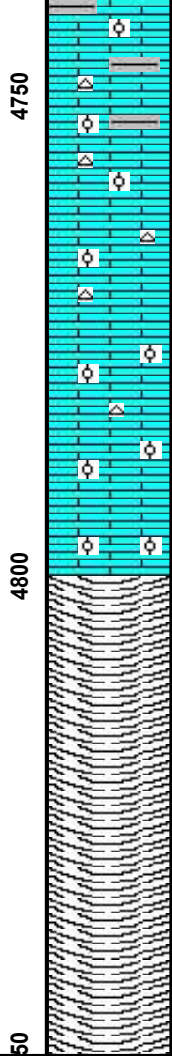
WOB 38
RPM 85
PP 750

WT 9.5
VIS 58
LCM 1

ROP (min/ft) 10
Gamma (API) 150

R.T.D. @ 4800'

L.T.D. @ 4802'



4725-4734 LS- TR TO HVY TR WHT CRM CHLK, TR WHT OOLITES, TAN TR GRYISH, CRYPTO-VV/FN-XLN, V/ TO EXTERMY OOLITIC (SMLL TOMED TR LRG OOLITES), SUB CHLK, SUB SUCRO, TR PCKSTN, V/DLL YEL FLUOR, NO CUT, NO VIS POR W/ TR CHERT LT TO MED GRYTO YELLOW TAN , OPWUE

4725-4754' LS SIMILAR 4725-4734 W/ INTERBEDD LS TAN TR GRYISH, CRYPTO-VV/FN-XLN PACKSTONE, SUB LITHO, DLL YEL TO TRYEL FLUOR, NO CUT, NO VIS POR, W/ TR TO HVY TR CHERT GRYTAN & TRYEL TAN OPQUE

4754-4760' -LS- LS-SIMILAR TO 4725-4734 W/ABDT WHT TO CRM CHLK, NOTE; TR SILTST LT GREEN CLAYFILLED, NO FLUOR, CUT OR VIS POR

4760-4800- LS- TAN GRAYISH TAN I, CRYPTO-VV/FN-XLN, TR SUB SUCRO PACKSTONE & TR SUB LITHO, DLL YEL TO TR YEL FLUOR, NO CUT,NO VIS POR, W/ TR LS SIMILAR TO 4725-4734, NO CHERT

R.T.D. @ 1 :00 PM APRIL 11, 2019

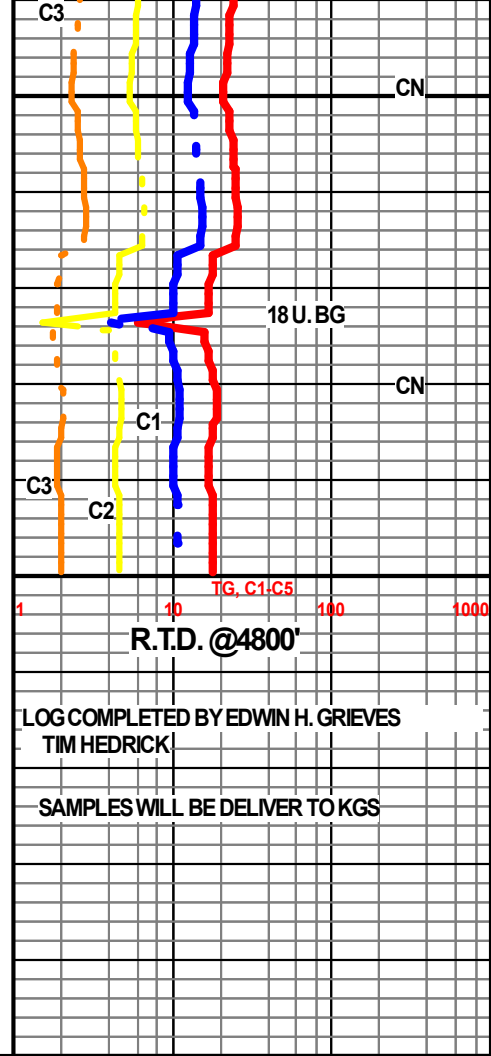
CFS FOR 1 HOUR

SHORT WIPER TRIP

TRIP OUT FOR LOGS

PIONEER / HAYS KANSAS

FINISH LOGGING 12:25 AM APRIL 12, 2019



LOG COMPLETED BY EDWIN H. GRIEVES
TIM HEDRICK

SAMPLES WILL BE DELIVER TO KGS