

PRECISION WELL LOGGING, INC

924 WAKEFIELD

HOUSTON, TX 77018

(713)681-3435

COMPANY: Marathon Oil Corp.

WELL: Cave Lion 5 Federal WC 5H ST1

FIELD: Red Hills COUNTY: Lea STATE: NM

LOCATION: X: 790365 Y: 388806.12

Interval Logged: 5440 To: 17275 G.L.: 3270 K.B: 3295.00

Date Logged: 11-7-17 To: 12-3-17 Spud Date: 10-30-17

Rig: H&P 423 Unit No.: 38L

Loggers: D.Harrison, H.Roberts

Api No.: 30-025-44102

Filename: cave_lion_5_federal_wc5h_st1.m

Geologist: T. Lockwood

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Created By MainLog

Abbreviations:

NB...New Bit
CO...Circ Out
NR...No Returns
TG...Trip Gas
WOB...Wt on Bit
RPM...Rev/Min
SG...Survey Gas
DST...Drill Stem Test
DS...Directional Survey
CG...Connection gas
LAT...Logged After Trip
PP...Pump Pressure
SPM...Strokes/Min
DTG...Down Time Gas

Mud Data

WT...Weight
PH...Acidity
CHL...Chlorides
V...Viscosity
F...Filtrate
SC...Solids Content

Lithology Symbols:

Anhydrite
Siltstone
Dolomite
Coal
Carb Shale
Red Sh
Cust Sh1
Cust Sh4
Salt
Chert
Conglomerate
Shale
Granite Wash
Org Sh
Cust Sh2
Cust Sh5
Granite
Sandstone
Limestone
Bentonite
Quartz Wash
Green Sh
Cust Sh3
Cust Sh6

Accessories

Glauconite
Pyrite
Fossils
Oolites
Fractures
Cement

Gas Chromatograph Analysis:

TG
C1
C2
C3
IC4
NC4
IC5
NC5

Drilling Rate

FT/HR

Lithology

Total Gas/Chromatograph

Descriptions/Remarks

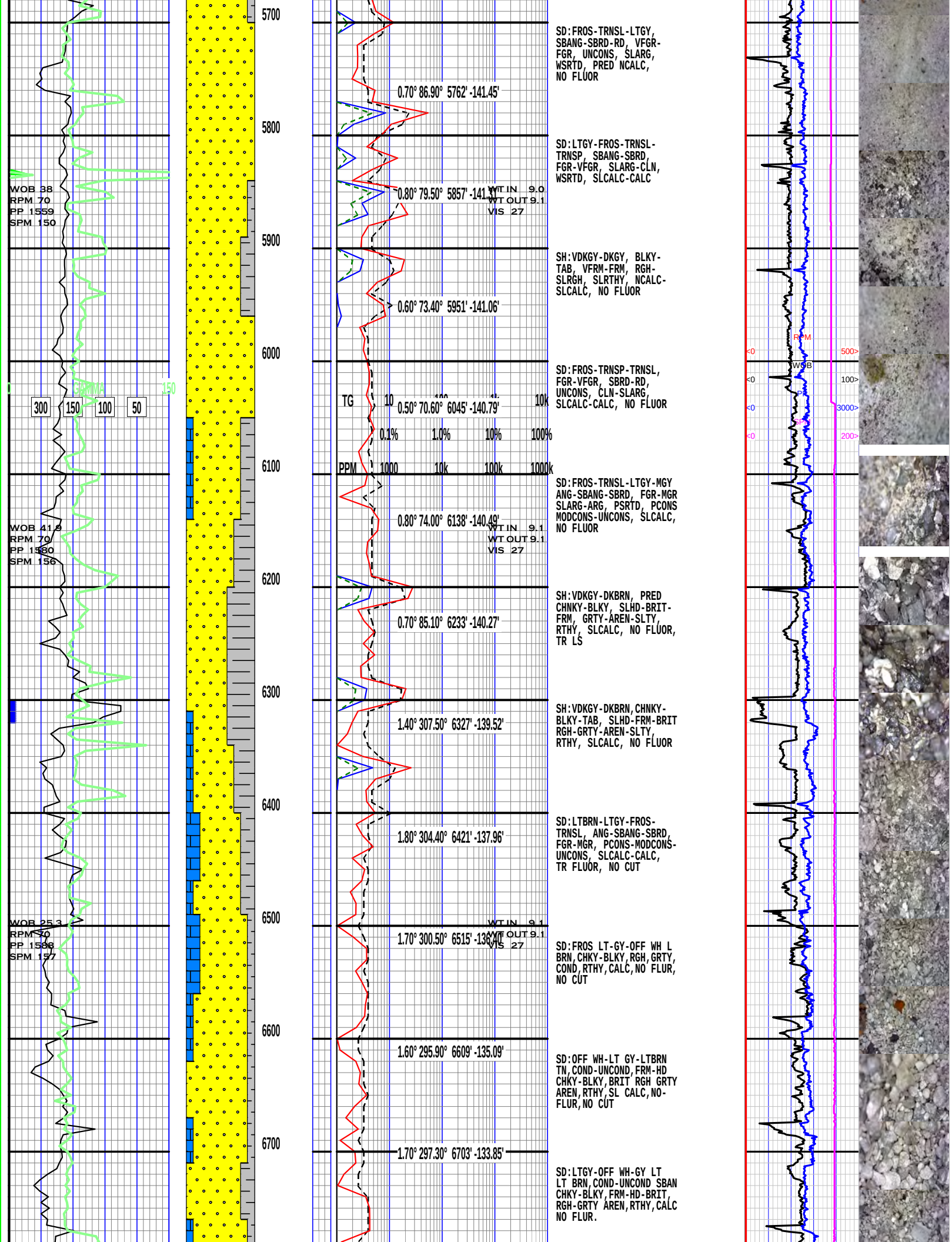
DRILLING

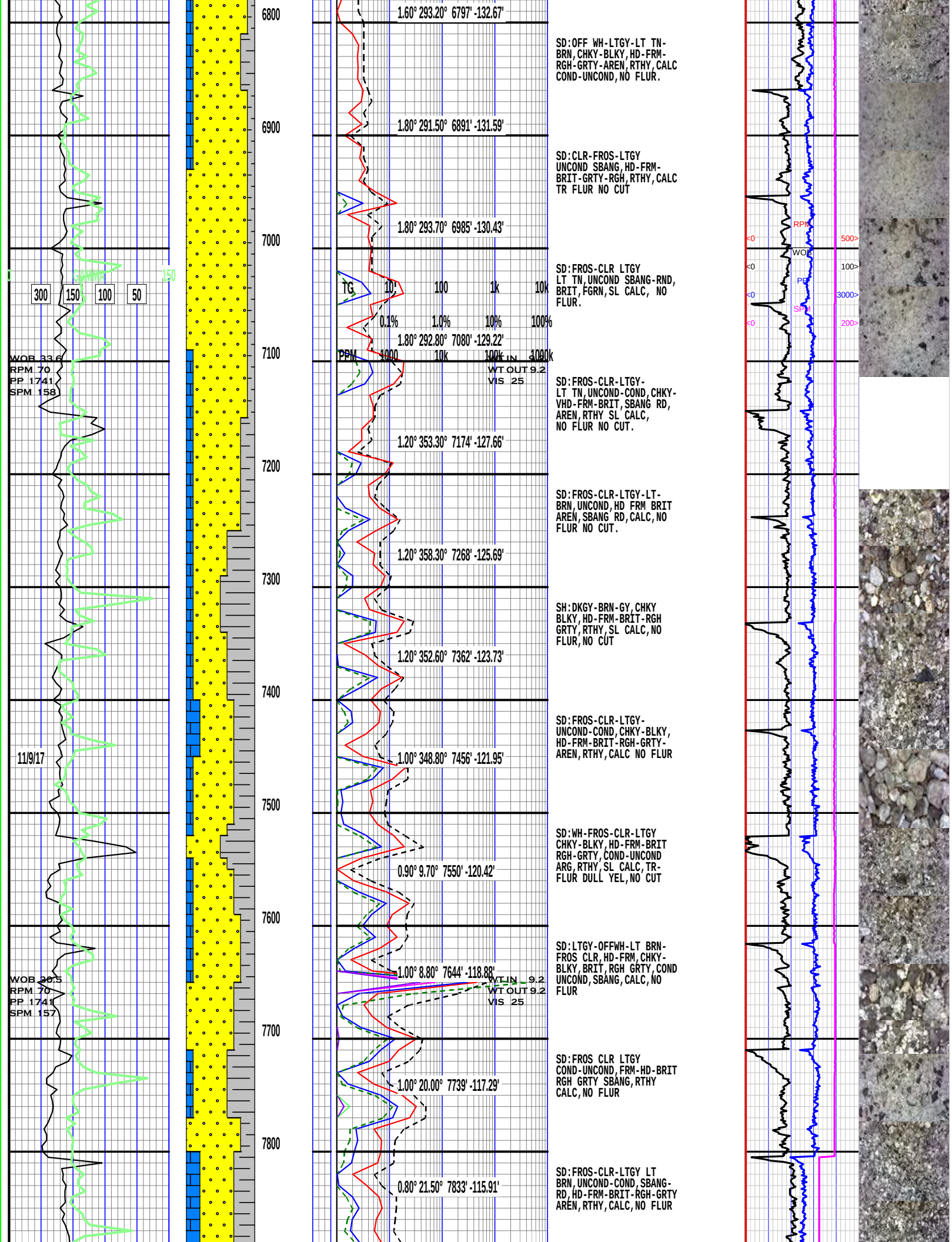
PICTURES

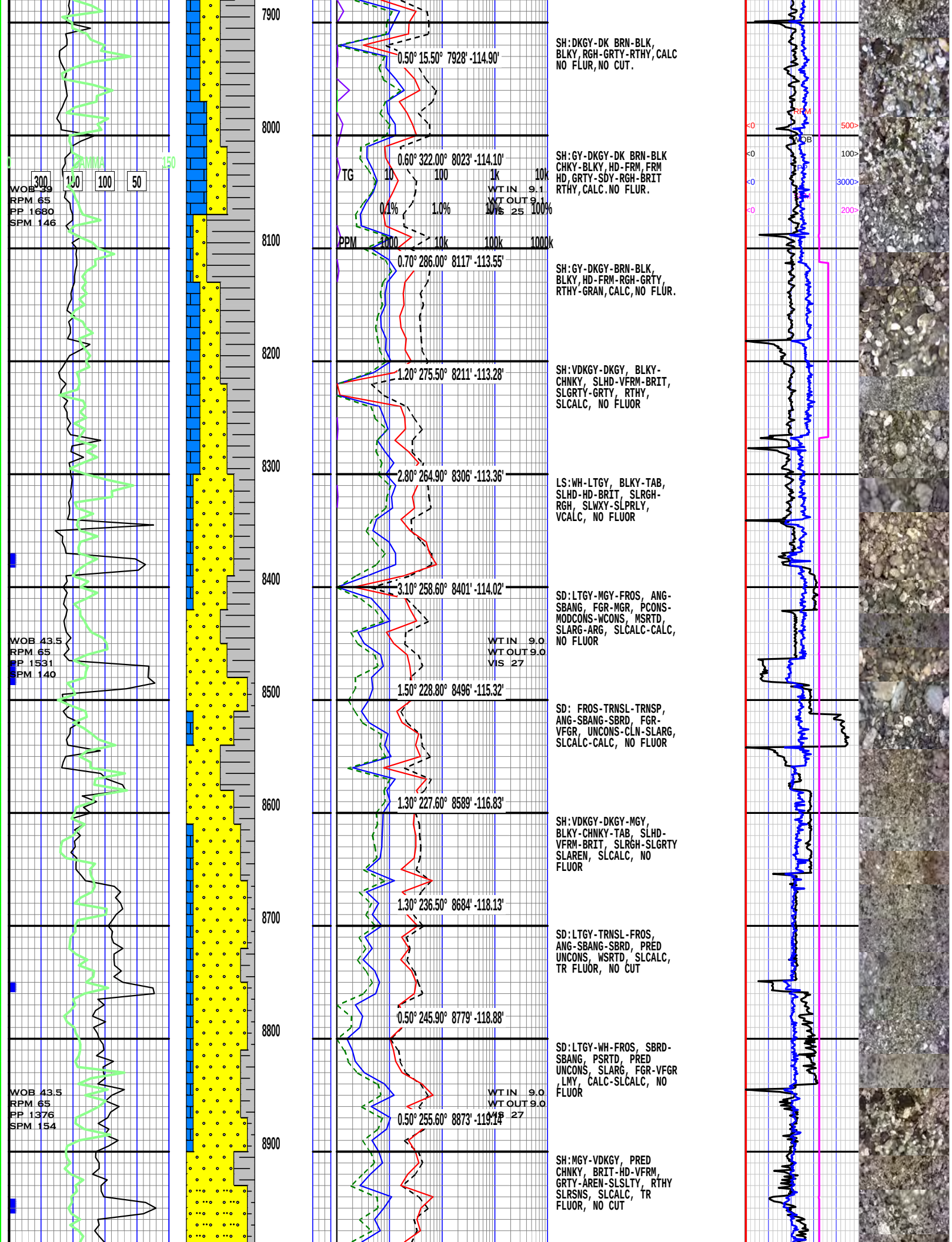
RIG UP 2 MAN LOGGING
UNIT 11/7/17, WBM

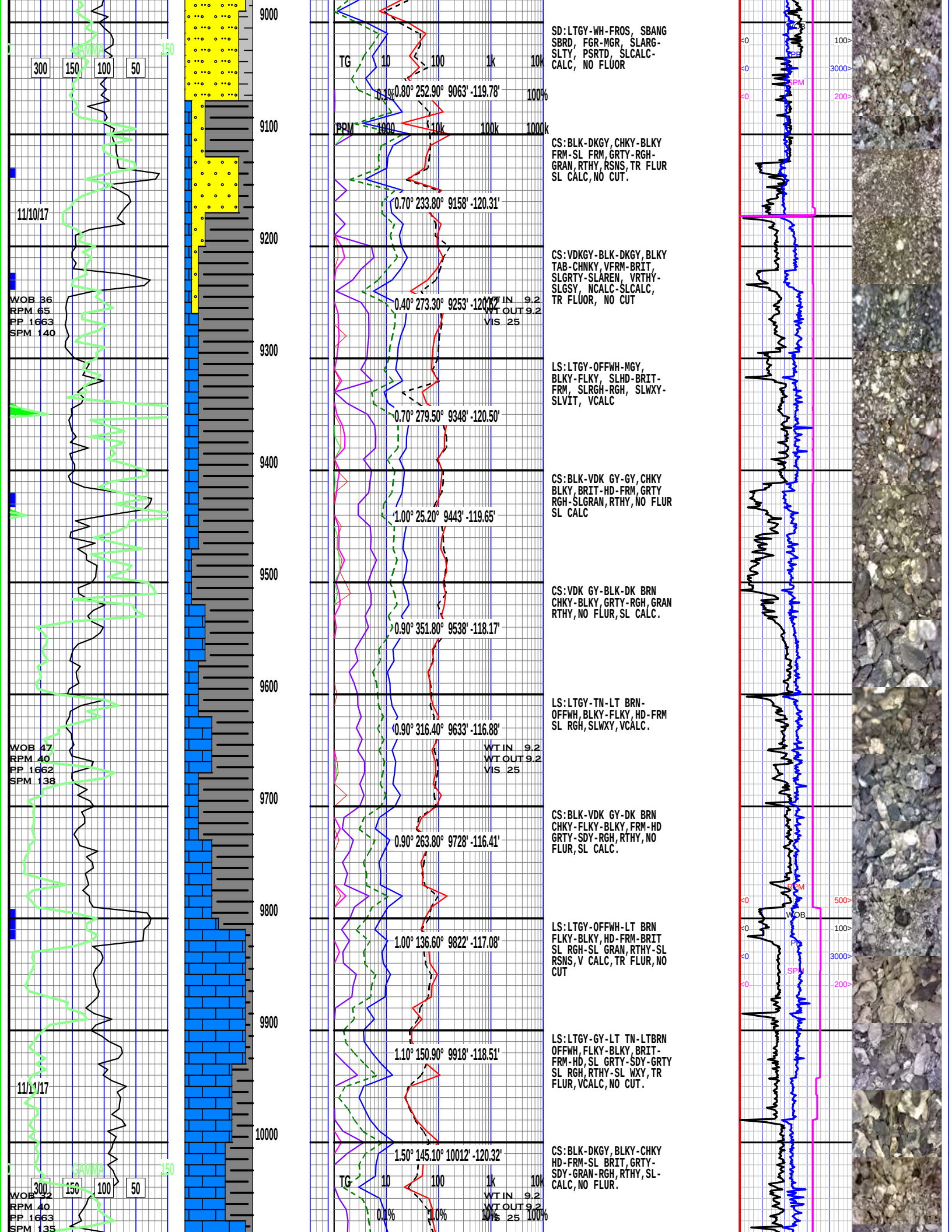
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MGR, ANG-SBANG-SBRD,
ARG, PCONS-WCONS,
SLCALC-NCALC, NO FLUOR

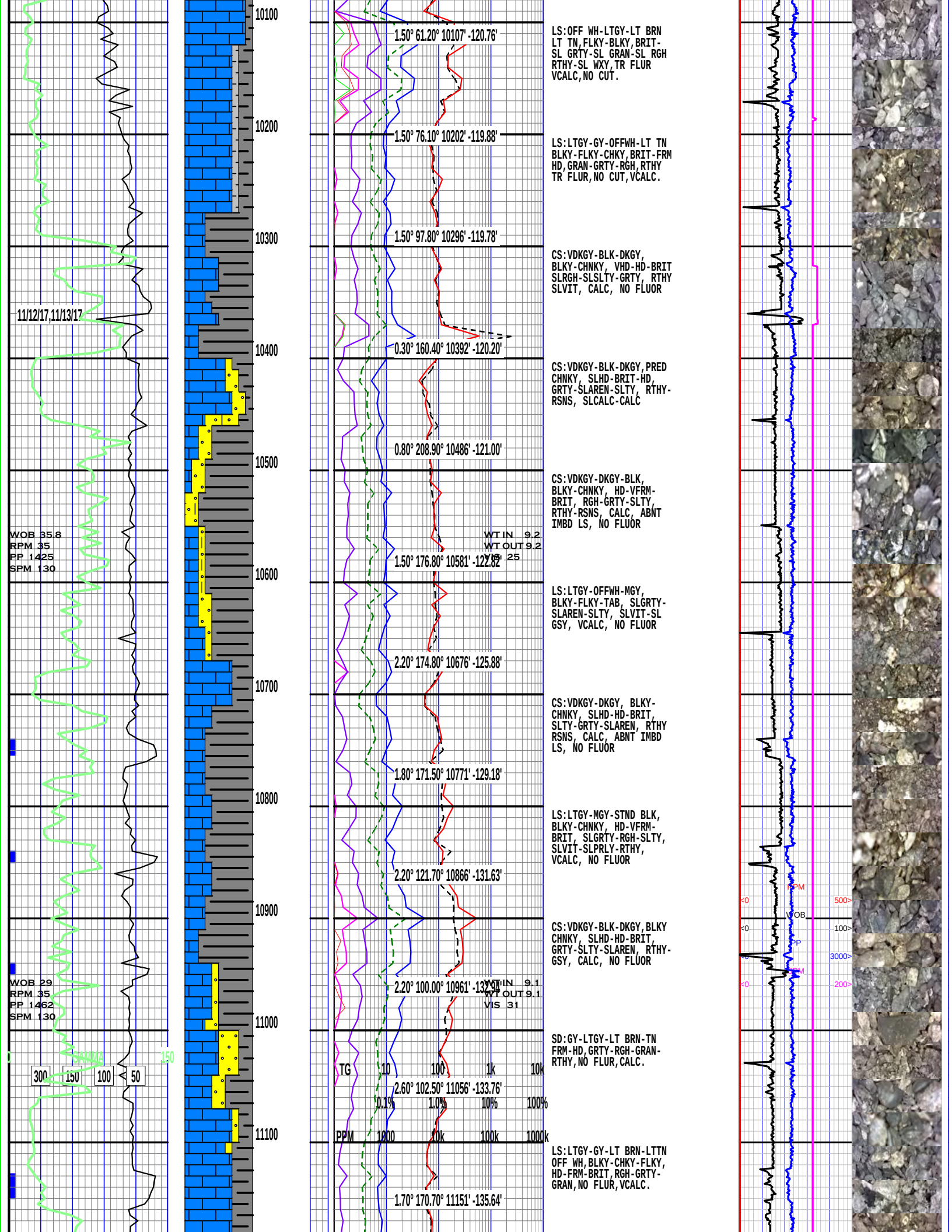
SH: LTGY-MGY, BLKY-CHNKY
SLSFT-SLFRM, SLSM-SL
AREN-AREN, SLWXY-WXY,
SLCALC-NCALC, NO FLUOR

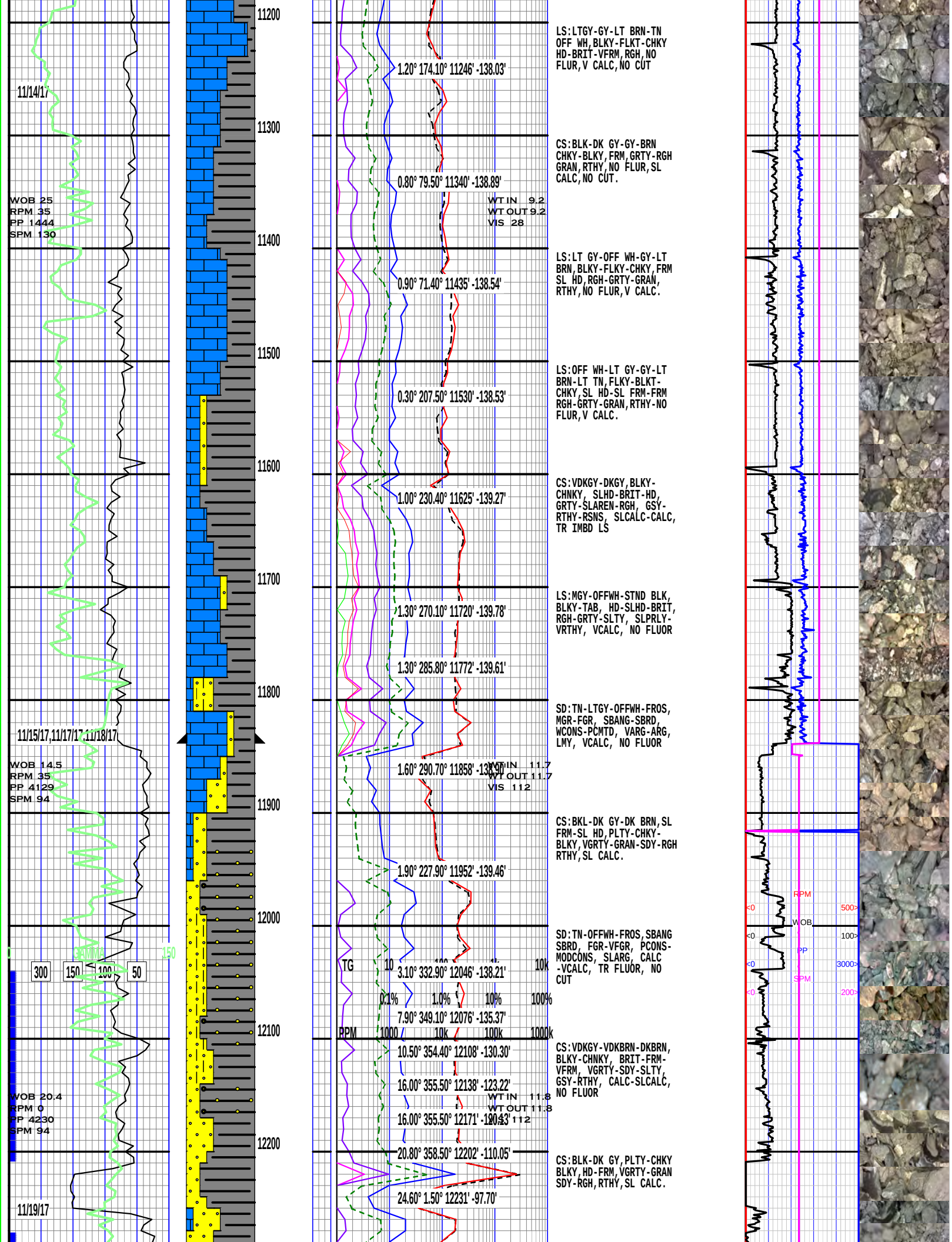


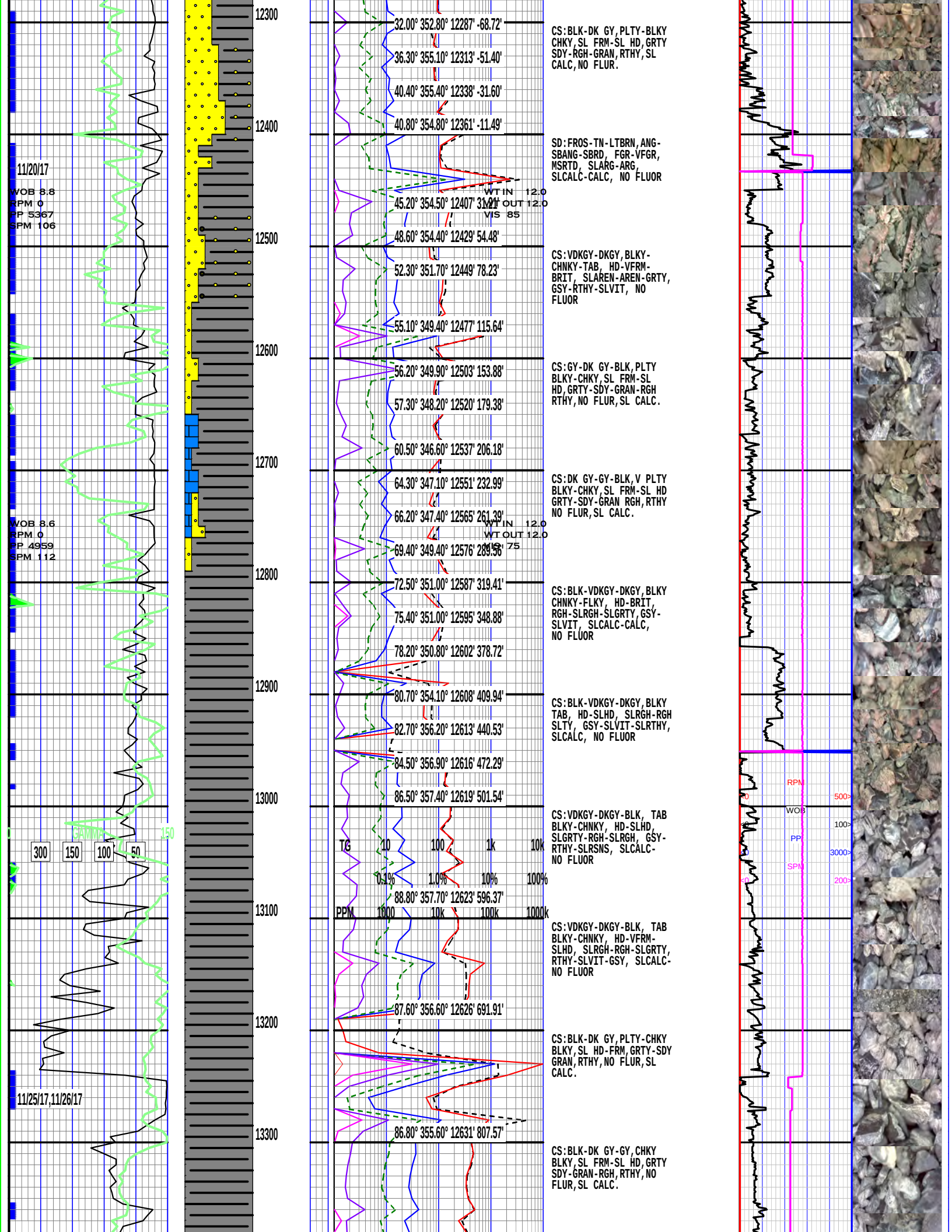


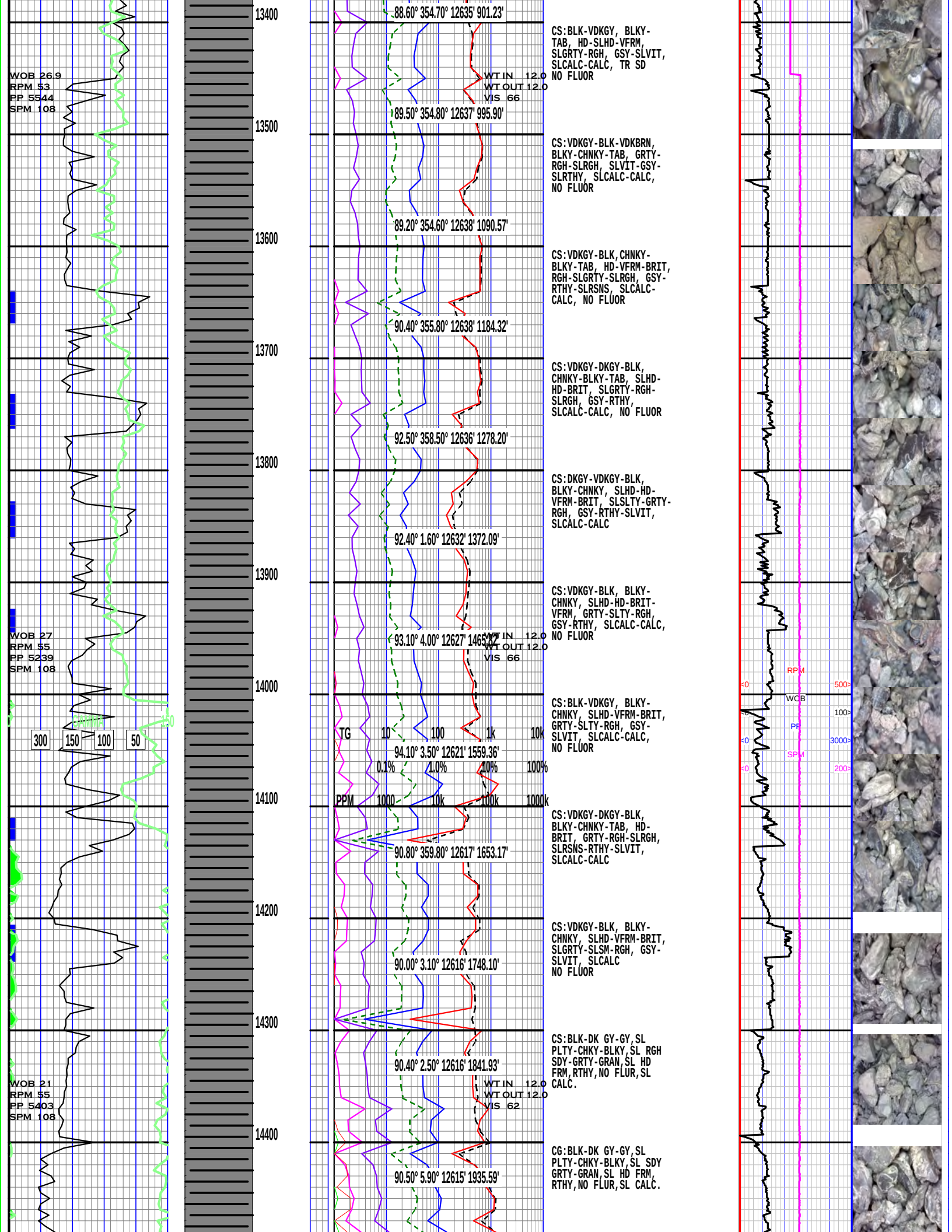


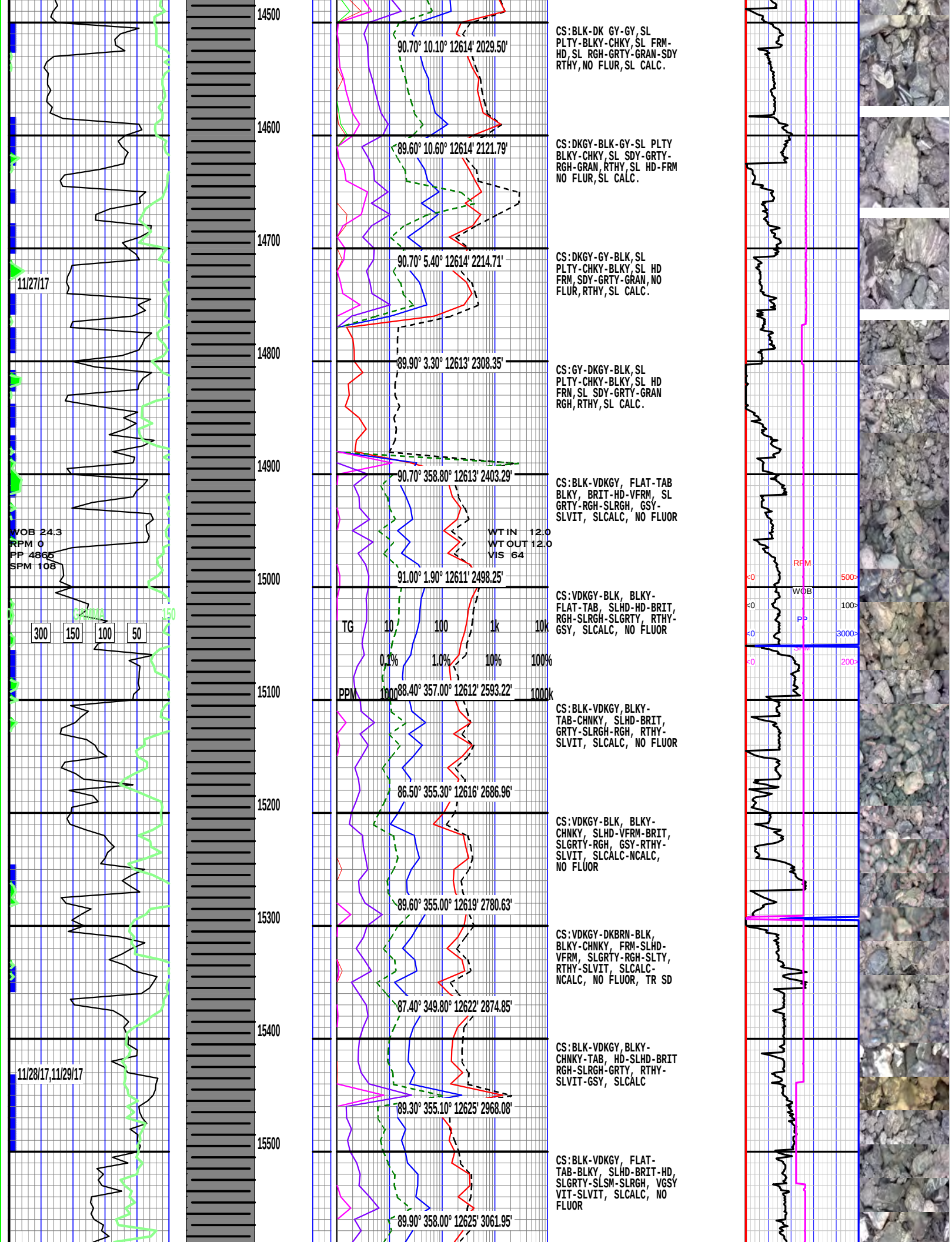


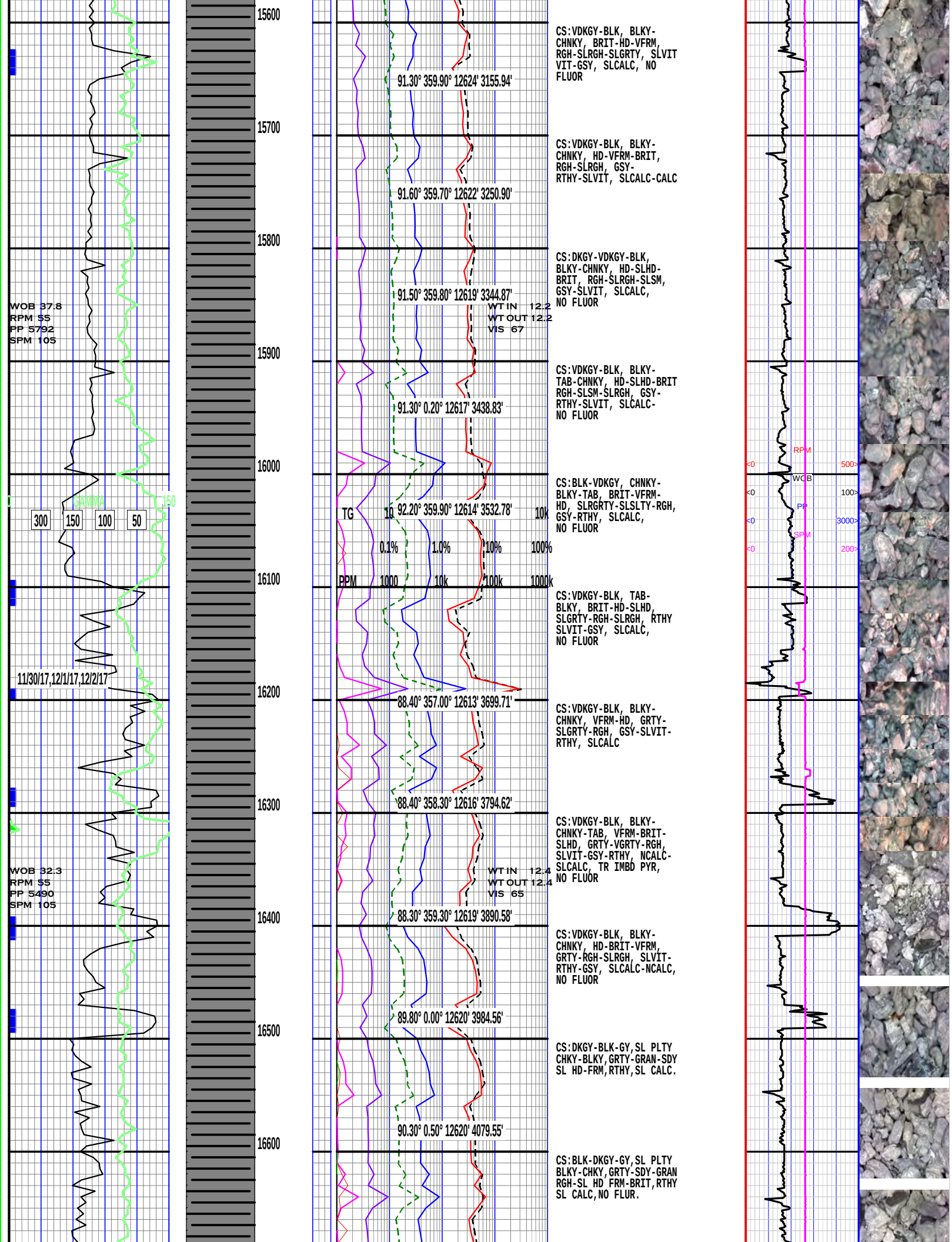


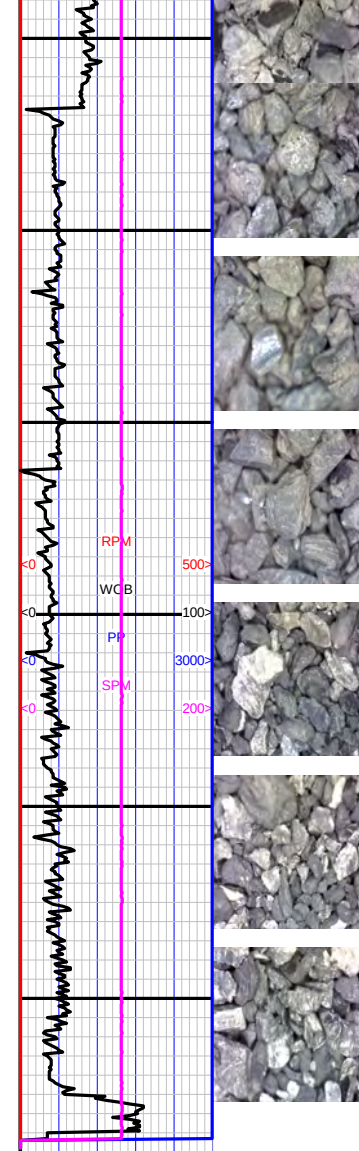
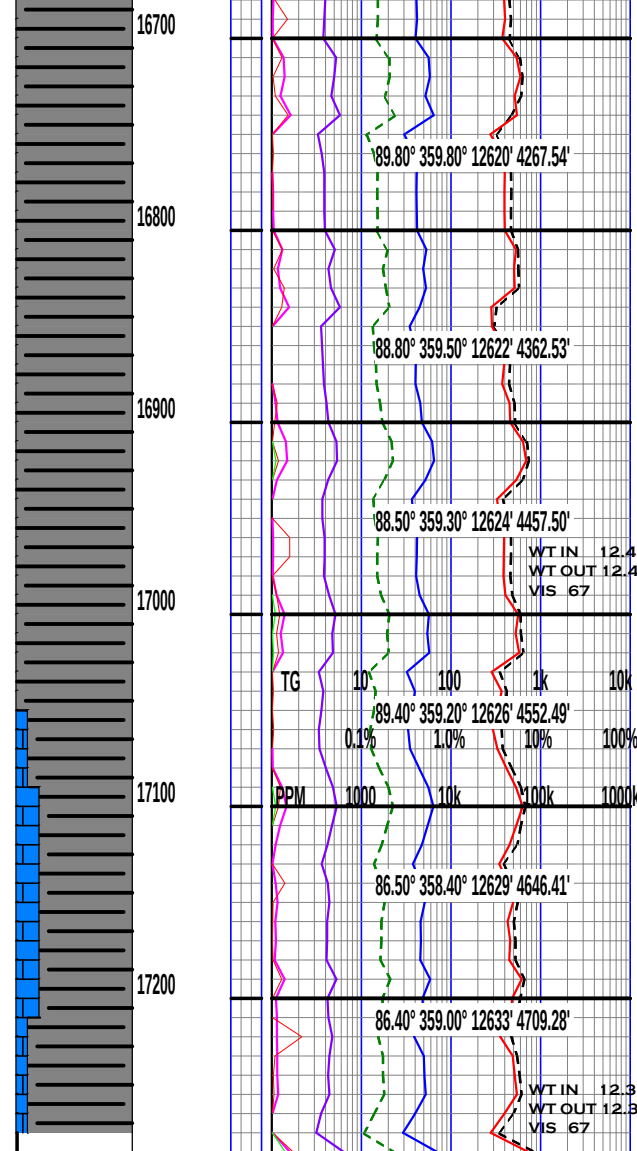
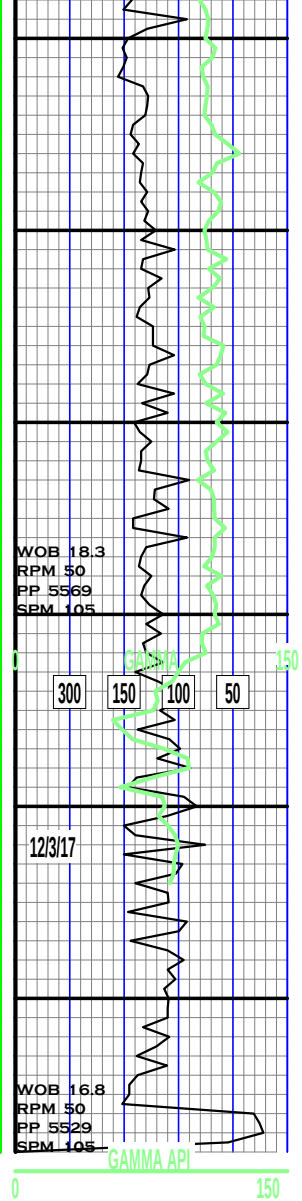












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Created By MainLog

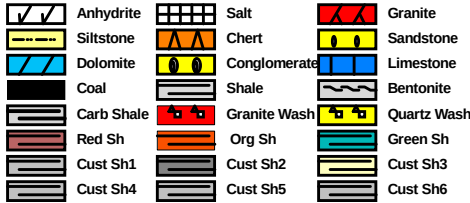
Abbreviations:

NB...New Bit
CO...Circ Out
NR...No Returns
TG...Trip Gas
WOB...Wt on Bit
RPM...Rev/Min
SG...Survey Gas
DST...Drill Stem Test
DS...Directional Survey
CG...Connection gas
LAT...Logged After Trip
PP...Pump Pressure
SPM...Strokes/Min
DTG...Down Time Gas

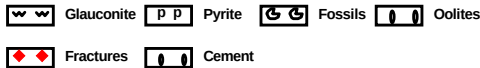
Mud Data

WT..Weight
PH..Acidity
CHL..Chlorides
V..Viscosity
F..Filtrate
SC..Solids Content

Lithology Symbols:



Accessories



Gas Chromatograph Analysis:

TG ---
C1 ---
C2 ---
C3 ---
IC4 ---
NC4 ---
IC5 ---
NC5 ---

Drilling Rate

FT/HR

Lithology

Total Gas/Chromatograph

Descriptions/Remarks

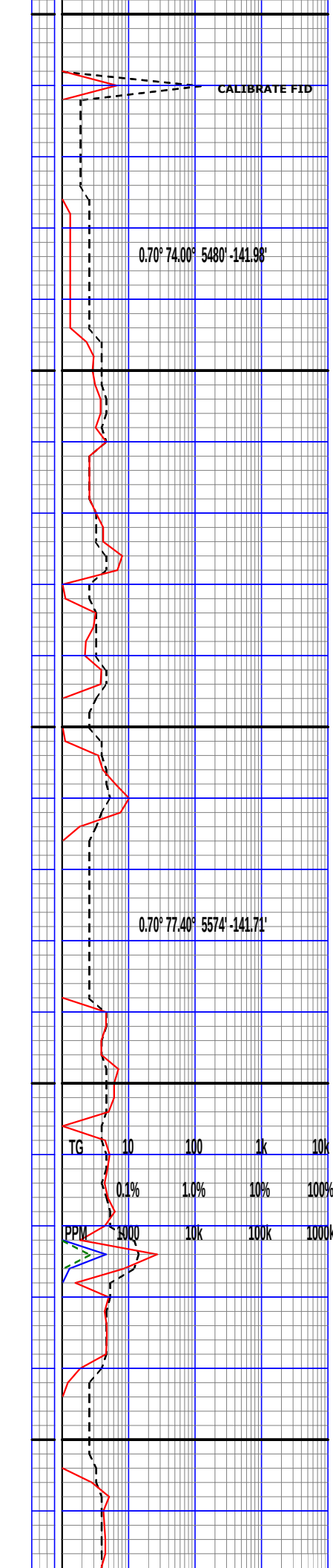
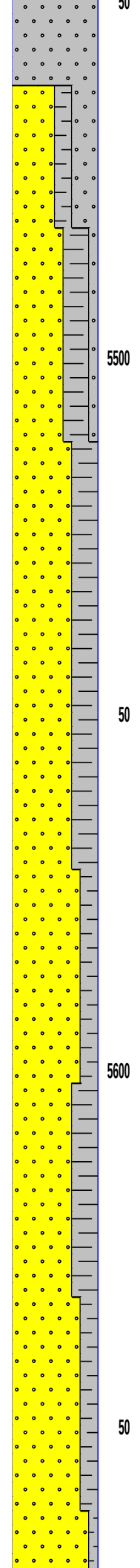
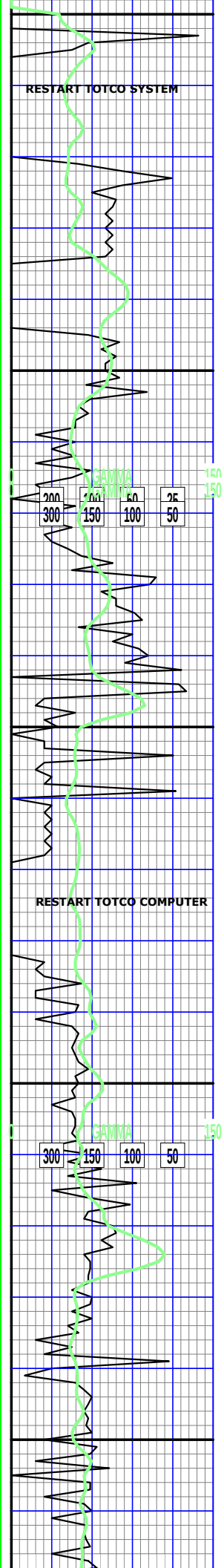
DRILLING

PICTURES

5400

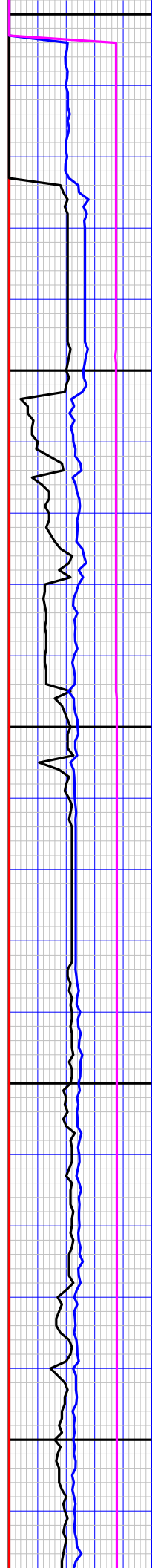
RIG UP 2 MAN LOGGING
UNIT 11/7/17, WBM

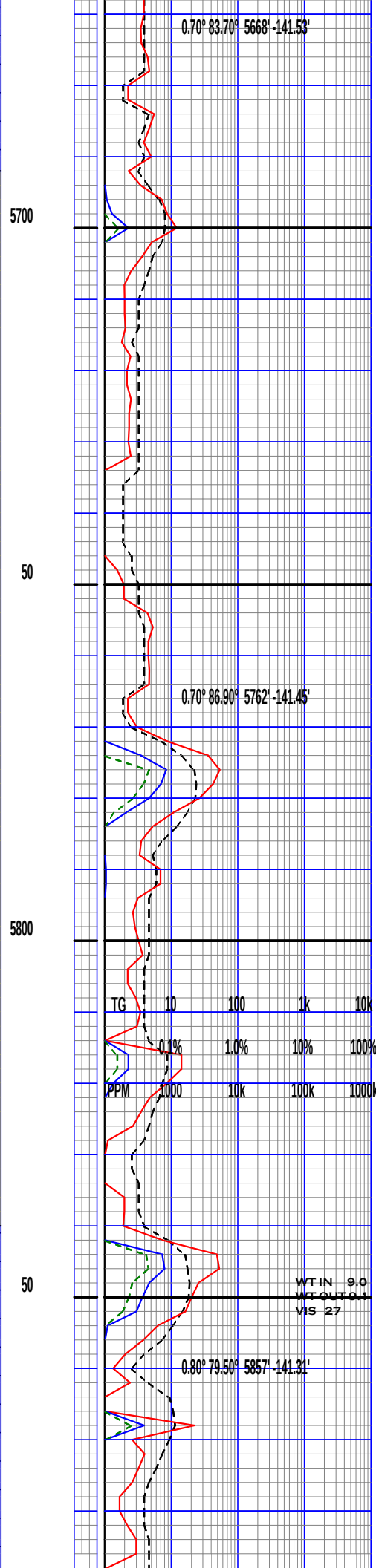
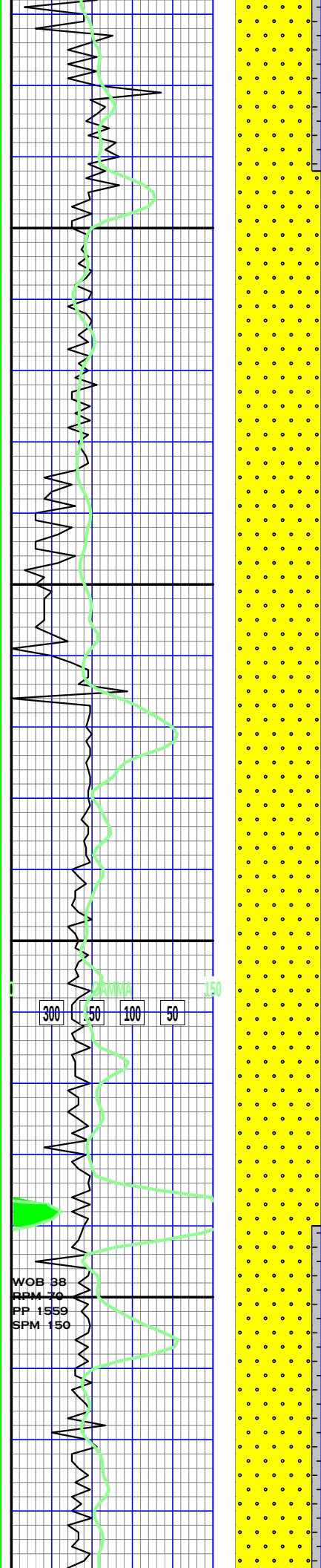
TG 10 100 1k 10k
0.1% 1.0% 10% 100%
PPM 1000 10k 100k 100k



SD: LTGY-MGY-FROS, FGR-MGR, ANG-SBANG-SBRD, ARG, PCONS-WCONS, SLCALC-NCALC, NO FLUOR

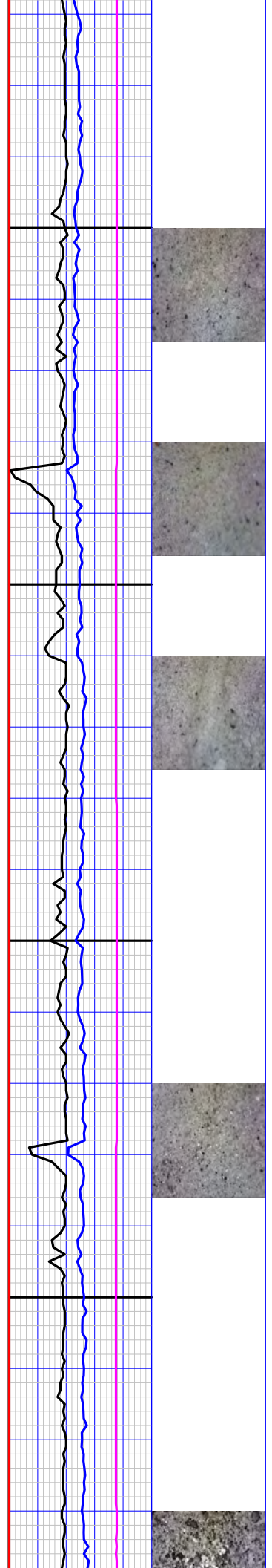
SH: LTGY-MGY, BLKY-CHNKY SLSFT-SLFRM, SLSM-SL AREN-AREN, SLWXY-WXY, SLCALC-NCALC, NO FLUOR

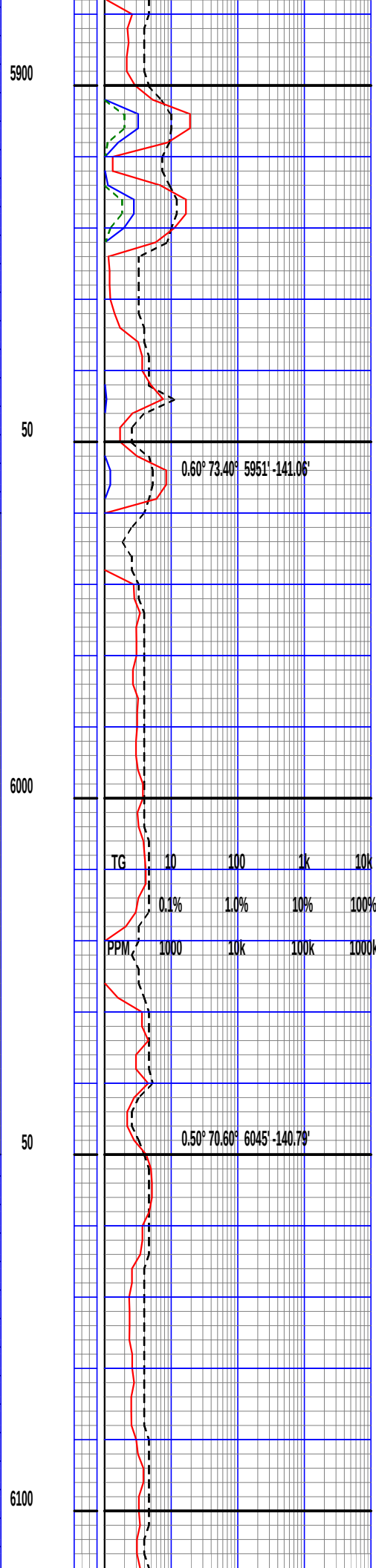
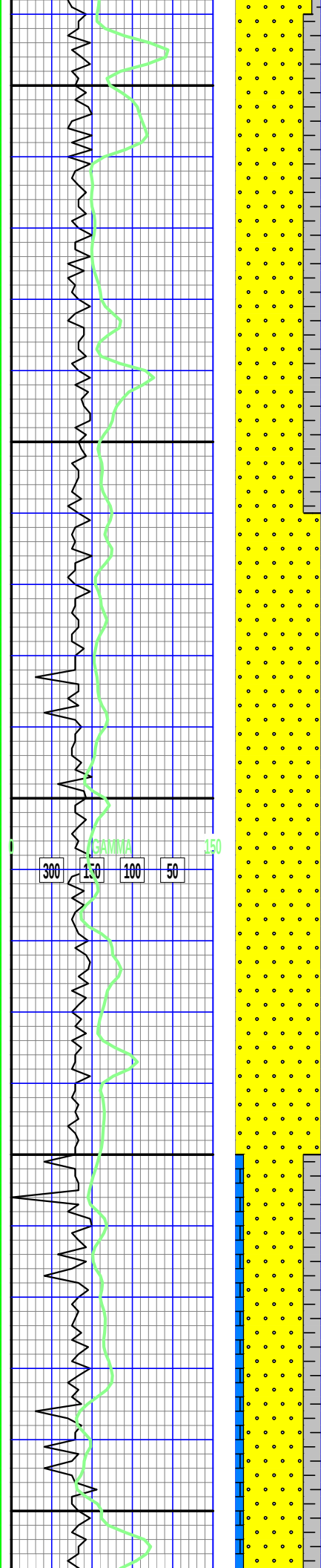




SD: FROS-TRNSL-LTGY,
SBANG-SBRD-RD, VFGR-
FGR, UNCONS, SLARG,
WSRTD, PRED NCALC,
NO FLUOR

SD: LTGY-FROS-TRNSL-
TRNSP, SBANG-SBRD,
FGR-VFGR, SLARG-CLN,
WSRTD, SLCALC-CALC

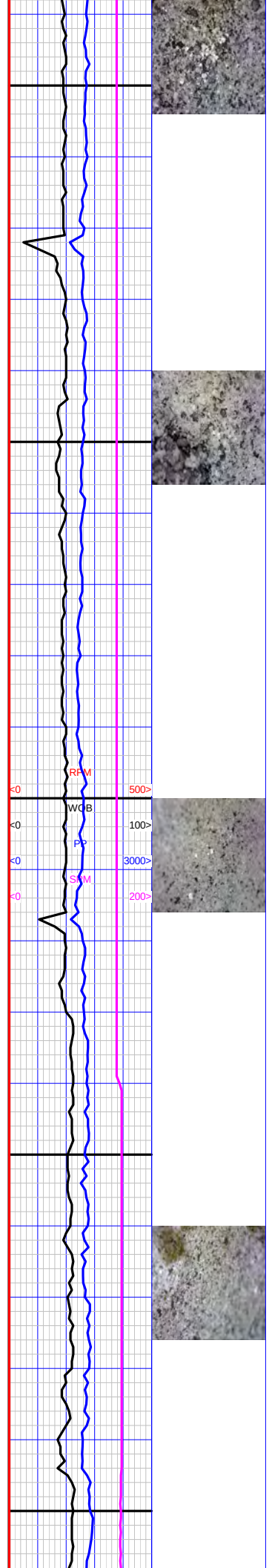


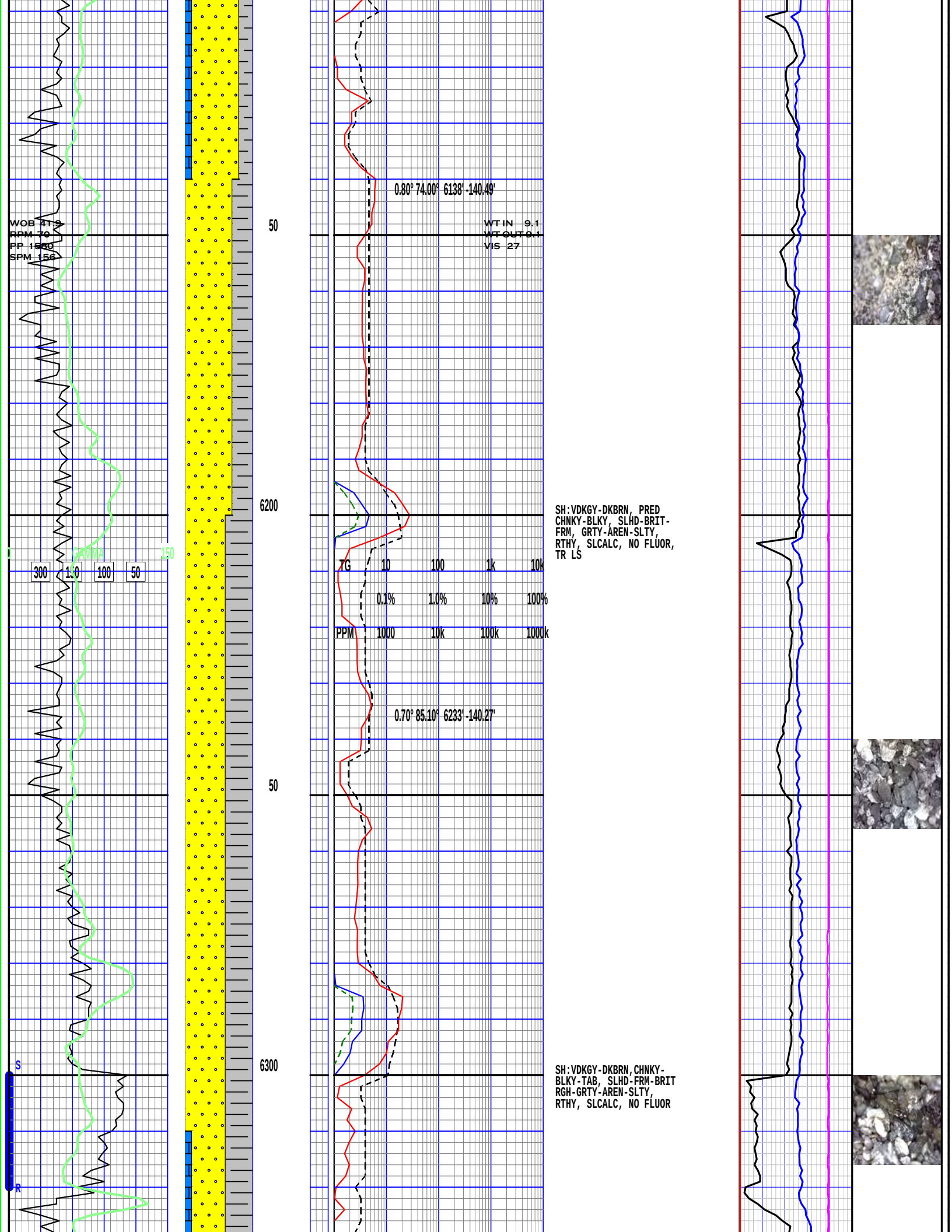


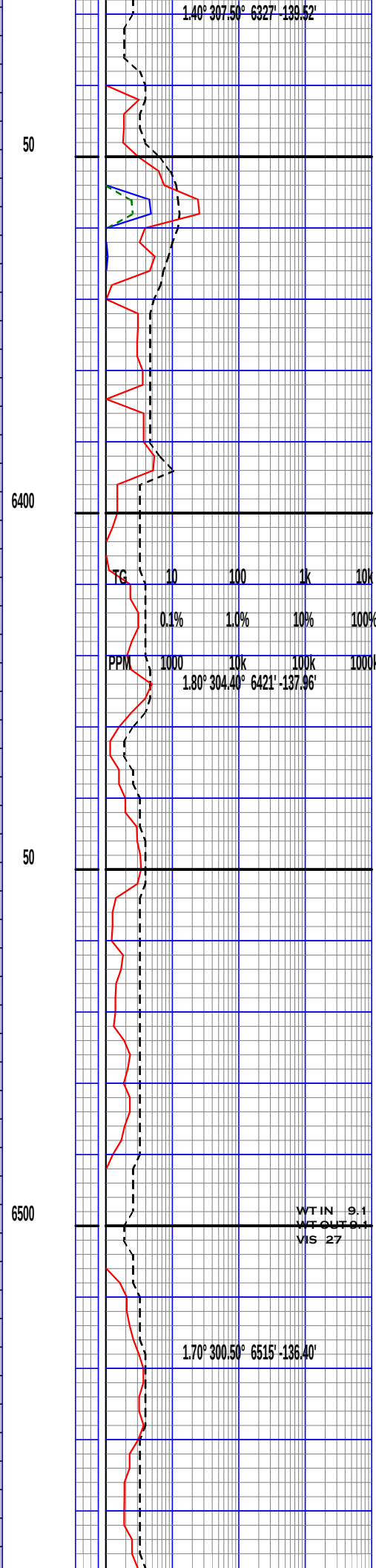
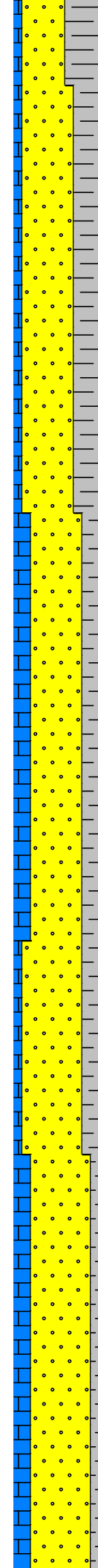
SH:VDKGY-DKGY, BLKY-TAB, VFRM-FRM, RGH-SLRGH, SLRTHY, NCALC-SLCALC, NO FLUOR

SD:FROS-TRNSP-TRNSL, FGR-VFGR, SBRD-RD, UNCONS, CLN-SLARG, SLCALC-CALC, NO FLUOR

SD:FROS-TRNSL-LTGY-MGY ANG-SBANG-SBRD, FGR-MGR SLARG-ARG, PSRTD, PCONS MODCONS-UNCONS, SLCALC, NO FLUOR

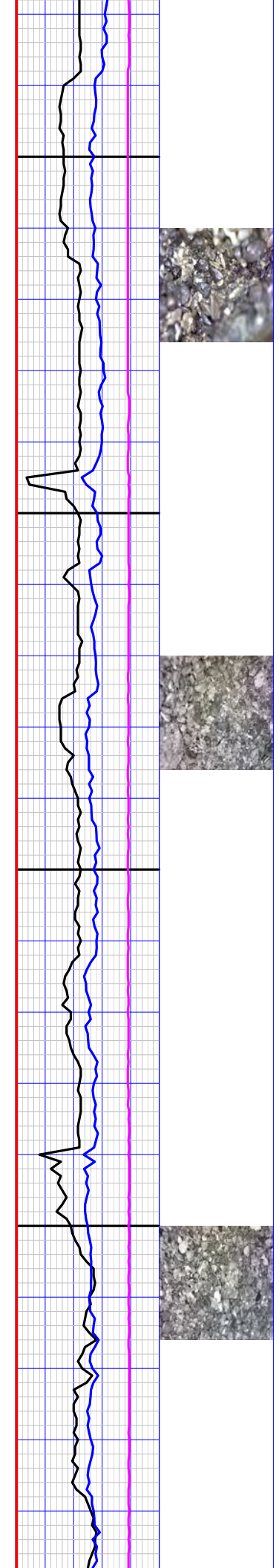


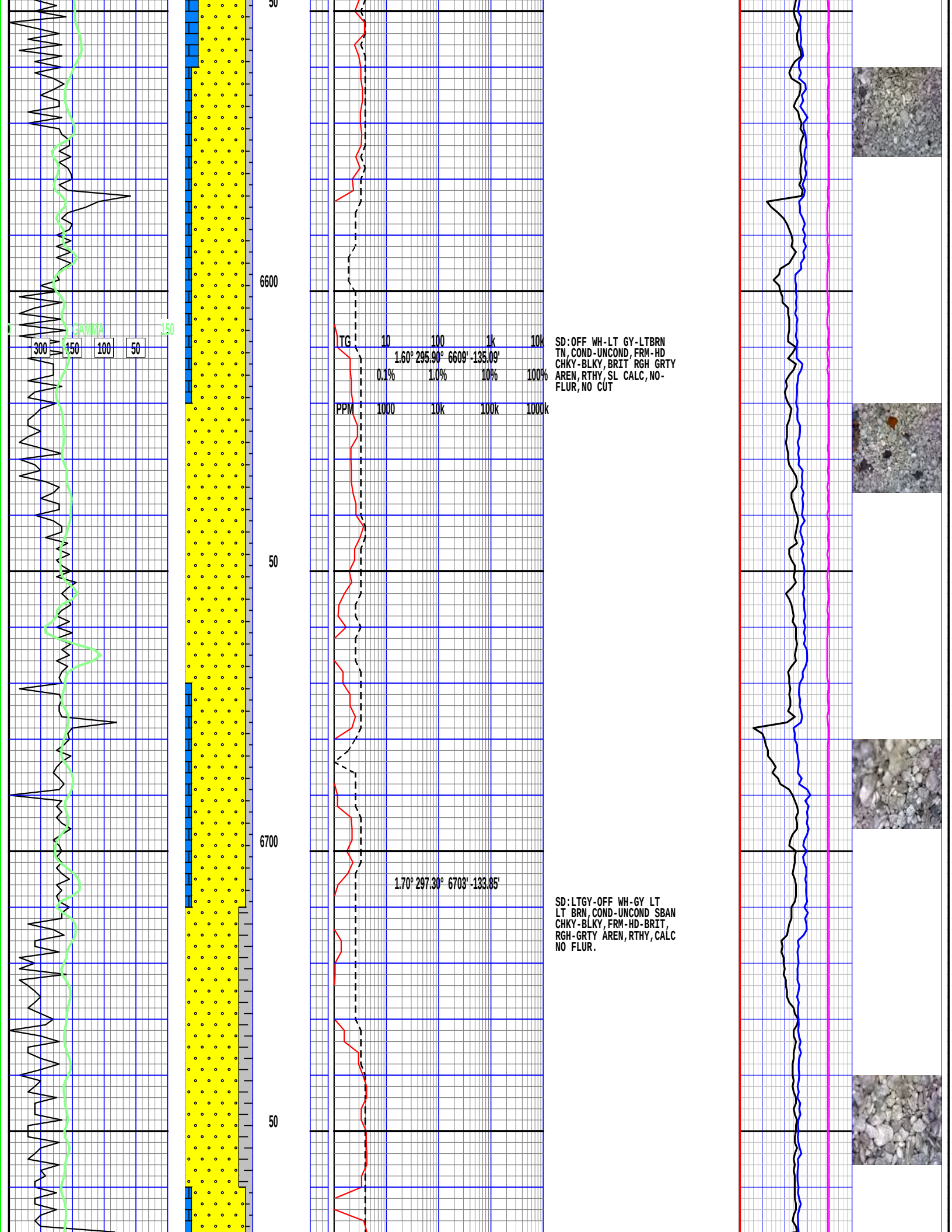


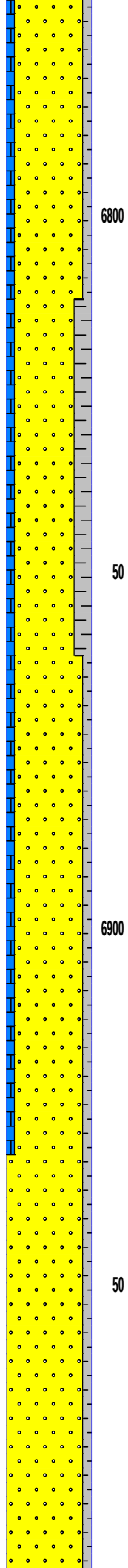
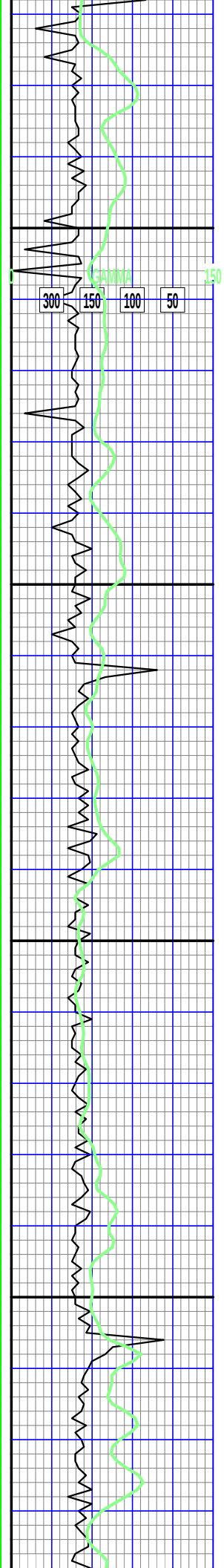


SD:LTBRN-LTGY-FROS-
TRNSL, ANG-SBANG-SBRD,
FGR-MGR, PCONS-MODCONS-
UNCONS, SLCALC-CALC,
TR FLUOR, NO CUT

SD:FROS LT-GY-OFF WH L
BRN,CHKY-BLKY,RGH,GRTY,
COND,RTHY,CALC,NO FLUR,
NO CUT





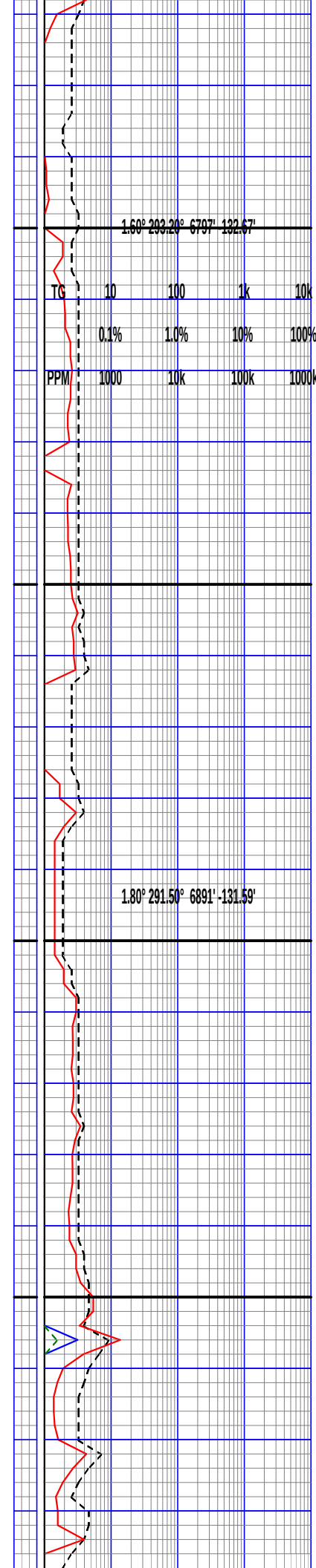


6800

50

6900

50



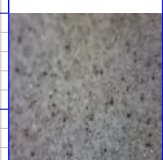
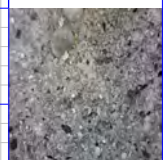
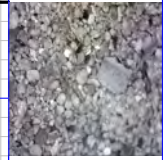
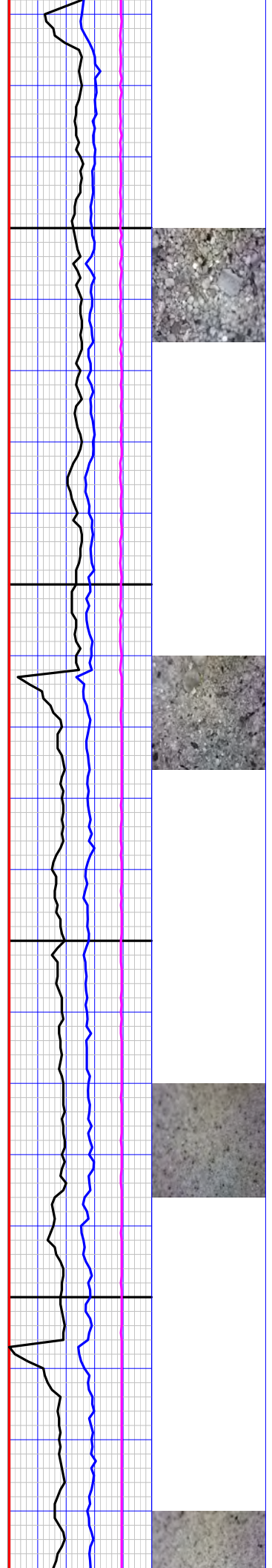
1.60° 293.20° 6707' 132.67'

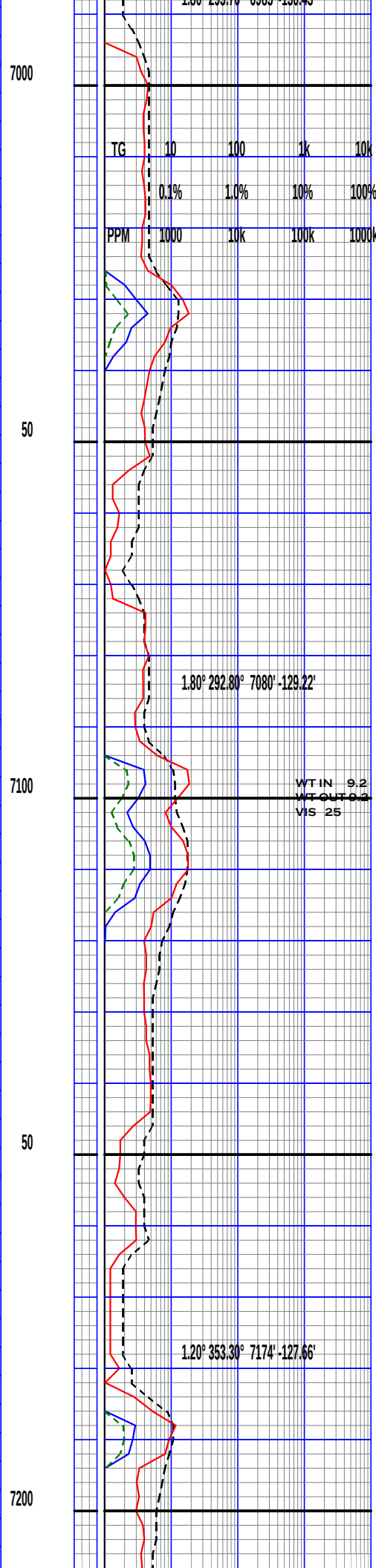
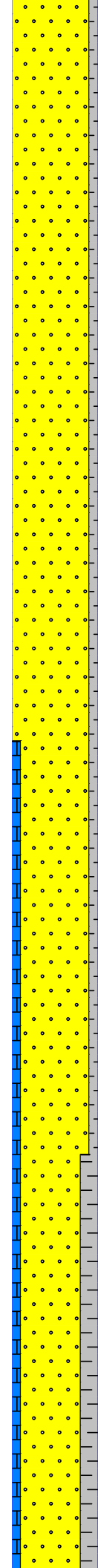
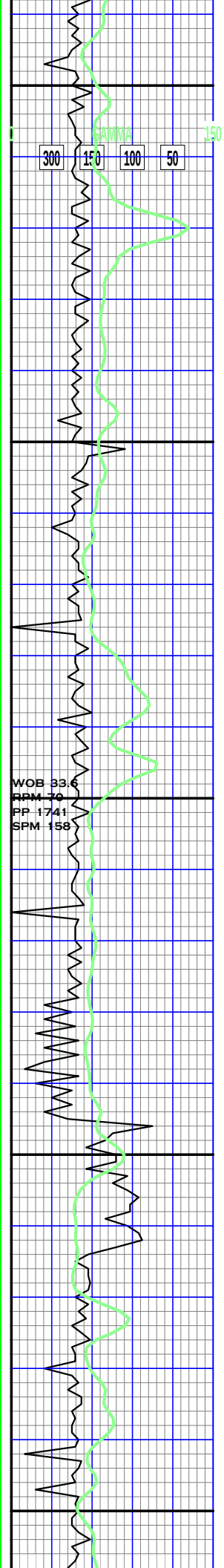
TG	10	100	1k	10k
PPM	0.1%	1.0%	10%	100%
PPM	1000	10k	100k	1000k

1.80° 291.50° 6891' 131.59'

SD: OFF WH-LTGY-LT TN-BRN,CHKY-BLKY,HD-FRM-RGH-GRTY-AREN,RTHY,CALC COND-UNCOND,NO FLUR.

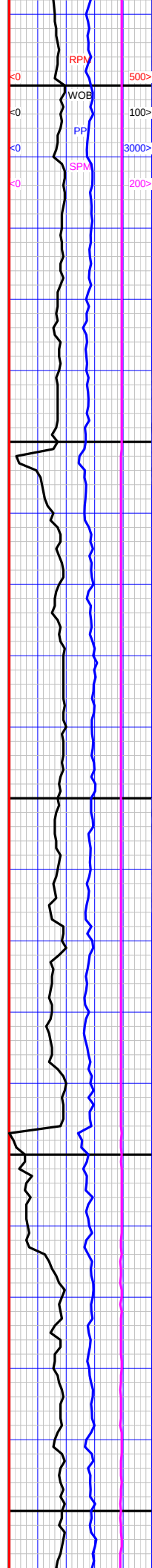
SD: CLR-FROS-LTGY UNCOND SBANG,HD-FRM-BRIT-GRTY-RGH,RTHY,CALC TR FLUR NO CUT

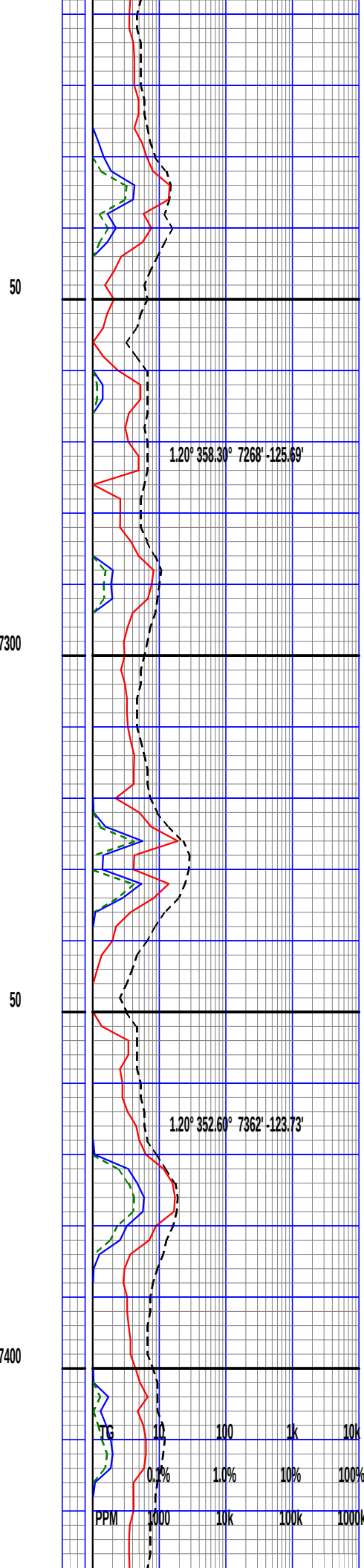
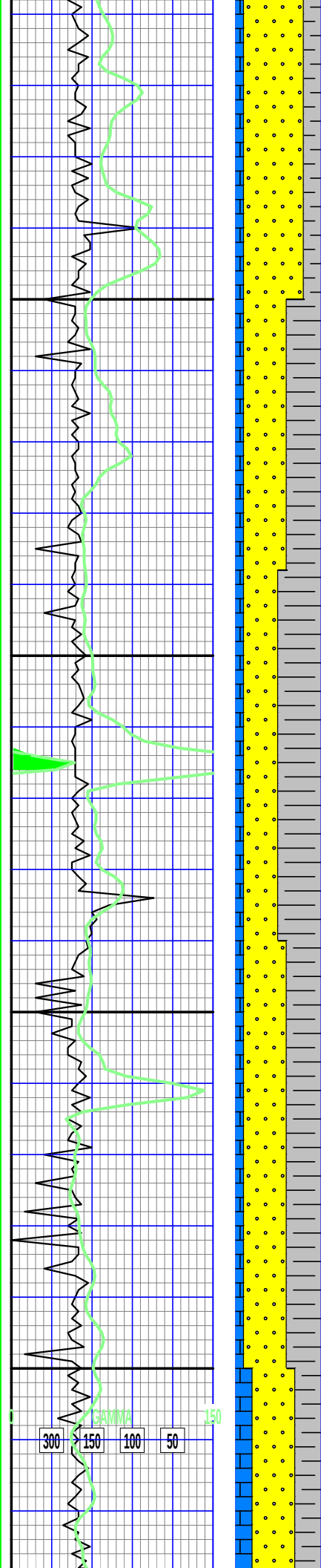




SD: FROS-CLR LTGY
LT TN, UNCOND SBANG-RND,
BRIT, FGRN, SL CALC, NO
FLUR.

SD: FROS-CLR-LTGY-
LT TN, UNCOND-COND, CHKY-
VHD-FRM-BRIT, SBANG RD,
AREN, RTHY SL CALC,
NO FLUR NO CUT.

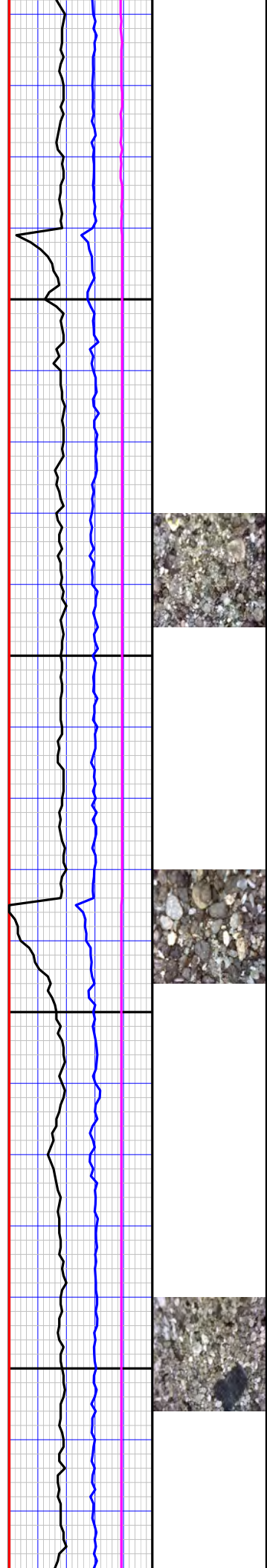


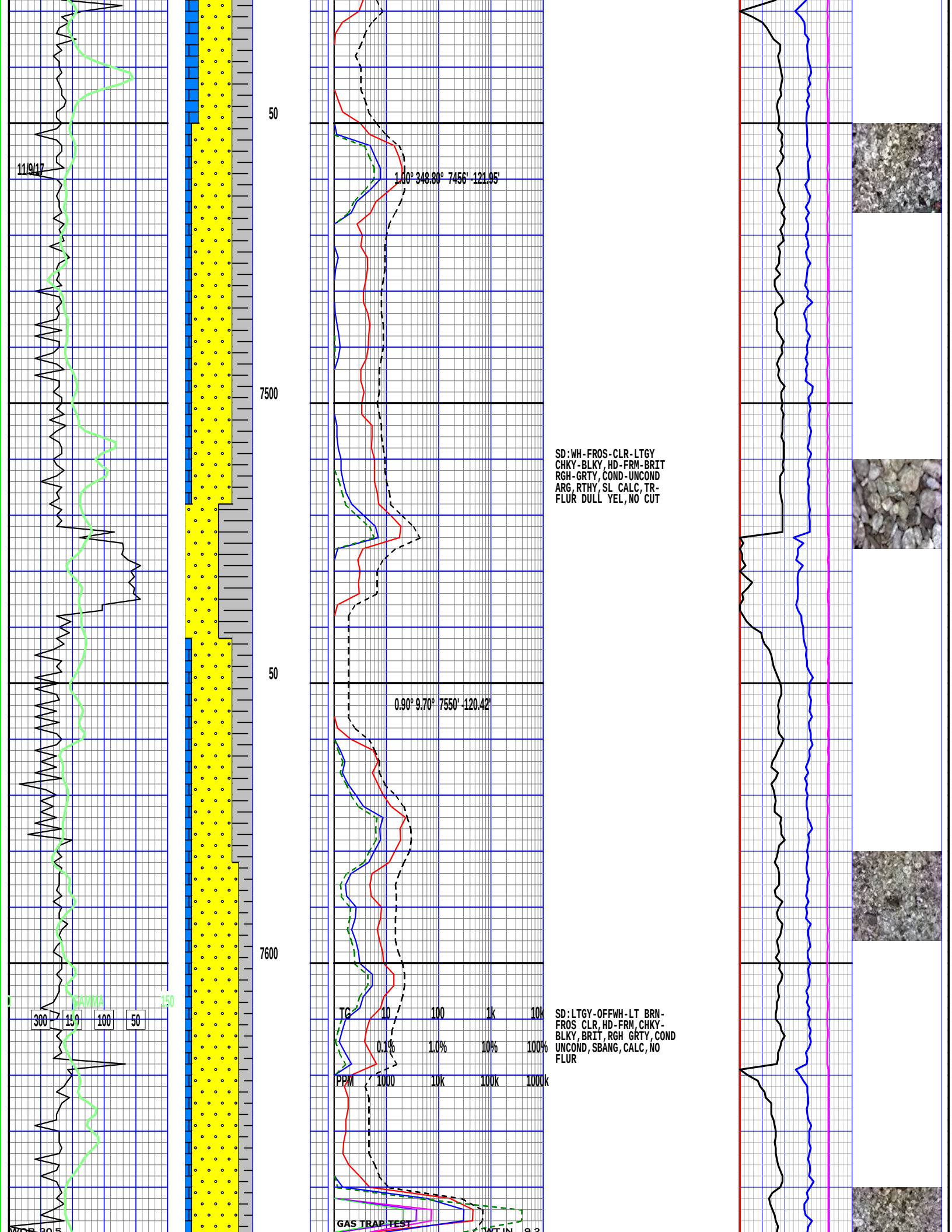


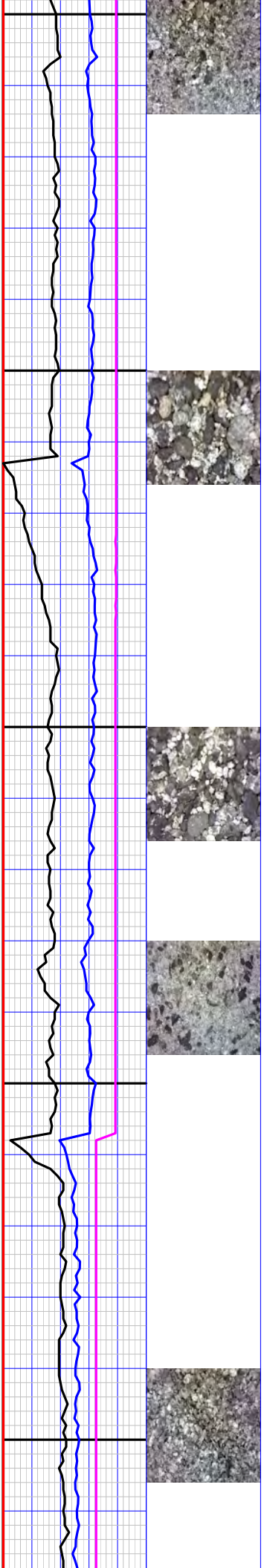
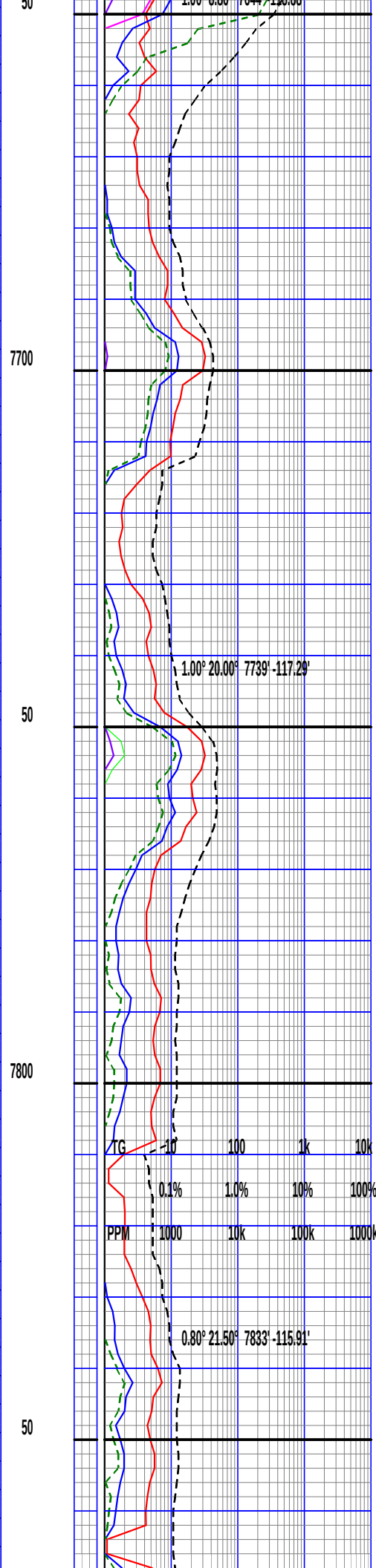
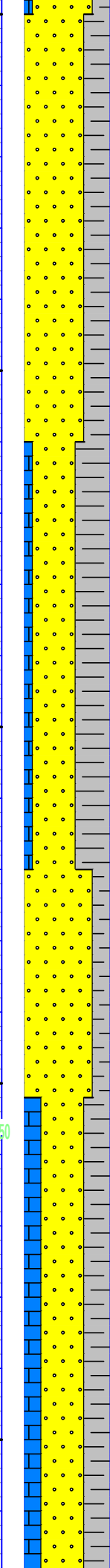
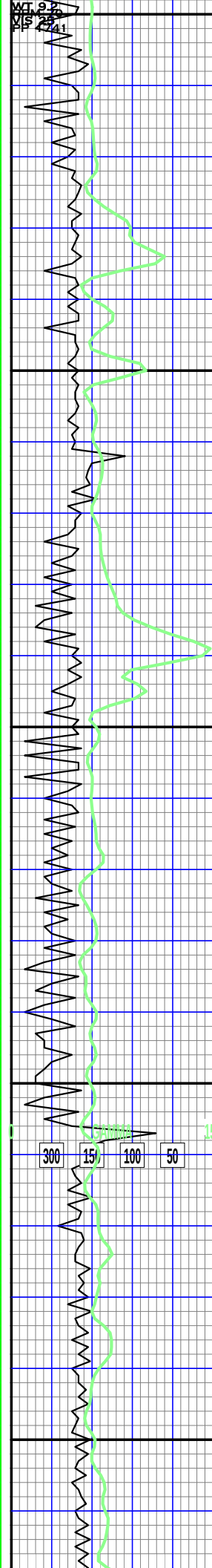
SD: FROS-CLR-LTGY-LT-BRN, UNCOND, HD FRM BRIT AREN, SBANG RD, CALC, NO FLUR NO CUT.

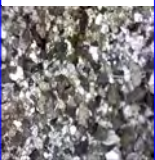
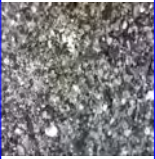
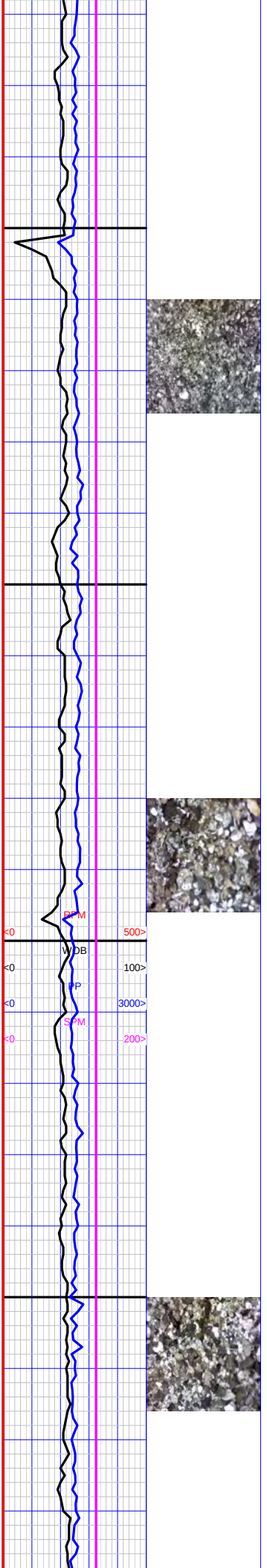
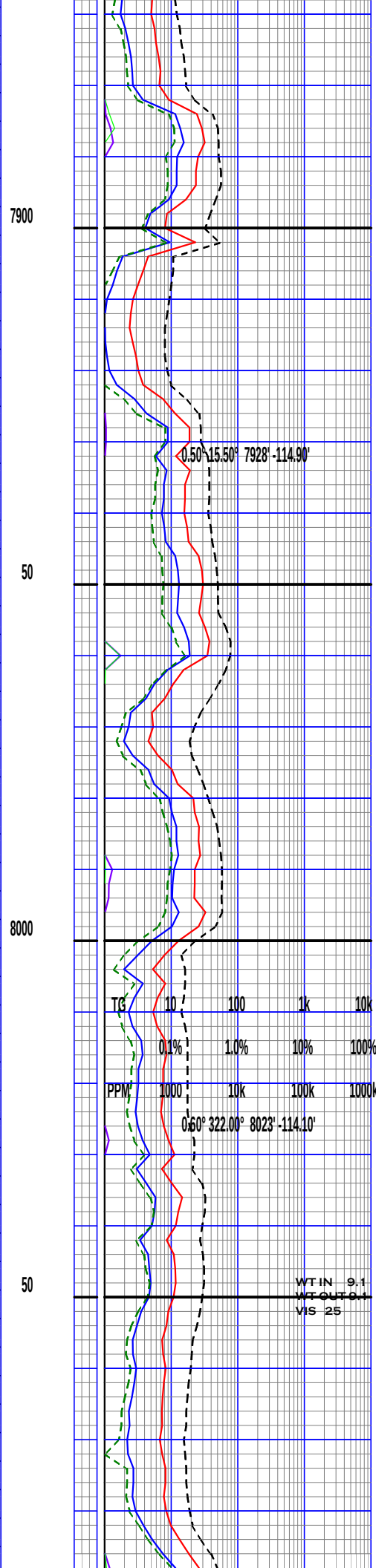
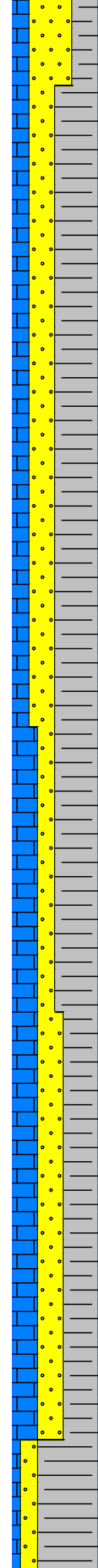
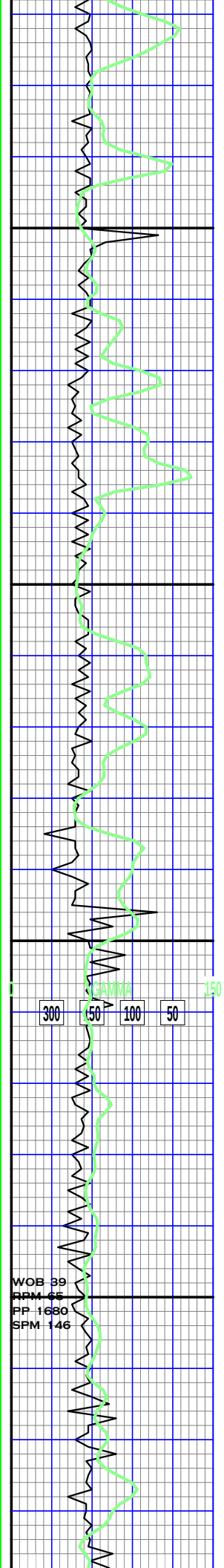
SH: DKGY-BRN-GY, CHKY BLKY, HD-FRM-BRIT-RGH GRTY, RTHY, SL CALC, NO FLUR, NO CUT

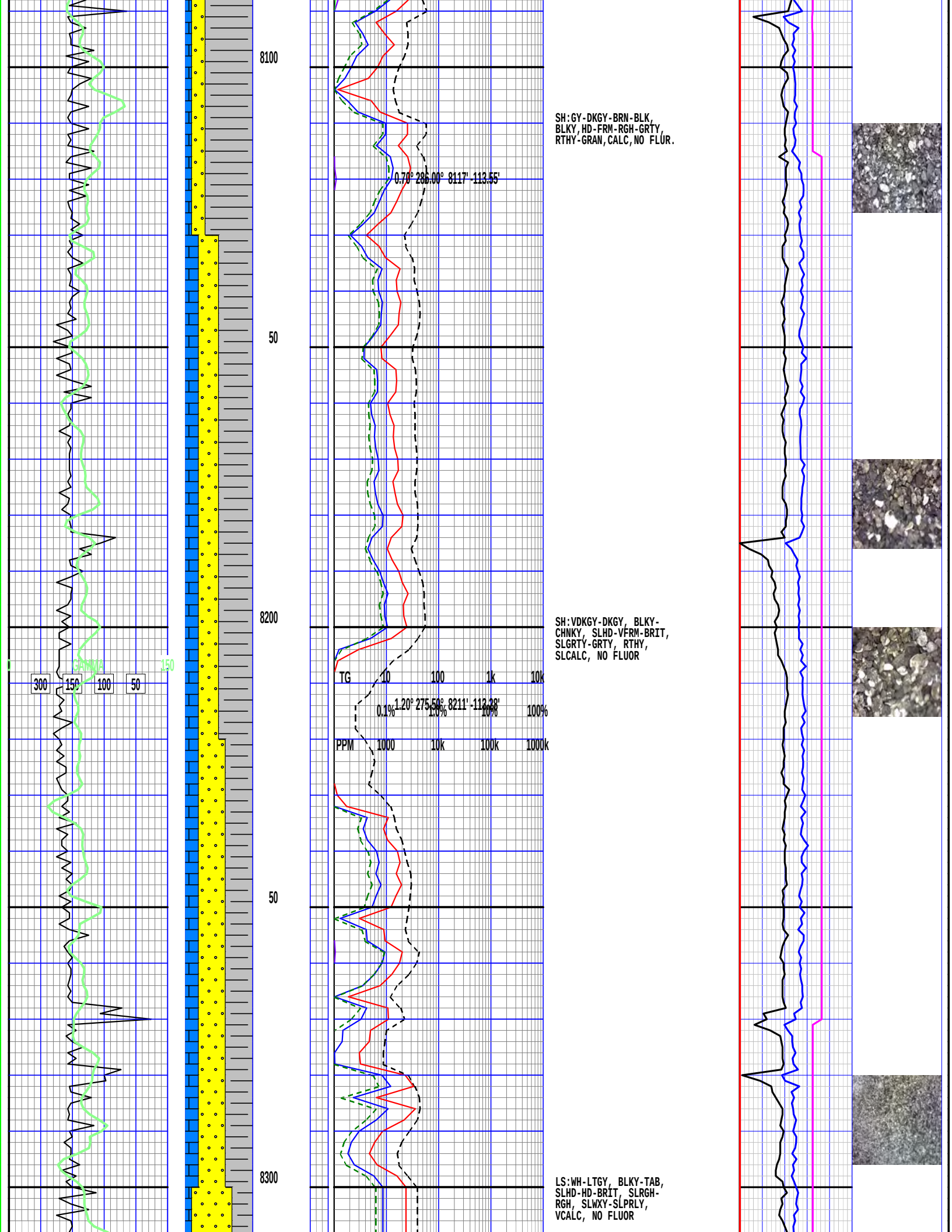
SD: FROS-CLR-LTGY-UNCOND-COND, CHKY-BLKY, HD-FRM-BRIT-RGH-GRTY-AREN, RTHY, CALC NO FLUR

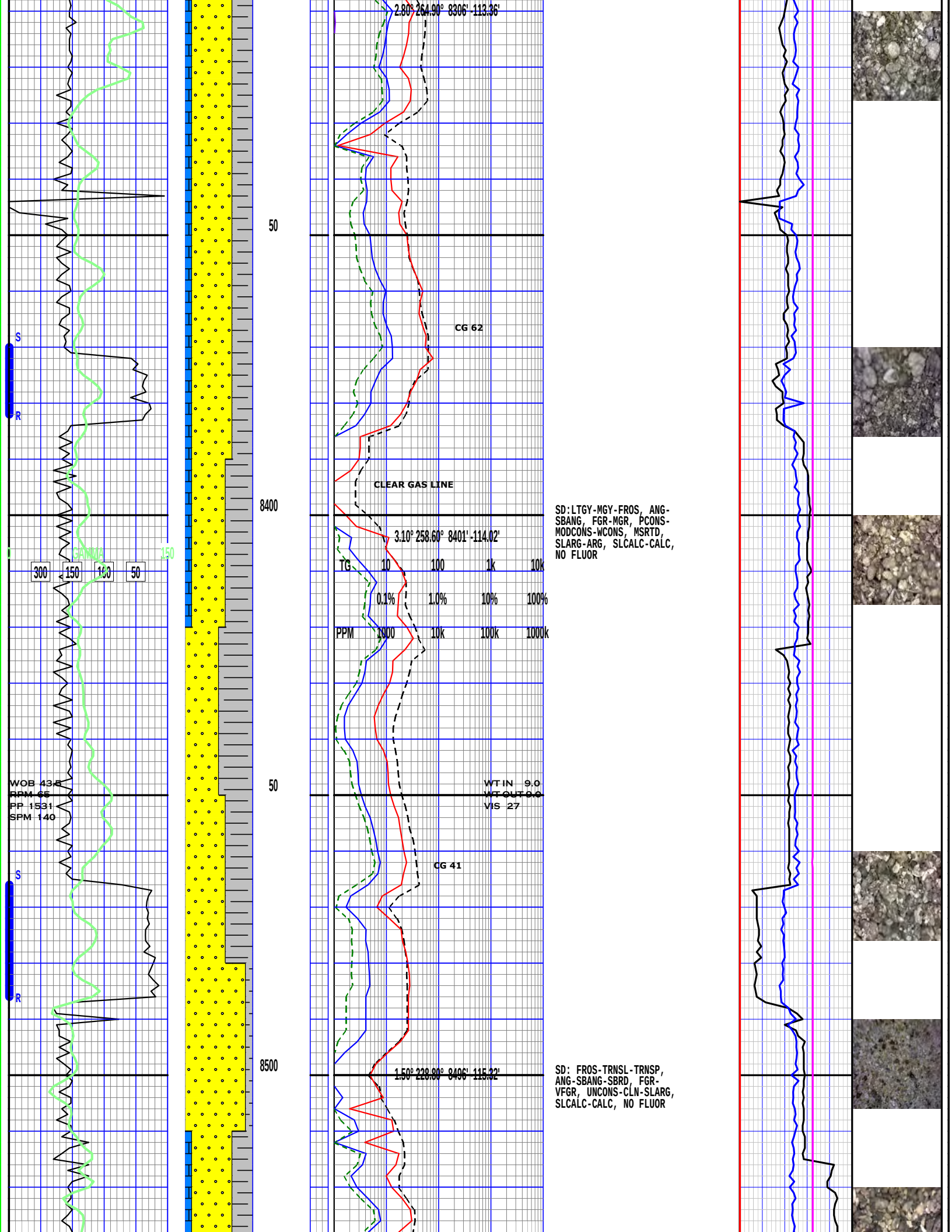


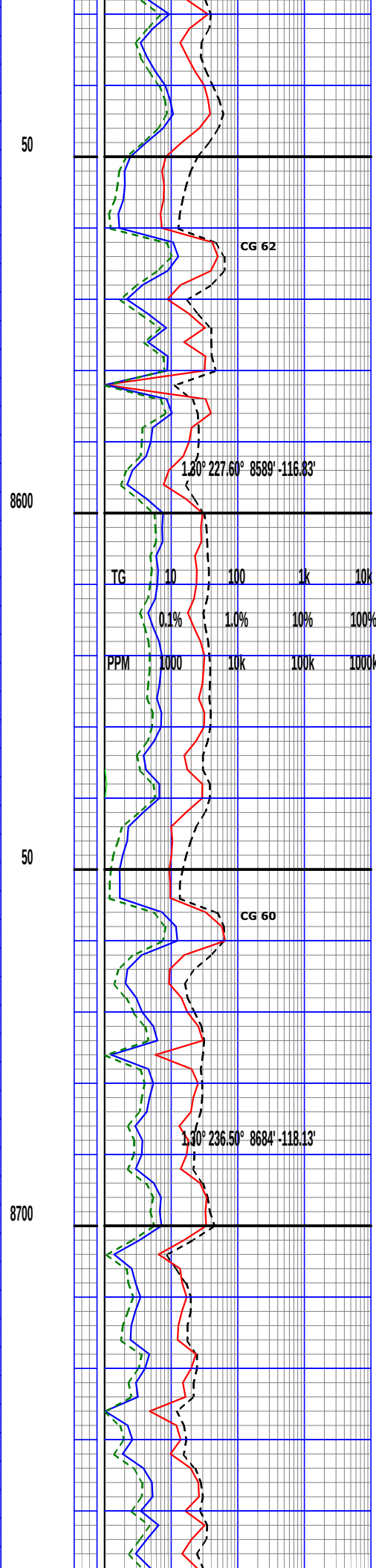
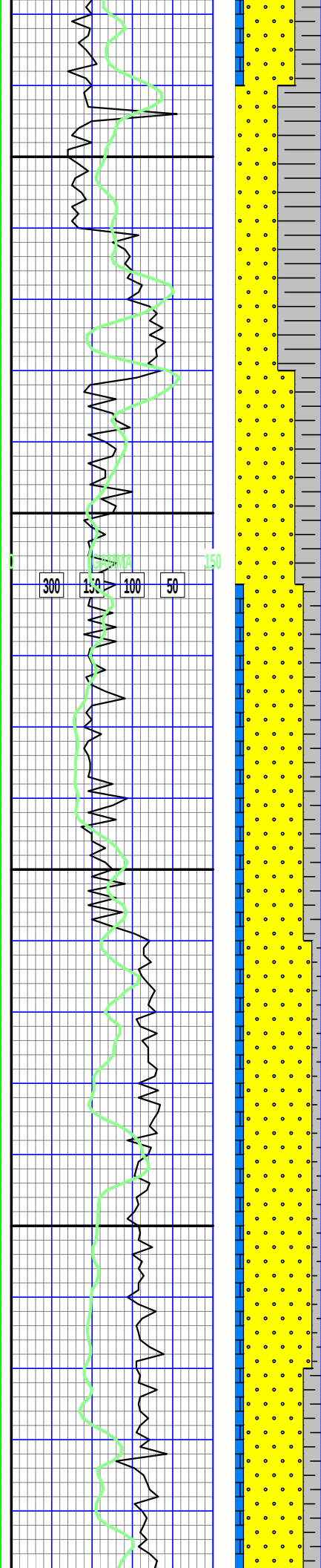






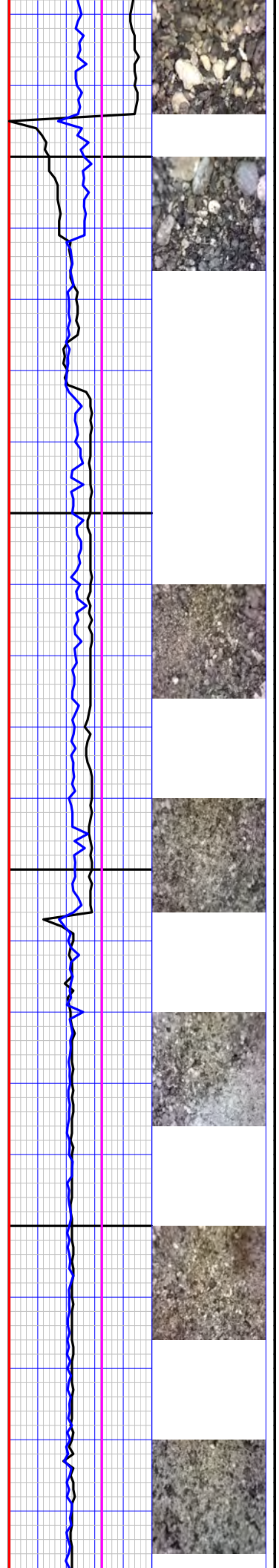


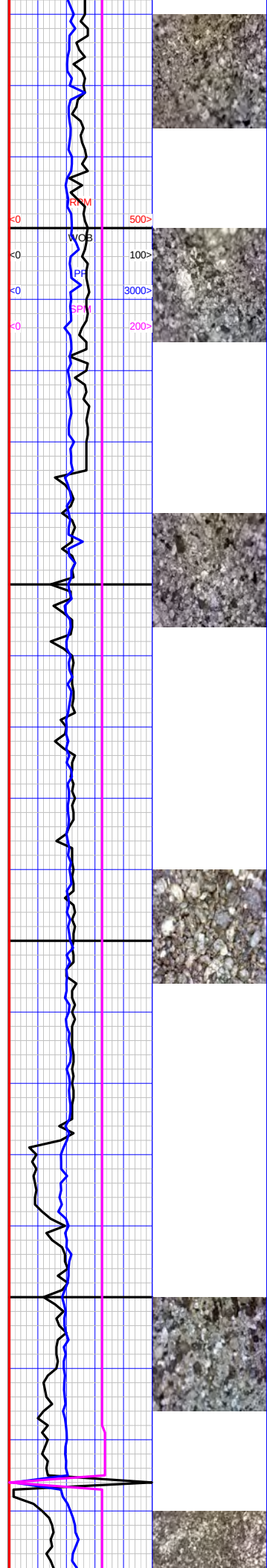
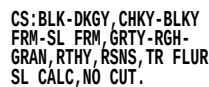
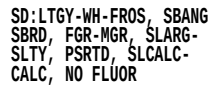
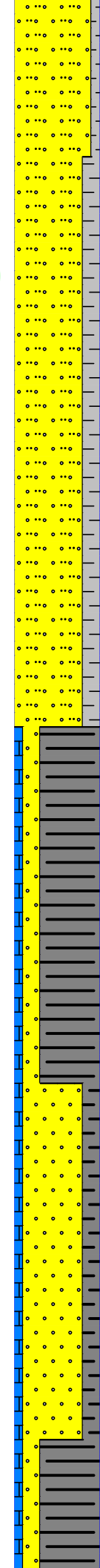


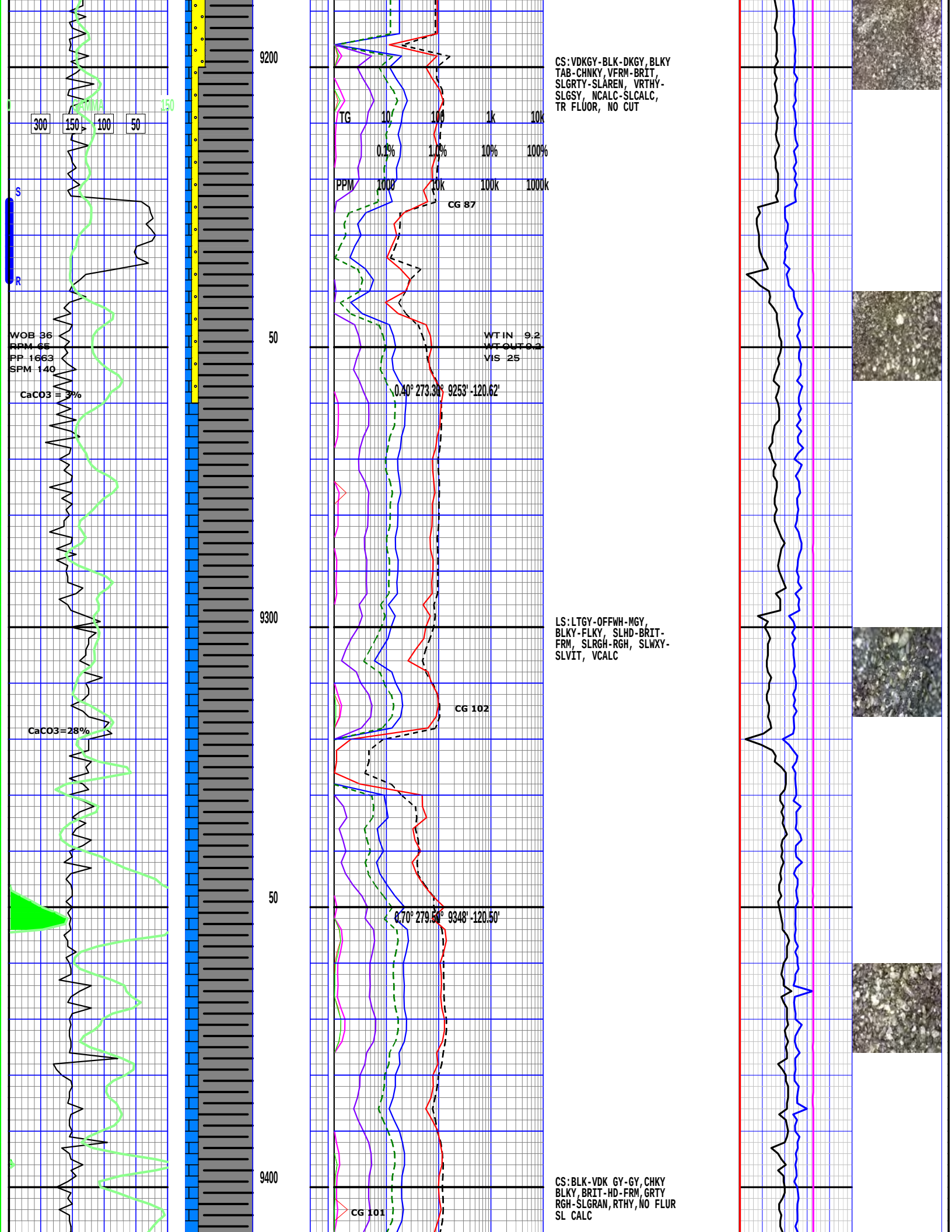


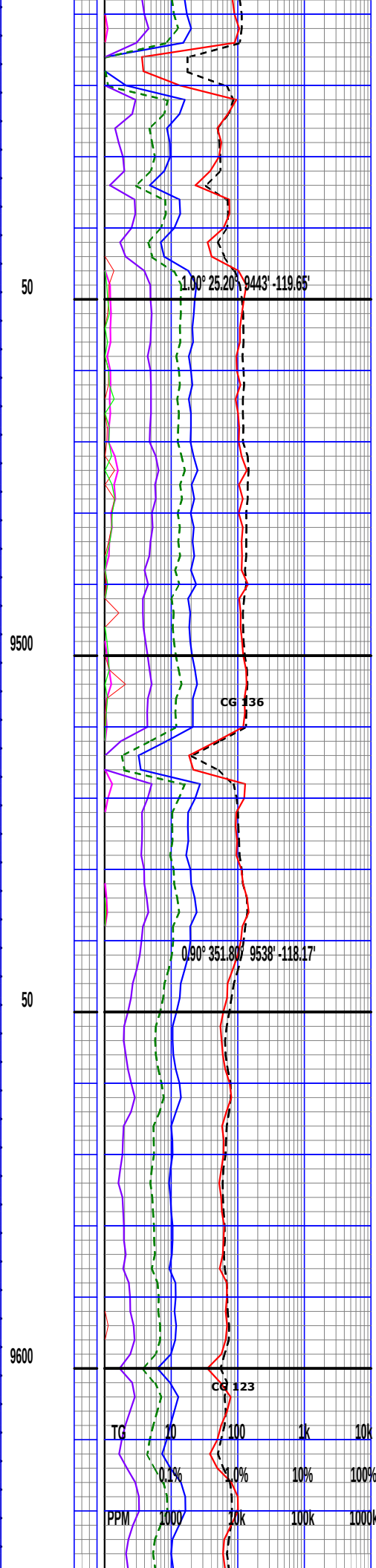
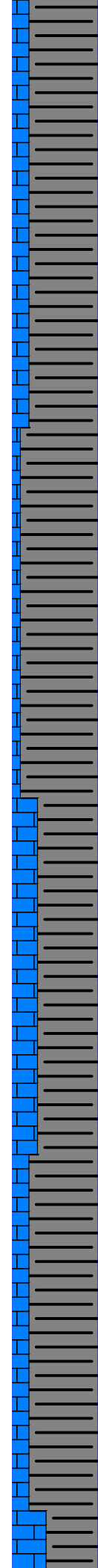
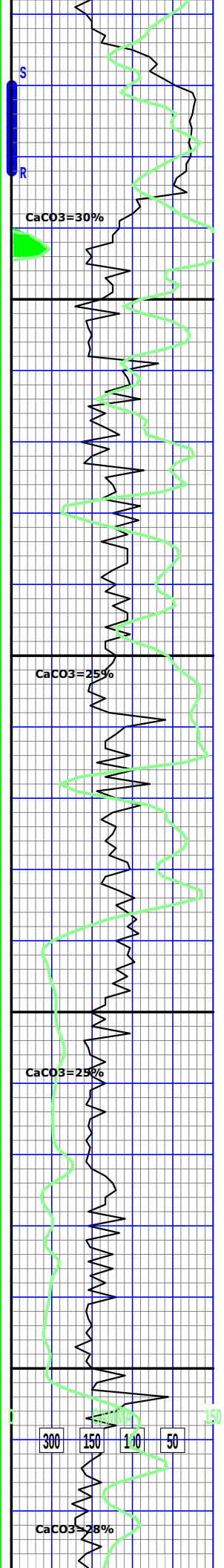
SH: VDKGY-DKGY-MGY,
BLKY-CHNKY-TAB, SLHD-
VFRM-BRIT, SLRGH-SLGRTY
SLAREN, SLCALC, NO
FLUOR

SD: LTGY-TRNSL-FROS,
ANG-SBANG-SBRD, PRD
UNCONS, WSRD, SLCALC,
TR FLUOR, NO CUT



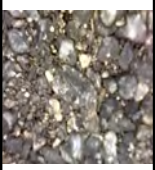
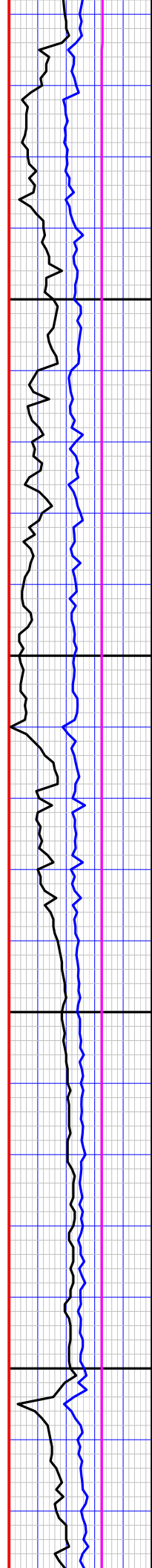


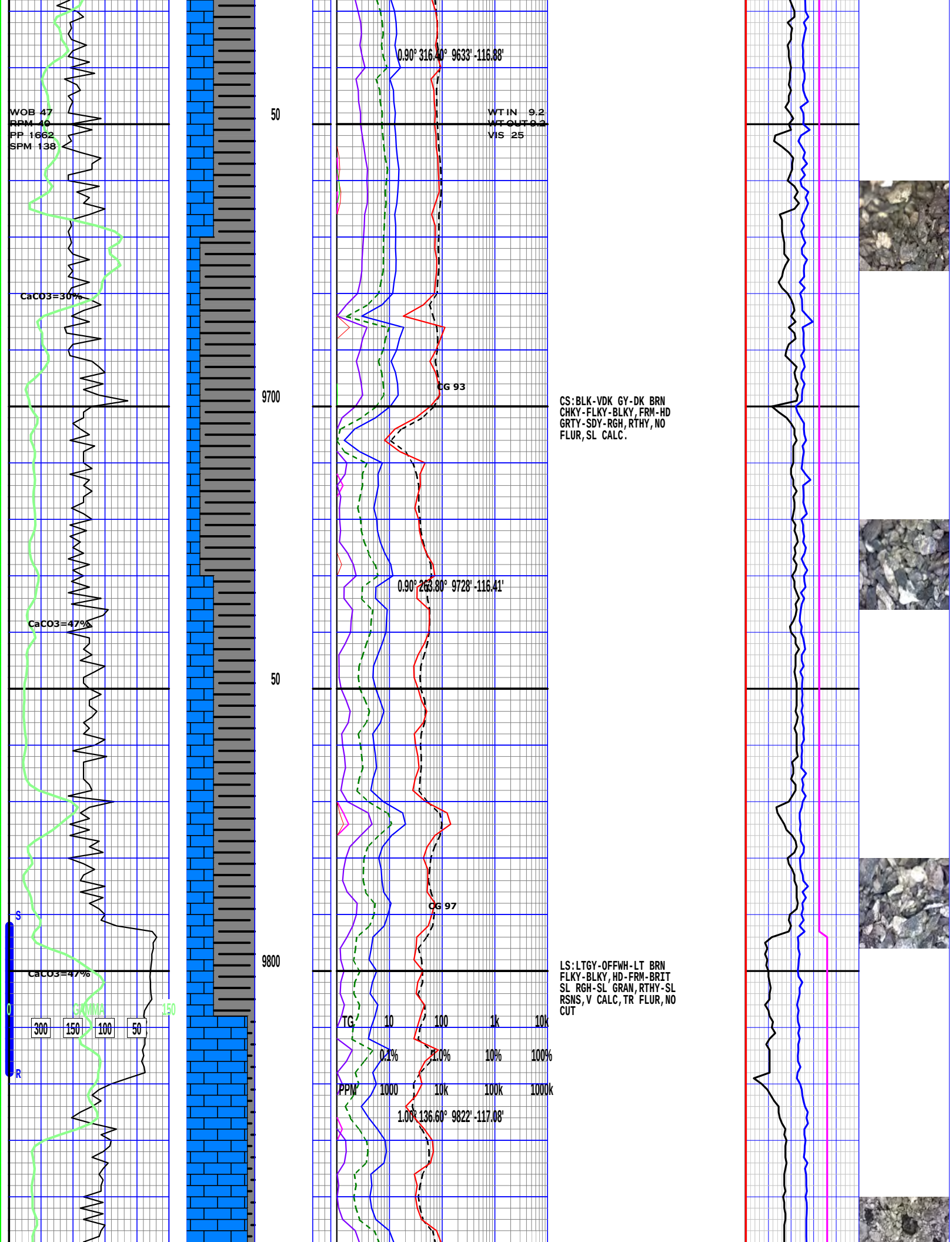


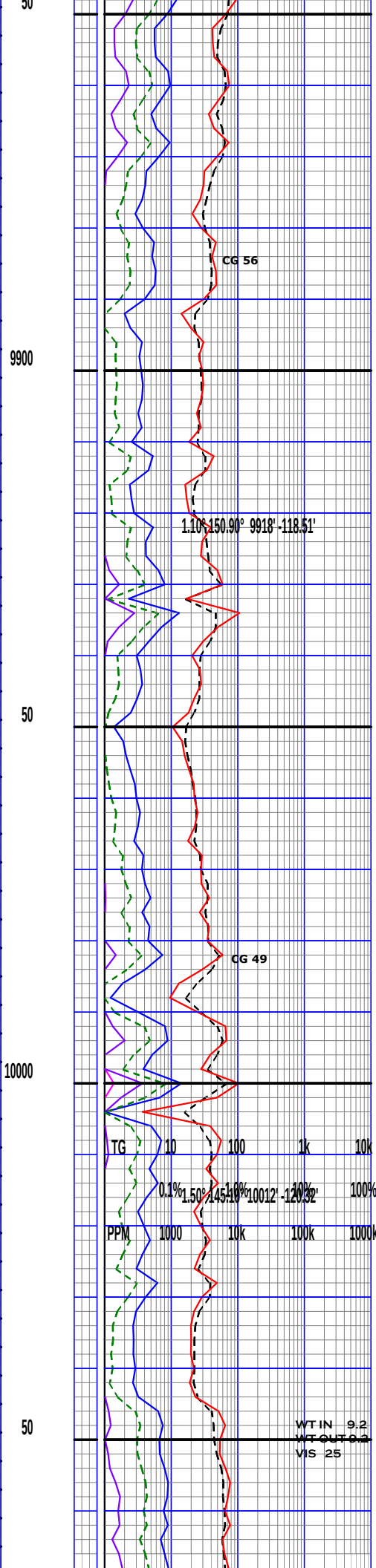
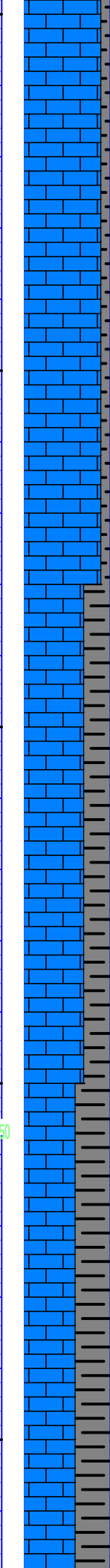
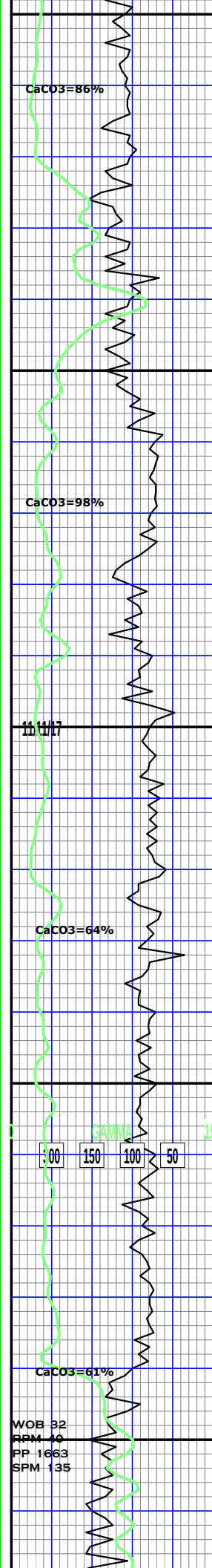


CS: VDK GY-BLK-DK BRN
BLKY-CHKY, SL FRM-FRM
HD BRIT, GRTY-GRAN SDY
RTHY, NO FLUR, SL CALC.

LS: LTGY-TN-LT BRN-
OFFWH, BLKY-FLKY, HD-FRM
SL RGH, SLWXY, V CALC.

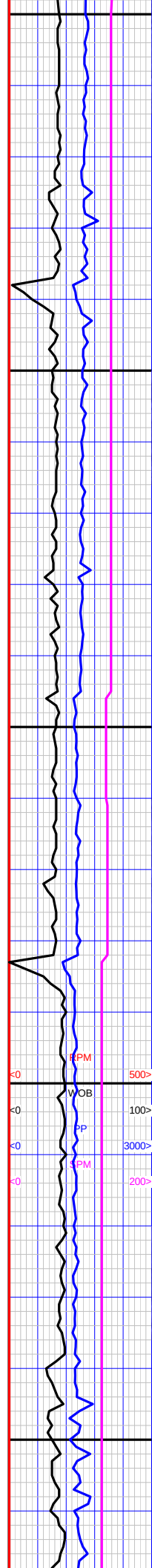


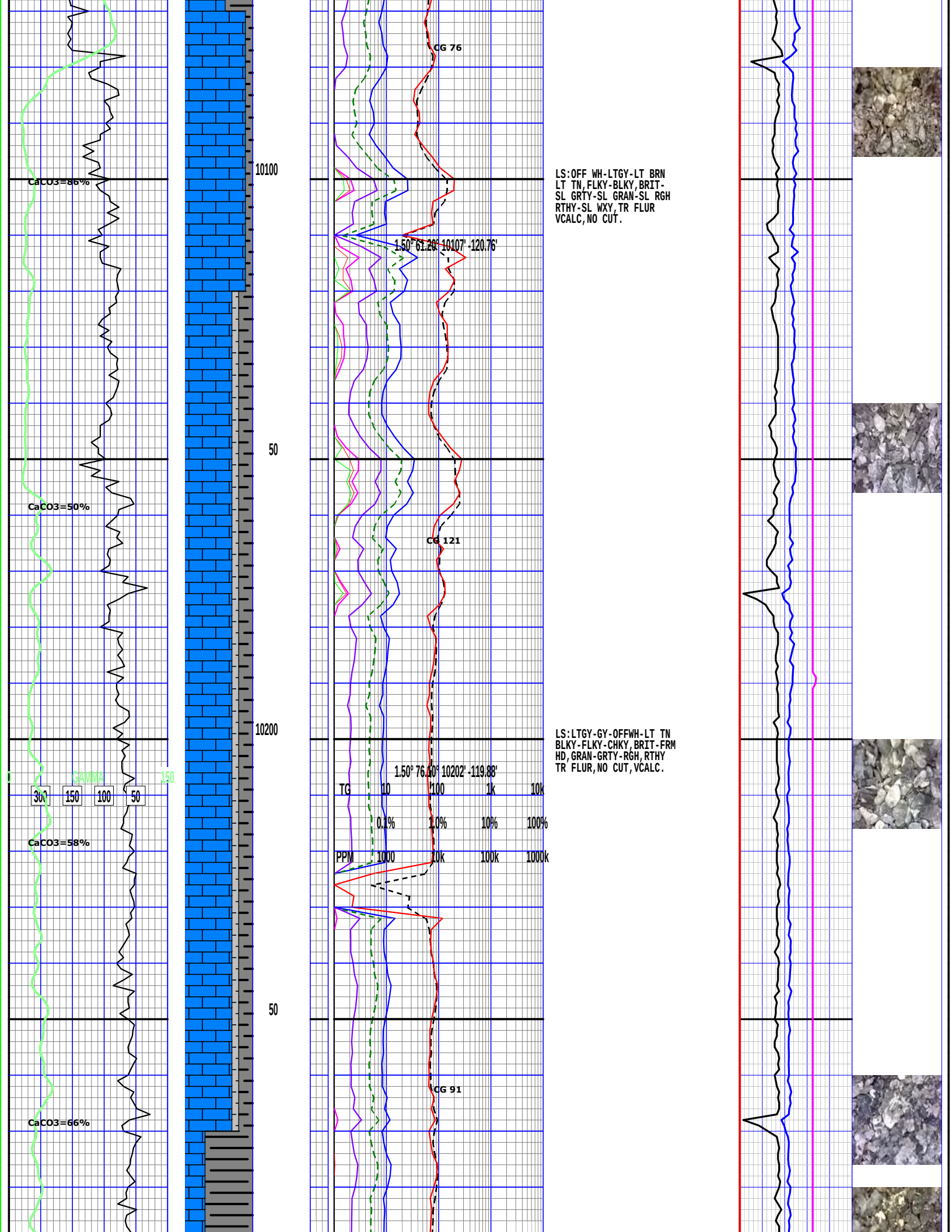


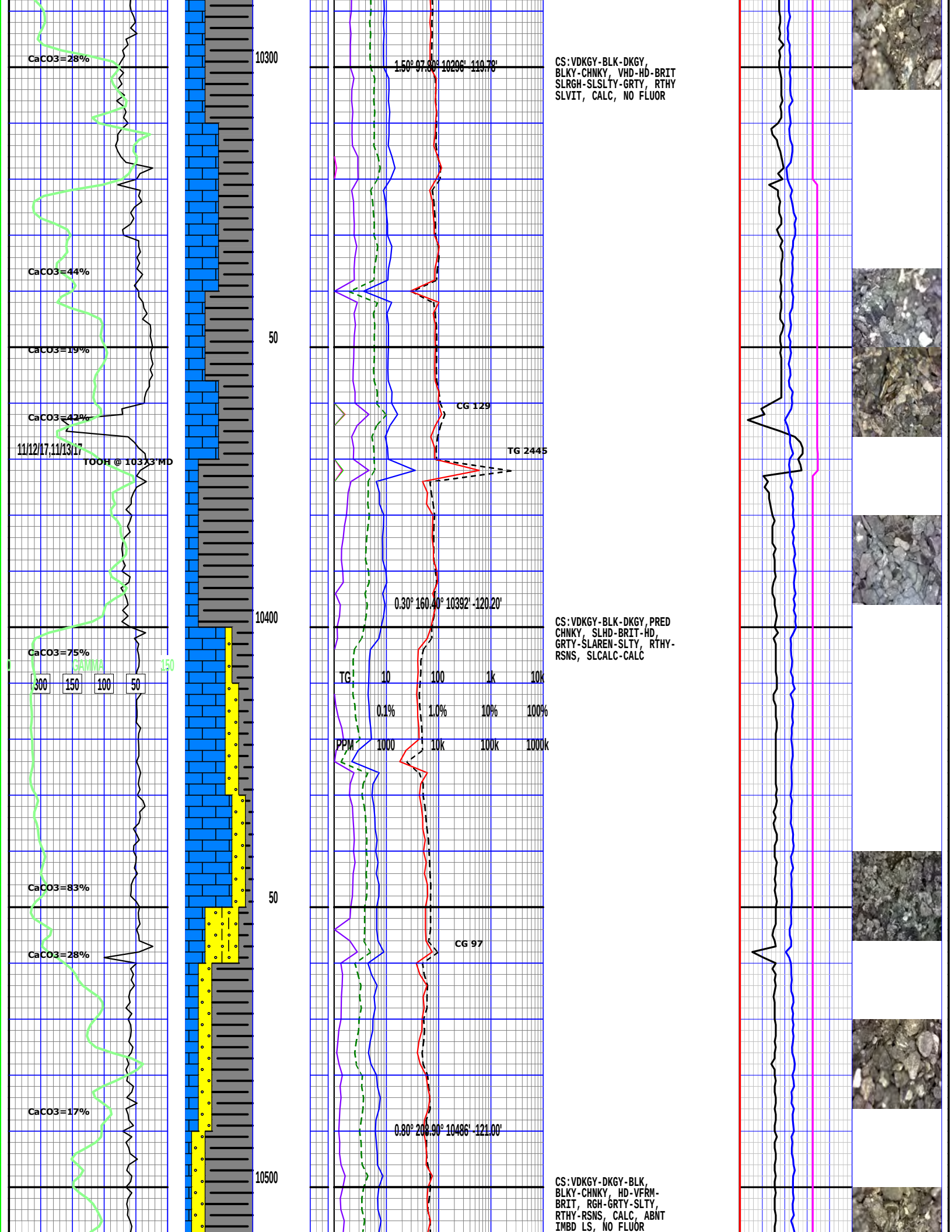


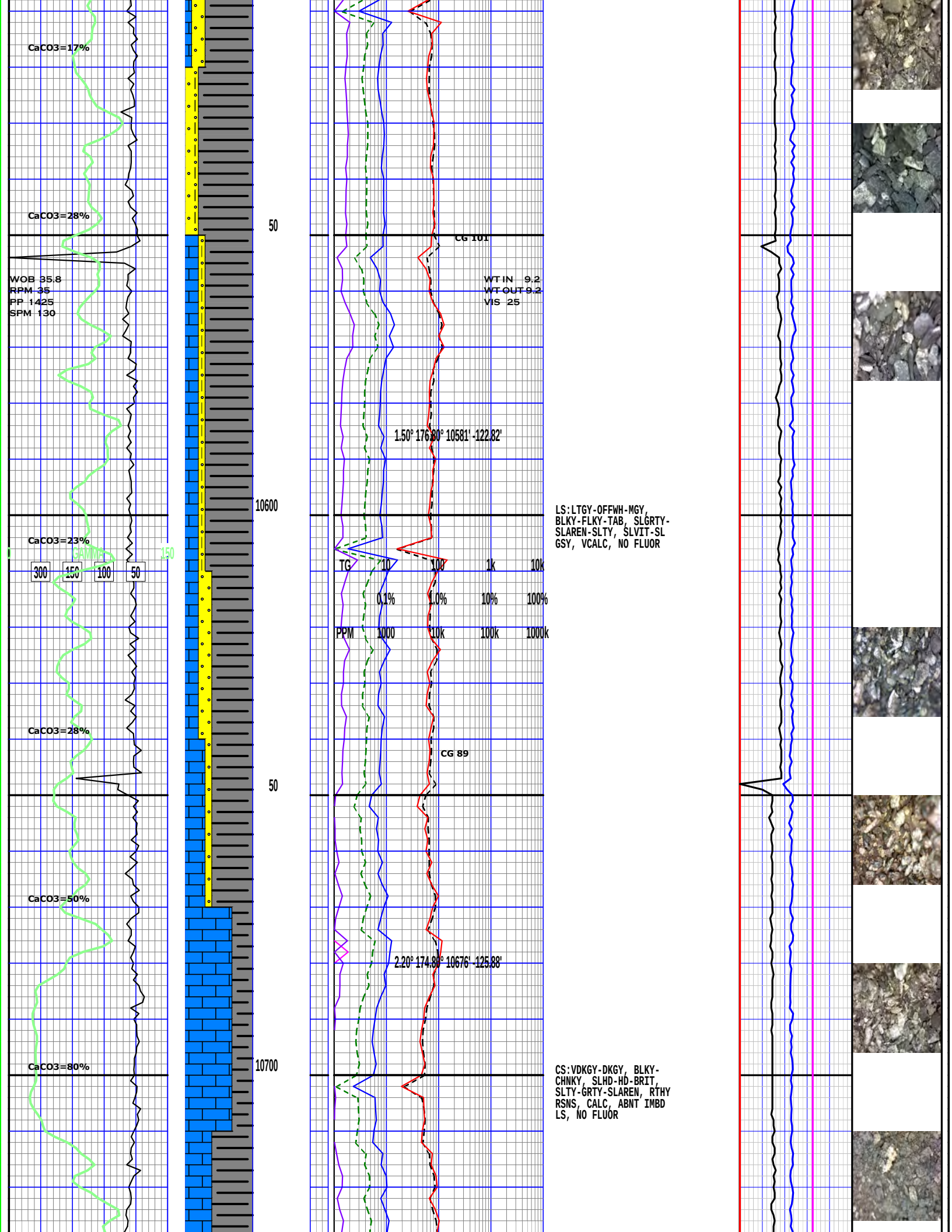
LS: LTGY-GY-LT TN-LTBRN
OFFWH, FLKY-BLKY, BRIT-
FRM-HD, SL GRTY-SDY-GRTY
SL RGH, RTHY-SL WXY, TR
FLUR, VCALC, NO CUT.

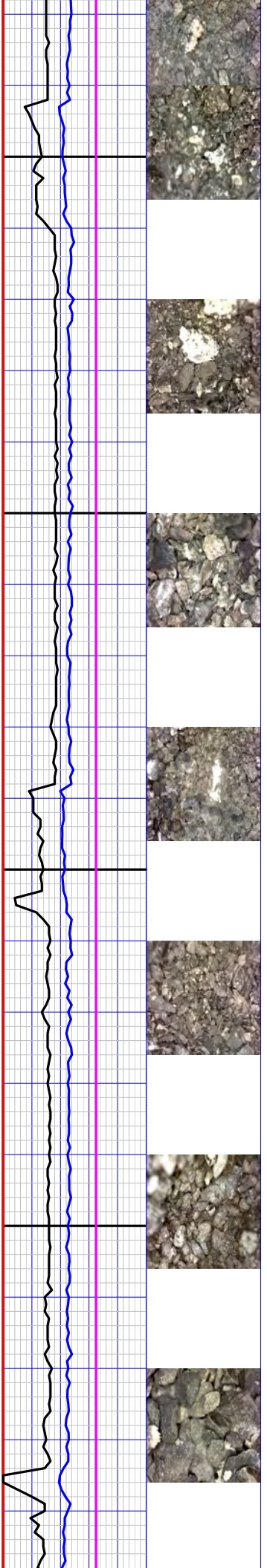
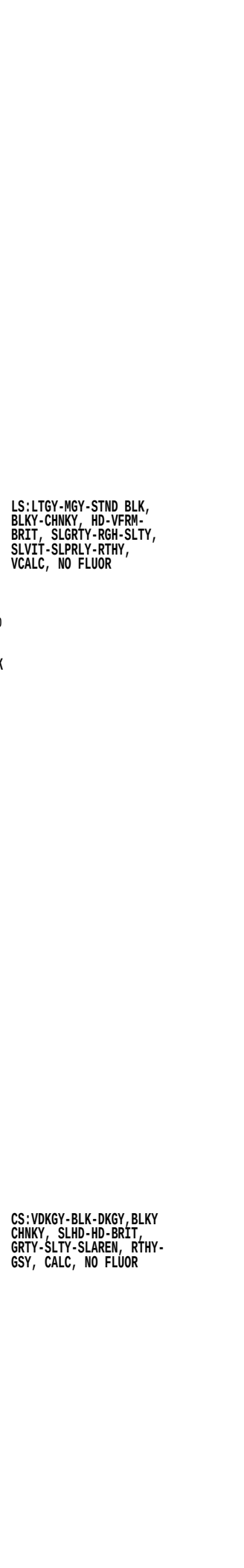
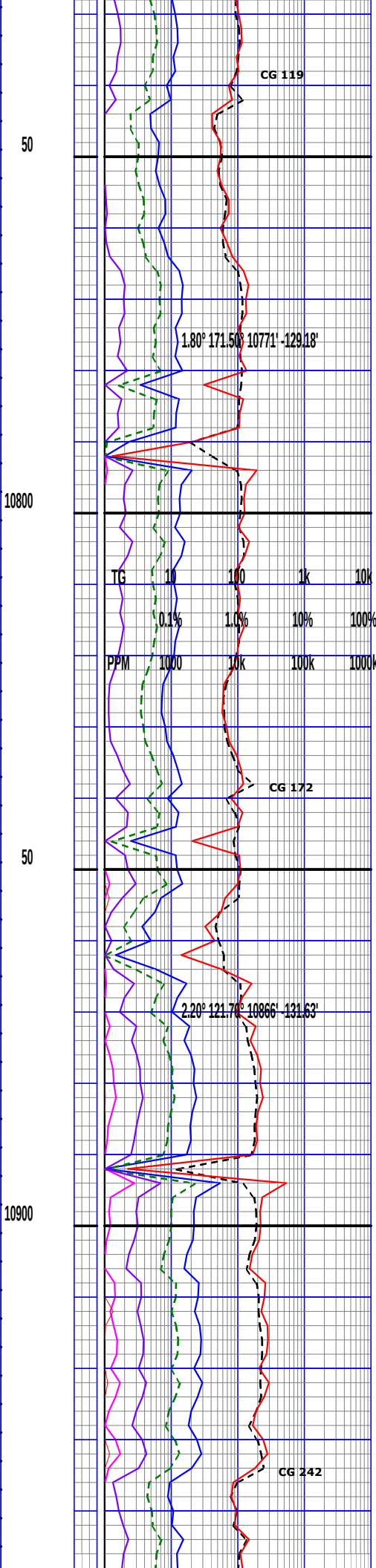
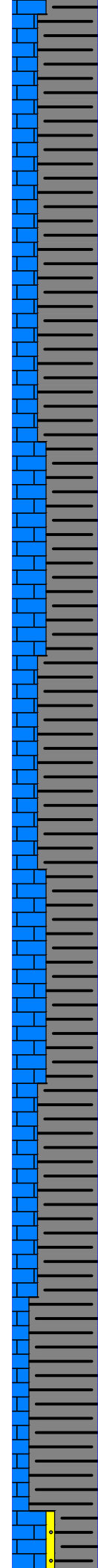
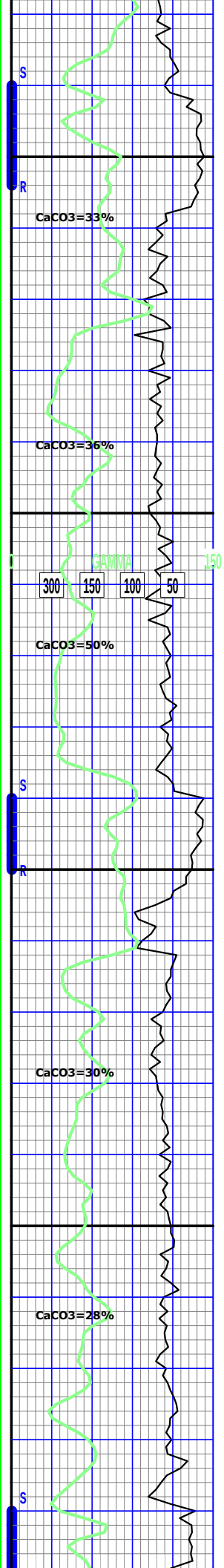
CS: BLK-DKGY, BLKY-CHKY
HD-FRM-SL BRIT, GRTY-
SDY-GRAN-RGH, RTHY, SL-
CALC, NO FLUR.





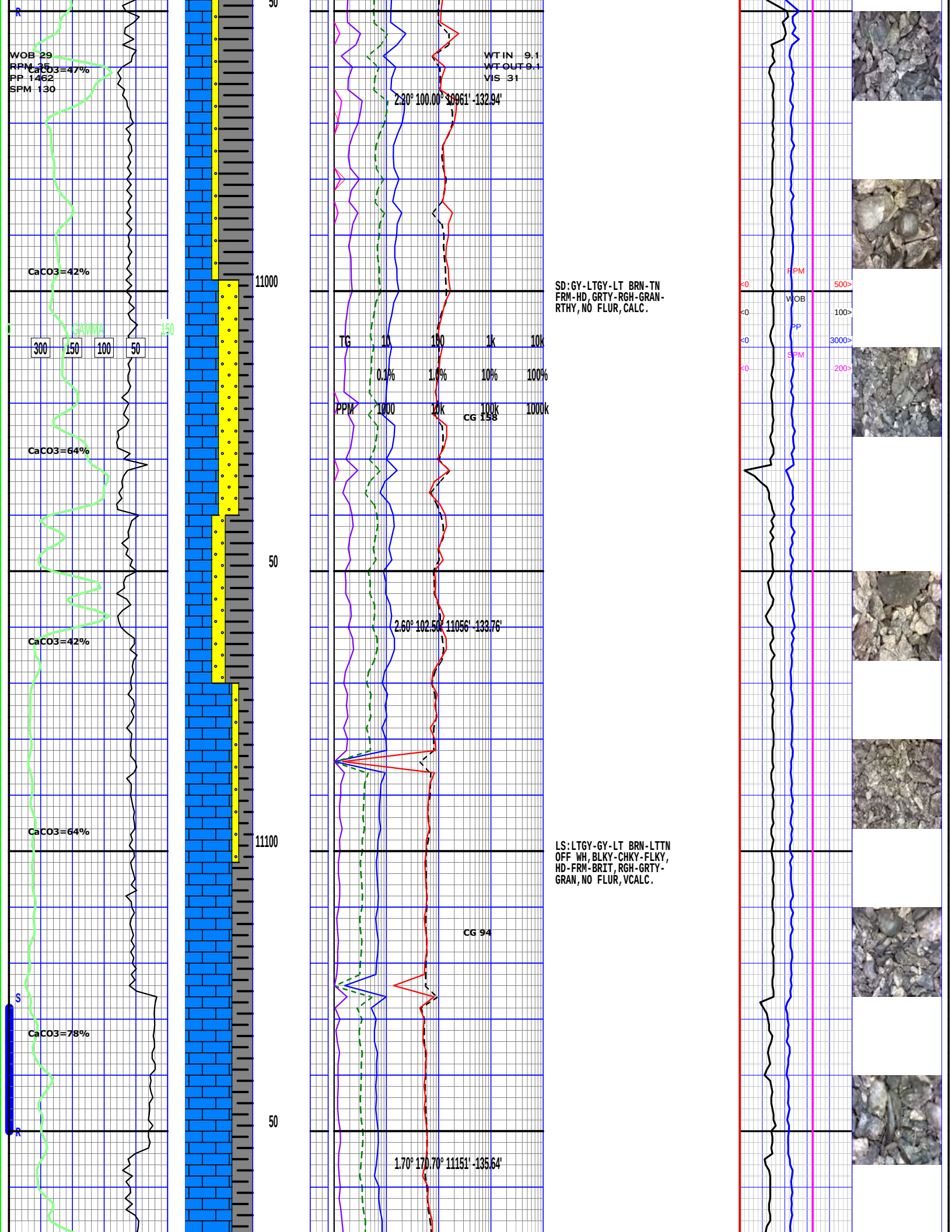


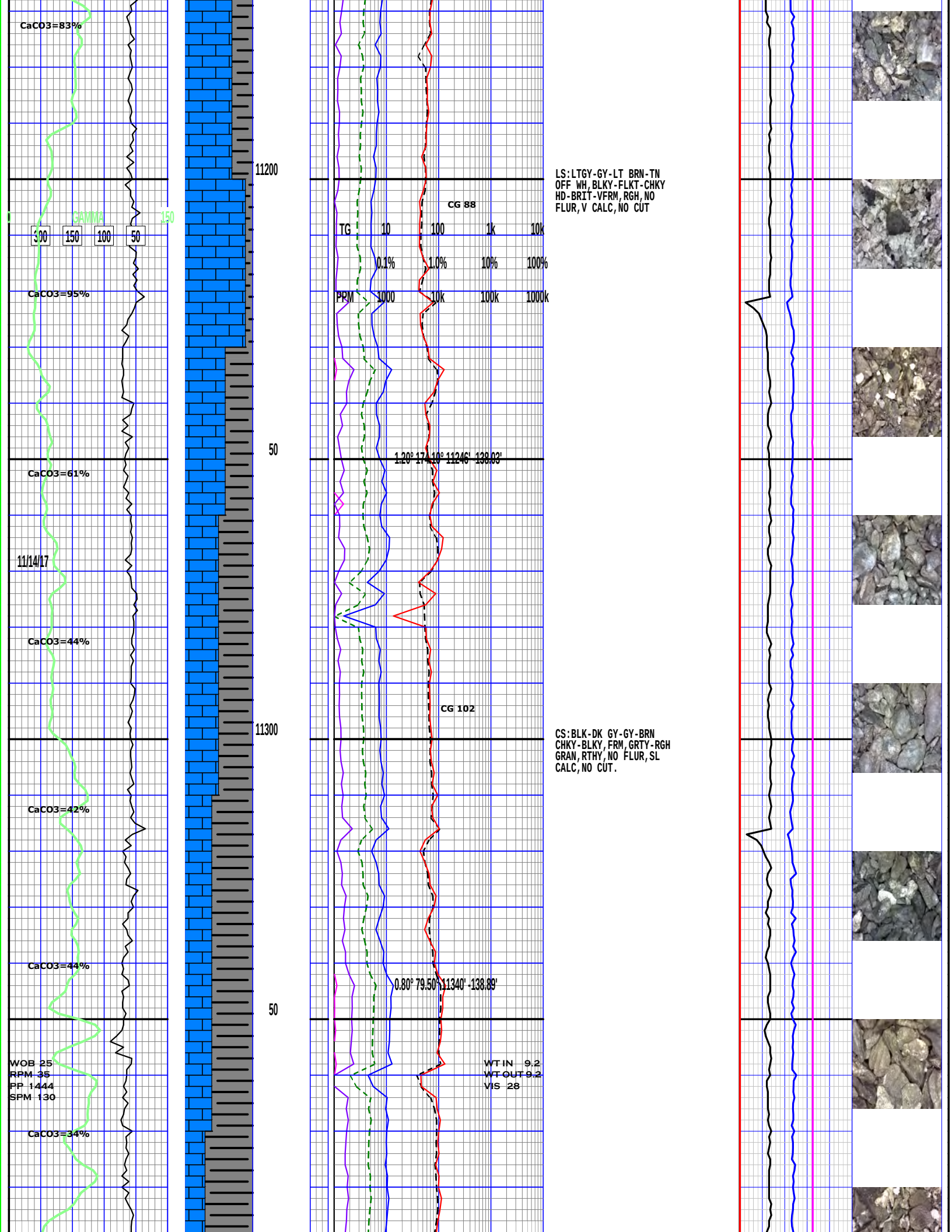


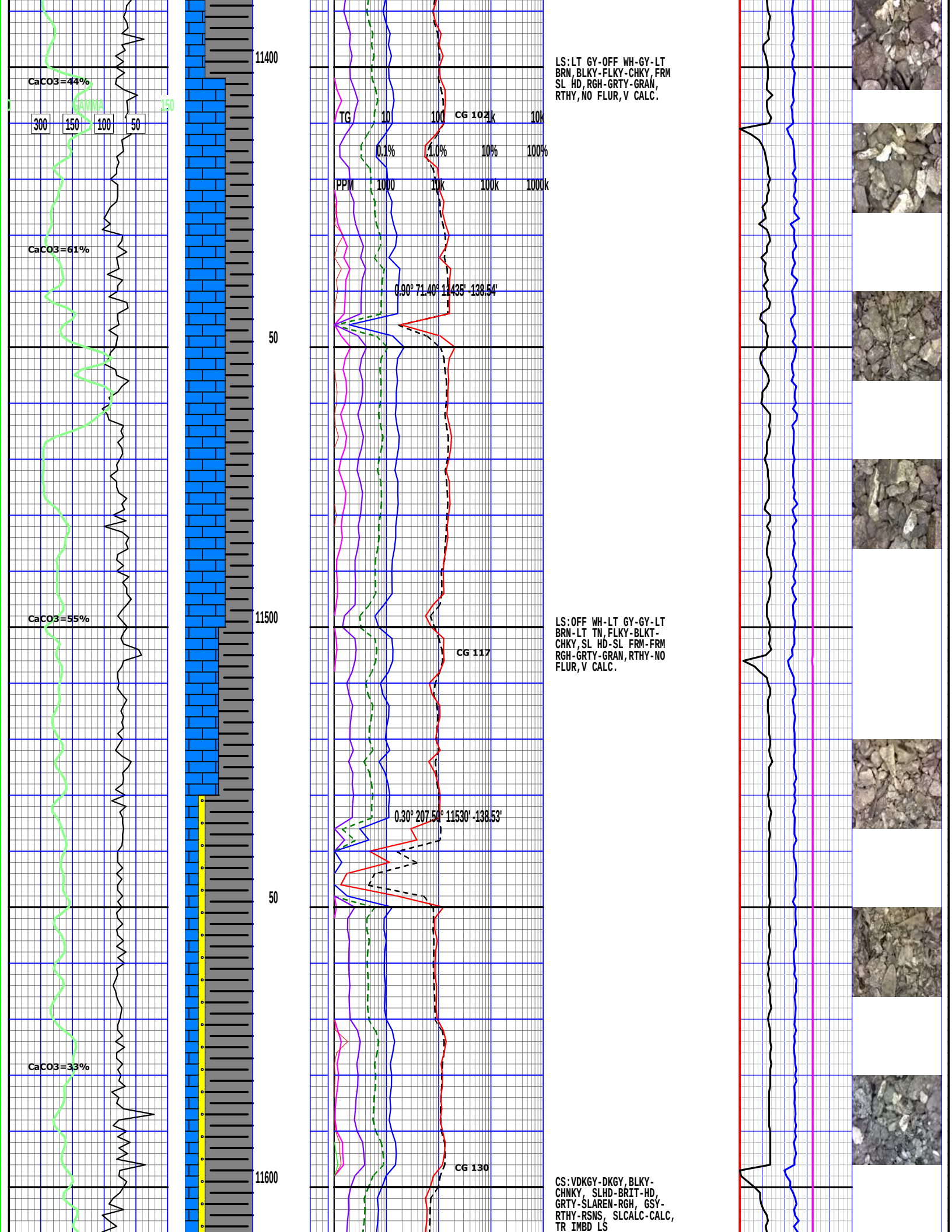


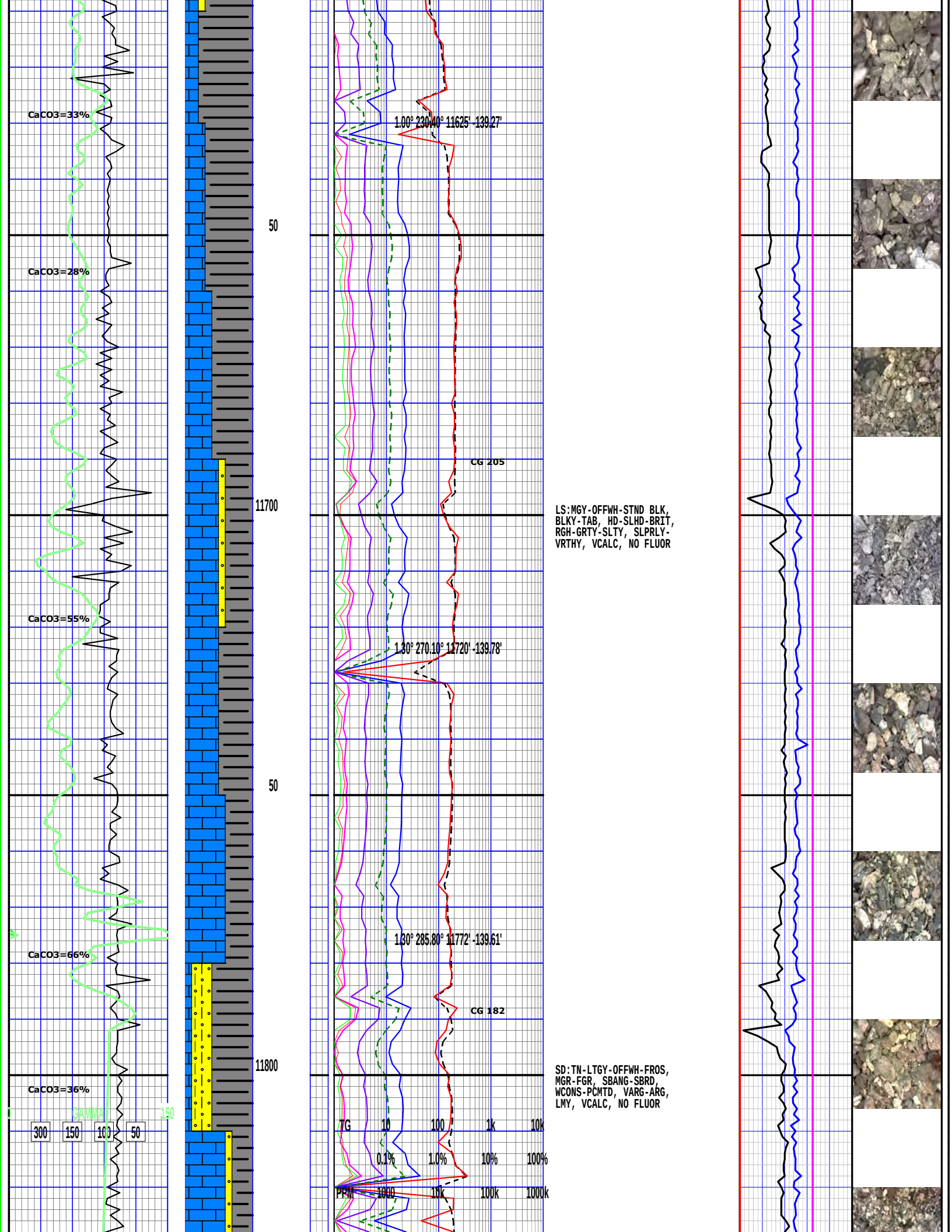
LS: LTGY-MGY-STND BLK,
BLKY-CHNKY, HD-VFRM-
BRIT, SLGRTY-RGH-SLTY,
SLVIT-SLPRLY-RTHY,
VCALC, NO FLUOR

CS: VDKGY-BLK-DKGY, BLKY
CHNKY, SLHD-HD-BRIT,
GRTY-SLTY-SLAREN, RTHY-
GSY, CALC, NO FLUOR









CaCO3=33%

CaCO3=28%

CaCO3=55%

CaCO3=66%

CaCO3=36%

GAMMA 300 150 100 50

50

11700

50

11800

1.00° 230.40° 11625' -139.27'

CG 205

1.30° 270.10° 11720' -139.78'

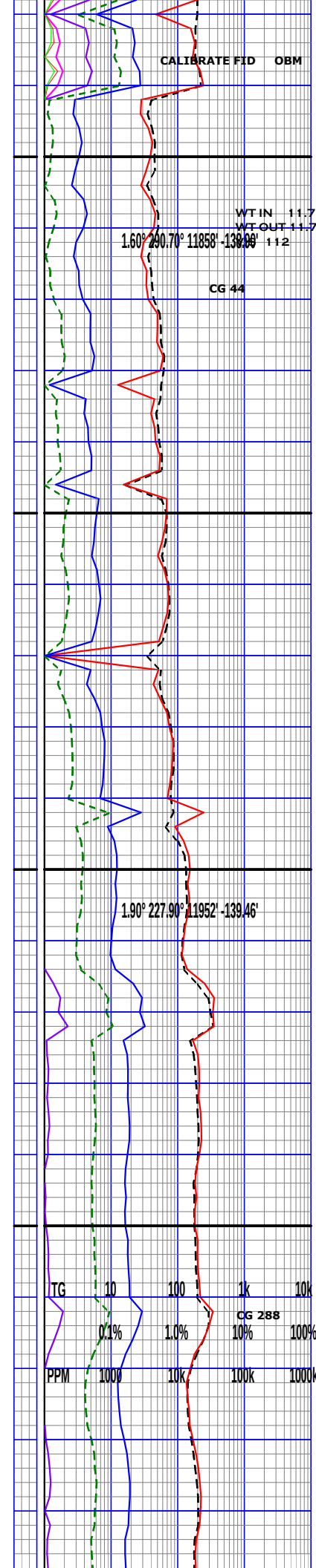
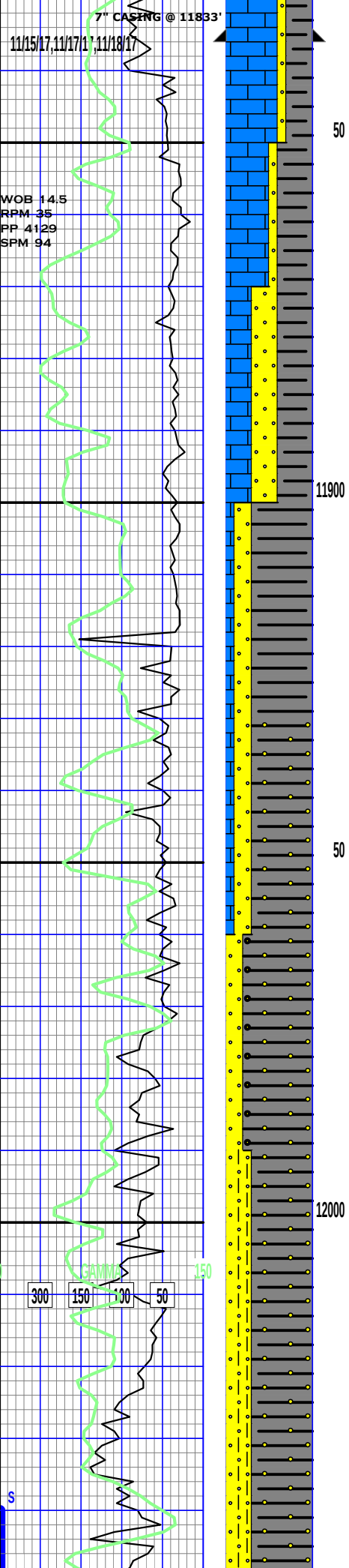
1.30° 285.80° 11772' -139.61'

CG 182

LS: MGY-OFFWH-STND BLK, BLKY-TAB, HD-SLHD-BRIT, RGH-GRTY-SLTY, SLPRLY-VRTHY, VCALC, NO FLUOR

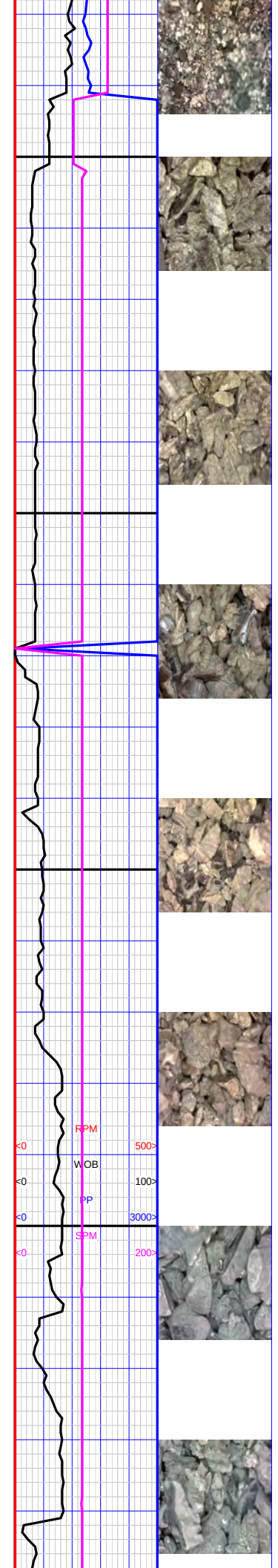
SD: TN-LTGY-OFFWH-FROS, MGR-FGR, SBANG-SBRD, WCONS-PCMTD, VARG-ARG, LMY, VCALC, NO FLUOR

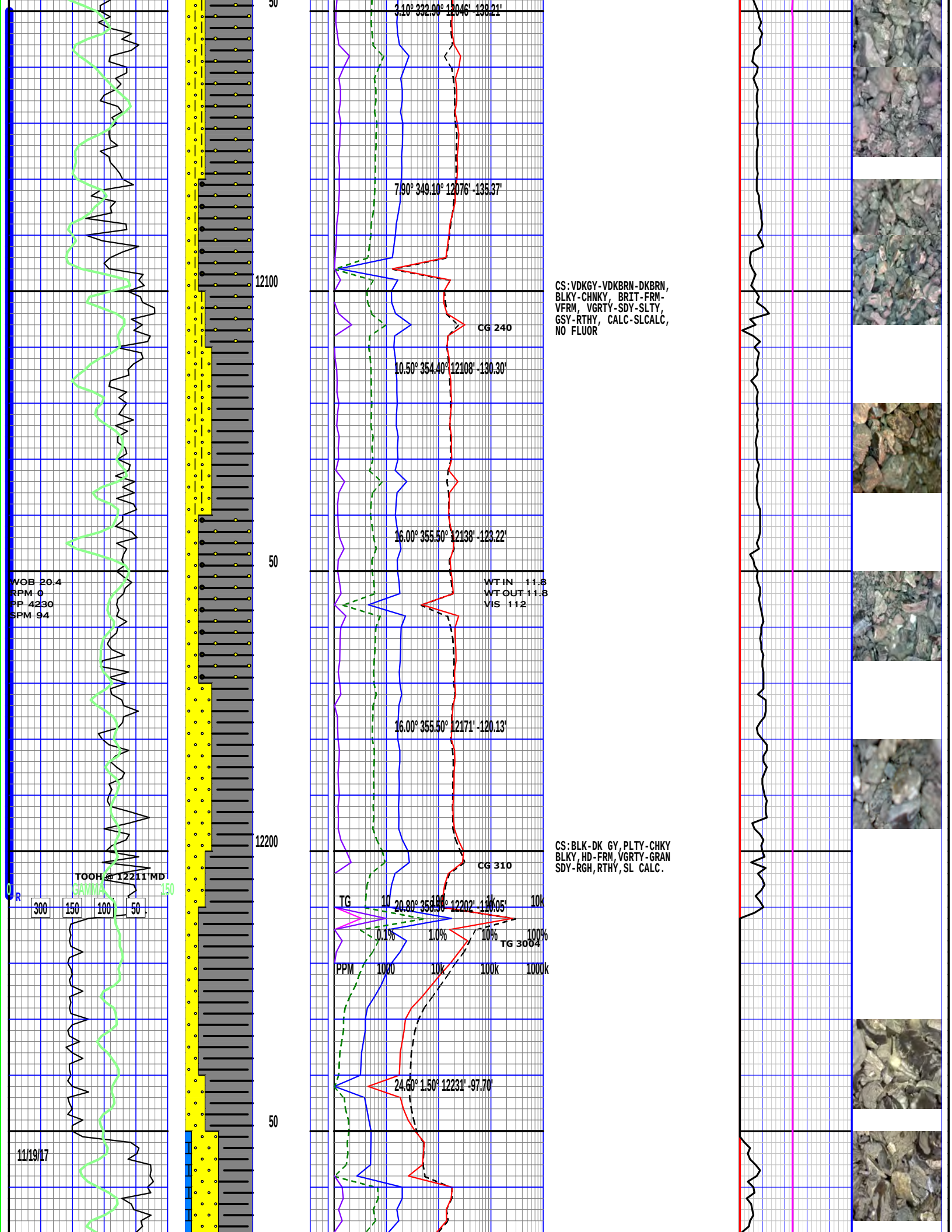
TG 10 100 1k 10k
0.1% 1.0% 10% 100%
PPM 1000 10k 100k 1000k

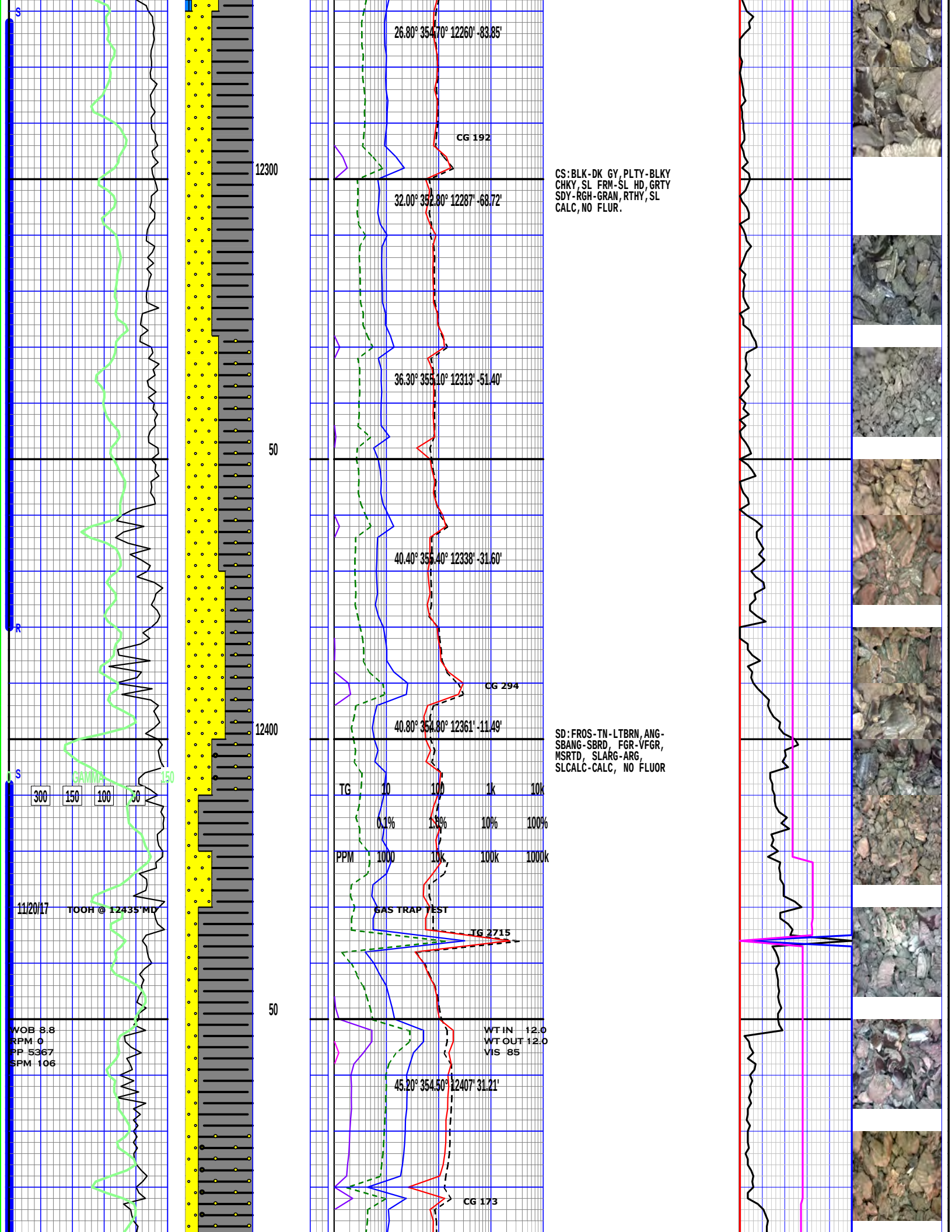


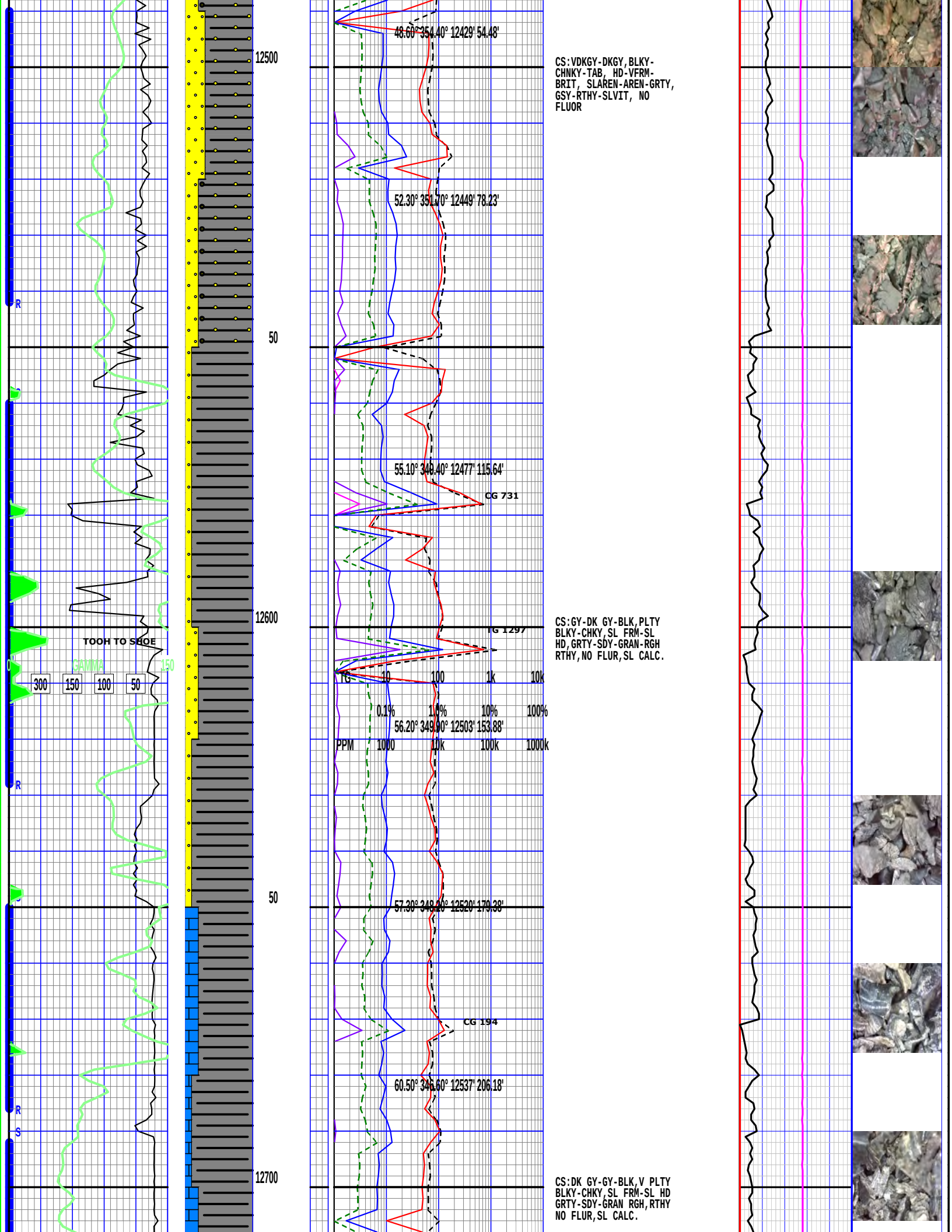
CS: BKL-DK GY-DK BRN, SL
FRM-SL HD, PLTY-CHKY-
BLKY, VGRTY-GRAN-SDY-RGH
RTHY, SL CALC.

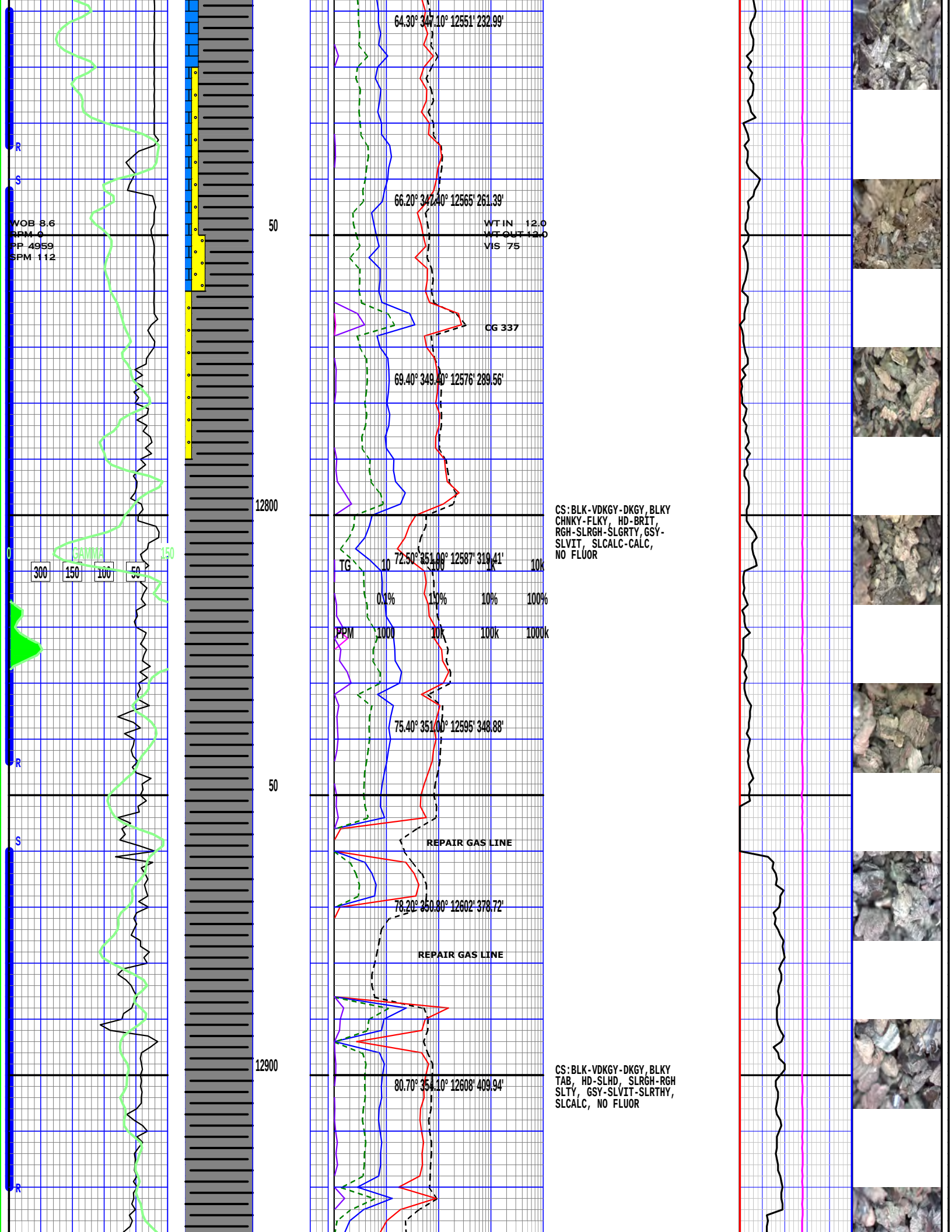
SD: TN-OFFWH-FROS, SBANG
SBRD, FGR-VFGR, PCONS-
MODCONS, SLARG, CALC
-VCALC, TR FLUOR, NO
CUT

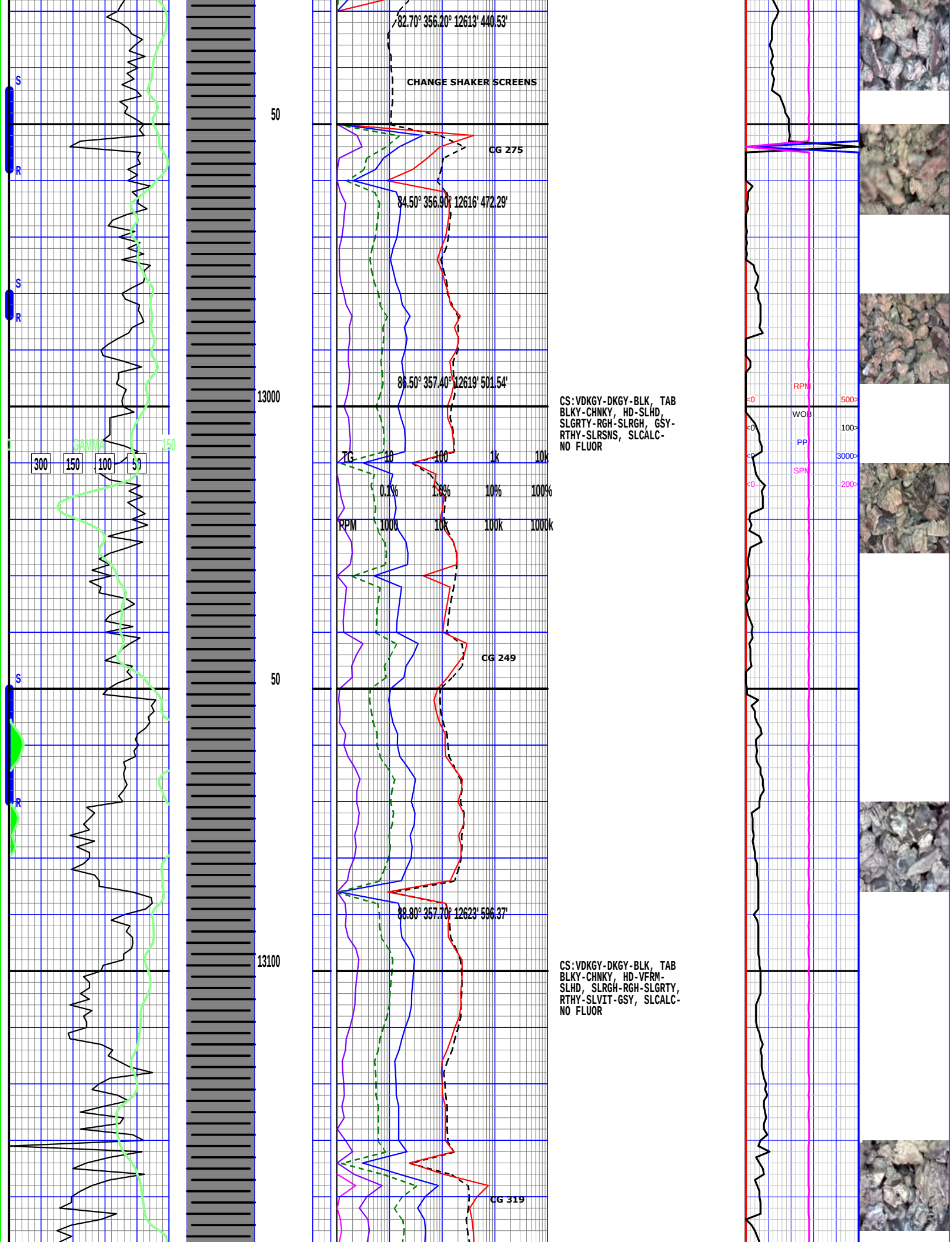


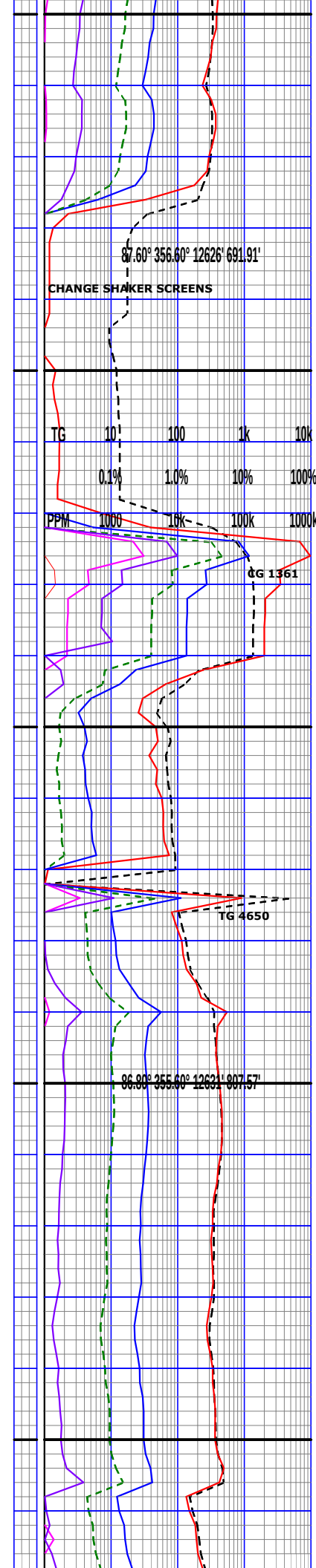
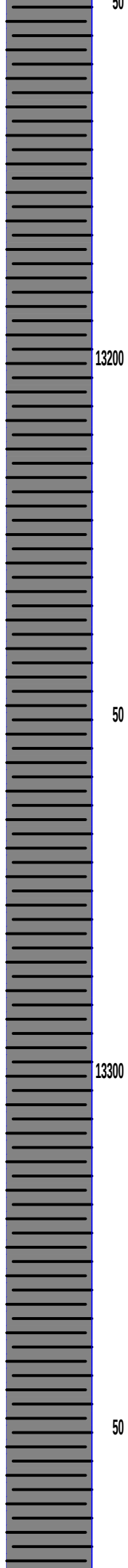
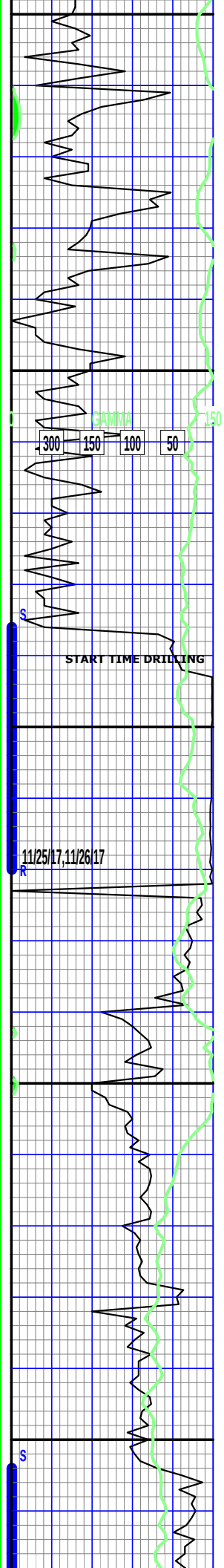






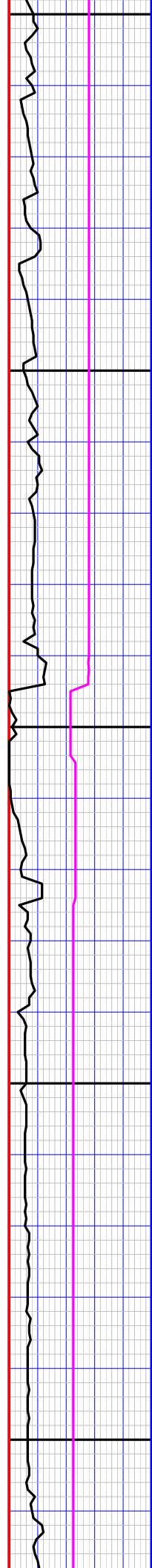


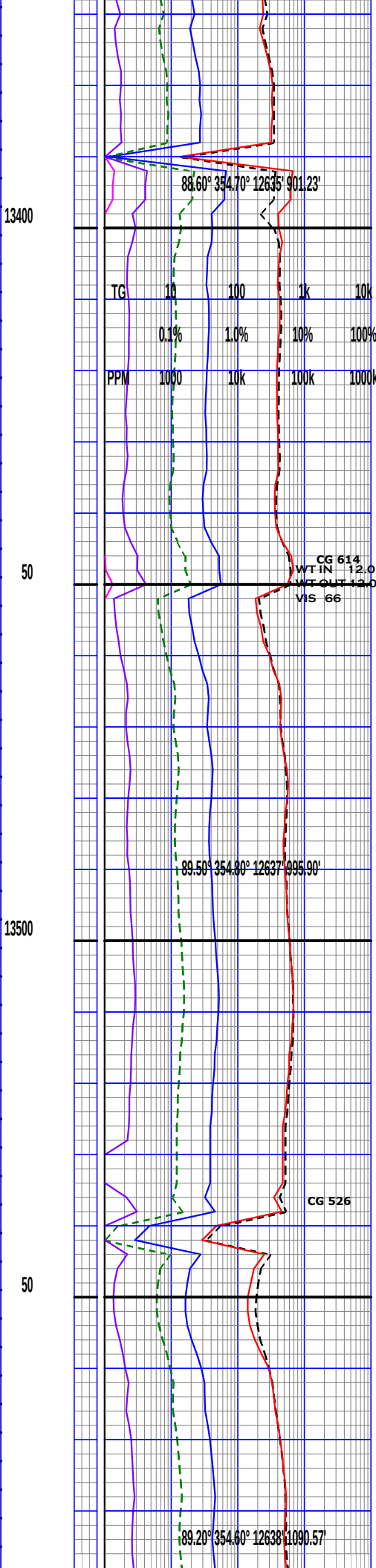
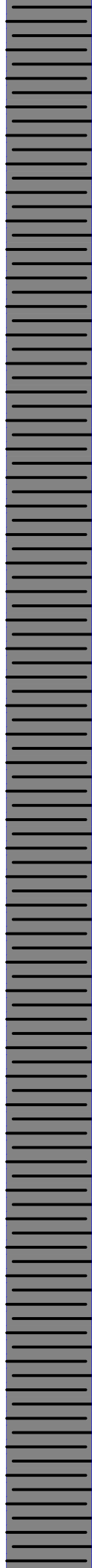
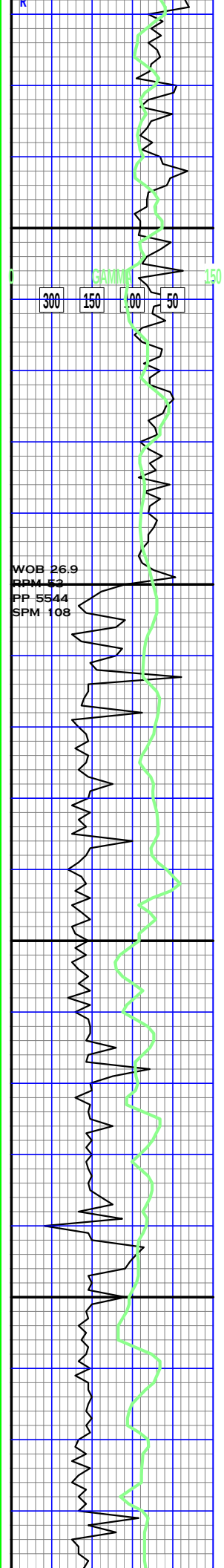




CS:BLK-DK GY,PLTY-CHKY
BLKY,SL HD-FRM,GRTY-SDY
GRAN,RTHY,NO FLUR,SL
CALC.

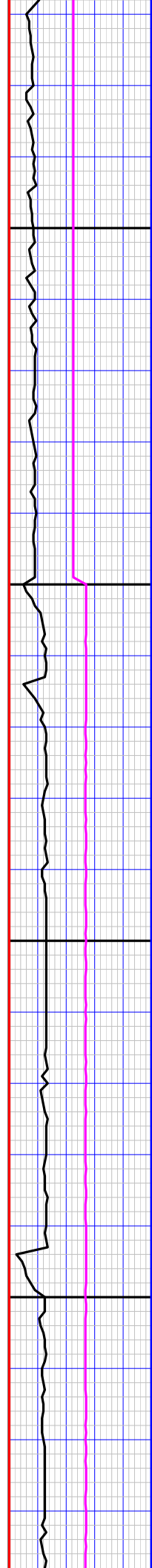
CS:BLK-DK GY-GY,CHKY
BLKY,SL FRM-SL HD,GRTY
SDY-GRAN-RGH,RTHY,NO
FLUR,SL CALC.

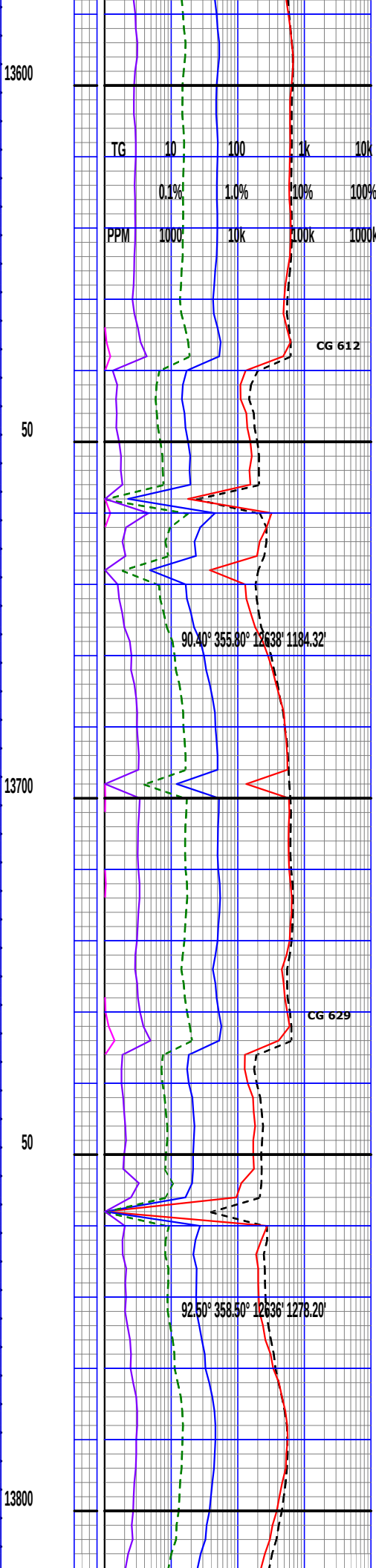
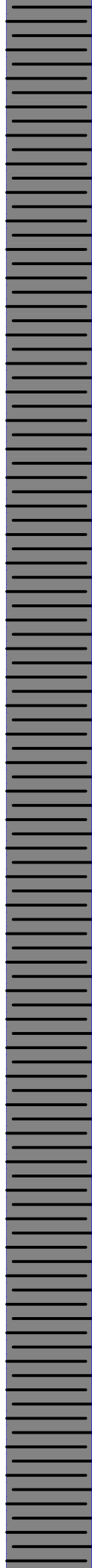
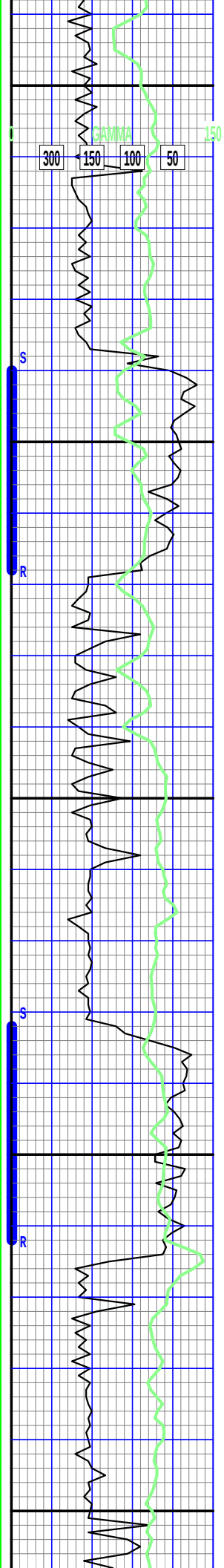




CS: BLK-VDKGY, BLKY-TAB, HD-SLHD-VFRM, SLGRTY-RGH, GSY-SLVIT, SLCALC-CALC, TR SD NO FLUOR

CS: VDKGY-BLK-VDKBRN, BLKY-CHNKY-TAB, GRTY-RGH-SLRGH, SLVIT-GSY-SLRTHY, SLCALC-CALC, NO FLUOR

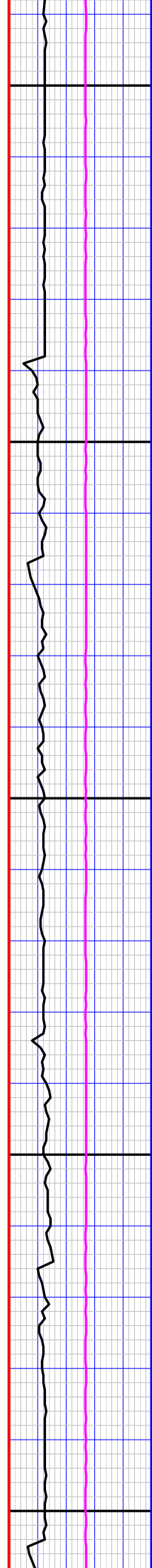


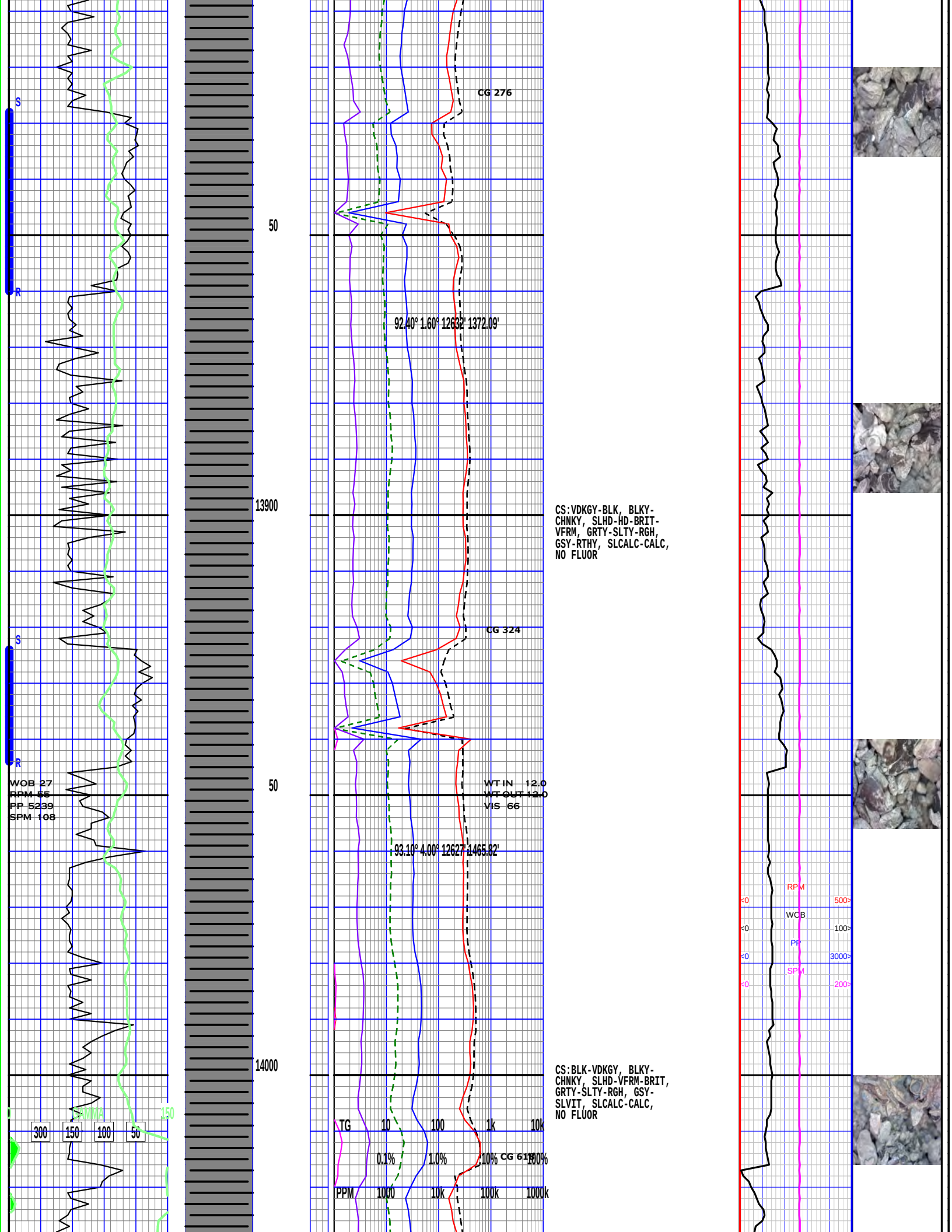


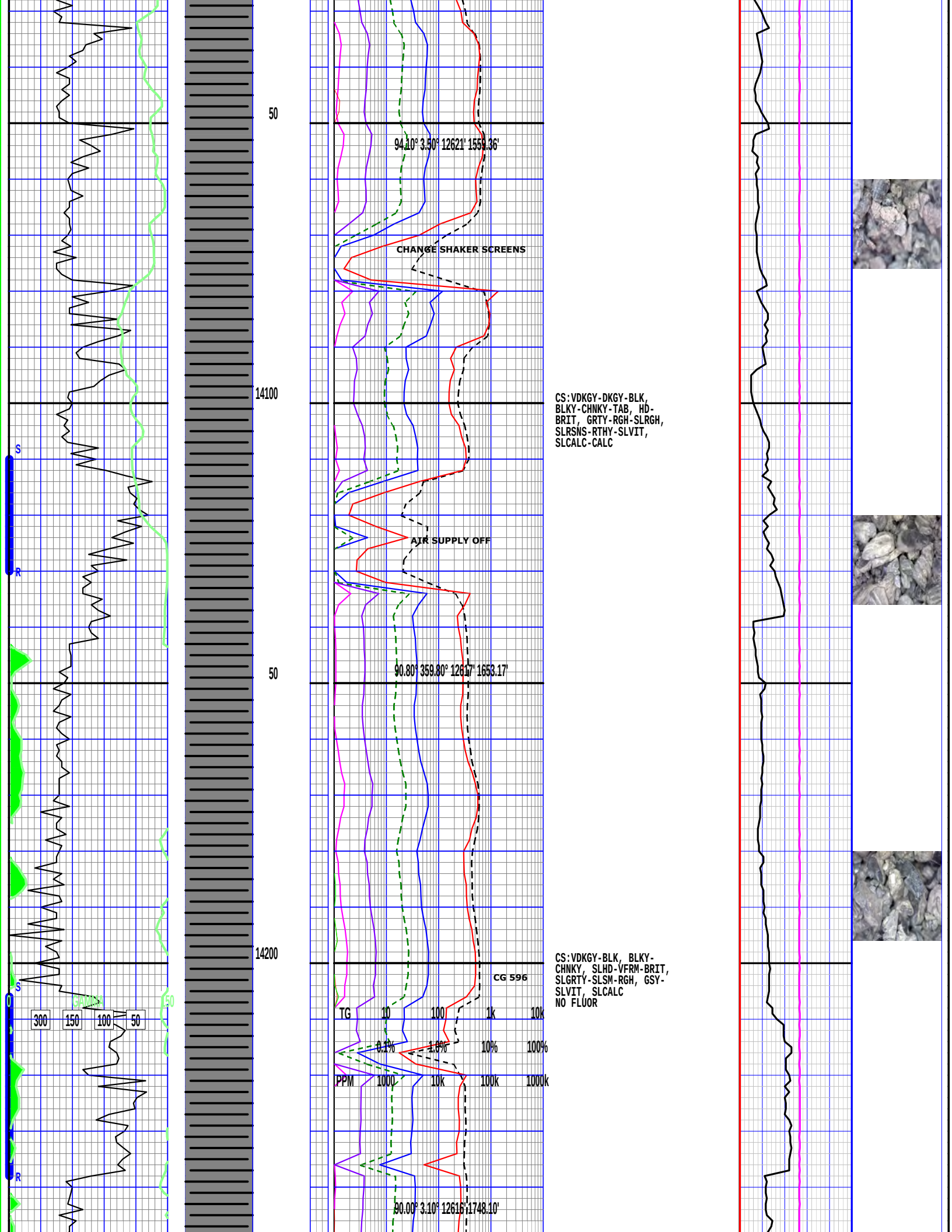
CS:VDKGY-BLK,CHNKY-BLKY-TAB, HD-VFRM-BRIT, RGH-SLGRTY-SLRGH, GSY-RTHY-SLRSNS, SLCALC-CALC, NO FLUOR

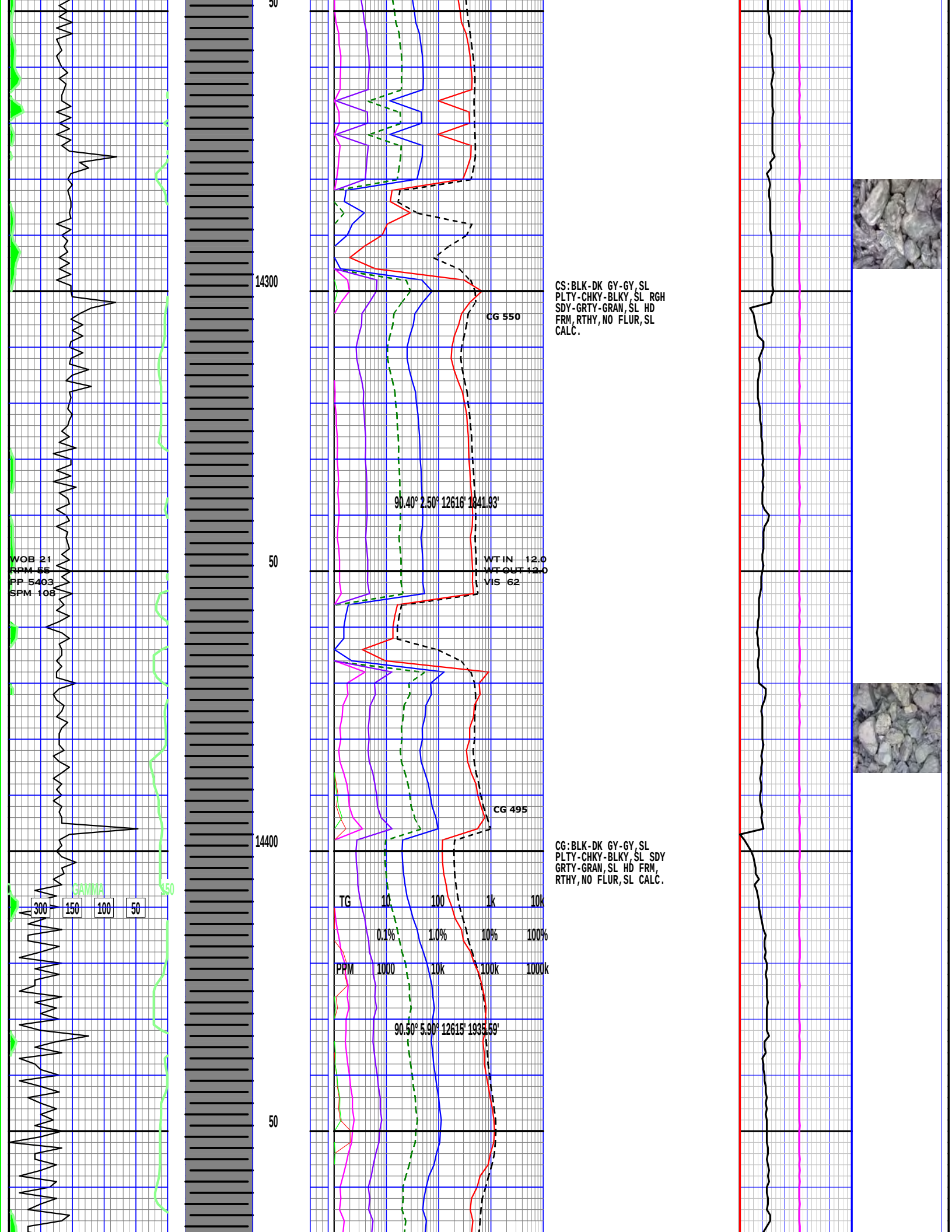
CS:VDKGY-DKGY-BLK,CHNKY-BLKY-TAB, SLHD-HD-BRIT, SLGRTY-RGH-SLRGH, GSY-RTHY, SLCALC-CALC, NO FLUOR

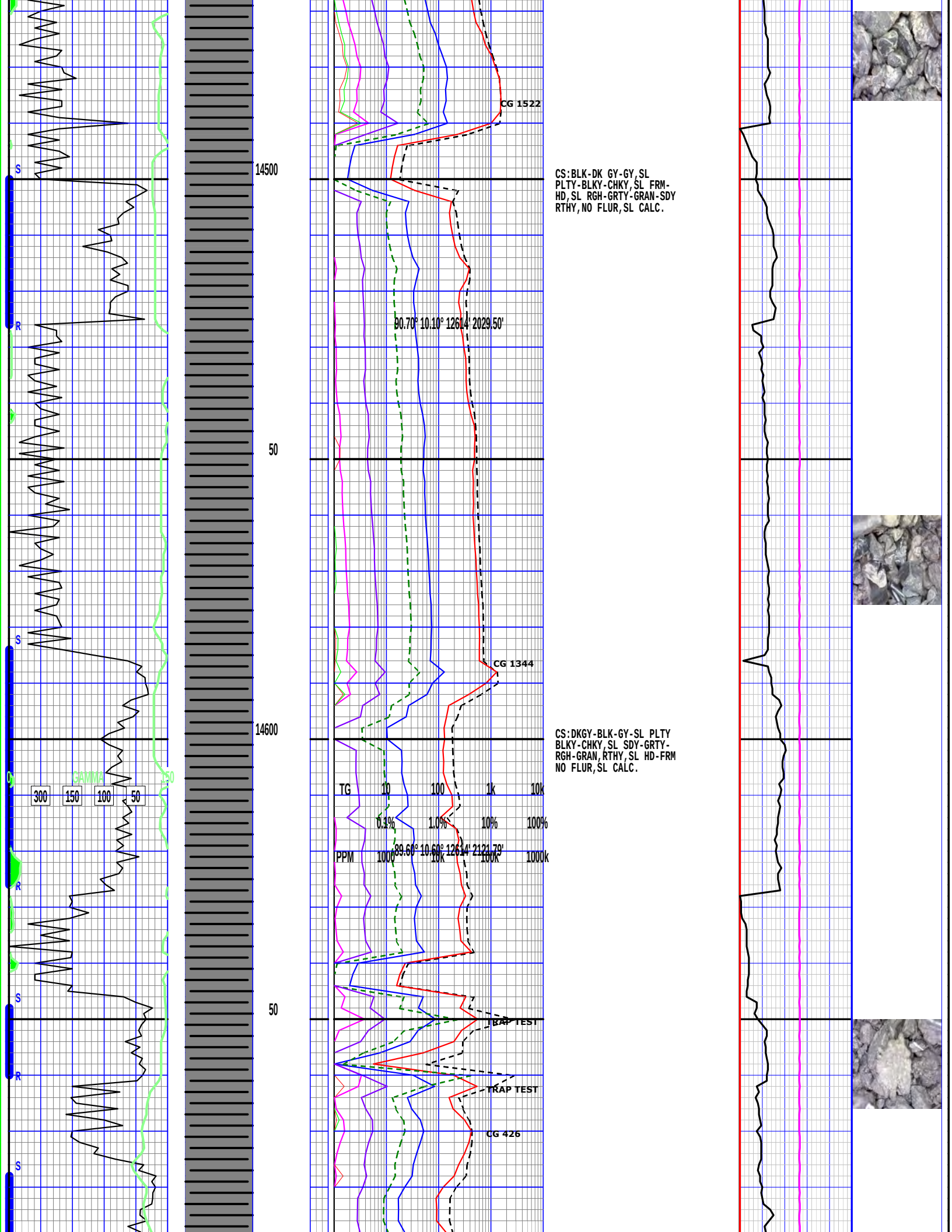
CS:DKGY-VDKGY-BLK, BLKY-CHNKY, SLHD-HD-VFRM-BRIT, SLSLTY-GRTY-RGH, GSY-RTHY-SLVIT, SLCALC-CALC

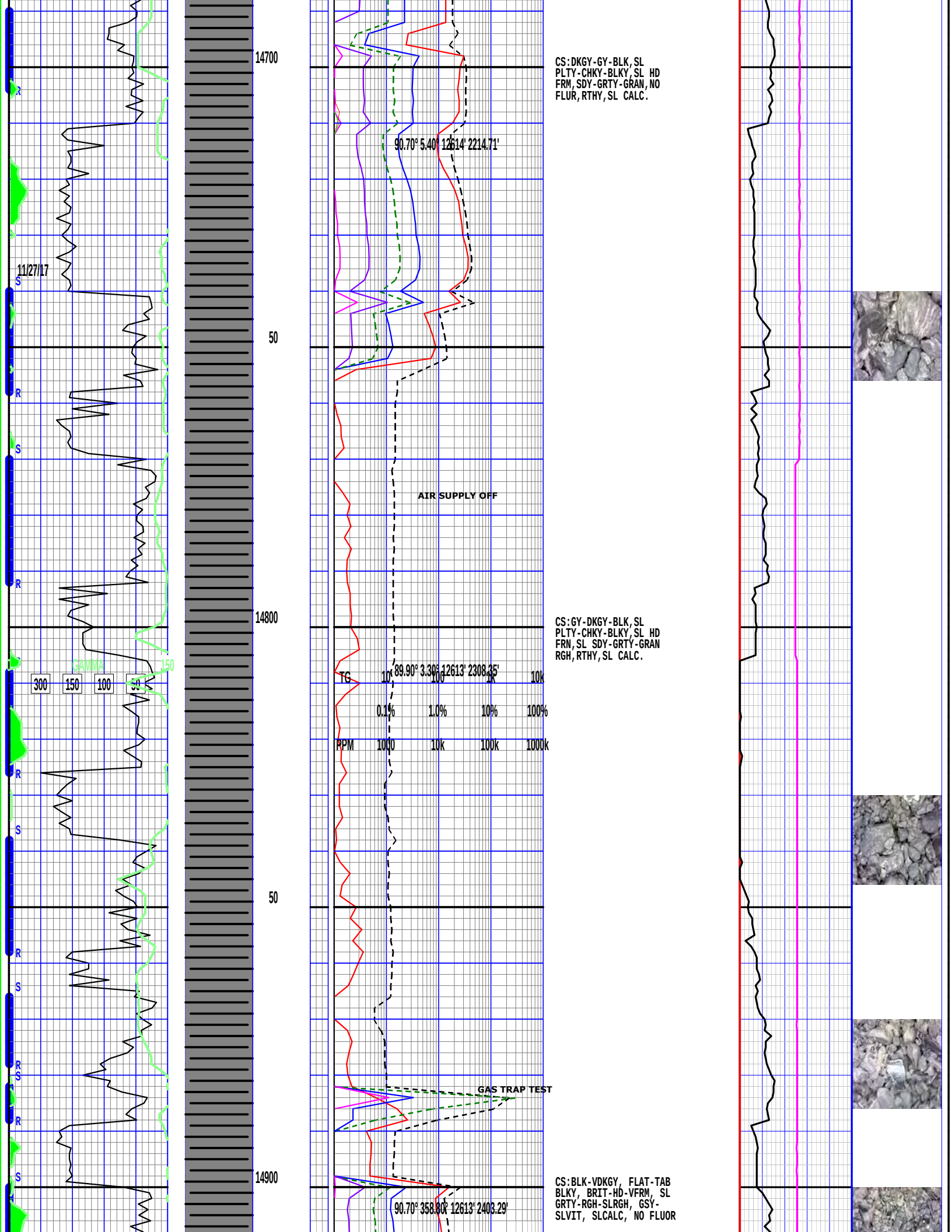


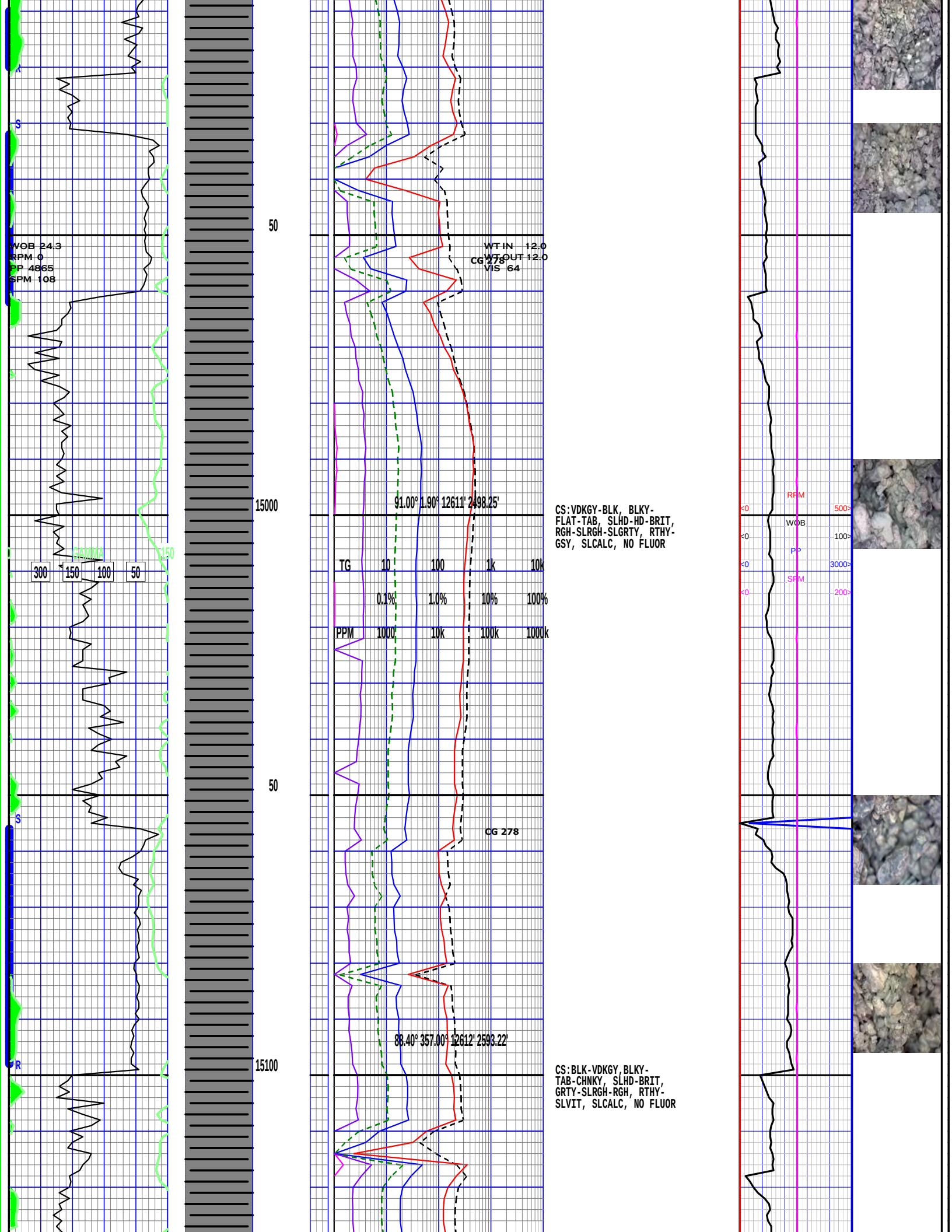


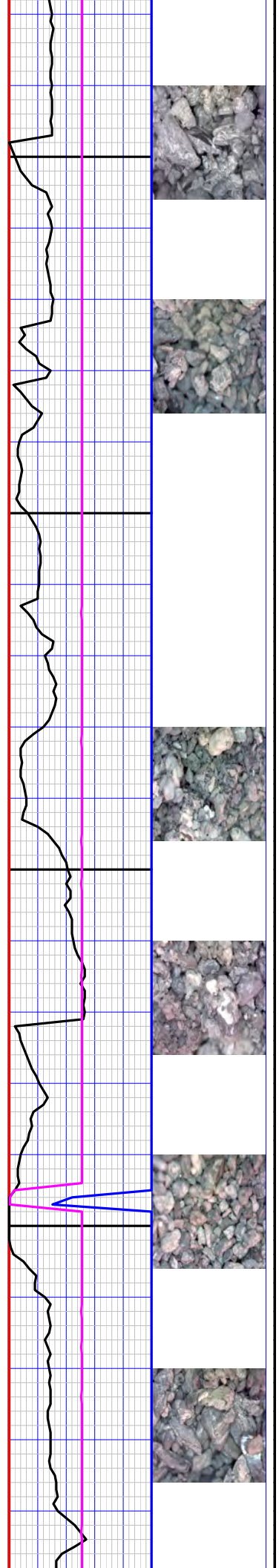
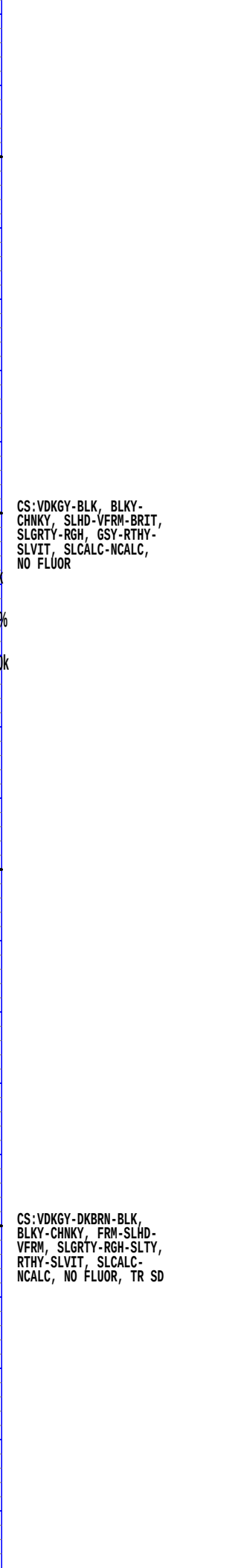
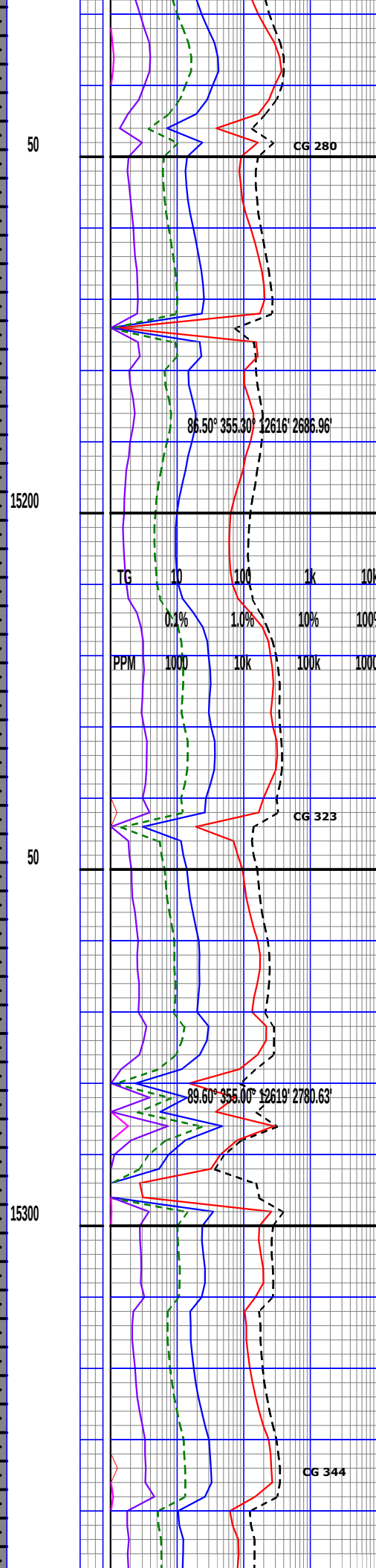
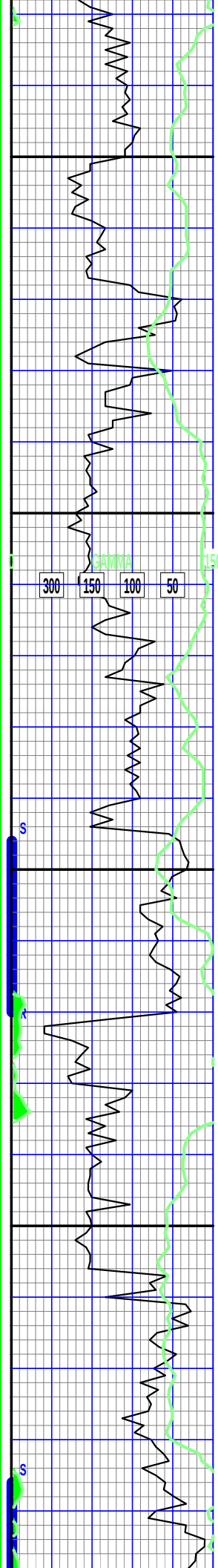


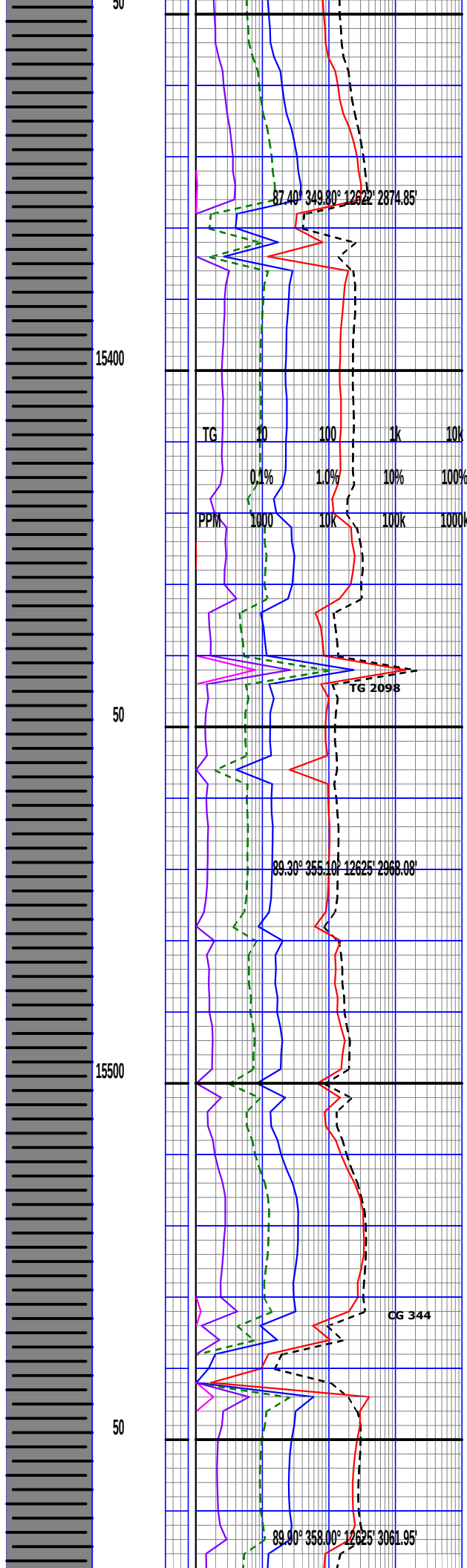
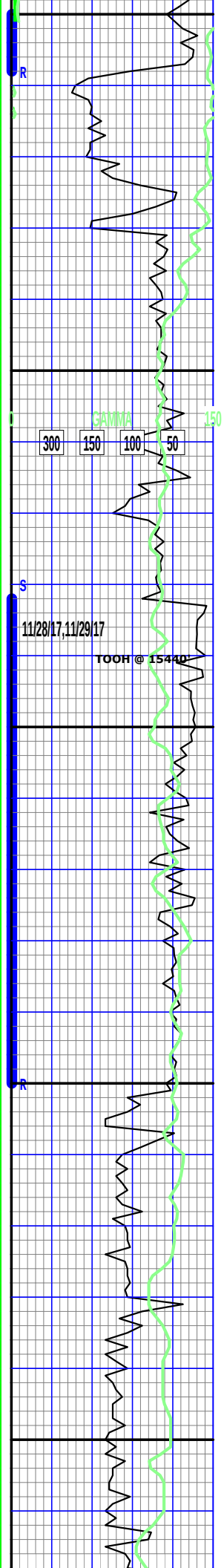






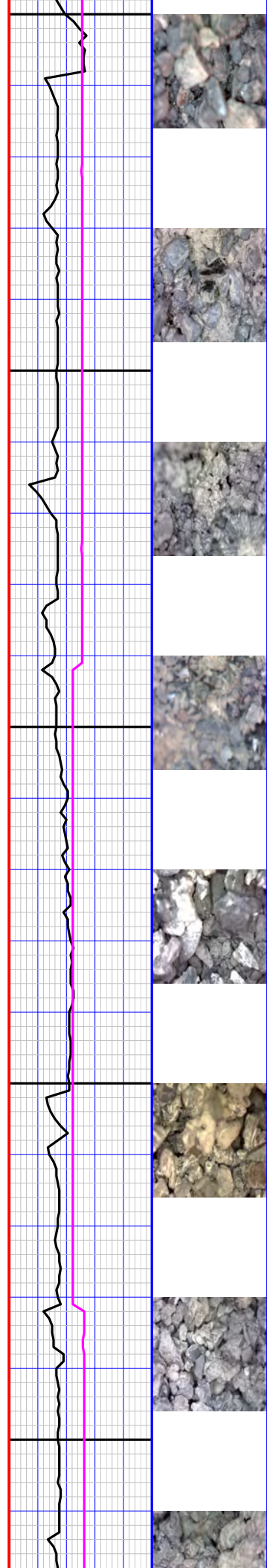


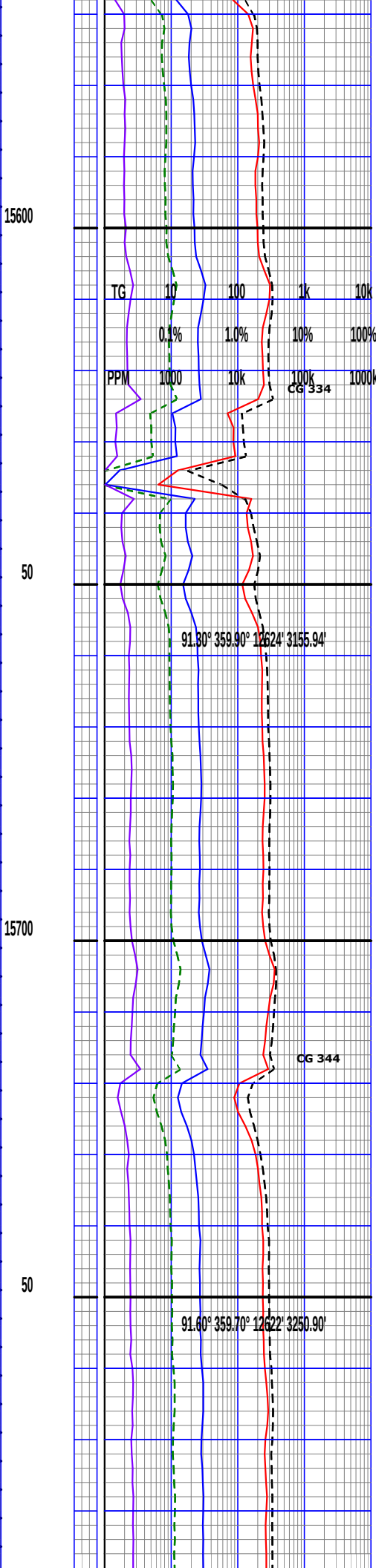
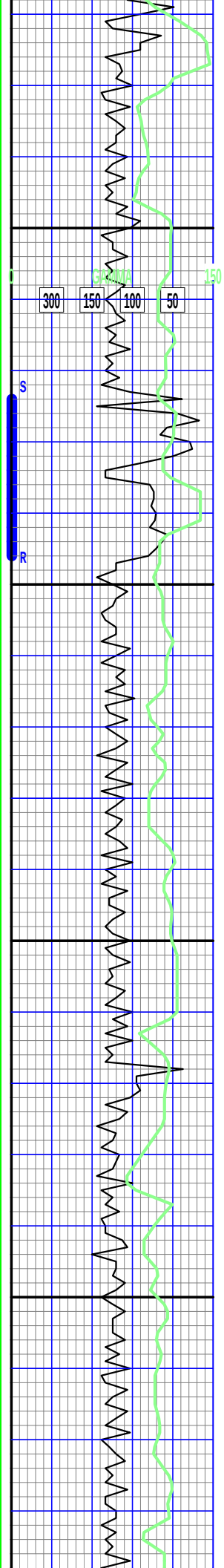




CS: BLK-VDKGY, BLKY-CHNKY-TAB, HD-SLHD-BRIT
RGH-SLRGH-GRTY, RTHY-SLVIT-GSY, SLCALC

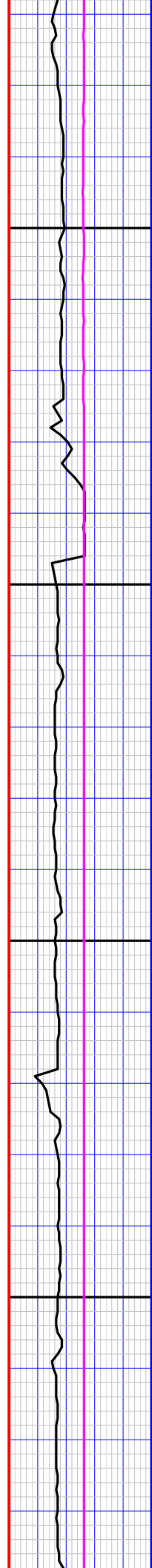
CS: BLK-VDKGY, FLAT-TAB-BLKY, SLHD-BRIT-HD, SLGRTY-SLSM-SLRGH, VGSY-VIT-SLVIT, SLCALC, NO FLUOR

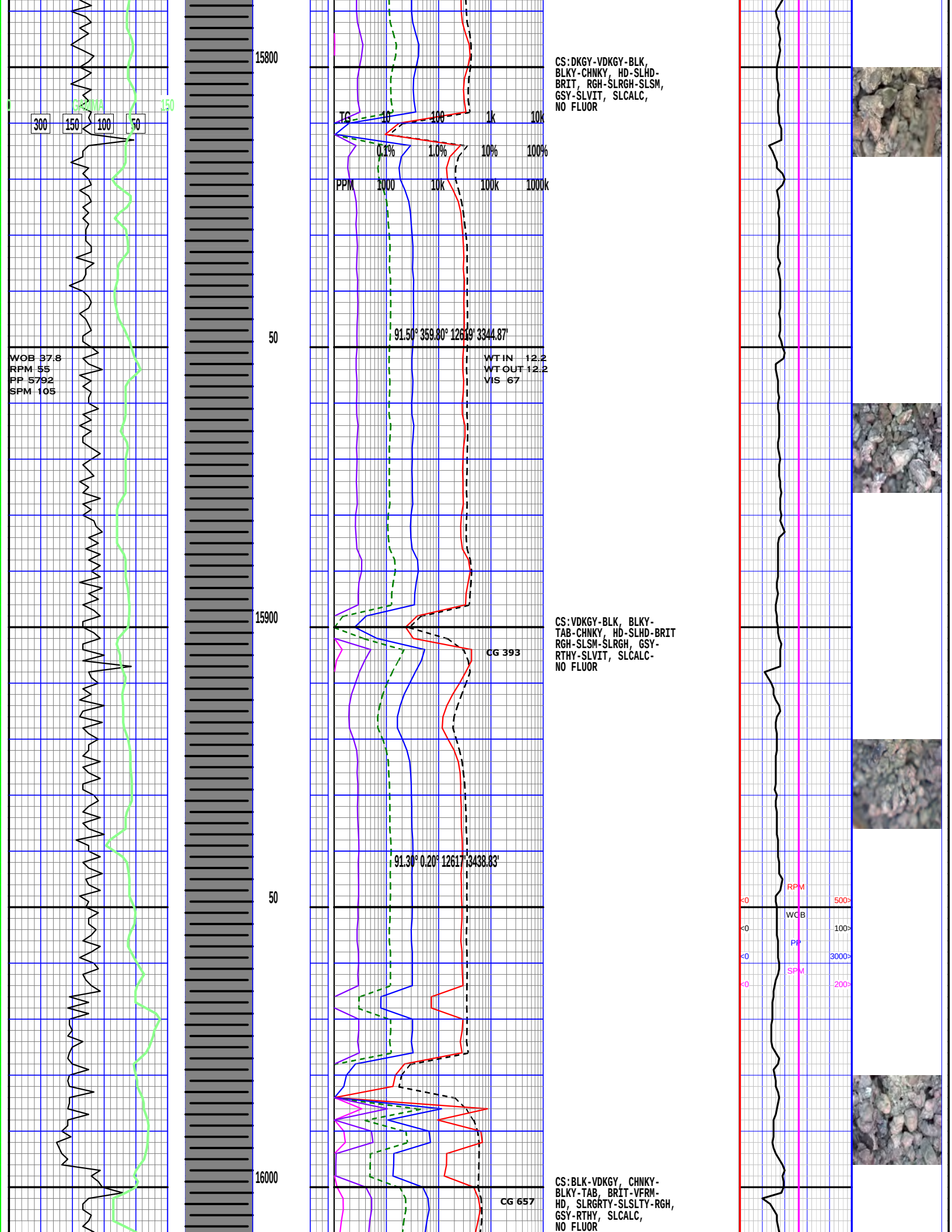


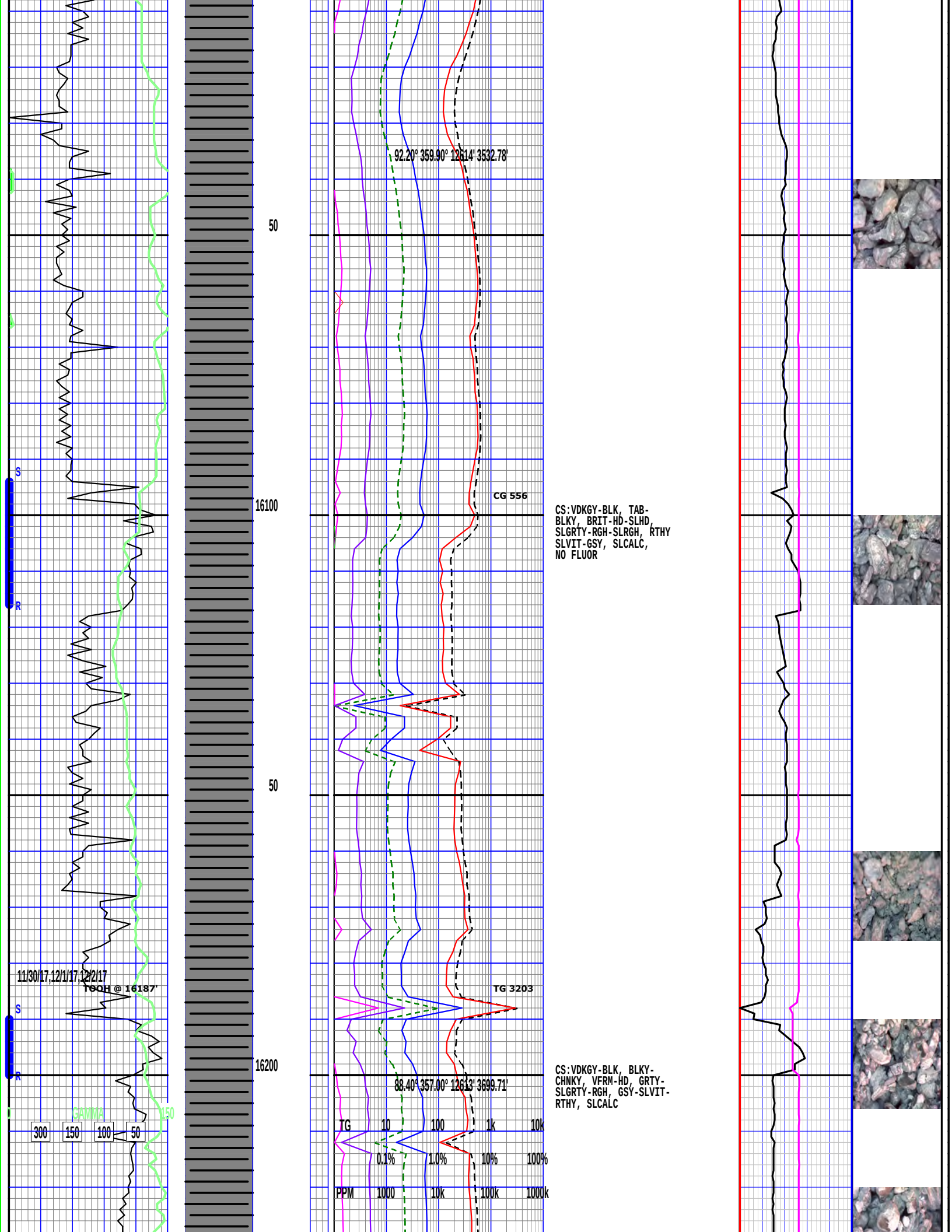


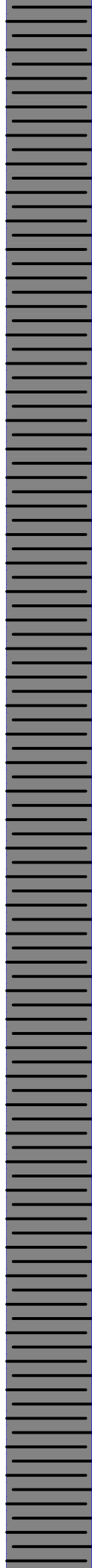
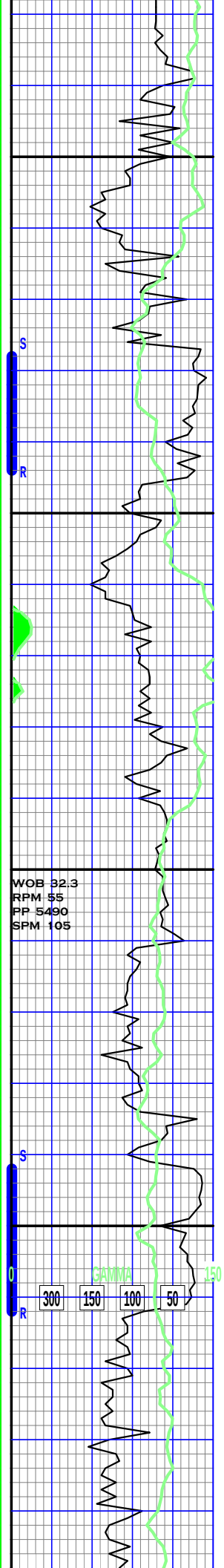
CS:VDKGY-BLK, BLKY-CHNKY, BRIT-HD-VFRM, RGH-SLRGH-SLRGT, SLVIT VIT-GSY, SLCALC, NO FLUOR

CS:VDKGY-BLK, BLKY-CHNKY, HD-VFRM-BRIT, RGH-SLRGH, GSY-RTHY-SLVIT, SLCALC-CALC







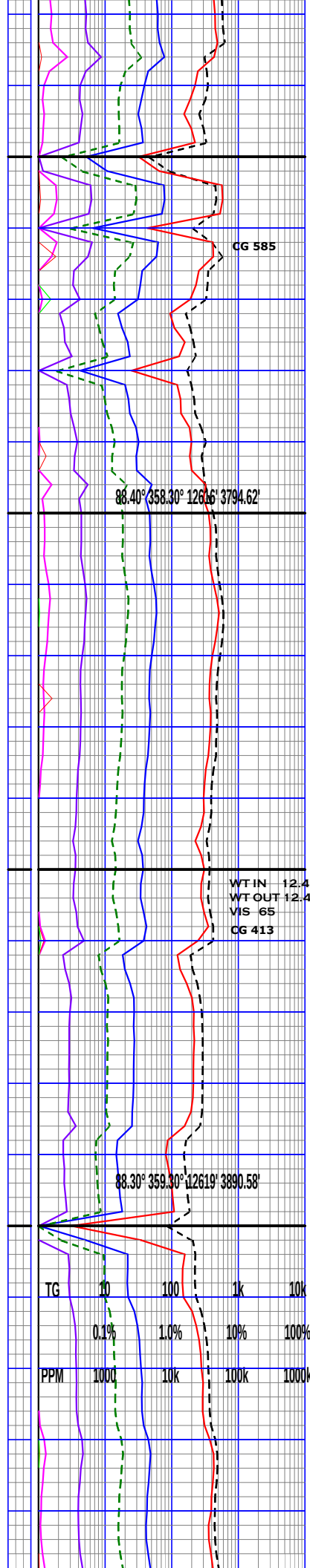


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16300

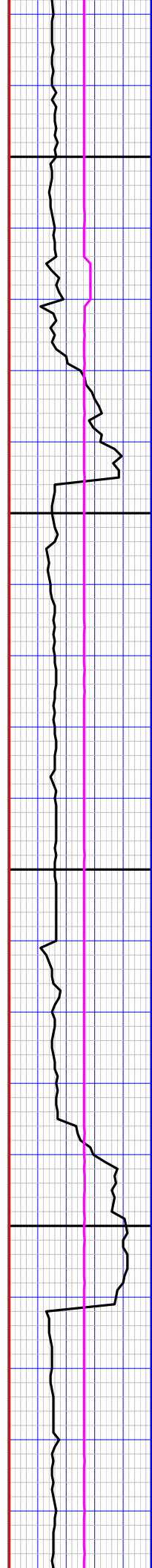
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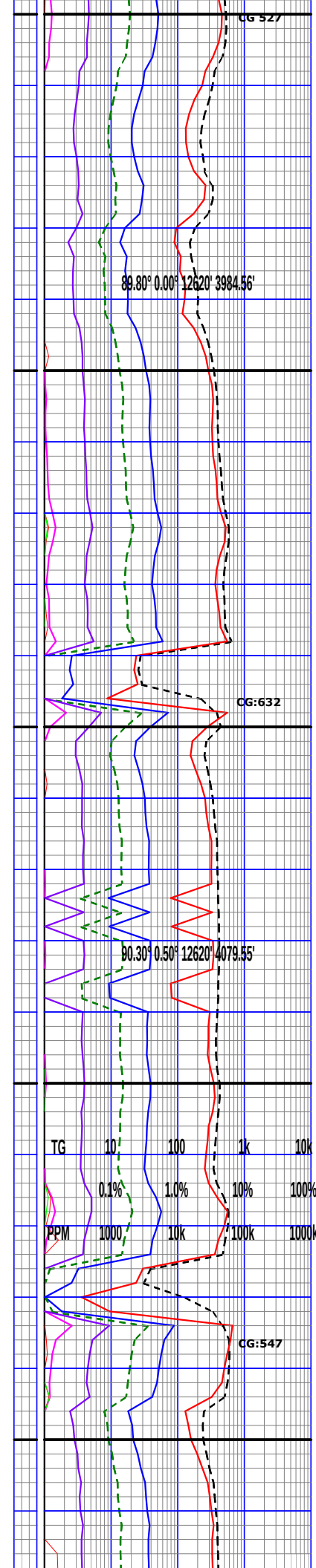
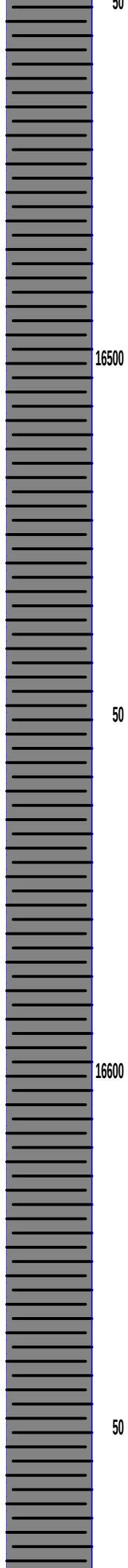
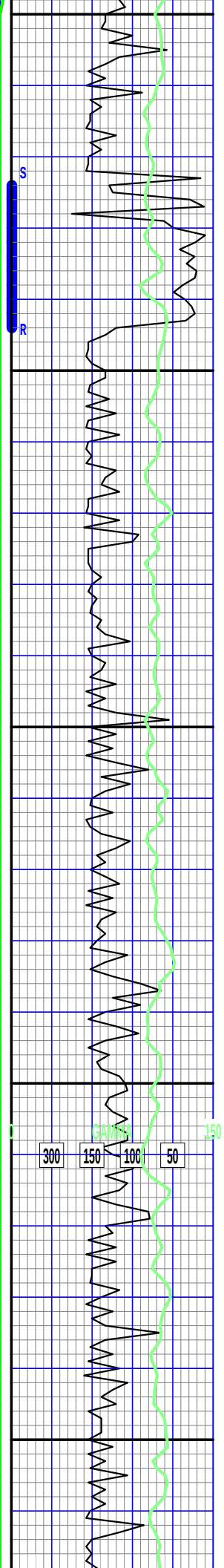
16400



CS:VDKGY-BLK, BLKY-CHNKY-TAB, VFRM-BRIT-SLHD, GRTY-VGRTY-RGH, SLVIT-GSY-RTHY, NCALC-SLCALC, TR IMBD PYR, NO FLUOR

CS:VDKGY-BLK, BLKY-CHNKY, HD-BRIT-VFRM, GRTY-RGH-SLRGH, SLVIT-RTHY-GSY, SLCALC-NCALC, NO FLUOR





CS:DKGY-BLK-GY, SL PLTY
CHKY-BLKY, GRTY-GRAN-SDY
SL HD-FRM, RTHY, SL CALC.

CS:BLK-DKGY-GY, SL PLTY
BLKY-CHKY, GRTY-SDY-GRAN
RGH-SL HD FRM-BRIT, RTHY
SL CALC, NO FLUR.

