



WESLEY D. HANSEN Consulting Petroleum Geologist

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**KGS
AAPG #799479
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**Scale 1:240 (5"=100') Imperial
Measured Depth Log**

Well Name: Murfin Drilling Company, Inc. #10-21 Red Poll

API: 05-073-06720

Location: 2200' FSL, 1500' FEL of Section 21-10S-56W

License Number: 61650

Region: Lincoln County, CO

Spud Date: 8-15-2017

Drilling Completed: 9-2-2017

Surface Coordinates: 2200' FSL, 1500' FEL of Section 21-10S-56W

Bottom Hole Vertical hole

Coordinates:

Ground Elevation (ft): 5492'

K.B. Elevation (ft): 5505'

Logged Interval (ft): 4000' To: RTD

Total Depth (ft): 8500'

Formation: Arbuckle at RTD

Type of Drilling Fluid: Chemical

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

OPERATOR

Company: Murfin Drilling Co., Inc.

Address: 250 N. Water

Suite 300

Wichita, KS 67202

GEOLOGIST

Name: Wesley D. Hansen

Company: Wesley D. Hansen - Consulting Petroleum Geologist

Address: 212 N. Market, Suite 257

Wichita, KS 67202

Cellular: 316-772-6188

DAILY RIG ACTIVITY

DATE	DEPTH	ACTIVITY and NOTES
8-14-2017	0'	MIRT, Rig up
8-15	0'	Prepare to spud, Spud at 11:15 AM
8-16	483'	WOC
8-17	2065'	Drilling
8-18	3125'	Drilling
8-19	4215'	Drilling
8-20	4939'	Drilling
8-21	5590'	Drilling; made wiper trip at 5223'
8-22	5972'	Drilling; trip for hole in pipe at 5770'
8-23	6153'	Drilling; minimal WOB due to deviation
8-24	6310'	Drilling; WOB 4-8K; will trip bit
8-25	6623'	Drilling; tripped bit at 6328'
8-26	7290'	CFS
8-27	7550'	Short trip for DST No. 1
8-28	7550'	TOH for DST No. 2 (No. 1 packer failure)
8-29	7690'	CFS
8-30	8193'	Drilling
8-31	8300'	DST No. 3
9-1	8430'	Drilling
9-2	8500' RTD	Prepare to run 5 1/2" casing

COMMENTS

Contractor: Murfin Drilling Co., Inc. Rig 25
Pusher: Ray Bland

Surface Casing: 8 5/8" set at 476' w/300 sx
Production Casing: 5 1/2" set at 8501' w/340 sx

Mud by: Universal Fluids - Rob Lange was the engineer

DST's by: Trilobite - Mike Roberts as the tester

Logs by: Pioneer Wireline (DIL, CN-CD, MEL, BHCS) - Dan Schmidt was the engineer

Deviation Surveys: 1.7 deg. @483'; 1.4 deg @617'; 0.9 deg. @898'; 0.8 deg. @1309'; 0.6 deg. @1655'; 0.2 deg. @1846'; 0.2 deg. @2034'; 0.4 deg. @2224'; 0.8 deg. @2414'; 1.0 deg. @2731'; 2.3 deg. @2952'; 1.5 deg. @3077'; 2.5 deg. @3110'; 1.7 deg. @3329'; 1.3 deg. @3519'; 1.4 deg. @3960'; 1.6 deg. @4180'; 1.2 deg. @4303'; 1.2 deg. @4434'; 1.0 deg. @4487'; 1.0 deg. @4510'; 0.9 deg. @4939'; 0.1 deg. @5096'; 0.6 deg. @5223'; 1.5 deg. @5412'; 1.9 deg. @5571'; 1.1 deg. @5633'; 2.7 deg. @5758'; 3.1 deg. @5948'; 3.3 deg. @6010'; 3.3 deg. @6041'; 2.0 deg. @6073'; 2.1 deg. @6167' (W.L.); 2.2 deg. @6230' (MWD); 1.7 deg. @6261' (MWD); 1.6 deg. @6293' (MWD); 1.7 deg. @6325' (MWD); 1.5 deg. @6328' (WL); 1.6 deg. @6419' (MWD); 1.3 deg. @6515' (MWD); 0.6 deg. @6610' (MWD); 1.7 deg. @6640'; 1.3 deg. @6703'; 1.7 deg. @6861'; 1.1 deg. @6988'; 1.5 deg. @7177'; 1.6 deg. @7335'; 1.5 deg. @7398'; 0.7 deg. @7434'; 0.6 deg. @7550'; 0.8 deg. @8330'; 1.2 deg. @8500'

NOTES: Lost 100 bbl on connection at 4654'.

Tripped for hole in pipe at 5770'. Found cracked joint 14 stands off bottom at 3865'. Bit trip at 6328'. Lost 180 bbl after wiper trip at 7450'. Lost 80 bbl on bottom after DST No. 1.

BIT RECORD

Bit #	Size	MFG	Type	Depth Out	Footage Cut	Hours on bit
1	12 1/4"		RR	483'	483'	6 3/4
2	7 7/8"	HTC	DP506	6328'	5845'	161 1/4
3	7 7/8"	HTC	DP506	8300'	1972'	73 1/2
4	7 7/8"	HTC	DP506rr	8500'	200'	15 3/4

FORMATION TOPS AND STRUCTURAL COMPARISON

FORMATION	SAMPLE TOPS		LOG TOPS		COMPARISON WELL Wiepking-Fullerton Expl. Conquest #14 5508' KB 621' FSL, 1736' FWL Section 15-10S-56W
	Depth	Datum	Depth	Datum	
	5505'	KB	5505'	KB	
Niobrara			3574'	+1931	-22
X Bentonite	4427'	+1078	4426'	+1079	+11
Dakota D Sand	4525'	+980	4521'	+984	+12
Dakota J Sand	4556'	+949	4561'	+944	+2
Anhydrite	5950'	-445	5962'	-457	-16
B/Anhydrite	5955'	-450	5976'	-471	-24
Lansing	7088'	-1583	7075'	-1570	-29
Stark Shale	7289'	-1784	7285'	-1780	-26
Mound City	7366'	-1861	7361'	-1856	-28
Fort Scott	7479'	-1974	7471'	-1966	-16
Oakley	7580'	-2075	7580'	-2075	-23
Morrow	7969'	-2464	8002'	-2497	-63
Mississippian	8232'	-2727	8232'	-2727	-83
Arbuckle	8412'	-2907	8394'	-2889	-113
RTD	8500'	-2995			
LTD			8499'	-2994	

DRILL STEM TESTS

DST No. 1 Fort Scott/Lower Fort Scott
Interval: 7496'-7550'
Misrun - packer seat failure

DST No. 2 Fort Scott/Lower Fort Scott
Interval: 7476'-7550'
Misrun - packer seat failure

DRILL STEM TESTS

DST No. 3 ?Morrow/Mississippian

Interval: 8198'-8300'

Times: 30-0-0-0

Recovery: 192' G&OCM (2g, 3o, 95m); 288'

G&MCO (5g, 20m, 75o); 186' GW&MCO (5g, 2w,

5m, 88o); 186' G&MCO (5g, 15m, 80o); 186'

GCM (5g, 95m); total fluid 1038'

FP: 157-380/N/A SIP: N/A

HP: 4405-4024 BHT: 200 deg. F

IFP: B.O.B. in 4 minutes

ISIP: could not rotate test tool, stuck, pulled free, trip out with tool

FFP: N/A

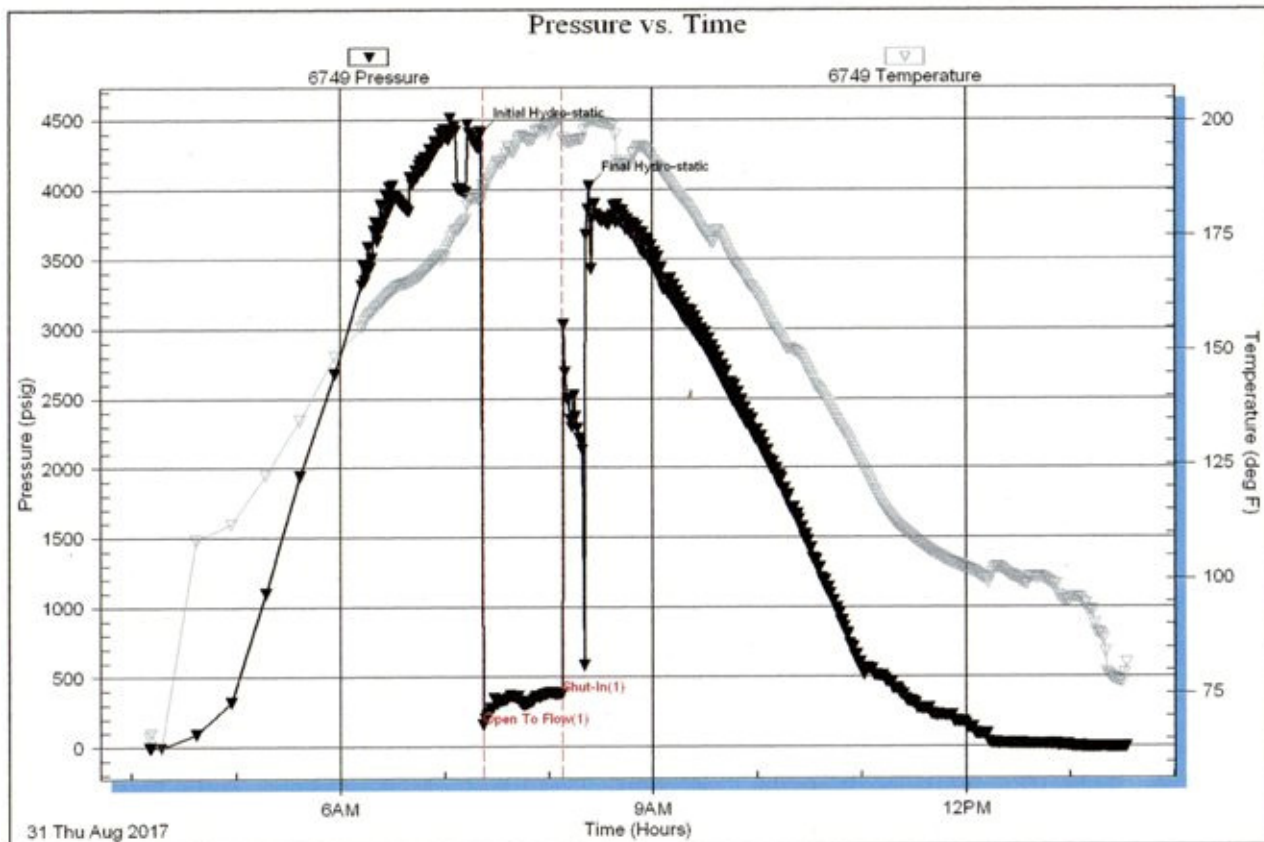
FSIP: N/A

Serial #: 6749

Outside Murfin Drilling Co. Inc.

Red Poll 10-21

DST Test Number: 3



Trilobite Testing, Inc

Ref. No: 63844

Printed: 2017.08.31 @ 14:04:20

ROCK TYPES

Congl
 Igne
 Anhy
 Cht
 Coal
 Congl
 Gyp

Lmst
 Salt
 Shale
 Shcol
 Siltstone
 red sst
 Sst

Carb sh
 Dol
 Dtd
 Grayshale
 Sandylms
 Redshale
 Greenshale

Siltstn
 Shlyslts
 Sndy/siltyshale
 Silty dolo
 Shy dolo
 Shaly ls
 Dolomite

ACCESSORIES

FOSSIL

Algae
Amph
Belm
Bioclst
Brach
Bryozoa
Cephal
Coral
Crin
Echin
Fish
Foram
Fossil
Gastro
Oolite
Ostra
Pelec
Pellet
Pisolite
Plant

Strom
Fuss
Oomold

MINERAL

Anhy
Arggrn
Arg
Bent
Bit
Brecfrag
Calc
Carb
Chtdk
Chtlt
Dol
Feldspar
Ferrpel
Ferr
Glau
Gyp

Hvymn
Kaol
Marl
Minxl
Nodule
Phos
Pyr
Salt
Sandy
Silt
Sil
Sulphur
Tuff
Chlorite
Dol
Sand
Sltly

STRINGER

Anhy
Arg

Bent
Coal
Dol
Gyp
Ls
Mrst
Sltstrg
Ssstrg
Carbsh
Clystn
Dol
Grysh
Gryslt
Lms
Sandylms
red shale
green shale
Sltstn

OTHER SYMBOLS

INTERVALS

Dst top/bottom
Dst
Dst

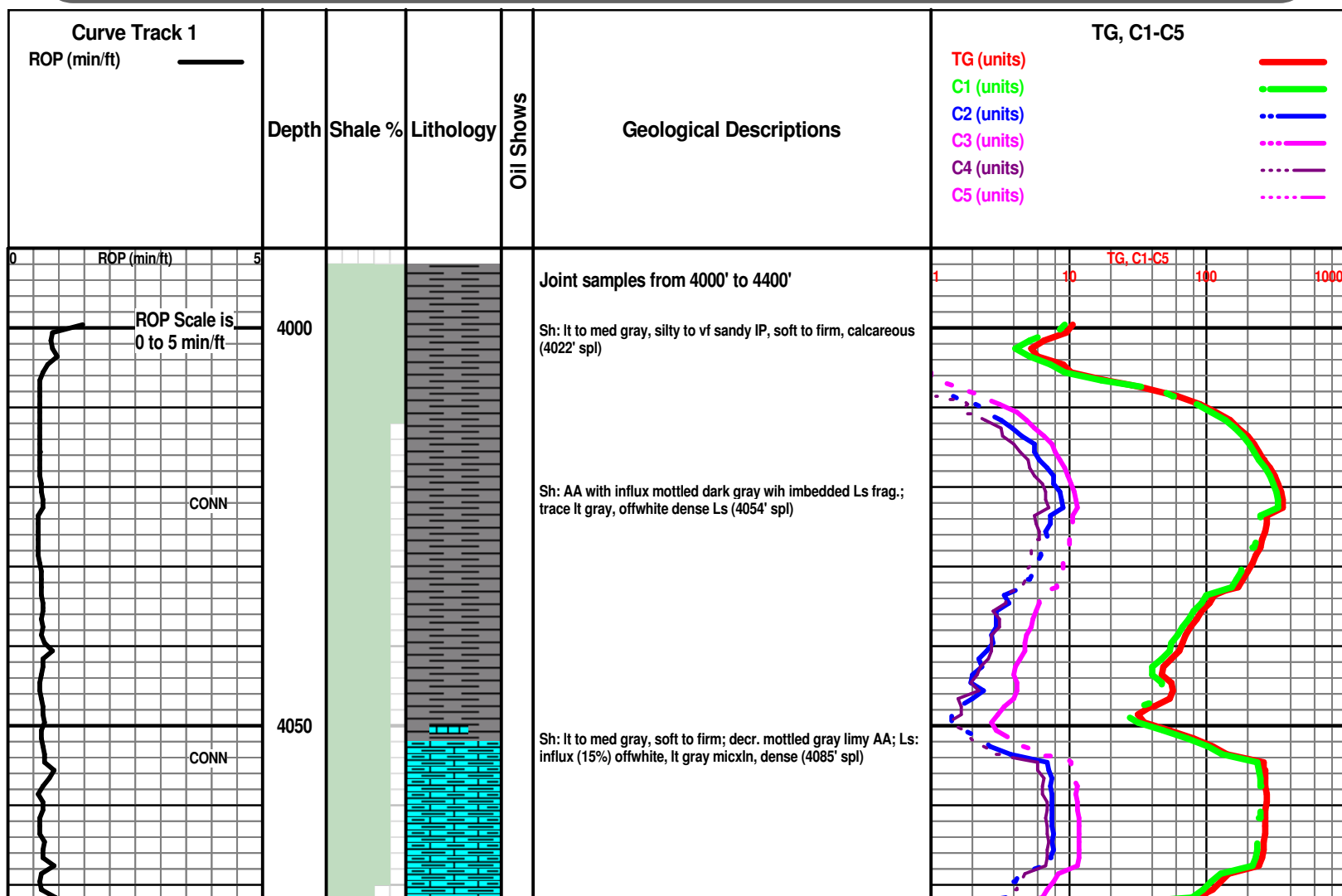
EVENTS

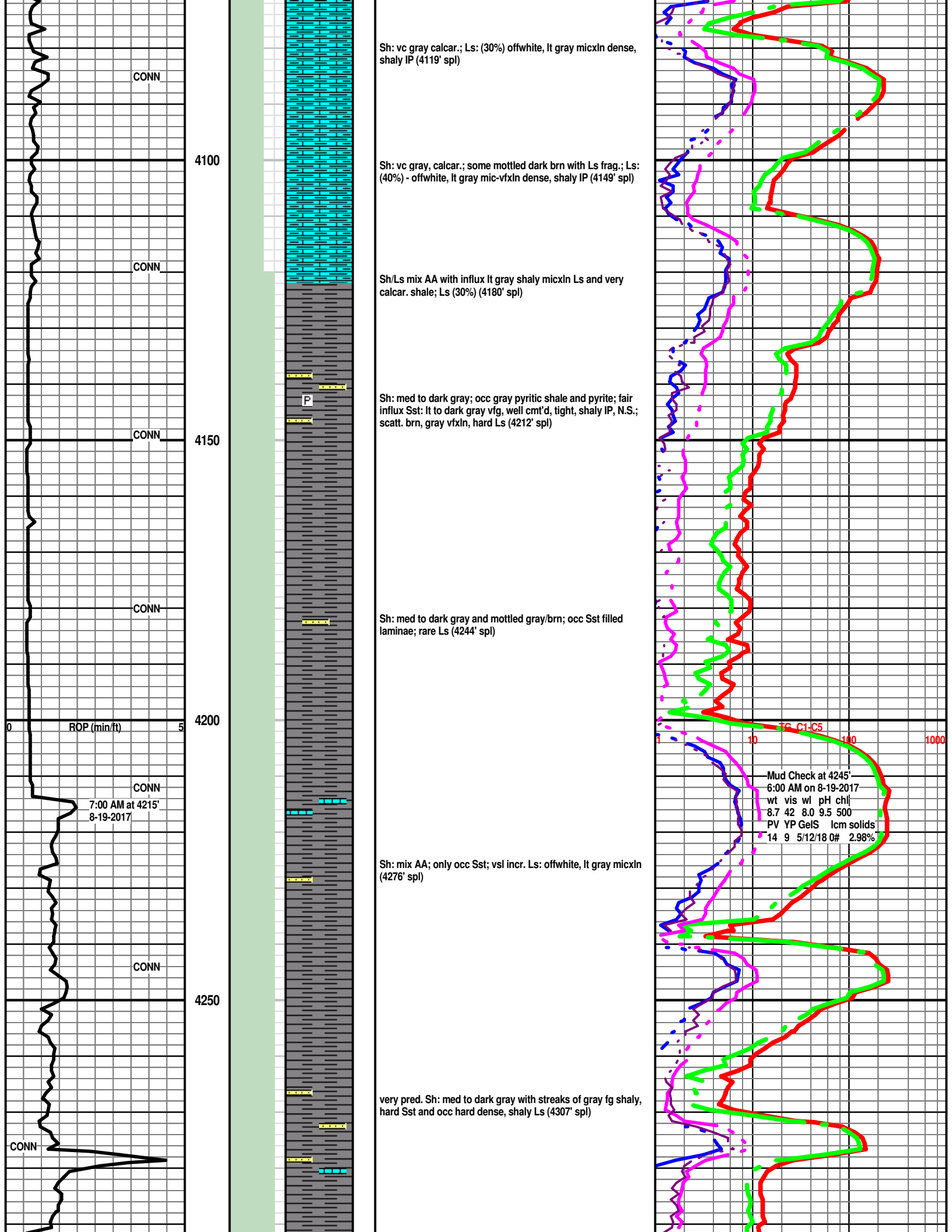
Rft
Rft

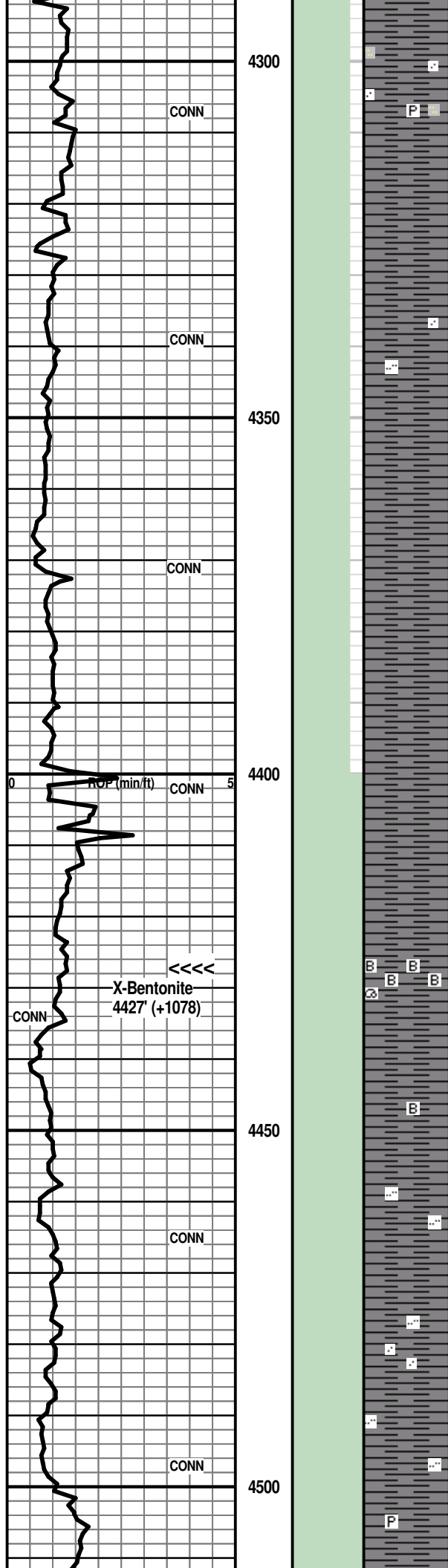
OIL SHOWS

Even
Spotted
Trace/quest.

Dead
Oil & gas show
Gas show







Sh: med to dark gray, soft to firm, silty and finely sandy IP; occ finely pyritic (4340' spl)

Sh: med to dark gray, soft to firm; occ silty and finely sandy IP (4372' spl)

Sh: med to dark gray, rarely with imbedded Ls frag., soft to firm (4404' spl)

Sh: med to dark gray, soft to firm; some mottled brn/gray with imbedded tan, brn Ls frag.

Sh: very pred. AA; very scatt. chips offwhite, soft mushy rock, vs! reaction with HCL (bentonite?)

Sh: mix AA with scatt. chips of soft bentonite; trace foss. gastropods

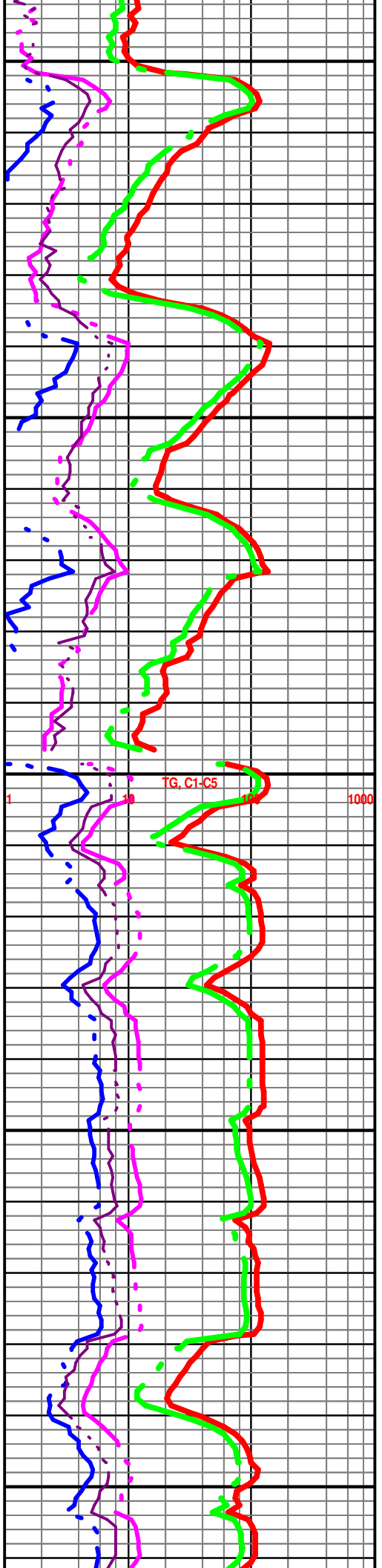
Sh: med to dark gray AA; sl influx very soft mushy gray shale; sl incr. in offwhite soft bentonite

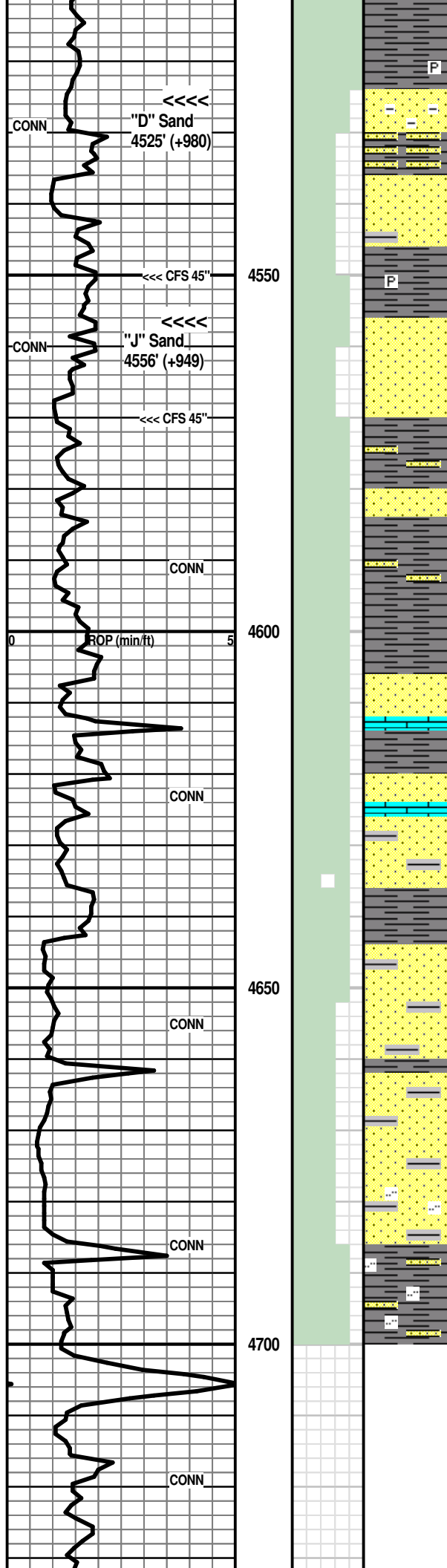
Sh: med to dark gray; lesser lt gray, soft, silty

Sh: mix various gray, silty IP; trace offwhite fg calcar. Sst

Sh: pred. med to dark gray, some silty AA, no Sst

Sh: med to dark gray, gen. softer than above, silty IP, some with dess. pyrite, no Sst





40' spl - Sh: mix AA, no Sst

50' spl - Sh: mix AA, occ pyritic; Sst: few clusters lt gray vf-fg, subrnd-rnd, mod. sorted with shale flecks, friable, poorly cemented, N.S.

CFS 4550' 20" spl - 80-85% shales AA; Sst: 15-20% lt to med gray, vf-fg with shale flecks, some carb. laminae, friable to tight, N.S.; 45" spl - 30% Sst: AA with qtz cement, more tight; trace pale green imbedded mnrl (not glauc.); 70% Sh: med to dark gray

60' spl - no new rocks; Sh: med to dark gray, soft to firm, pyritic IP; some Sst AA; 70' spl - Sh: AA; Sst: lt to med gray vf-fg tight, shaly IP with imbedded shale flecks, some friable

CFS 4570' 20" spl - very shaly AA; influx Sst: lt gray vf-fg shaly AA; some vf-med grnd, subrnd-rnd, fair sorted, friable with good por., N.S.; 45" spl - Sst: AA with more offwhite, lt gray vfg tight, hard, N.S.

80' spl - no new rocks; 90' spl - Sh: 99% lt to med gray, soft to firm; occ Sst AA

4600' spl - Sh: 95% AA; Sst: 5% offwhite, lt gray vf-fg, tight, offwhite vfg soft, N.S.

10' spl - 95% shales and 5% Sst AA

20' spl - Sh: 98% lt to med gray, soft to firm; 2% Sst: offwhite vfg tight to friable, soft

30' spl - 95% shales AA; 5% Sst: offwhite, tan vfg, subrnd-rnd, well sorted, friable wih good por., N.S.

40' spl - Sh: 95% lt to med gray, soft to firm; scatt. Sst AA; some Ls: tan, offwhite micxn dense

50' spl - Sh: 90% AA, some fine sandy; Sst: 5% offwhite, lt gray vfg, friable to tight; some gray vfg, shaly; Ls: 5% tan micxn

60' spl - Sh: 90% lt to med gray, soft; trace Sst (lost returns at 4654' - sample affected)

70' spl - Sh: 97% lt to med gray, silty IP; 2-3% Sst AA, N.S.

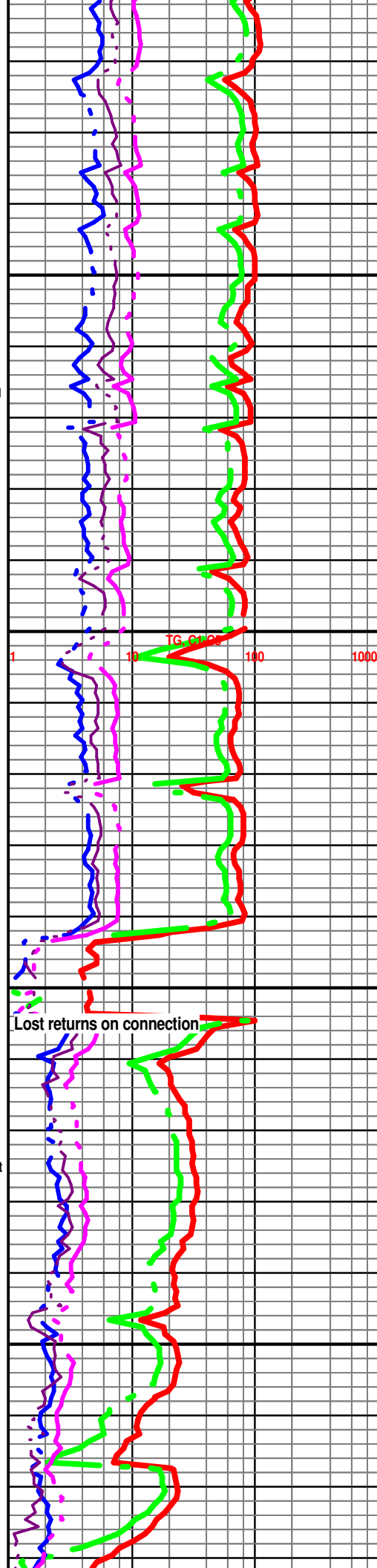
80' spl - Sh: 90-95% AA; Sst: fair influx offwhite, lt gray vfg friable, N.S. and med gray vfg shaly

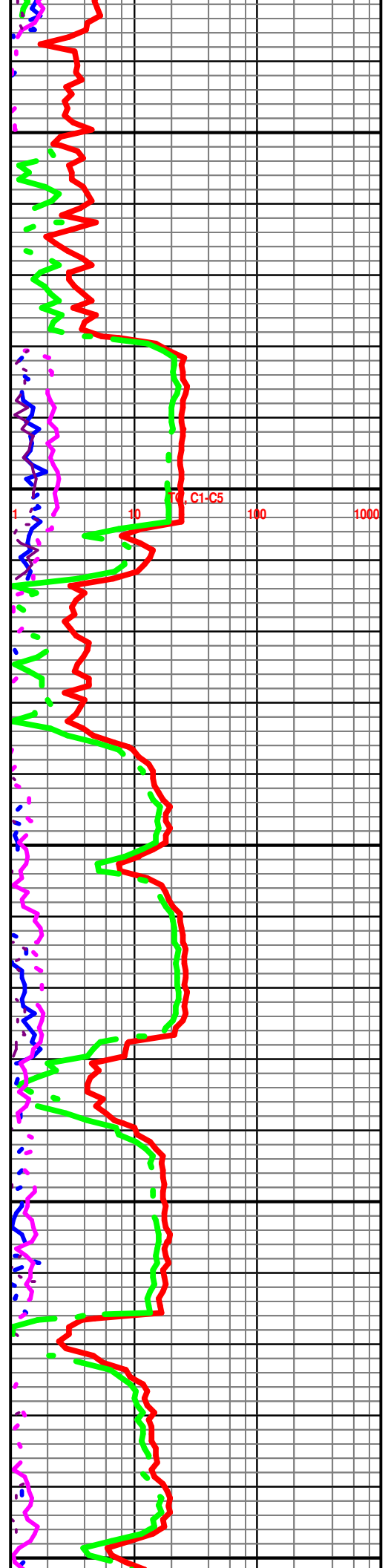
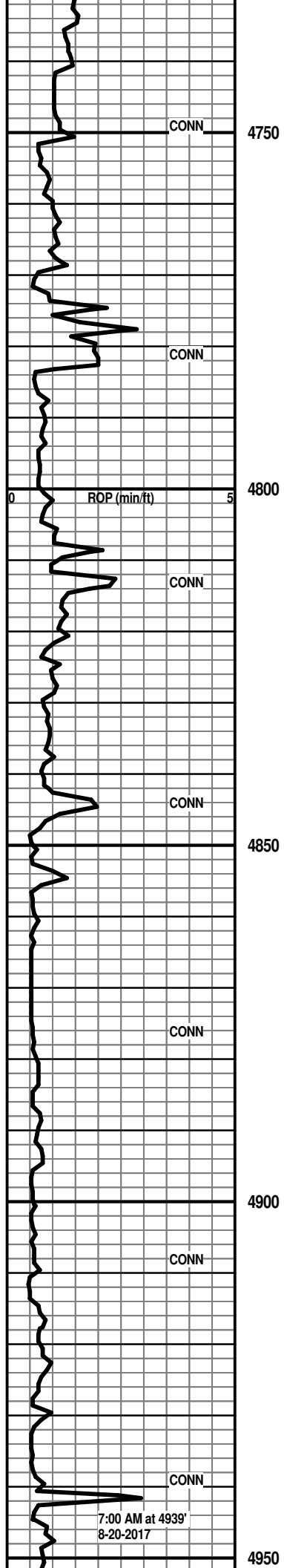
90' spl - Sh: 75% AA; Sst: 25-30% offwhite, lt gray vfg friable and gray shaly AA, N.S.

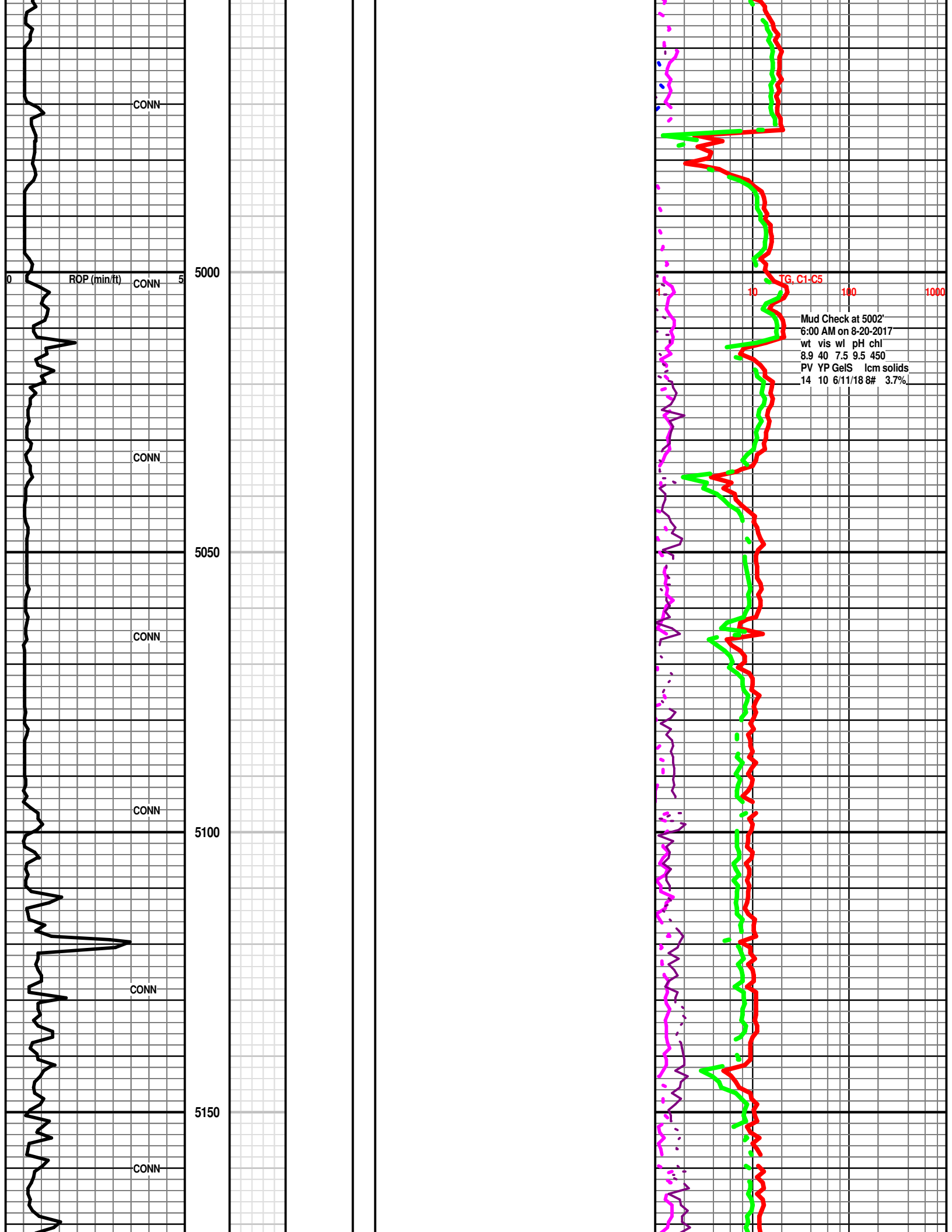
4700' spl - Sh: approx. 50% AA; good influx Sst: 20% offwhite lt gray vf-fg friable to tight, N.S.; 30% dark gray very shaly and silty vfg, NVP, N.S.

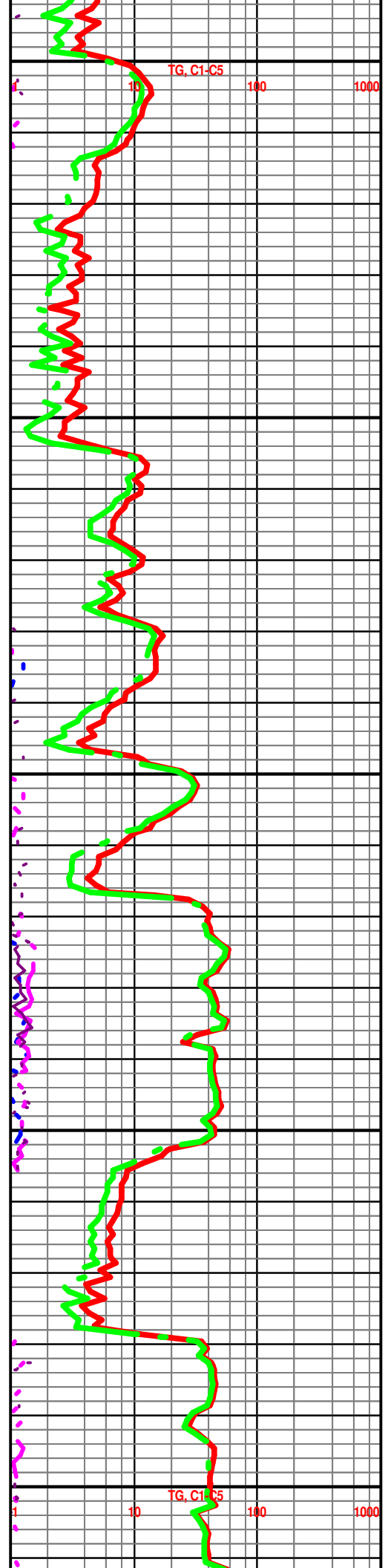
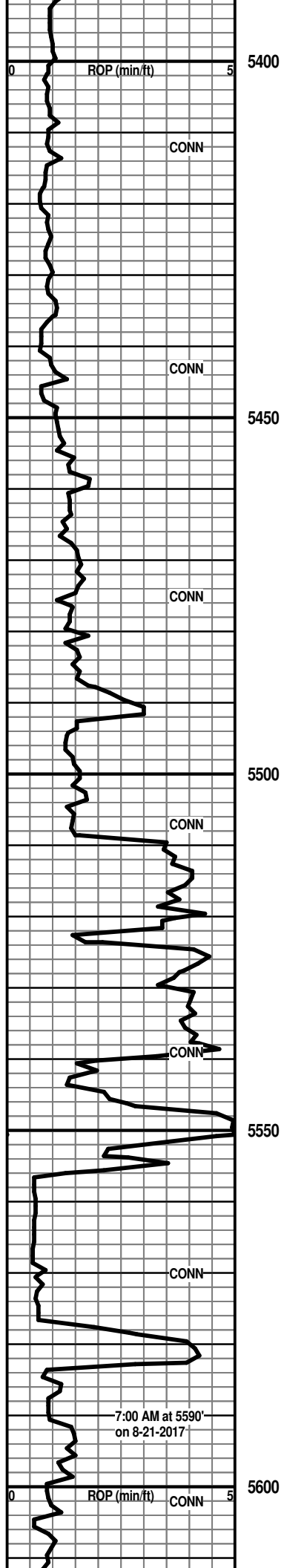
Sh: incr. to 80% vc gray with Sst mix AA

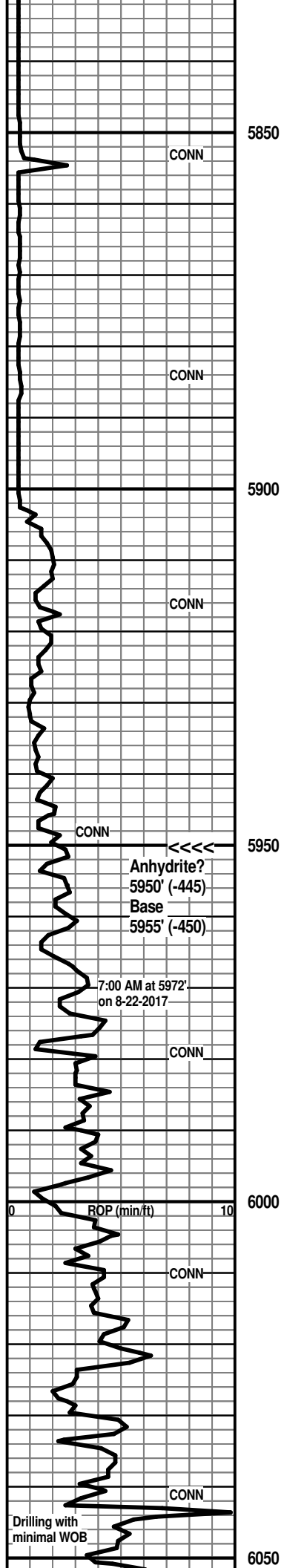
Samples stopped from 4700' to 6900' The gas readings and drill time will continue.



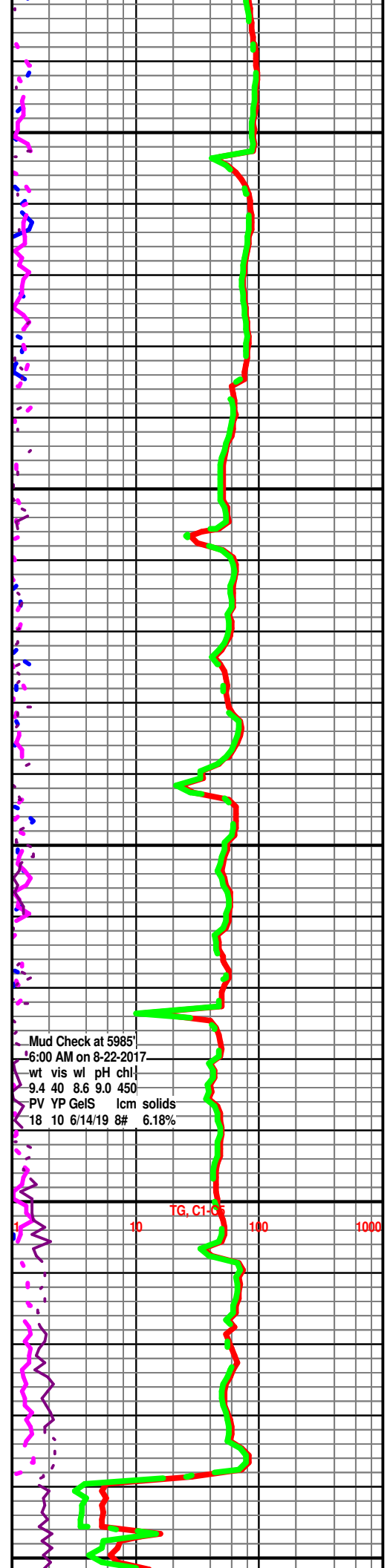


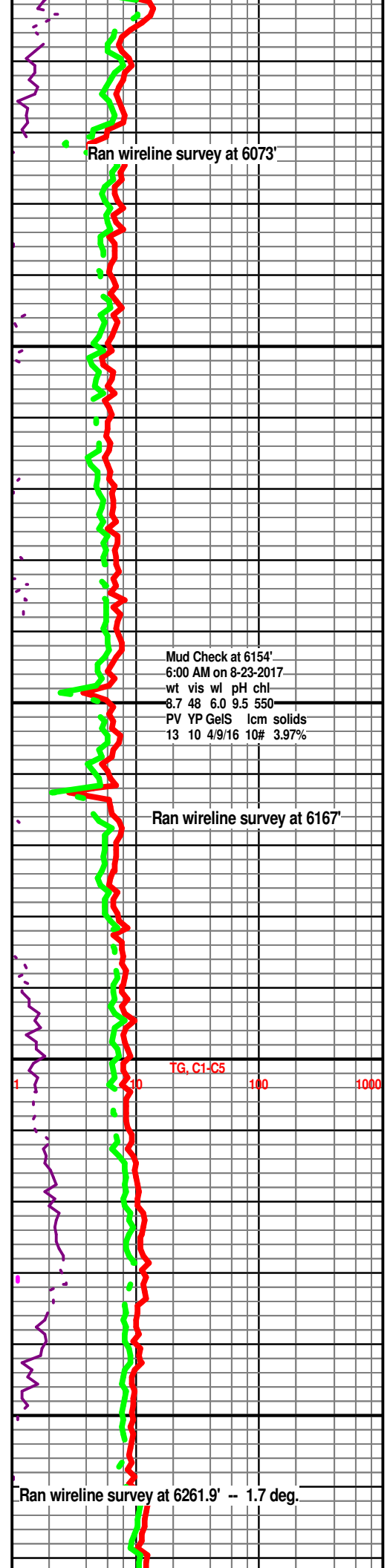
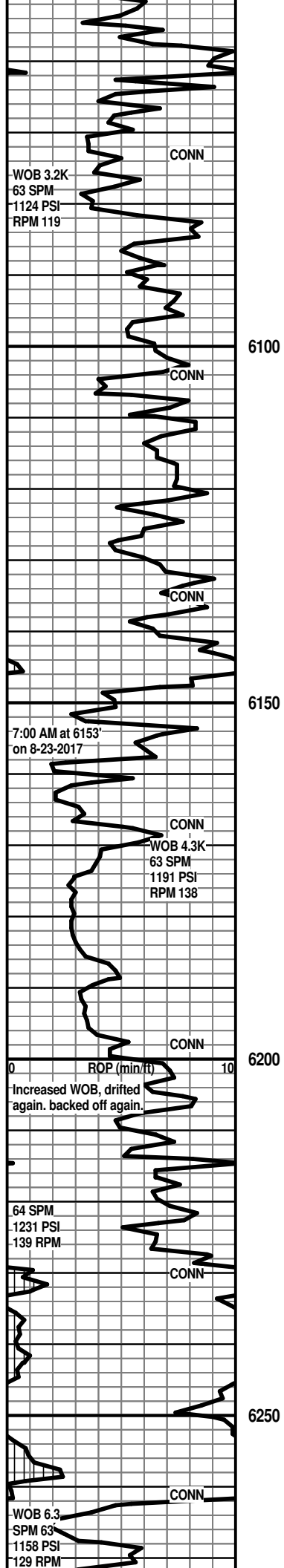


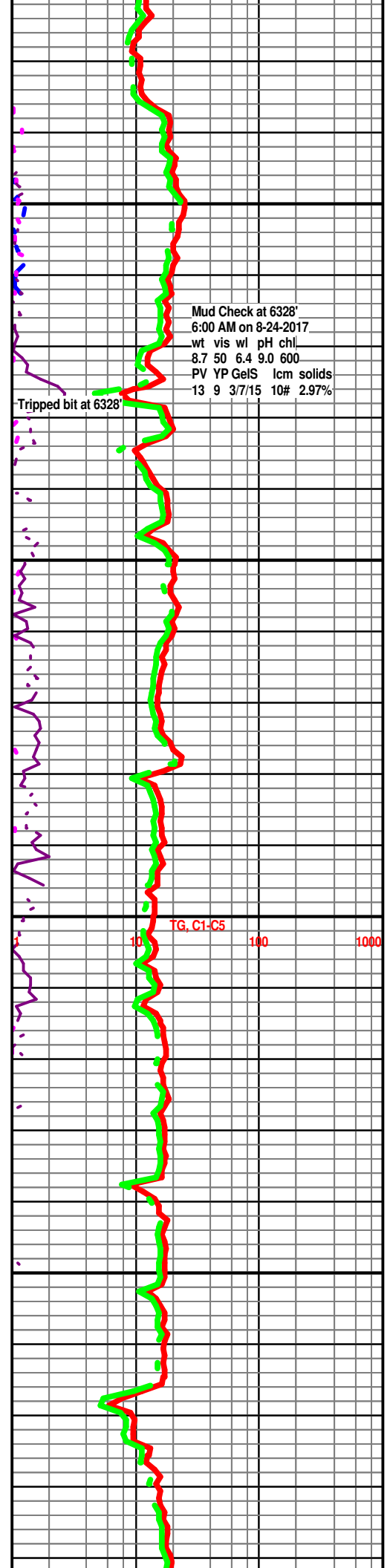
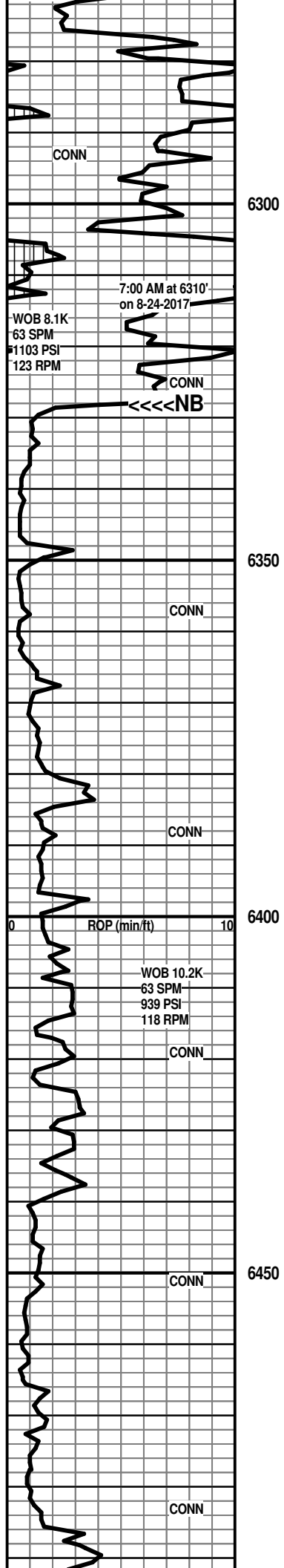


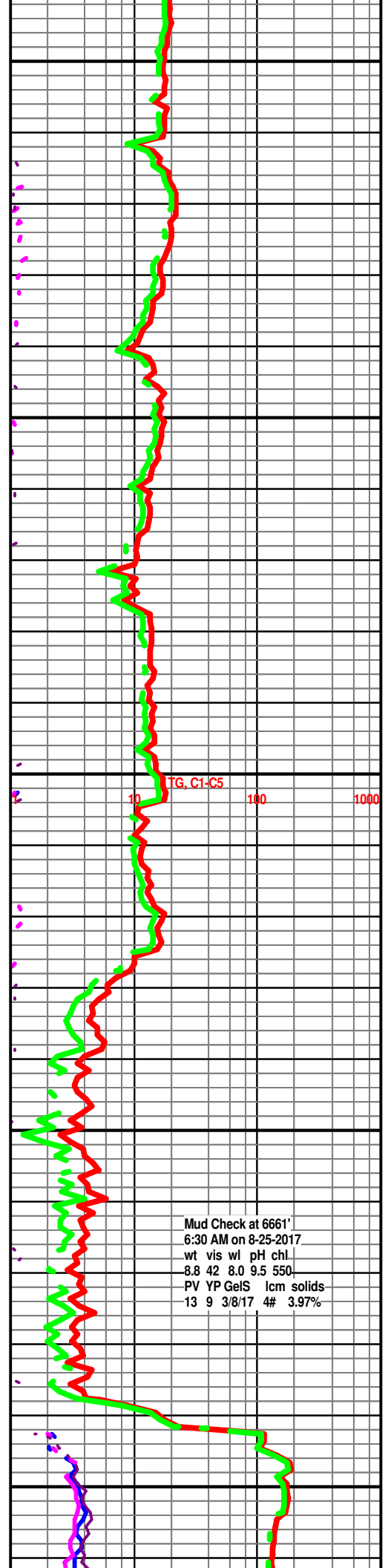
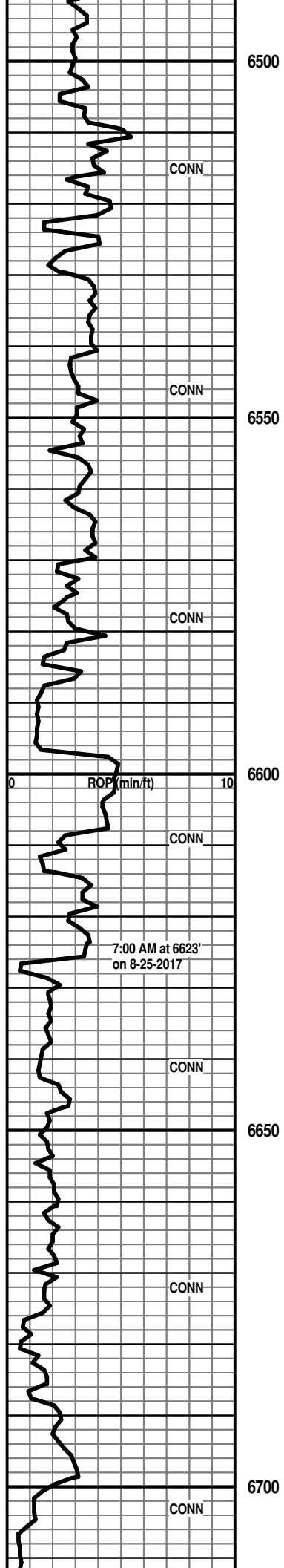


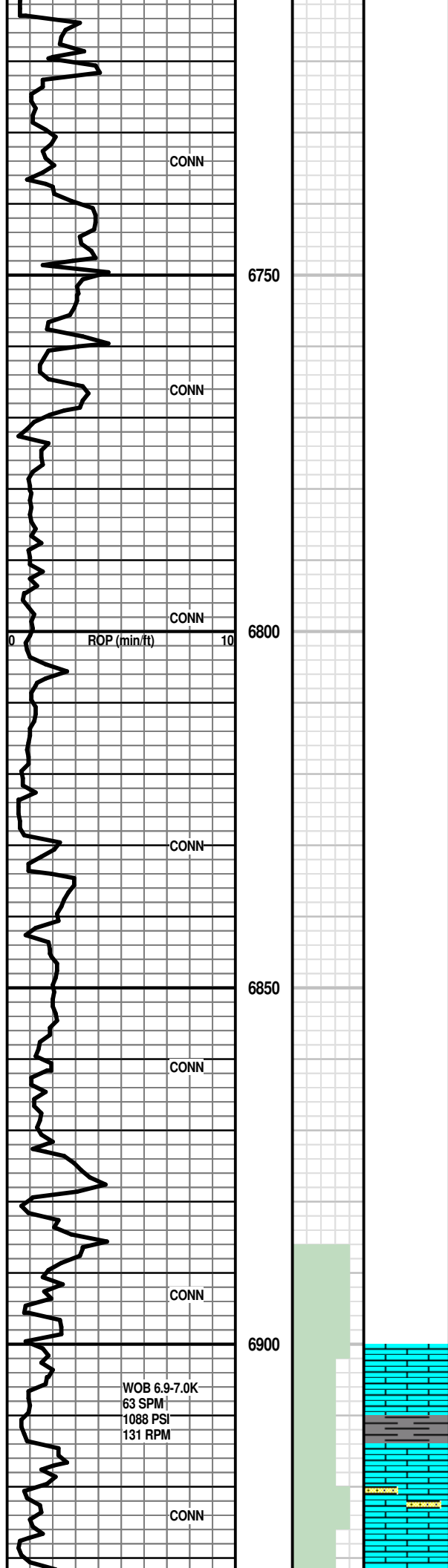
Anhydrite pick from drill time comparison to
comparison well. Questionable pick.









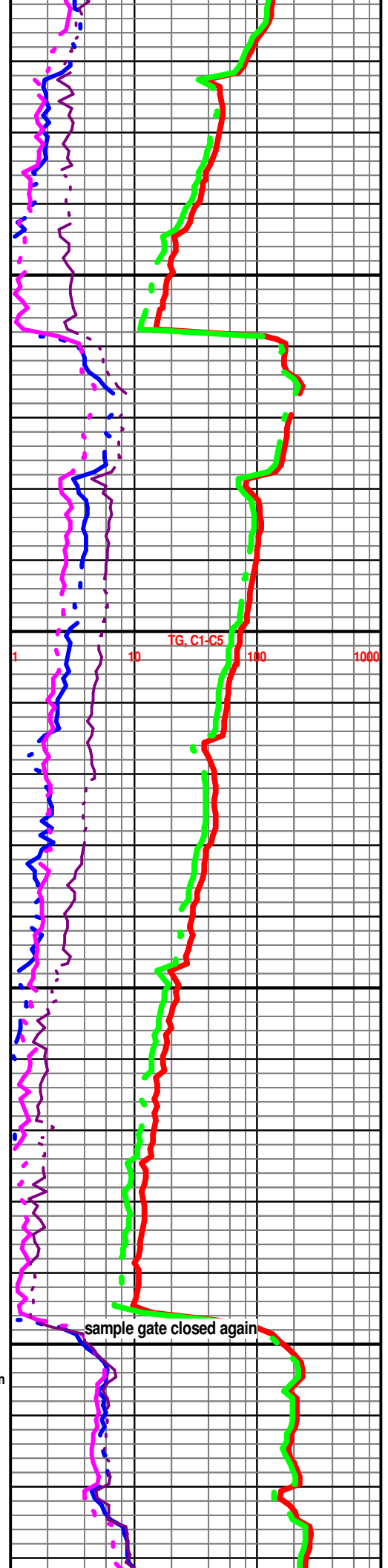


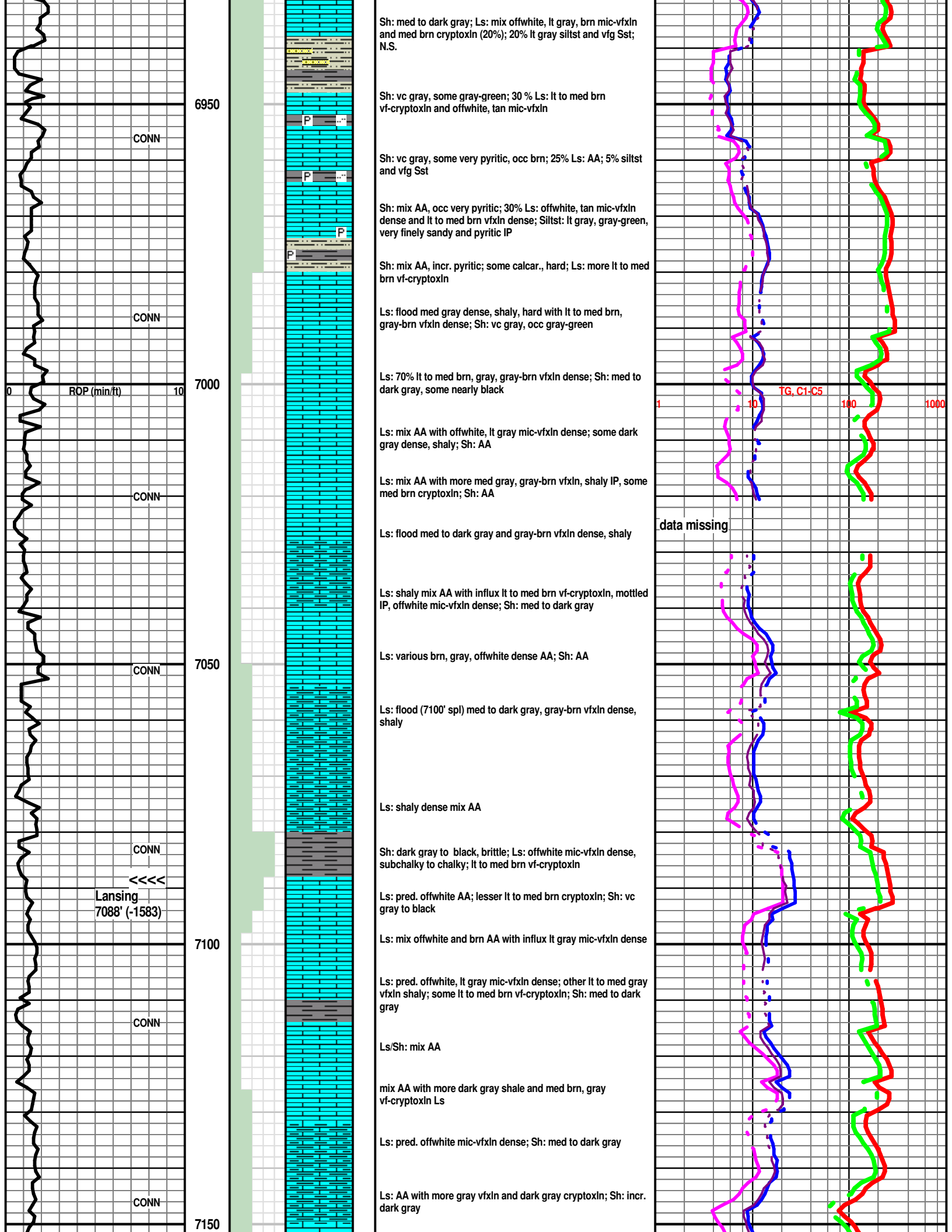
Start 1' drilling time and 10' wet and dry samples at 6910'

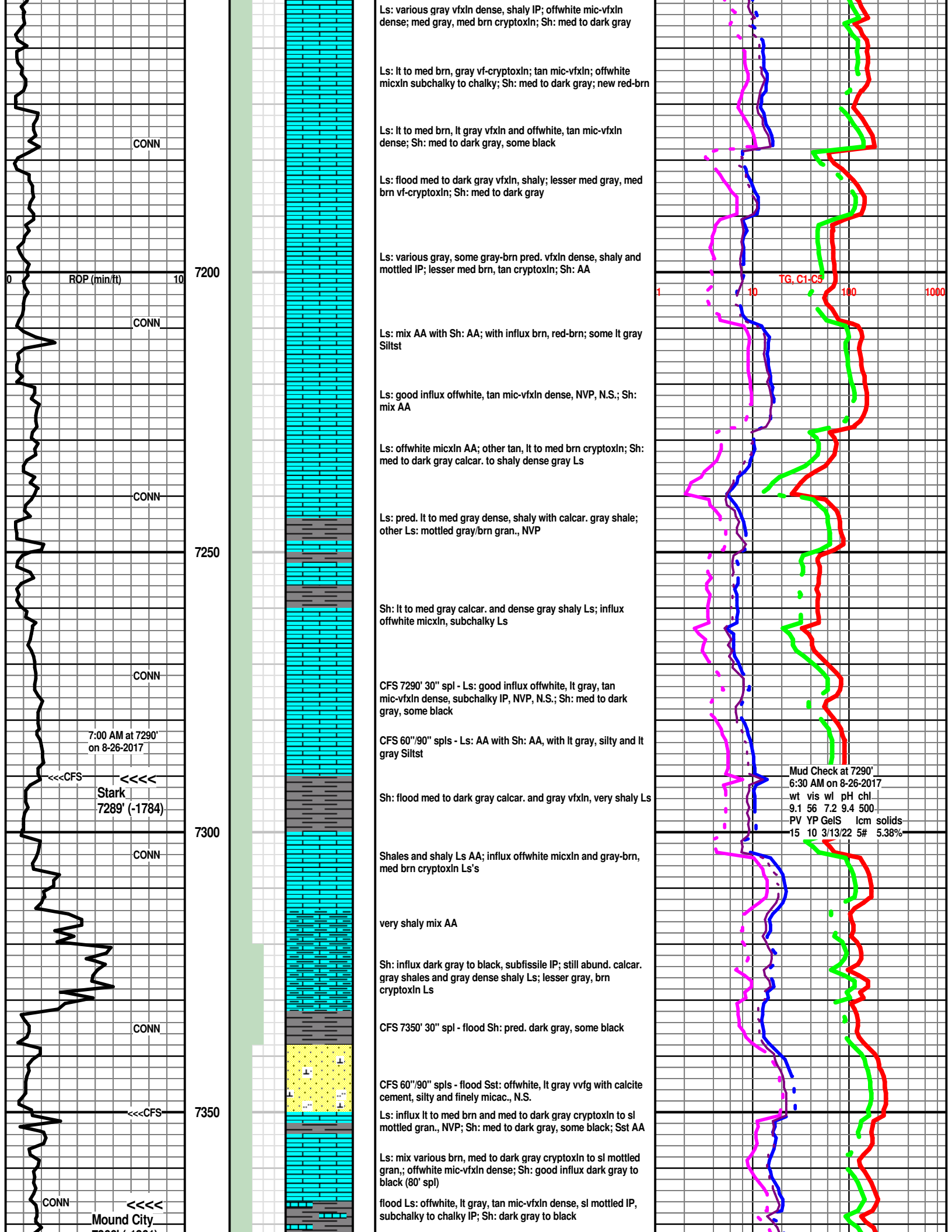
Sh: med to dark gray; Ls: offwhite, lt gray, lt brn mic-vfxln dense

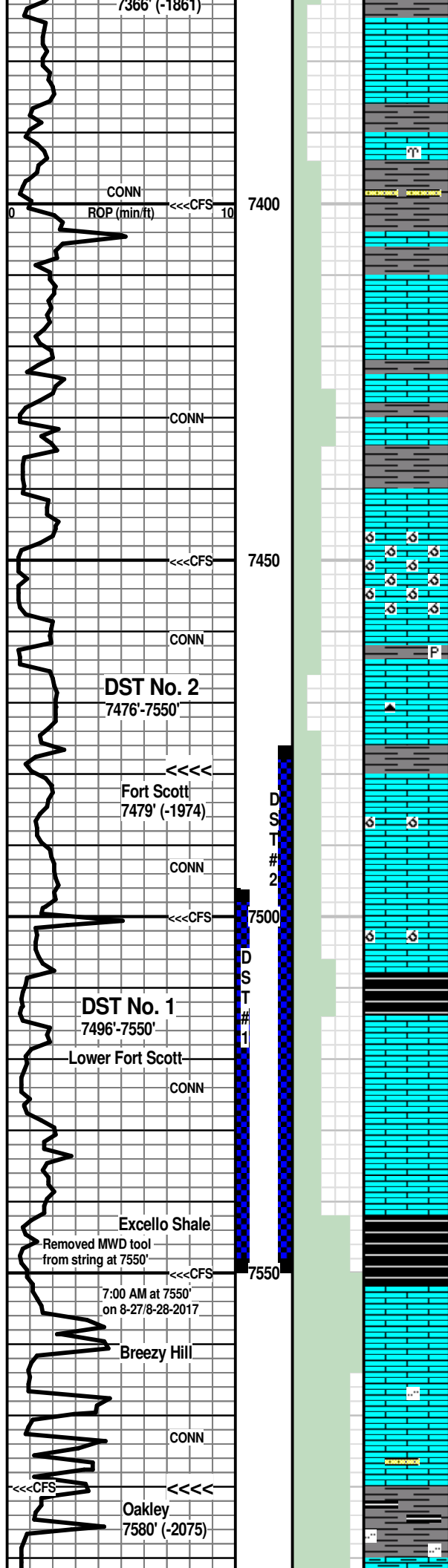
Ls: lt to med brn vf-cryptoxln; lt to med gray, offwhite mic-vfxln dense; Sh: vc gray

Sh: med to dark gray with influx brick red-orange; Sst: lt gray vfg, calcar.; Ls: mix AA









Ls: mix AA with more med gray vf-cryptoxln; Sh: AA decr. %

CFS 7400' 30" spl - Ls: abund. offwhite mic-vfxln dense, subchalky IP; lesser lt to med brn, lt to med gray cryptoxln; Sh: med to dark gray, some black

CFS 60"/90" spls - Ls: influx offwhite chalky; some smooth lt gray cryptoxln; trace tan with fenestral bryozoan fabric imprint; incr. Sh % in 90" with some Sst: lt gray vvf, silty

Ls: sl influx lt gray, lt to med brn pred. cryptoxln; offwhite subchalky to chalky AA; Sh: med to dark gray, some black; occ Sst AA

Ls: brn, gray cryptoxln and offwhite, tan mic-vfxln dense; Sh: med to dark gray, black, sl carbon., subfissile IP

Ls: influx mottled dark gray/brn gran. NVP; Sh: AA

CFS 7450' 30" spl - Ls: various dense, mottled AA; incr. % Sh: med to dark gray, black

CFS 60"/90" spls - Ls: influx lt to med brn, gray-brn oolitic with good oomoldic por., N.S.; other dense AA; Sh: AA

still trashy from wiper trip; Ls: ool/oom AA; offwhite micxln subchalky-chalky; Sh: vc gray, orange, green, brn

90' spl - Ls: flood smooth lt to med brn cryptoxln; offwhite, tan mic-vfxln dense; Sh: decr. %, common lt green, gray-green, med to dark gray

Ls: offwhite, tan mic-vfxln dense; med to dark gray, lt to med brn vf-cryptoxln, some mottled; trace dark brn opq chert; Sh: 20% med to dark gray, occ pyritic

CFS 7500' 30" spl - Ls: flood offwhite micxln subchalky IP; lt gray, tan mic-vfxln dense; other lt brn cryptoxln; trace offwhite oolitic with poor-fair oomoldic por., N.S.

CFS 60"/90" spls - Ls: very pred. offwhite, lt gray mic-vfxln subchalky and offwhite subchalky to chalky; lesser lt to med brn cryptoxln; Sh: dark gray

Ls: some offwhite, lt gray oolitic with fair-good oomoldic por., N.S.

Sh: flood dark gray, dark gray-brn, black carbon. and micac.; Ls: mottled gray/brn/offwhite gran. NVP, N.S.

Ls: flood white chalky, N.S.

CFS 7550' 30" spl - Ls: white chalky AA; lt to med brn cryptoxln to sl gran. NVP, N.S.

CFS 60"/90" spls - Sh: flood black carbon. with Ls mix AA

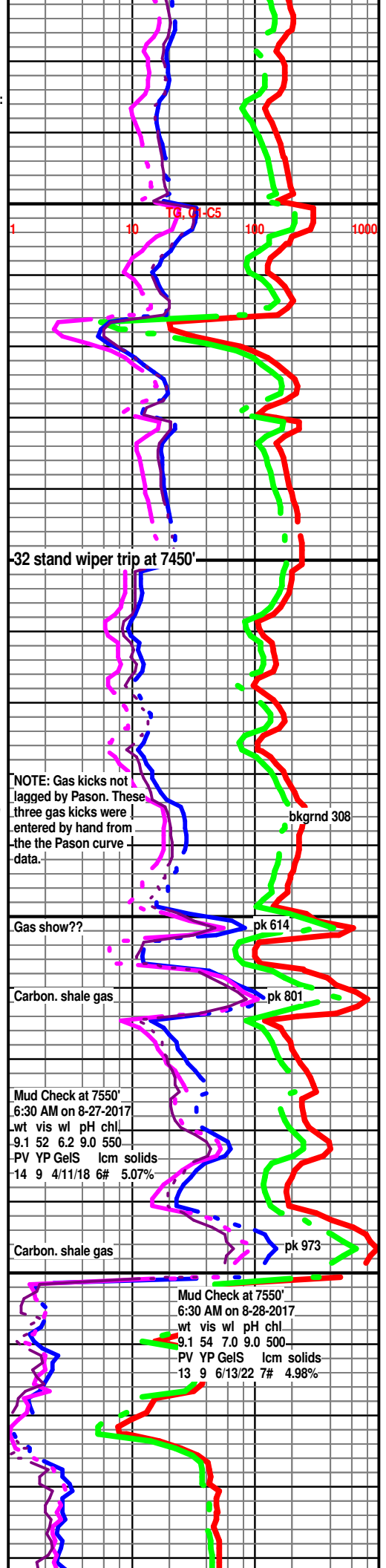
Sh: 90% med to dark gray; Ls: sl influx lt gray vfxln dense, sl shaly; med to dark brn cryptoxln; trace offwhite, tan oolitic with poor oomoldic por., N.S. (cavings?)

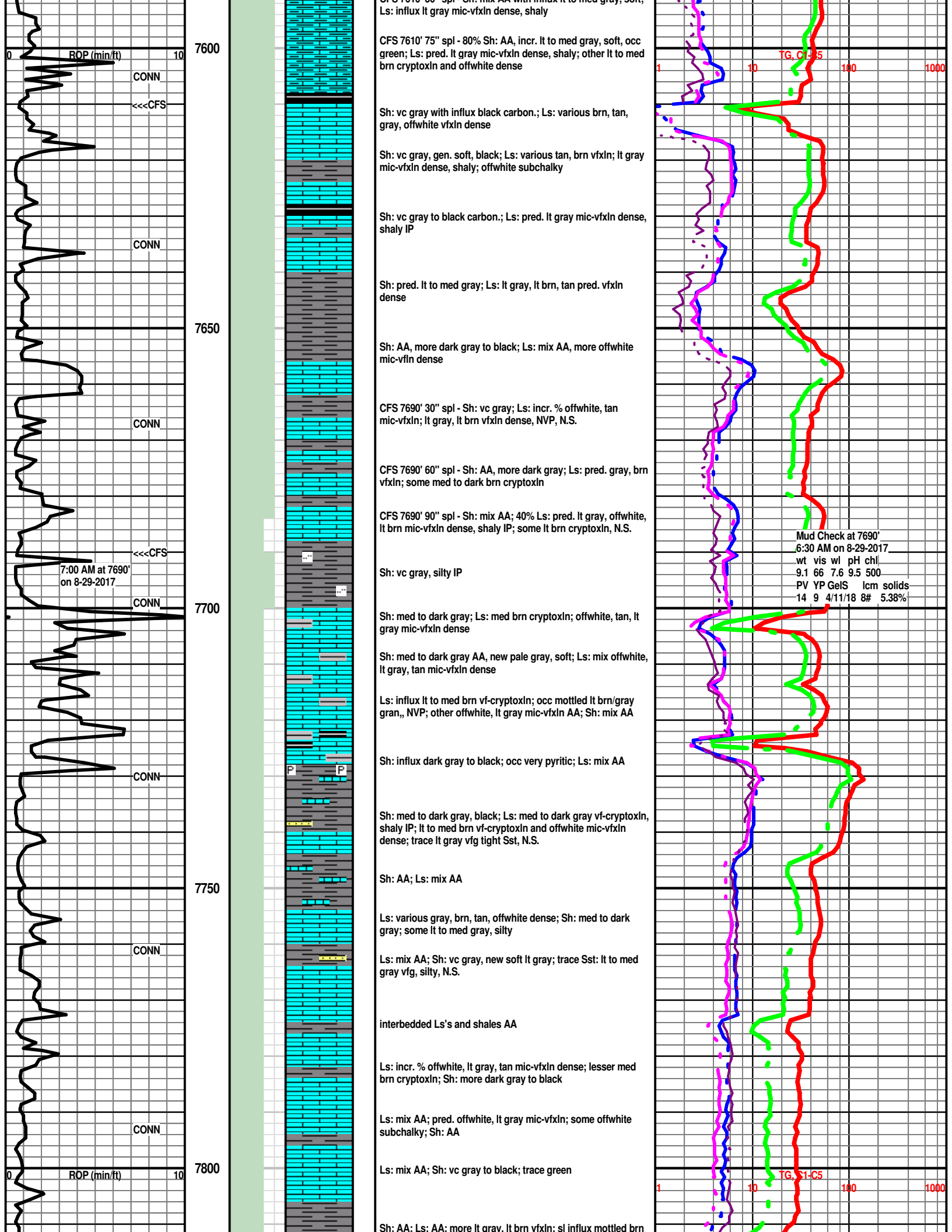
CFS 7580' 30" spl - 85% shales AA; Ls: various cryptoxln and dense AA; trace mottled lt brn sl gran. and trace lt gray, silty, N.S.

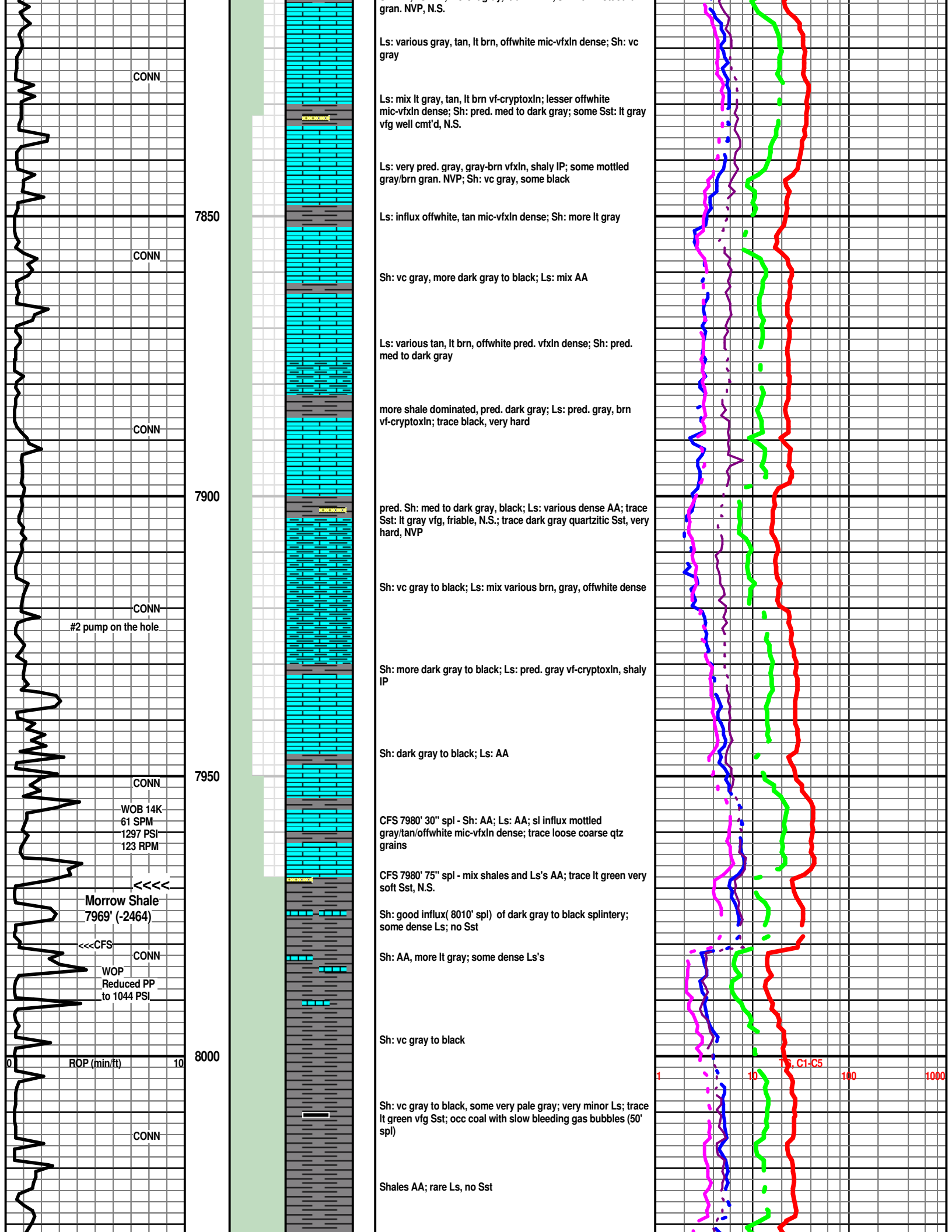
CFS 7580' 75" spl - 80-85% Sh: med to dark gray, occ lt green; Ls: mix AA with new offwhite, tan vfxln; trace Sst: lt gray fg, sl glauc., soft, N.S.

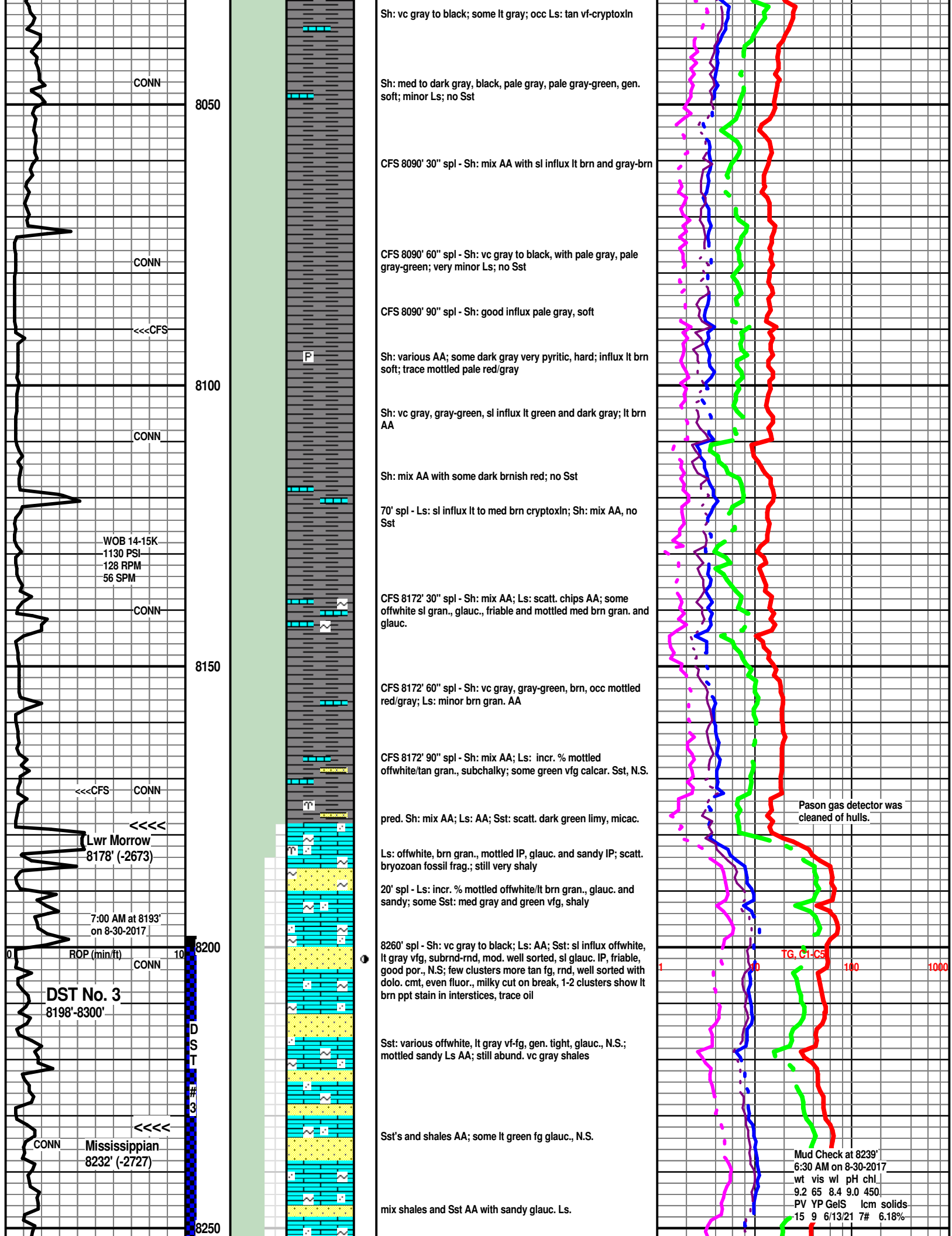
Sh: influx dark gray to black (7610' spl); med gray silty

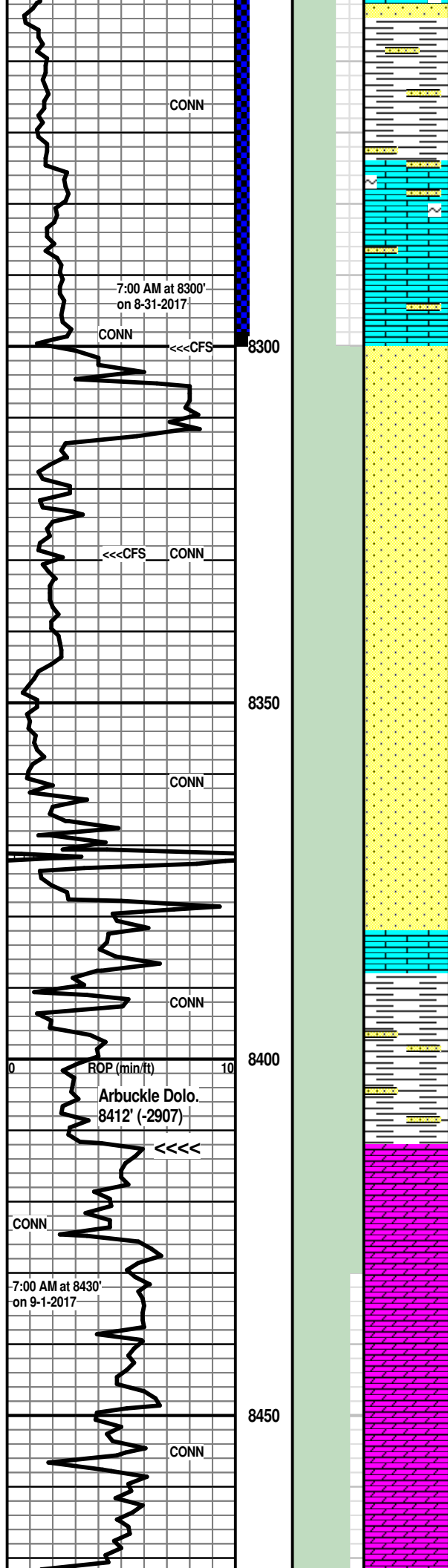
CFS 7610' 30" spl - Sh: mix AA with influx lt to med gray, soft-











8300' spl - very pred. shales; much decr. % of Sst and Ls

CFS 8300' 30" spl - pred. Sh: vc gray, gray-green; Sst: various offwhite, lt gray fg, glauc. and tight; Ls: mottled AA; offwhite mic-vfxln dense and lt brn vf-cryptoxln

CFS 8300' 60" spl - pred. Sh: mix AA; Ls: offwhite dense; Sst: occ green vfg, tight, N.S.

CFS 8300' 90" spl - mix shales/Sst and Ls AA

Sh: vc gray, gray-green, some brn, occ mottled red/gray; Ls: various offwhite vfxln dense, lt brn cryptoxln and mottled lt brn gran.; Sst: minor offwhite, lt gray vf-fg, N.S.

CFS 8329' 30" spl - 85% Sh: vc gray, gray-green; Sst: sl influx offwhite vf-fg, subrnd, well sorted, silica cement, N.S.; 2-3 clusters tan, lt gray vfg, glauc. with spotty fluor., weak cut on break, NFO

CFS 8329' 60"/90" spls - 85% shales AA; Sst: incr. % offwhite vf-fg with scatt. imbedded coarse to very coarse grains, N.S.; rare Ls, no Dolo.

NOTE: Most samples from 8330' to 8500' were 95-98% shales.

Sh: vc gray, gray-green, some brick red; Sst: scatt. clusters offwhite vfg, N.S.; scatt. Ls: brn gran. to cryptoxln, glauc.

Sh: 95-98% AA; occ gray vfg shaly Sst; occ Ls: gray-brn vfxln dense, shaly, no dolo.

Shales AA; scatt. offwhite vfg Sst; very scatt. mottled brn sandy and glauc. gran, Ls

Sh: vc gray to black; rare Sst; occ Ls: med brn cryptoxln, no dolo

Shales AA; scatt. Ls: lt to med brn, gray-brn cryptoxln, and offwhite micxln; rare Sst; no dolo.

Sh: vc gray to black, occ gray-green, dull red; scatt. Ls: lt brn vf-cryptoxln and mottled gran. AA; no Sst, no dolo.

Sh: mix AA; scatt. Sst: offwhite vf-fg, N.S.; trace sandy orange (Arbuckle?)

98% Sh: mix AA; scatt. Ls: med gray, lt to med brn cryptoxln; rare offwhite fg Sst, N.S. no dolo.

98% Sh: vc gray to black, occ pyritic or sandy, occ dark orange; scatt. Ls AA, no Sst, no dolo.

Sh: mix AA; occ Ls; rare Sst; no dolo.

95% Sh: mix AA; 60' spl - first indication of Arbuckle Dolo: very scatt. lt orange to red fnxln, glauc. and tan vfxln, N.S.

70' spl - Sh: 97-98% AA; Dolo: 2-3% AA, pred. lt orange fnxln, glauc.

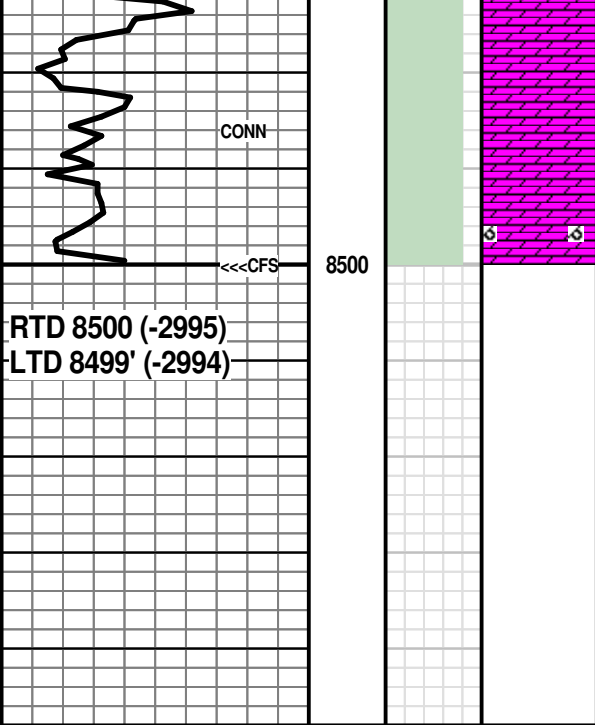
80' spl - 95% Sh: mix AA; Dolo: mix AA, some lt gray, tan fn-vfxln, N.S.

90' spl - 85-90% Sh: mix AA; Dolo: pred. lt orange, pink fnxln, glauc.; lesser tan, lt gray vfxln

Mud Check at 8300'
6:30 AM on 8-31-2017
wt vis wl pH chl
9.3 55 6.8 9.0 400
PV YP GelS lcm solids
15 8 4/11/18 6# 6.38%

TG, G1-13

Mud Check at 8441'
6:30 AM on 9-1-2017
wt vis wl pH chl
9.3 52 6.2 9.3 500
PV YP GelS lcm solids
14 9 4/10/21 6# 5.98%



Sh/Dolo mix AA

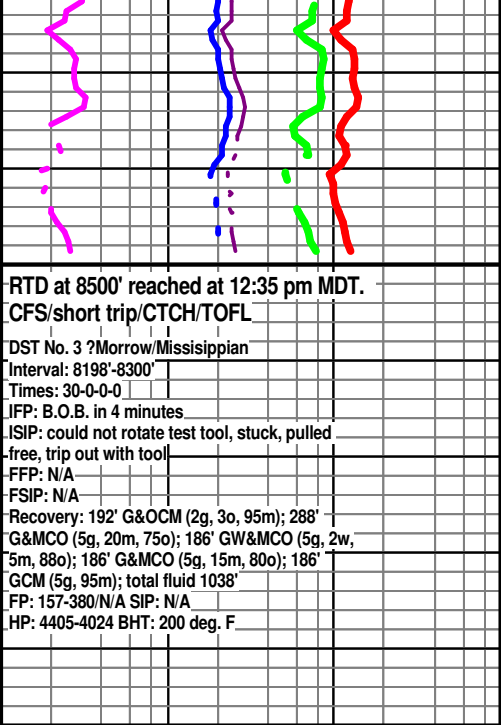
CFS 8500' 30" spl - 85-90% Shales AA; Dolo: pink, orange glauc. AA; lt gray, offwhite fn-vfxln

CFS 8500' 60"/90" spls - Sh: AA; Dolo: various AA, gen. glauc.; new offwhite oolitic with some fair oomoldic por., N.S.

After review of samples, DST results and open hole log evaluations, the decision was made to run 5 1/2" casing for further testing.

Respectfully submitted,

Wesley D. Hansen
Petroleum Geologist



RTD at 8500' reached at 12:35 pm MDT.
CFS/short trip/CTCH/TOFL

DST No. 3 ?Morrow/Mississippian
Interval: 8198'-8300'
Times: 30-0-0-0
JFP: B.O.B. in 4 minutes
ISIP: could not rotate test tool, stuck, pulled free, trip out with tool
FFP: N/A
FSIP: N/A
Recovery: 192' G&OCM (2g, 3o, 95m); 288' G&MCO (5g, 20m, 75o); 186' GW&MCO (5g, 2w, 5m, 88o); 186' G&MCO (5g, 15m, 80o); 186' GCM (5g, 95m); total fluid 1038'
FP: 157-380/N/A SIP: N/A
HP: 4405-4024 BHT: 200 deg. F