

COLUMBINE LOGGING

Scale: 4.20" / 100'
Measured Depth Log

Well Name Caboose 1548-21-44 SWD

Location Sec21, T15S, R48W

State COLORADO

County CHEYENNE

Country USA

Rig Number PIONEER 54

API Number 05-017-07780-00

AFE # 2085499

Region LAS ANIMAS ARCH

Field WILDCAT

Spud Date 1/31/2014

Drilling Completed 2/13/2014

Surface Coordinates 675' FSL / 1100' FEL

Bottom Hole Coordinates 675' FSL / 1100' FEL

Ground Elevation 4254'

K.B. Elevation 4273'

Logged Interval 535' To 5916'

Total Depth 5916'

Formation REAGAN

Type of Drilling Fluid FRESH WATER

Operator

Company Anadarko Petroleum

Address 1099 18th St. Suite 1800
Denver, CO 80202

Geologist

Name Mark Lehrer

Company Anadarko Petroleum

Address 1099 18th St. Suite 1800
Denver, CO 80202

Other

Rock Types

UNKNOWN	NO SAMPLE	GRANITE	SHALE GRAY
ANHYDRITE	BENTONITE	GYPSUM	SHALY SANDSTONE
CHALK	BRECCIA	IGNEOUS	SHALY SILTSTONE
MARLSTONE	CEMENT	SIDERITE or LIMONITE	TILL
DOLOMITE	CHERT	METAMORPHIC	TUFF
LIMESTONE	CLAY CHOKe SAND	SALT	WELDED TUFF
SANDSTONE	CLAYSTONE	SALT- PEPPER SAND	
SILTY SHALE	COAL	SHALE	
SILTSTONE	CONGLOMERATE	SHALE COLORED	

Accessories

Fossils

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHIOPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA

F FOSSIL

- GASTROPOD
- INOCERAMUS
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID

Minerals

ANHYDRITIC

- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- CHTLT
- COAL - THIN BEDS
- DOLOMITIC
- FELDSPAR
- FERRUGINOUS PELLET

FERRUGINOUS

- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS
- SILTY

TUFFACEOUS

Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPSUM STRINGER
- LIMESTONE STRINGER
- MARLSTONE (CALC) STRG
- MARLSTONE (DOL) STRG
- SANDSTONE STRINGER
- SHALE STRINGER
- SILTSTONE STRINGER

Other Symbols

Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

Porosity

- E EARTHY
- F FENESTRAL
- F FRACTURE
- X INTERCRYSTALLINE
- O INTEROOLITIC

MOLDIC

- O ORGANIC
- P PINPOINT
- V VUGGY

Engineering

- BIT
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- CONNECTION GAS
- CORE - LOST
- CORE - RECOVERED
- DST INTERVAL

FAULT

- FORMATION TOP
- GAS SHOW
- MN DEPTH
- NORMAL FAULT
- OIL SHOW
- OVERTURNED STRATA
- REVERSE FAULT
- SIDEWALL CORE (LEFT)
- SIDEWALL CORE (RIGHT)
- SLIDE
- SURVEY
- TRIP GAS

WIRELINE TESTED - LEFT

WIRELINE TESTED - RT

Rounding

- A ANGULAR
- R ROUNDED
- S SUBANG
- M SUBRND

Textures

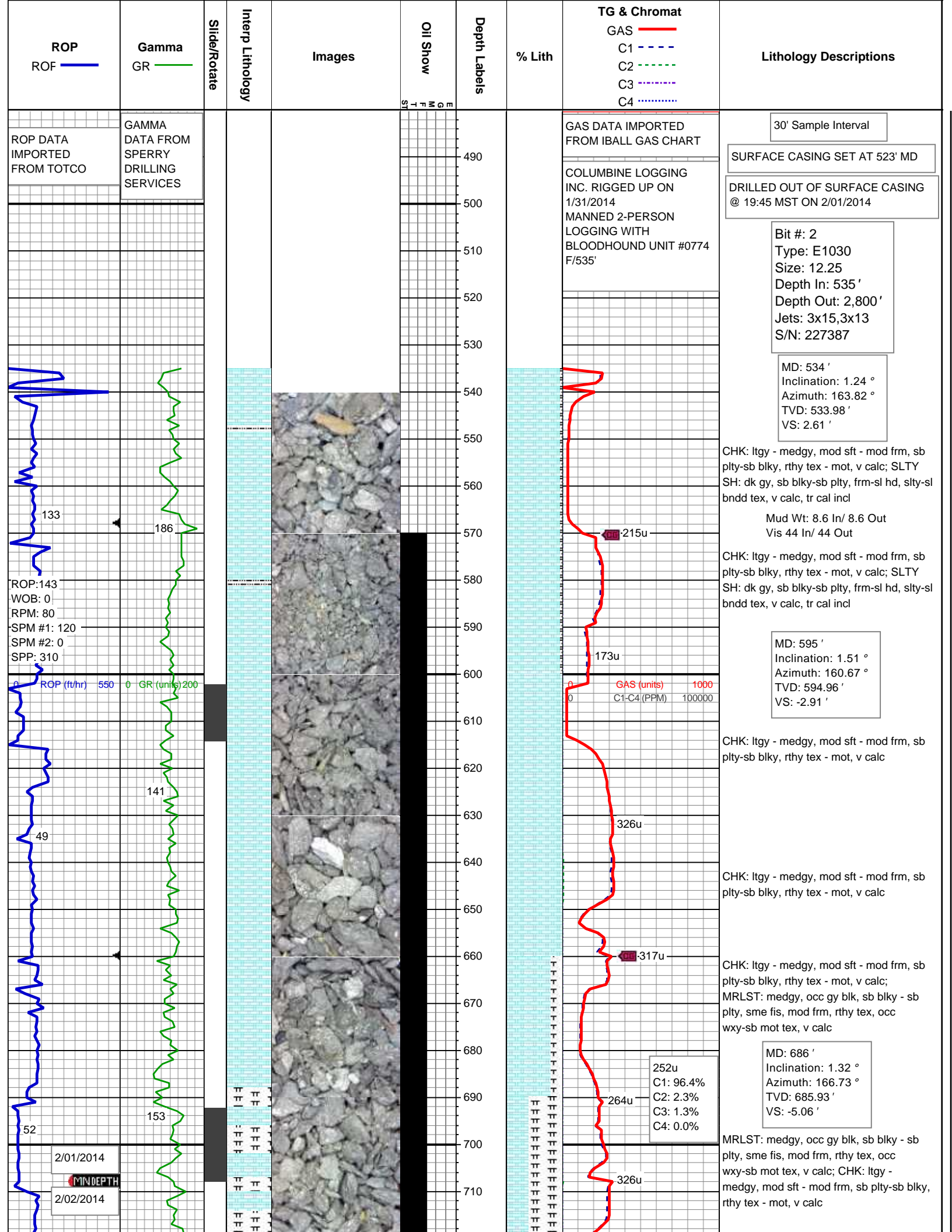
- B BOUNDSTONE
- C CHALKY
- C CRYPTOXLN

E EARTHY

- F FINELYXLN
- G GRAINSTONE
- L LITHOGRAPHIC
- M MICROXLN
- M MUDSTONE
- P PACKSTONE
- W WACKESTONE

Sorting

- M MODERATE
- P POOR
- W WELL



ROP
ROF

Gamma
GR

Slide/Rotate

Interp Lithology

Images

Oil Show

Depth Labels

% Lith

TG & Chromat
GAS
C1
C2
C3
C4

Lithology Descriptions

ROP DATA IMPORTED FROM TOTCO

GAMMA DATA FROM SPERRY DRILLING SERVICES

GAS DATA IMPORTED FROM IBALL GAS CHART

COLUMBINE LOGGING INC. RIGGED UP ON 1/31/2014 MANNED 2-PERSON LOGGING WITH BLOODHOUND UNIT #0774 F/535'

30' Sample Interval

SURFACE CASING SET AT 523' MD

DRILLED OUT OF SURFACE CASING @ 19:45 MST ON 2/01/2014

Bit #: 2
Type: E1030
Size: 12.25
Depth In: 535'
Depth Out: 2,800'
Jets: 3x15,3x13
S/N: 227387

MD: 534'
Inclination: 1.24 °
Azimuth: 163.82 °
TVD: 533.98'
VS: 2.61'

CHK: ltgy - medgy, mod sft - mod frm, sb pty-sb blk, rthy tex - mot, v calc; SLTY SH: dk gy, sb blk-sb pty, frm-sl hd, slty-sl bnnd tex, v calc, tr cal incl

Mud Wt: 8.6 In/ 8.6 Out
Vis 44 In/ 44 Out

CHK: ltgy - medgy, mod sft - mod frm, sb pty-sb blk, rthy tex - mot, v calc; SLTY SH: dk gy, sb blk-sb pty, frm-sl hd, slty-sl bnnd tex, v calc, tr cal incl

MD: 595'
Inclination: 1.51 °
Azimuth: 160.67 °
TVD: 594.96'
VS: -2.91'

CHK: ltgy - medgy, mod sft - mod frm, sb pty-sb blk, rthy tex - mot, v calc

CHK: ltgy - medgy, mod sft - mod frm, sb pty-sb blk, rthy tex - mot, v calc

CHK: ltgy - medgy, mod sft - mod frm, sb pty-sb blk, rthy tex - mot, v calc; MRLST: medgy, occ gy blk, sb blk - sb pty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

MD: 686'
Inclination: 1.32 °
Azimuth: 166.73 °
TVD: 685.93'
VS: -5.06'

MRLST: medgy, occ gy blk, sb blk - sb pty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc; CHK: ltgy - medgy, mod sft - mod frm, sb pty-sb blk, rthy tex - mot, v calc

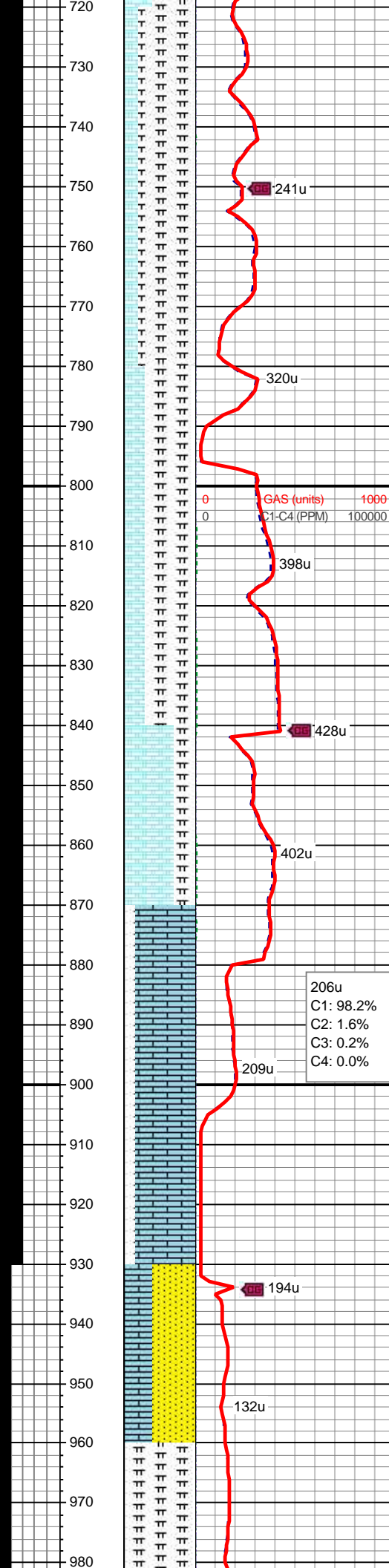
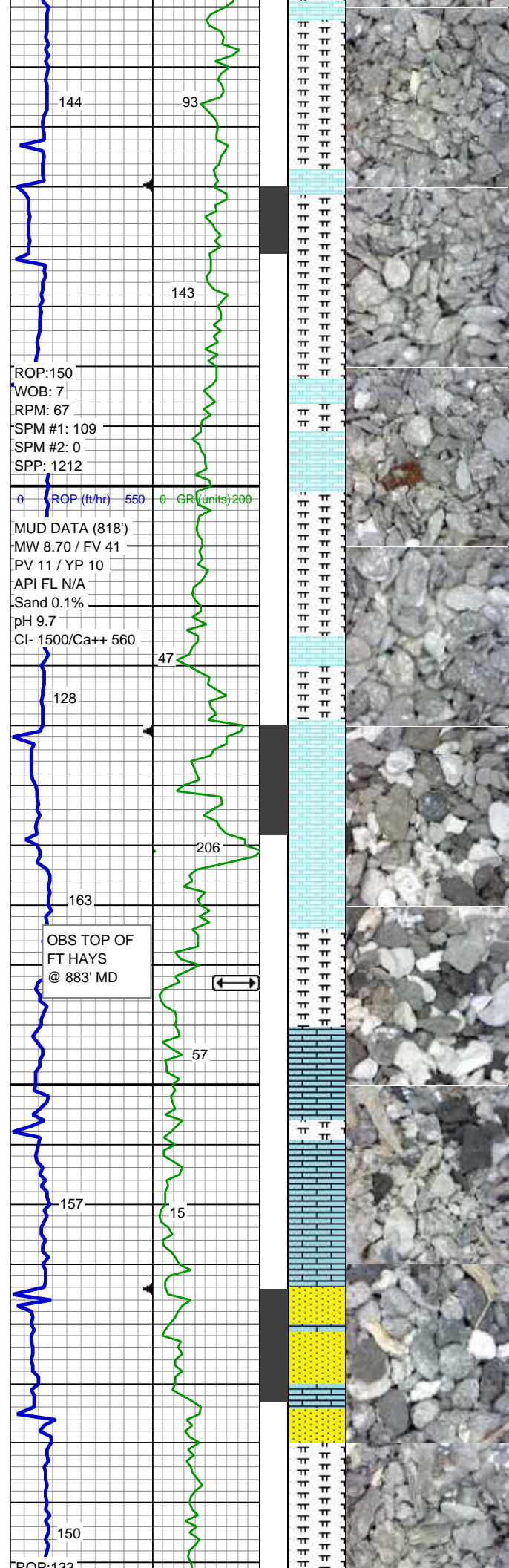
ROP:143
WOB: 0
RPM: 80
SPM #1: 120
SPM #2: 0
SPP: 310

ROP (ft/hr) 550 GR (units) 200

GAS (units) 1000
C1-C4 (PPM) 100000

252u
C1: 96.4%
C2: 2.3%
C3: 1.3%
C4: 0.0%

2/01/2014
MINDEPTH
2/02/2014



MRLST: medgy, occ gy blk, sb blkly - sb plty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc; CHK: ltgy - medgy, mod sft - mod frm, sb plty-sb blkly, rthy tex - mot, v calc

MRLST: medgy, occ gy blk, sb blkly - sb plty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc; CHK: ltgy - medgy, mod sft - mod frm, sb plty-sb blkly, rthy tex - mot, v calc

MD: 777 '
Inclination: 1.11 °
Azimuth: 171.64 °
TVD: 776.91 '
VS: -6.95 '

Mud Wt: 8.6 In/ 8.7 Out
Vis 41 In/ 41 Out

MRLST: medgy, occ gy blk, sb blkly - sb plty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc; CHK: ltgy - medgy, mod sft - mod frm, sb plty-sb blkly, rthy tex - mot, v calc

MRLST: medgy, occ gy blk, sb blkly - sb plty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc; CHK: ltgy - medgy, mod sft - mod frm, sb plty-sb blkly, rthy tex - mot, v calc

CHK: ltgy - medgy, mod sft - mod frm, sb plty-sb blkly, rthy tex - mot, v calc; MRLST: medgy, occ gy blk, sb blkly - sb plty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

MD: 870 '
Inclination: 0.83 °
Azimuth: 157.44 °
TVD: 869.9 '
VS: 9.42 '

LS: wh-lt gy, mod sft - mod frm, sb plty-sb blkly, rthy tex, v calc; MRLST: medgy, occ gy blk, sb blkly - sb plty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

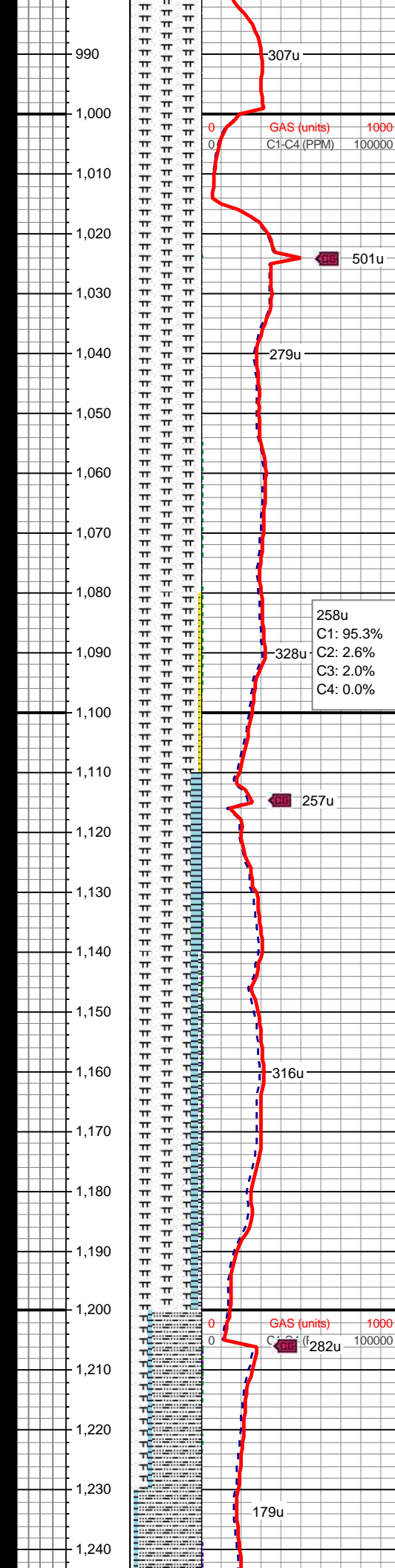
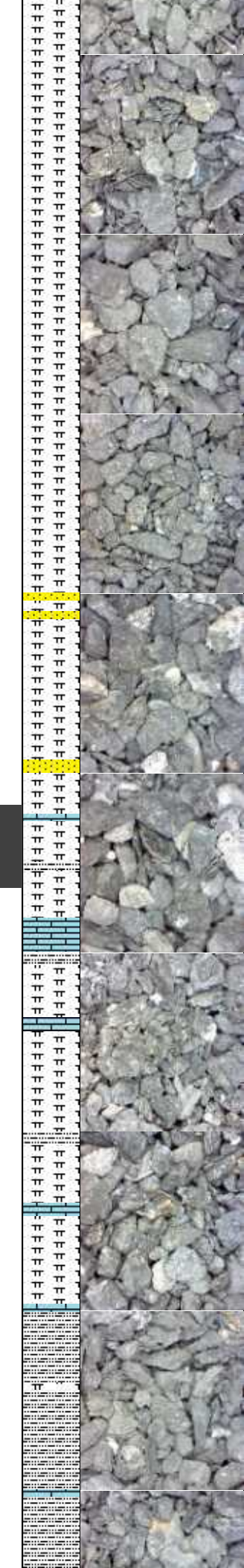
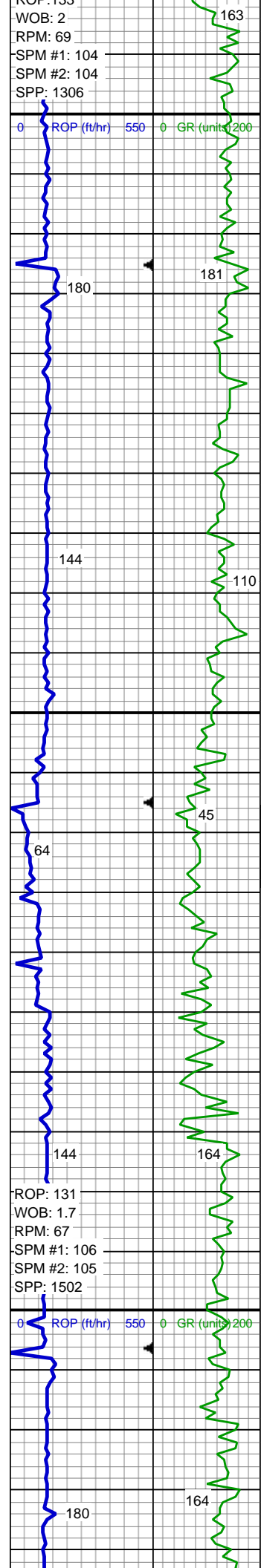
LS: wh-lt gy, mod sft - mod frm, sb plty-sb blkly, rthy tex, v calc; MRLST: medgy, occ gy blk, sb blkly - sb plty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

Mud Wt: 8.7 In/ 8.7 Out
Vis 41 In/ 41 Out

LS: wh-lt gy, mod sft - mod frm, sb plty-sb blkly, rthy tex, v calc; SS: wh-lt gy, frm-hd, f-vf gr, sb ang-sb rnd, p ind, sl uncons, p por, slty tex ip, sil-arg cmt, tr glau, tr dk lthc frag

MD: 959 '
Inclination: 0.44 °
Azimuth: 153.73 °
TVD: 958.89 '
VS: -9.37 '

MRLST: med-dk gy, occ gy blk, sb blkly -



sb pfty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

MRLST: med-dk gy, occ gy blk, sb blkly - sb pfty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

MRLST: med-dk gy, occ gy blk, sb blkly - sb pfty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

MD: 1,051 '
Inclination: 0.59 °
Azimuth: 147.34 °
TVD: 1,050.89 '
VS: 11.44 '

MRLST: lt - med gy brn, tr gy blk, sb blkly - sb pfty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc

MRLST: lt - med gy brn, tr gy blk, sb blkly - sb pfty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc; tr SS, tr dissym pyr, tr yel mnrl flr, mod slow frnt yel difse cut

Mud Wt: 8.7 In/ 8.7 Out
Vis 42 In/ 42 Out

MRLST: lt - med gy brn, tr gy blk, sb blkly - sb pfty, sme fis, mod frm, rthy tex, occ wxy-sb mot tex, v calc; LS: wh-lt gy, mod sft - mod frm, sb pfty-sb blkly, rthy tex, v calc, occ dul orgn mnrl flr, mod slow dul yel difse cut

MD: 1,142 '
Inclination: 0.4 °
Azimuth: 108.78 °
TVD: 1,141.88 '
VS: -10.77 '

MRLST: lt - med gy brn, tr gy blk, sb blkly - sb pfty, sme fis, mod frm - frm, rthy tex, occ wxy, v mot mot/bnd tex, v calc; LS: wh-lt gy, mod sft - mod frm, sb pfty-sb blkly, rthy tex, v calc, tr slty sh, tr dul yel/orgn mnrl flr, mod slow dul yel difse cut

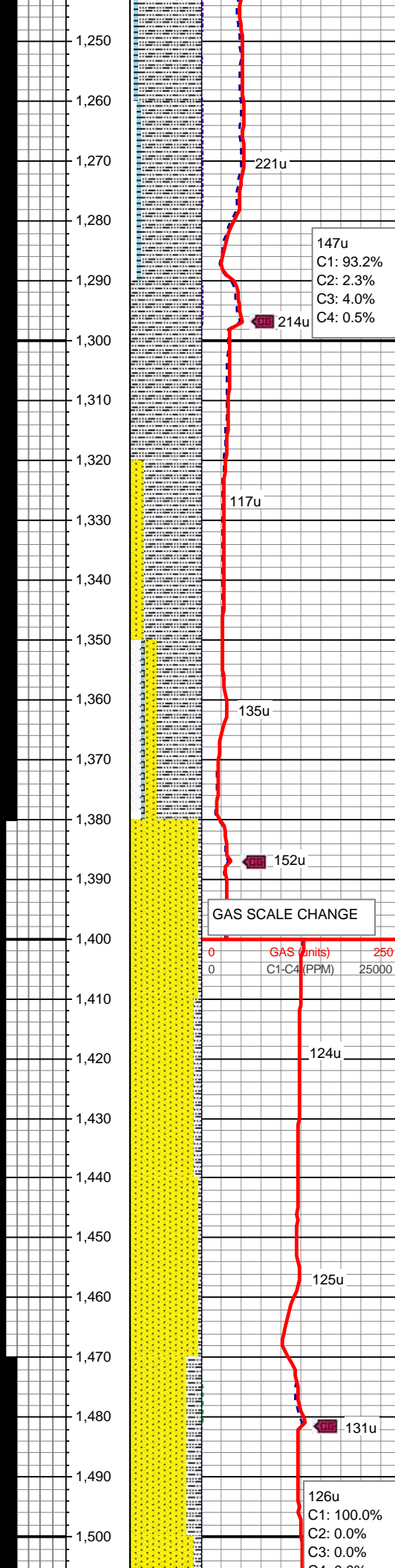
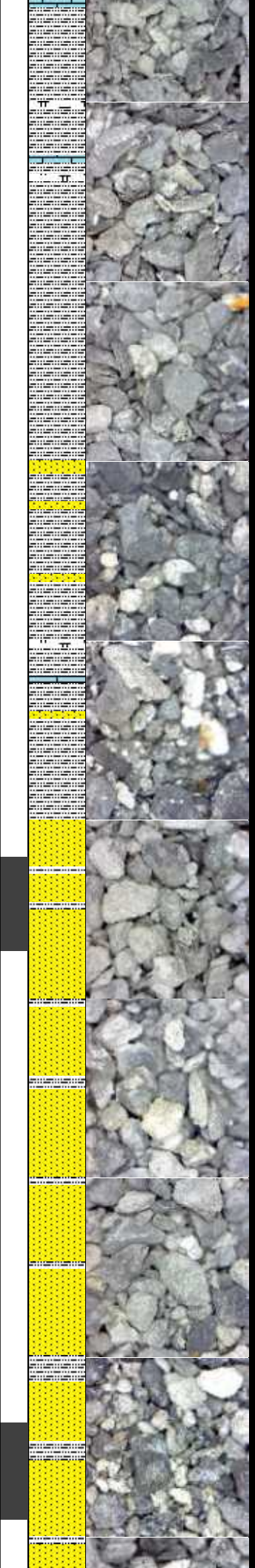
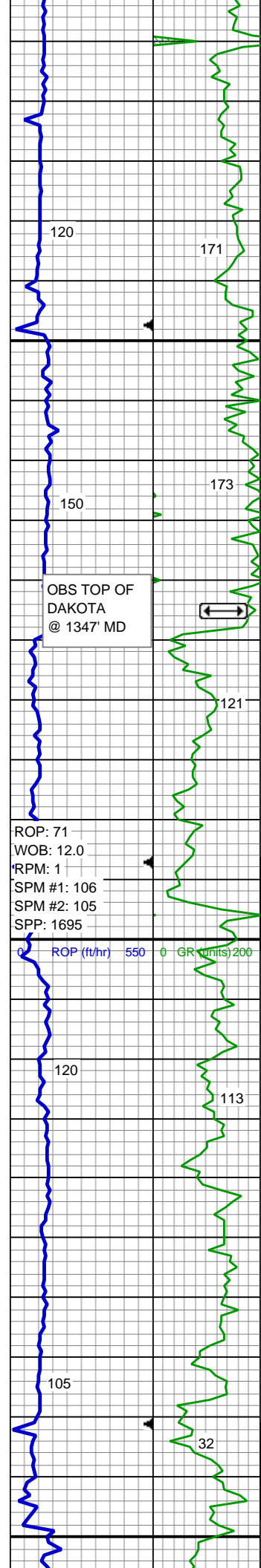
MRLST: lt - med gy brn, tr gy blk, sb blkly - sb pfty, sme fis, mod frm - frm, rthy tex, occ wxy, v mot mot/bnd tex, v calc; LS: pred. lt gy, sme off wh, mod frm, smwt brit, sb pfty-sb blkly, rthy tex, v calc, tr slty sh, com dul yel mnrl flr, mod slow dul lt bl difse cut

Mud Wt: 8.7 In/ 8.7 Out
Vis 42 In/ 41 Out

SLTY SH: gy-dk gy, sb blkly-sb pfty, frm-sl hd, slty/rthy-sl bndd tex, v calc; grd to

MRLST: lt - med gy brn, sb blkly - sb pfty, sme fis, mod frm - frm, rthy tex, occ wxy, v mot mot/bnd tex, v calc; tr LS, tr dul yel mnrl flr, mod slow dul lt bl difse cut

MD: 1,233 '
Inclination: 0.56 °
Azimuth: 108.91 °
TVD: 1,232.88 '
VS: -11.01 '



SLTY SH: gy-dk gy, sb blkly-sb plty, frm-sl hd, slty/rthy-sl bnnd tex, mod - v calc; grdg ip to MRLST; sl tr LS, no flor, mod fast mod bri yel sl stmg difse cut

SLTY SH: gy-dk gy, sb blkly-sb plty, mod frm-sl hd, slty/rthy-sl bnnd tex, tr fos frag, mod - v calc; grdg ip to MRLST; sl tr LS, tr dul yel mnrl flor, mod fast dull yel difse cut

SLTY SH: gy-dk gy, sb blkly-sb plty, mod frm-sl hd, slty/rthy-sl bnnd tex, tr fos frag, mod - v calc; tr dul org mnrl flor, mod fast mod bri bl wh sl stmg difse cut

MD: 1,323 '
Inclination: 0.79 °
Azimuth: 103.31 °
TVD: 1,322.87 '
VS: -11.3 '

SLTY SH: gy-dk gy, sb blkly-sb plty, mod frm - sl hd, slty/rthy-sl bnnd tex; SS: wh-off wh, sme lt gy, clr gr, frm-hd, f-vf gr, sb ang-sb rnd, p - mod ind, sl uncons, sil-arg cmt; no mnrl flor, mod fast mod bri bl wh sl stmg difse cut

SLTY SH: gy-dk gy, sb blkly-sb plty, mod frm - sl hd, slty/rthy-sl bnnd tex; MRLST: lt - med gy brn, tr gy blk, sb blkly - sb plty, sme fis, mod frm - frm, rthy tex, occ wxy, v mot mot/bnd tex, v calc; SS: wh-off wh, sme lt gy, clr gr, frm-hd, f-vf gr, sb ang-sb rnd, p - mod ind, sl uncons, sil-arg cmt; tr dul yel mnrl flor, mod slow mod dull bl wh sl stmg difse cut

SS: pred wh-off wh, sme lt gy, clr gr, frm-hd, f-vf gr, sb ang-sb rnd, p - mod ind, sl uncons, sil-arg cmt; spec wi glau, v sl calc ip, no mnrl flor, mod slow mod dull bl wh sl stmg difse cut

MD: 1,418 '
Inclination: 0.94 °
Azimuth: 96.32 °
TVD: 1,417.86 '
VS: -11.53 '

SS: pred wh-off wh, sme lt gy, clr gr, frm-hd, f-vf gr, sb ang-sb rnd, p - mod ind, sl uncons, sil-arg cmt; grdg to SLTY SH: gy-dk gy, sb blkly-sb plty, mod frm, slty/rthy tex; v sl calc ip, no mnrl flor, mod slow mod dull bl wh sl stmg difse cut

SS: pred lt gy, sme off wh, clr gr, mod frm-hd, f-vf gr, sb ang-sb rnd, p - mod ind, sl uncons, sil-arg cmt; v sl calc ip, no mnrl flor, mod slow dull yel sl stmg difse cut

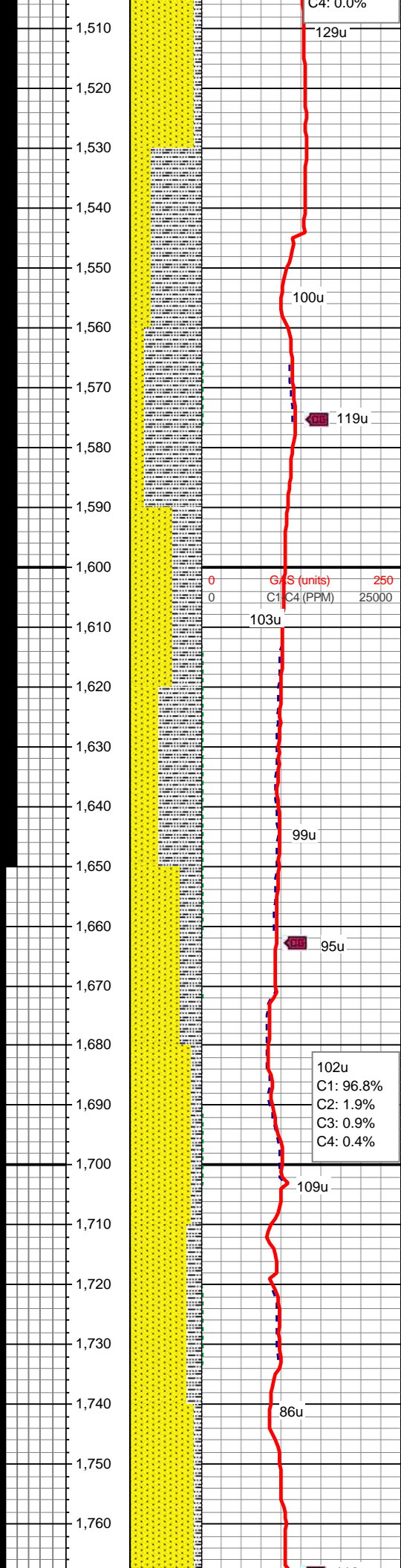
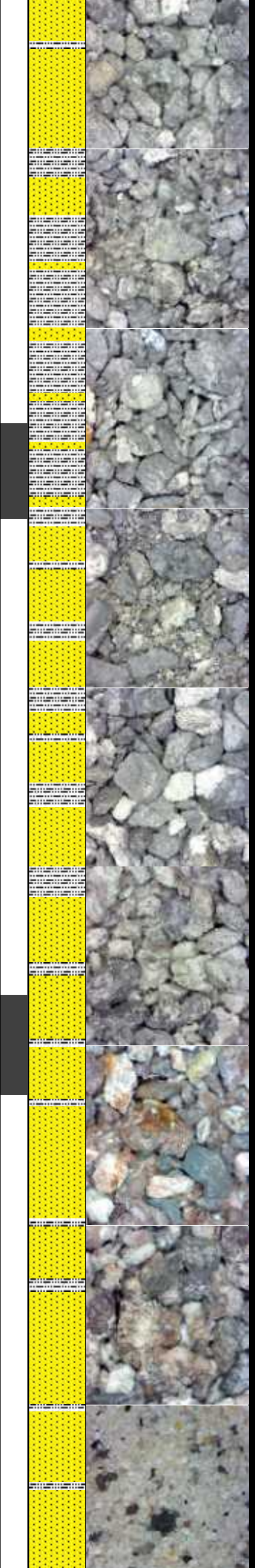
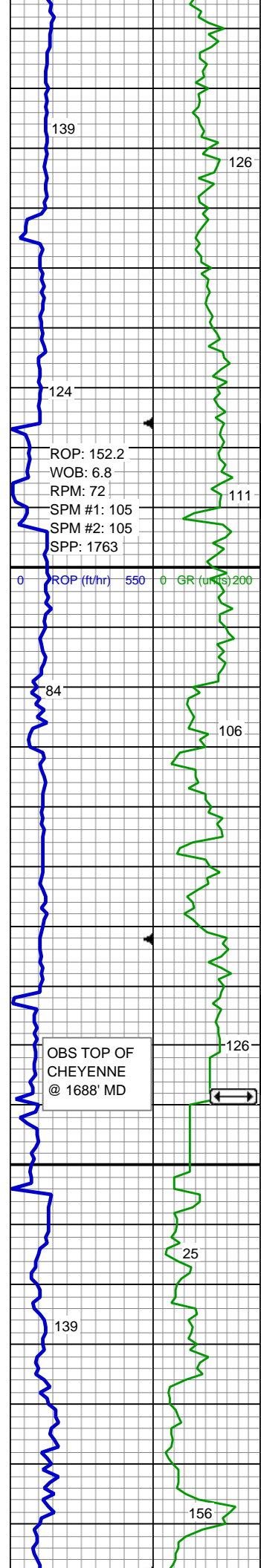
SS: pred wh-off wh, sme lt gy, clr gr, frm-hd, f-vf gr, sb ang-sb rnd, p - mod ind, sl uncons, sil-arg cmt; grdg to SLTY SH: gy-dk gy, sb blkly-sb plty, mod frm, slty/rthy tex; v sl calc ip, no mnrl flor, mod slow dull yel difse cut

MD: 1,513 '
Inclination: 0.97 °
Azimuth: 101.61 °

147u
C1: 93.2%
C2: 2.3%
C3: 4.0%
C4: 0.5%

GAS SCALE CHANGE

0	GAS (units)	250
0	C1-C4 (PPM)	25000



TVD: 1,512.85 '
 VS: -11.78 '

SS: pred lt gy, sme off wh, clr gr, mod frm-hd, f-vf gr, sb ang-sb rnd, mod ind, sil-arg cmt; grdg to SLTY SH: gy-dk gy, sb blk-y-sb pty, mod frm, slty/rthy tex; v sl calc ip, no mnrl flr, mod slow dull bl difse cut

SLTY SH: gy-dk gy, sb blk-y-sb pty, mod frm, slty/rthy tex; grdg to SS: pred lt gy, sme off wh, clr gr, mod frm-hd, vf gr, sb ang-sb rnd, mod ind, sil-arg cmt; v sl calc ip, tr lse pyr, no mnrl flr, mod slow dull bl sl stmg difse cut

SLTY SH: gy-dk gy, sb blk-y-sb pty, mod frm, slty/rthy tex; grdg to SS: pred lt gy, tr off wh, clr gr, mod frm-hd, vf gr, sb ang-sb rnd, mod ind, sil-arg cmt; v sl calc ip, tr lse pyr, no mnrl flr, mod slow dull bl difse cut

Mud Wt: 8.8 In/ 8.9 Out
 Vis 42 In/ 42 Out

SS: pred wh-off wh, tr lt gy, clr gr, frm-hd, f-m gr, sb ang-sb rnd, mod srt, p - mod ind, sl uncons, occ lse gr, sil-arg cmt; grdg to SLTY SH: gy-dk gy, sb blk-y-sb pty, mod frm, slty/rthy tex; v sl calc ip, tr pyr, no mnrl flr, mod slow dull yel difse cut

MD: 1,618 '
 Inclination: 0.68 °
 Azimuth: 116.01 °
 TVD: 1,617.84 '
 VS: -12.23 '

SLTY SH: gy-dk gy, sb blk-y-sb pty, mod frm, slty/rthy tex; grdg to SS: pred wh-off wh, tr lt gy, clr gr, frm-hd, f-m gr, sb ang-sb rnd, mod srt, p - mod ind, sl uncons, occ lse gr, sil-arg cmt; v sl calc ip, tr pyr, no mnrl flr, mod slow dull yel difse cut

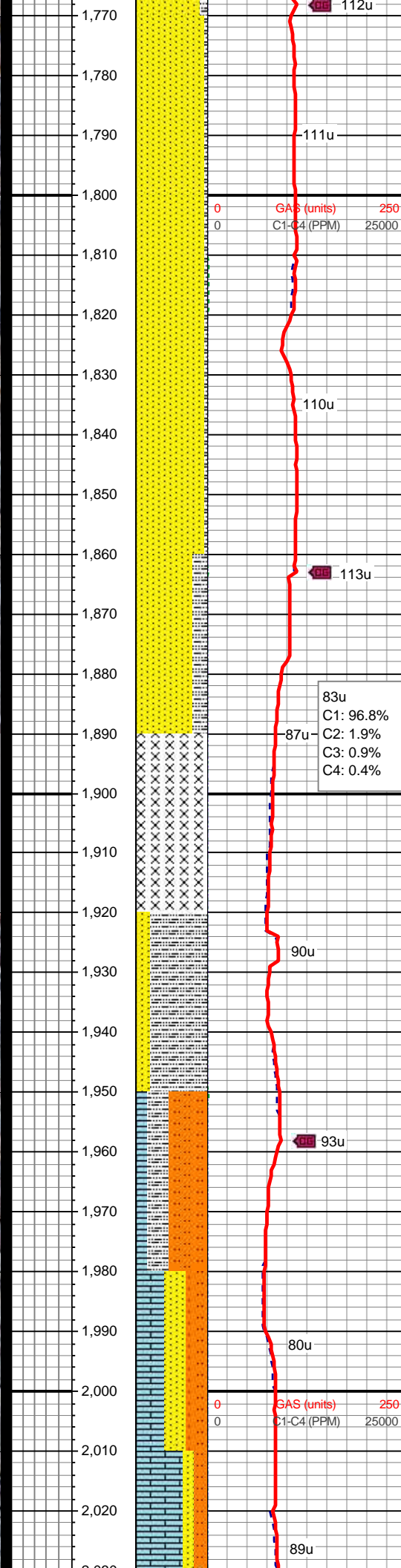
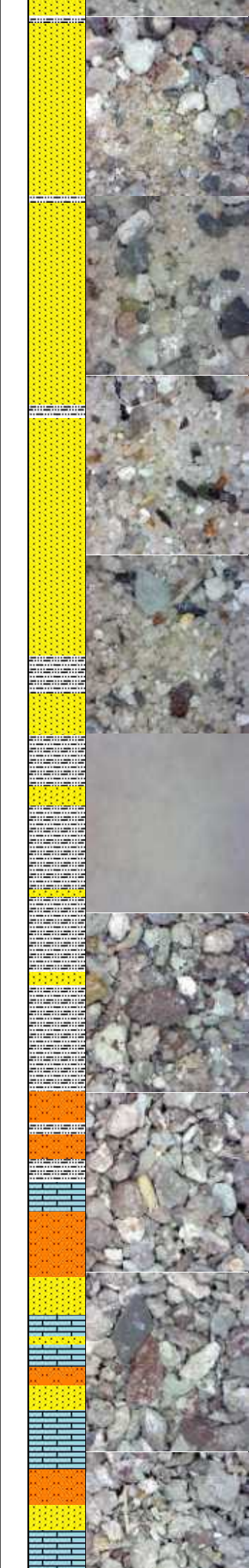
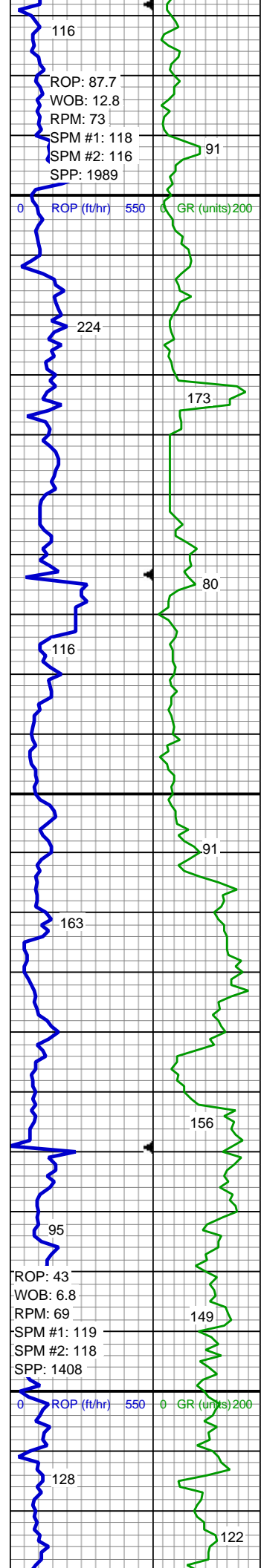
SS: pred wh-off wh, tr lt gy, clr gr, frm-hd, vf gr, sb ang-sb rnd, well srt, p - ind, sl uncons, occ lse gr, sil-arg cmt; grdg to SLTY SH: lt gy-gn-purp, tr dk gy, sb blk-y-sb pty, mod frm, sl slty tex; non calc, no mnrl flr, mod slow dull yel difse cut

SS: pred org/red, occ wh/purp/bl, clr gr, frm-hd, vf-med gr, sb ang-sb rnd, mod srt, p ind, sl uncons, occ lse gr, sil-arg cmt; grdg to SLTY SH: gy-lt bl gn, tr dk gy & org, sb blk-y-sb pty, mod frm, sl slty tex; sl calc ip, occ dul org mnrl flr, mod slow dull yel difse cut

MD: 1,703 '
 Inclination: 0.31 °
 Azimuth: 108.34 °
 TVD: 1,702.84 '
 VS: -12.53 '

SS: pred wh, occ lt org, clr gr, smwt frm, vf-med gr, sb ang-sb rnd, mod srt, p ind, sl uncons, occ lse gr, sil-arg cmt; grdg to SLTY SH: gy - red/org - purp, sb blk-y-sb pty, frm, sl slty tex; v sl calc ip, no mnrl flr, mod slow dull yel difse cut

SS: pred wh, tr lt org, clr gr, smwt frm, vf-med gr, sb ang-sb rnd, p srt, v p ind, sl uncons, abnt lse gr, sil-arg cmt; grdg to SLTY SH: pred gy, tr red/org - purp, sb blk-y-sb pty, frm, sl slty tex; v sl calc ip, no mnrl flr, mod slow dull yel difse cut



SS: wh, lt org, red, yel, purp, clr gr, mod frm, vf-med gr, sb ang-sb rnd, mod srt, mod ind, smwt uncon, sme lse gr, sil-arg cmt; tr slty sh, v sl calc ip, no mnrl flor, mod slow dull yel difse cut

MD: 1,798 '
Inclination: 0.33 °
Azimuth: 100.13 °
TVD: 1,797.83 '
VS: -12.66 '

SS: wh, lt org, red, yel, purp, clr gr, mod frm, vf-med gr, sb ang-sb rnd, p srt, mod ind, smwt uncon, abnt lse gr, sil-arg cmt; tr slty sh, sl calc ip, no mnrl flor, mod slow dull yel difse cut

SS: pred wh, tr lt org, clr gr, smwt frm, vf-med gr, sb ang-sb rnd, p srt, v p ind, sl uncon, abnt lse gr, sil-arg cmt; grdg to SLTY SH: pred gy-dk gy, tr red/org - purp, sb blk-y-sb pty, frm, sl slty tex; sl calc ip, no mnrl flor, mod slow dull yel difse cut

SS: pred wh, tr lt org, clr gr, smwt frm, vf-med gr, sb ang-sb rnd, p srt, v p ind, sl uncon, abnt lse gr, sil-arg cmt; grdg to SLTY SH: pred gy-dk gy, tr red/org - purp, sb blk-y-sb pty, frm, sl slty tex; sl calc ip, no mnrl flor, mod slow dull yel difse cut

MD: 1,894 '
Inclination: 0.45 °
Azimuth: 122.68 °
TVD: 1,893.83 '
VS: 18.63 '
NO RECOVERABLE SAMPLE

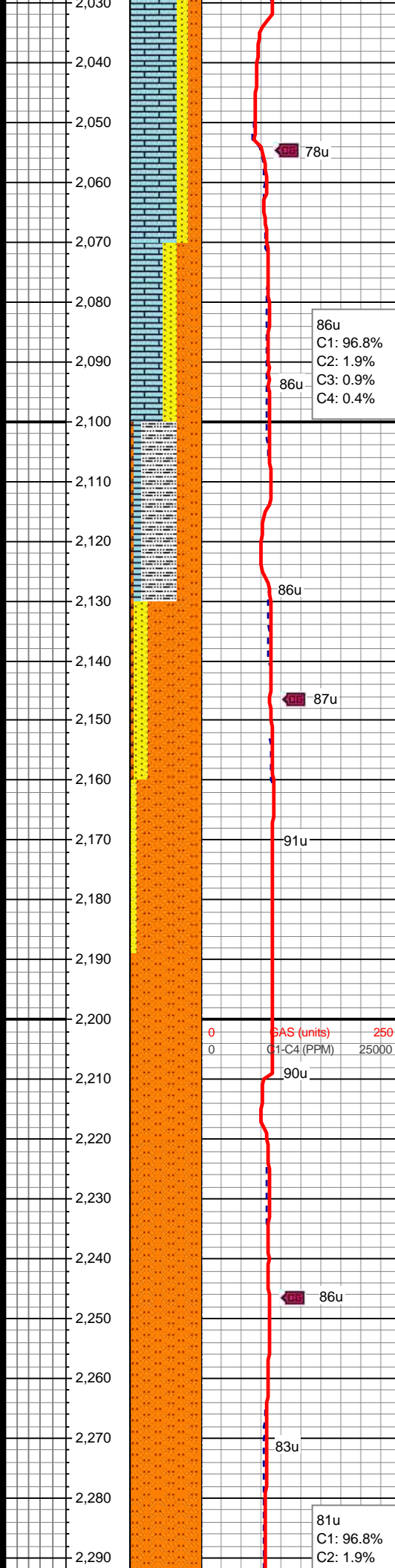
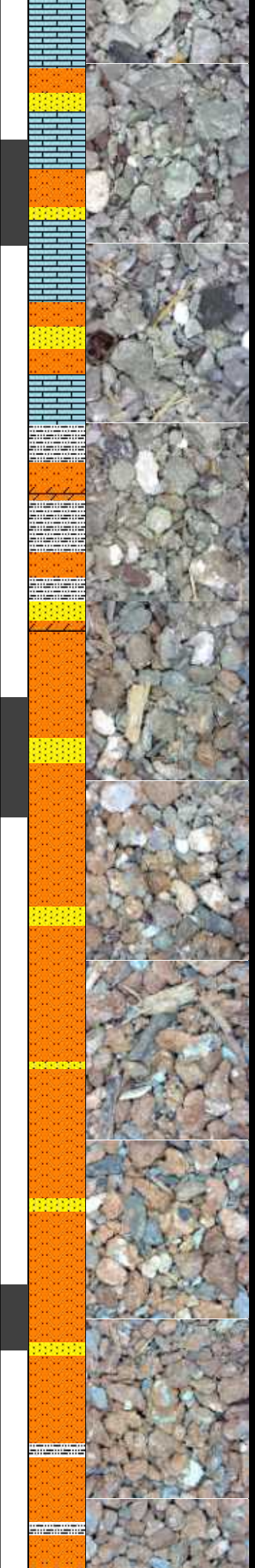
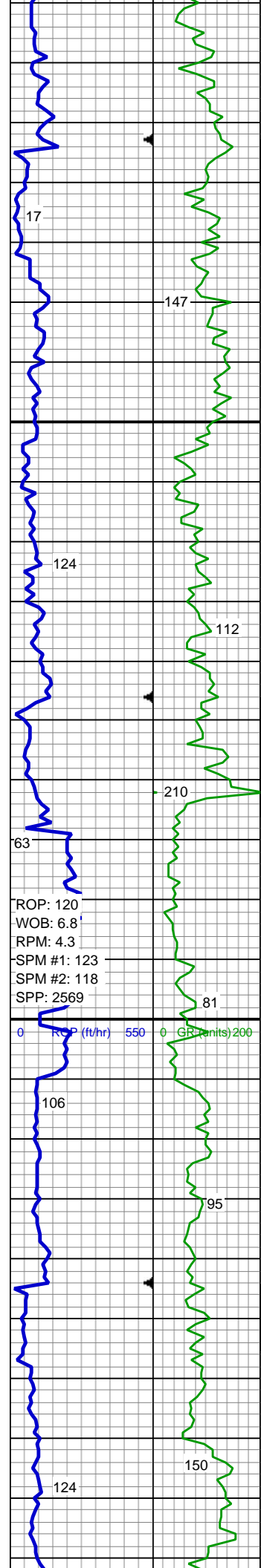
SLTY SH: lt gy-dk gy, abnt pk, rr gn, sb blk-y-sb pty, v sft-frm, slty tex, rr sdy tex, non calc; SS: lt gy-wh, rr trnsl, frm, med-vf gr, sb ang-sb rnd, p ind, v p por, sil-arg cmt, no mnrl flor, no cut

SLTY SH: lt gy-dk gy, abnt pk, rr gn, sb blk-y-sb pty, v sft-frm, slty tex, rr sdy tex, non calc; LMST: lt gy, frm-sl hd, sb blk-y-sb pty, sm tex; SLTST: red-red brn, occ wh-gn, sft-mod sft, calc, sb pty-pty, grdg- sh ip, gy sh ip, tr ss, sl mnrl flor, no cut

MD: 1,989 '
Inclination: 0.9 °
Azimuth: 134.52 °
TVD: 1,988.83 '
VS: -13.63 '

LMST: lt gy, frm-sl hd, sb blk-y-sb pty, sm tex; SLTST: red-red brn, occ wh-gn, sft-mod sft, calc, sb pty-pty, grdg- sh ip, gy sh ip; SS: lt gy-wh, rr trnsl, frm, med-vf gr, sb ang-sb rnd, p ind, v p por, sil-arg cmt, sl mnrl flor, no cut

Mud Wt: 9.0 In/ 9.0 Out
Vis 44 In/ 44 Out



LMST: lt gy, frm-sl hd, sb blk-y-sb plty, sm tex; SLTST: red-red brn, occ wh-gn, sft-mod sft, calc, sb plty-plty, grdg - sh ip, gy sh ip; SS: lt gy-wh, rr trnsl, frm, med-vf gr, sb ang-sb rnd, p ind, v p por, sil-arg cmt; sl mnrl flor, no cut

MD: 2,084 '
Inclination: 0.62 °
Azimuth: 136.22 °
TVD: 2,083.82 '
VS: -14.52 '

86u
C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

LMST: lt gy, frm-sl hd, sb blk-y-sb plty, sm tex; SLTST: red-red brn, occ wh-gn, sft-mod sft, calc, sb plty-plty, grdg - sh ip, gy sh ip; SLTY SH: lt gy-dk gy, some pk-gn, sb blk-y-sb plty, v sft-frm, slty tex, rr sdy tex, sl calc; LMST: gy, frm-sl hd, sb blk-y-sb plty, sm tex, v calc; Anhy: wh-crm, mlky, blk-y, v sft; tr ss, slow stmg bl cut

SLTST: red-red brn, occ wh-gy, sft-mod sft, calc, sb plty-plty, grdg - sh ip, gy sh ip; SS: lt red, red-ormg, occ wh-gy, f- vf, sb ang-sb rnd, mod w srt, mod-p cmt, cly-calc mtx, calc, fr por; Anhy: wh-crm, mlky, blk-y, v sft, slow stmg bl cut

SLTST: red-red brn, occ wh-gy, sft-mod sft, calc, sb plty-plty, grdg - sh ip, gy sh ip; SS: lt red, red-ormg, occ wh-gy, f- vf, sb ang-sb rnd, mod w srt, mod-p cmt, cly-calc mtx, calc, fr por, tr anhy

MD: 2,179 '
Inclination: 0.33 °
Azimuth: 203.39 °
TVD: 2,178.81 '
VS: -15.15 '

SLTST: red-red brn, occ wh-gy, sft-mod sft, sl calc, sb plty-plty, grdg - sh ip, gy sh ip, tr anhy, no mnrl flor, no cut

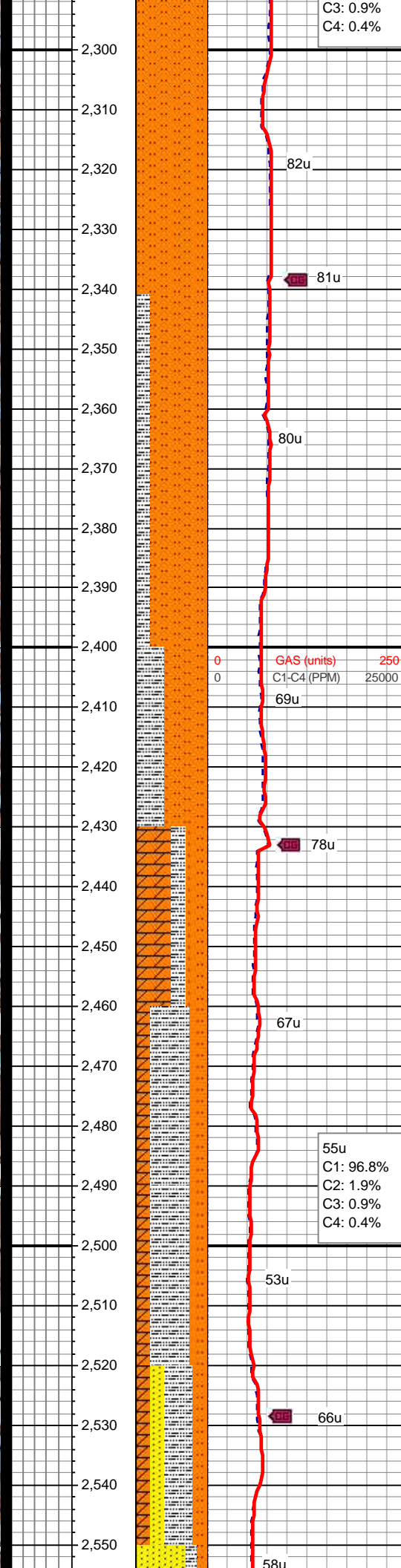
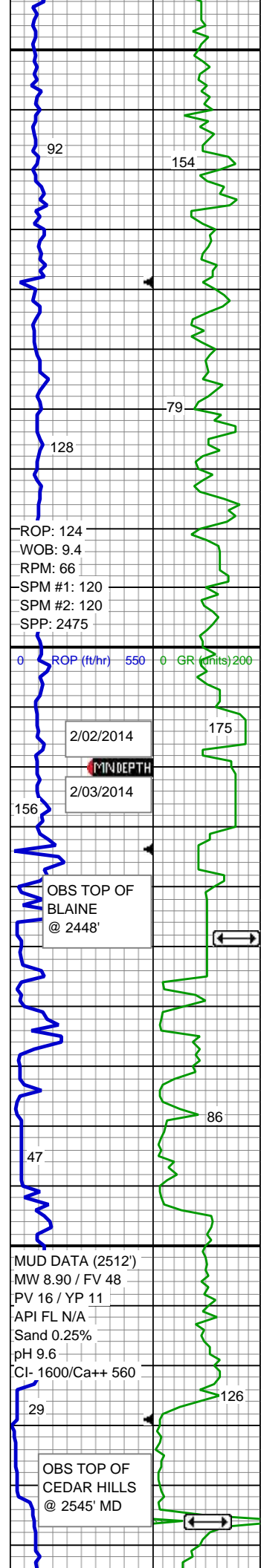
SLTST: red-red brn, occ wh-gy, sft-mod sft, sl calc, sb plty-plty, grdg - sh ip, gy sh ip, tr anhy, no mnrl flor, no cut

SLTST: red-red brn, occ wh-gy, sft-mod sft, sl calc, sb plty-plty, grdg - sh and ss ip, gy sh ip, tr anhy, no mnrl flor, no cut

MD: 2,274 '
Inclination: 0.12 °
Azimuth: 272.64 °
TVD: 2,273.81 '
VS: -15.39 '

SLTST: red-red brn, occ wh-gy, sft-mod sft, sl calc, sb plty-plty, grdg - sh and ss ip, gy sh ip, tr anhy, no mnrl flor, no cut

81u
C1: 96.8%
C2: 1.9%



SLTST: red-red brn, occ wh-gy, sft-mod sft, sl calc, sb pty-pty, grdg - sh ip, gy sh ip, tr anhy, no mnrl flr, no cut

SLTST: clr - wh or red, sl lt bl, sft, sb blkly - blkly, v f gr, w rnd, sl calc; SLTY SH: red - blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, sl calc

MD: 2,369 '
 Inclination: 0.32 °
 Azimuth: 318.9 °
 TVD: 2,368.81 '
 VS: -15.19 '

SLTST: clr - wh or red, sl lt bl, sft, sb blkly - blkly, v f gr, w rnd, sl calc; SLTY SH: red - blk, occ dk gy, frm to hd, sb pty - pty, slty lstr, gty tex, sl calc, occ ss

SLTST: clr - wh or red, sl lt bl, sft, sb blkly - blkly, v f gr, w rnd, sl calc; SLTY SH: red - blk, occ dk gy, frm to hd, sb pty - pty, slty lstr, gty tex, sl calc, occ ss

ANHY: wh-crm, mlky, blkly, v sft, non calc; SLTST: lt gy, sl lt bl, v hd, sb blkly - blkly, v f gr, w rnd, non calc; SLTY SH: red - blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc, sl mnrl flr, no cut

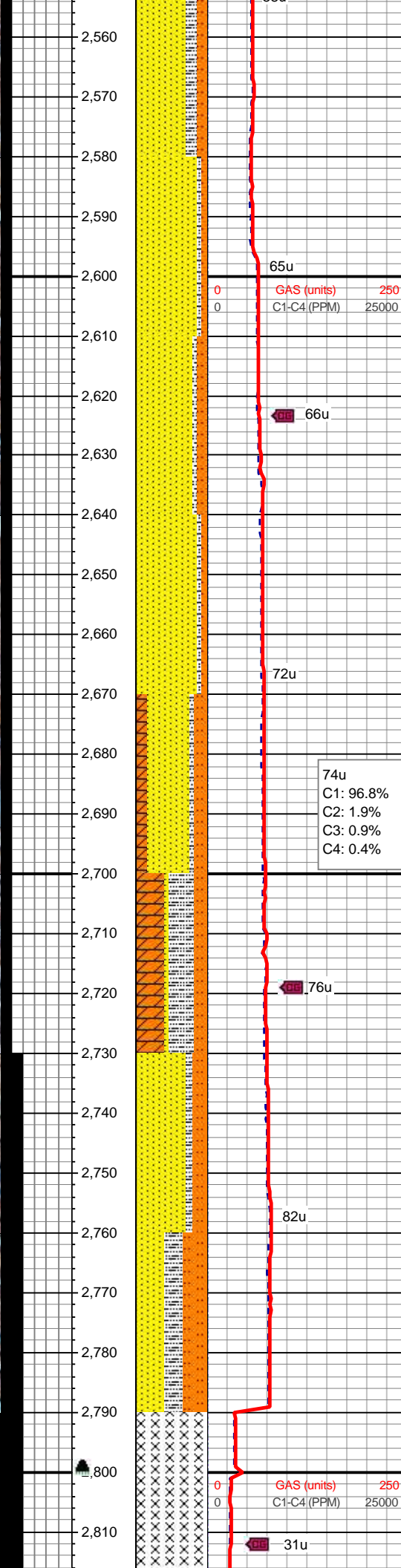
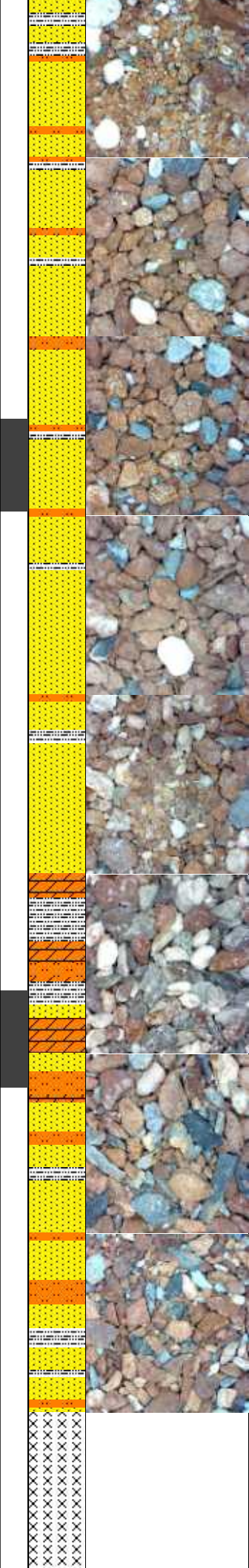
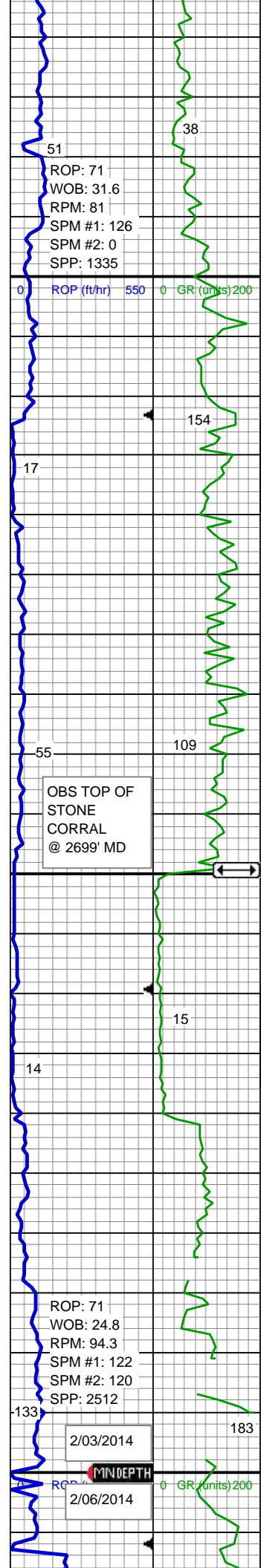
MD: 2,464 '
 Inclination: 0.56 °
 Azimuth: 339.19 °
 TVD: 2,463.81 '
 VS: -14.56 '

SLTY SH: red - blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc; SLTST: lt gy, sl lt bl, v hd, sb blkly - blkly, v f gr, w rnd, non calc; ANHY: wh-crm, mlky, blkly, v sft, non calc; sl mnrl flr, no cut

SLTY SH: red - blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc; SLTST: lt gy, sl lt bl, v hd, sb blkly - blkly, v f gr, w rnd, non calc; ANHY: wh-crm, mlky, blkly, v sft, non calc; sl mnrl flr, no cut

SLTY SH: red - dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc; SLTST: lt gy, sme lt bl/purp, v hd, sb blkly - blkly, v f gr, w rnd, non calc; SS: lt org - occ wh, vf - med gr, sb ang-sb rnd, sme lse med gr, mod w srt, mod - w cmt, arg - sl calc mtx; ANHY: wh-crm, mlky, blkly, v sft, non calc; sl dull org mnrl flr, no cut

MD: 2,559 '
 Inclination: 1.31 °
 Azimuth: 352.28 °
 TVD: 2,558.8 '



VS: -13.05'

SS: lt org - occ wh, vf - med gr, sb ang-sb rnd, fm - hd, sme lse med gr, mod w srt, mod - w cmt, arg - sil cmt; SLTY SH: red - dk gy, mod frm, sb plty - plty, slty lstr, gty tex, non calc; grdg to SLTST: lt gy, sme lt bl/purp, sme red, v hd, sb blk, v f gr, sb ang - sb rnd, non calc; tr anhy; sl calc ip, sl dull org mnrl flor, no cut

SS: pred org/red - occ wh, vf - med gr, sb ang-sb rnd, fm - hd, sme lse med gr, mod w srt, mod - w cmt, arg - sil cmt; grdg to SLTST: lt gy, sme lt bl/purp, sme red, v hd, sb blk, v f gr, sb ang - sb rnd, non calc; tr slty sh; sl calc ip, sl dull org mnrl flor, no cut

SS: pred org/red - tr wh, vf - med gr, sb ang-sb rnd, fm - hd, sme lse med gr, mod w srt, mod - w cmt, arg - sil cmt; grdg to SLTST: pred red, sme lt gy/brn/purp, frm, sb blk, v f gr, sb ang - sb rnd, non calc; tr slty sh; sl calc ip, sl dull org mnrl flor, no cut

MD: 2,654'
Inclination: 1.74°
Azimuth: 348.91°
TVD: 2,653.76'
VS: -10.55'

SS: pred org/red - tr wh, vf - med gr, sb ang-sb rnd, mod sft - frm, mod w srt, mod - w cmt, arg - sil cmt; grdg to SLTST: pred red, frm, sb blk, v f gr, sb ang - sb rnd, non calc; ANHY: wh-crm, mlky, blk, v sft, non calc; tr slty sh; sl calc ip, no mnrl flor, no cut

Mud Wt: 9.0 In/ 9.1 Out
Vis 39 In/ 40 Out

SS: pred org/red - tr wh, vf - med gr, sb ang-sb rnd, mod sft - frm, mod w srt, mod - w cmt, arg - sil cmt; grdg to SLTST: pred red, frm, sb blk, v f gr, sb ang - sb rnd, non calc; ANHY: wh-crm, mlky, blk, v sft, non calc; tr slty sh; sl calc ip, no mnrl flor, no cut

ANHY: wh-crm, mlky, blk, v sft, non calc; SLTY SH: red - dk gy, sme lt bl, sft - mod frm, sb plty - plty, slty lstr, gty tex, non calc; grdg to SLTST: red - lt gy, sme lt bl/purp, mod frm, sb blk, v f gr, sb ang - sb rnd, non calc; tr SS; no mnrl flor, no cut

MD: 2,736'
Inclination: 1.81°
Azimuth: 334.4°
TVD: 2,735.72'
VS: -8.16'

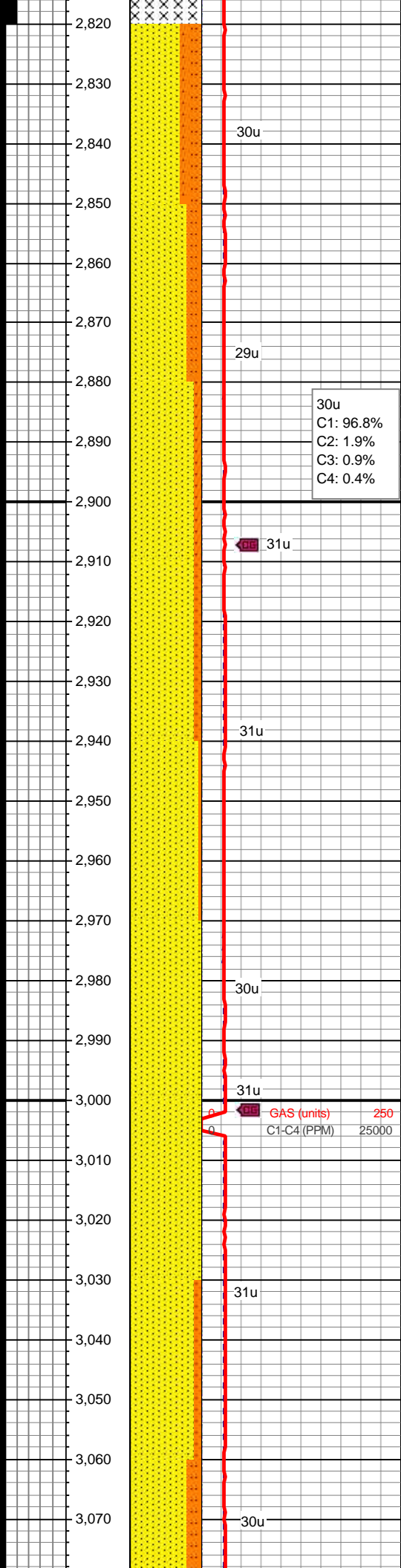
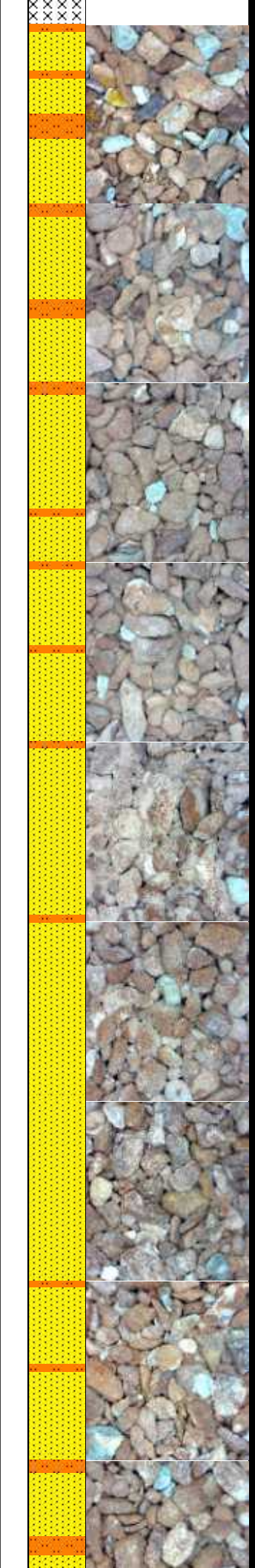
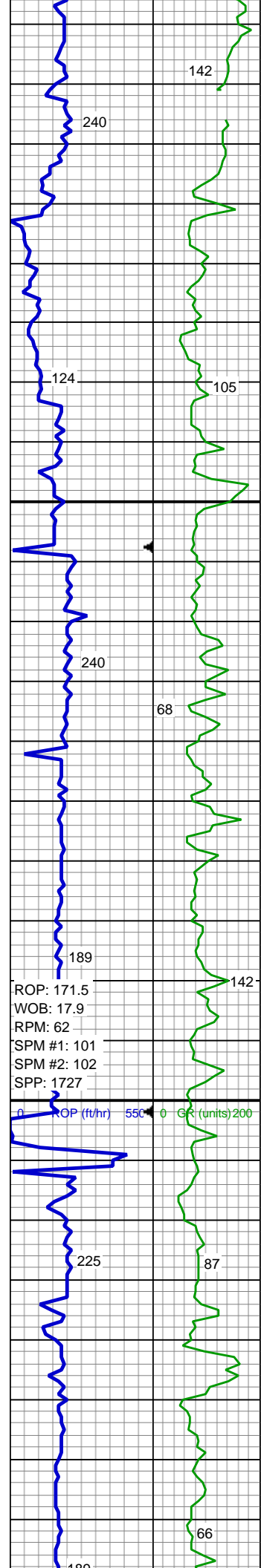
SS: pred org/red, vf - med gr, sb ang-sb rnd, mod sft - frm, mod w srt, mod - w cmt, arg - sil cmt; grdg to SLTST: org/red - lt gy, sme lt bl/purp, mod frm, sb blk, v f gr, sb ang - sb rnd, non calc; occ SLTY SH: red - dk gy, sme lt bl, sft - mod frm, sb plty - plty, slty lstr, gty tex, non calc; tr dul yel mnrl flor, no cut

MD: 2,790'
Inclination: 2.16°
Azimuth: 347.37°
TVD: 2,789.69'
VS: -6.4'

Mud Wt: 8.9+ In/ 9.0 Out
Vis 43 In/ 40 Out

TOOH FOR BHA #3
ON 2/03/2014
@ 12:08 hrs

Bit #: 3
Type: FX55



Size: 8.75
 Depth In: 2,800'
 Depth Out: 5,422'
 Jets: 5x18
 S/N: 12045517

RESUME DRILLING
 ON 2/05/2014 @ 04:15 hrs

MD: 2,845'
 Inclination: 1.57°
 Azimuth: 341.88°
 TVD: 2,844.66'
 VS: -4.67'

SS: pred org/red, mod frm - frm, sb ang-sb rnd, vf gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grdg to SLTST: org/red, mod sft - mod frm, sb blkly, v f gr, w srt, sb ang - sb rnd, non calc; no mnrl flr, no cut

30u
 C1: 96.8%
 C2: 1.9%
 C3: 0.9%
 C4: 0.4%

Mud Wt: 8.65 In/ 8.65 Out
 Vis 37 In/ 37 Out

SS: pred org/red, mod frm - frm, sb ang-sb rnd, vf gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grdg to SLTST: org/red, mod sft - mod frm, sb blkly, v f gr, w srt, sb ang - sb rnd, non calc; no mnrl flr, no cut

MD: 2,940'
 Inclination: 0.93°
 Azimuth: 318.82°
 TVD: 2,939.64'
 VS: -2.85'

SS: pred org/red, mod frm - frm, sb ang-sb rnd, vf gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grdg to SLTST: org/red, mod sft - mod frm, sb blkly, v f gr, w srt, sb ang - sb rnd, non calc; no mnrl flr, no cut

SS: pred org/red - tr wh, mod frm - frm, sb ang - sb rnd, vf gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; tr sltst, non calc; no mnrl flr, no cut

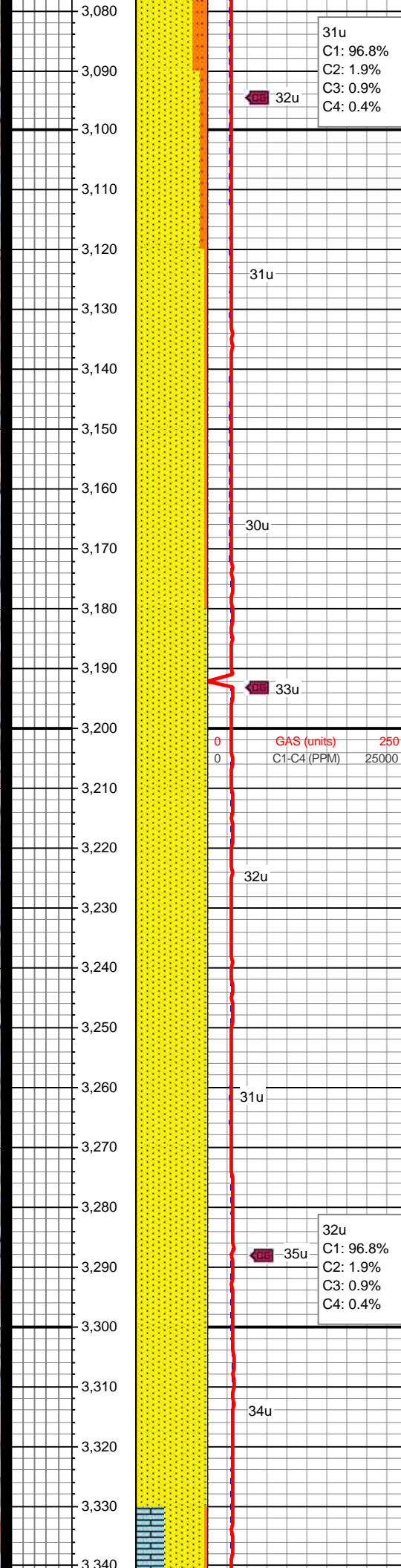
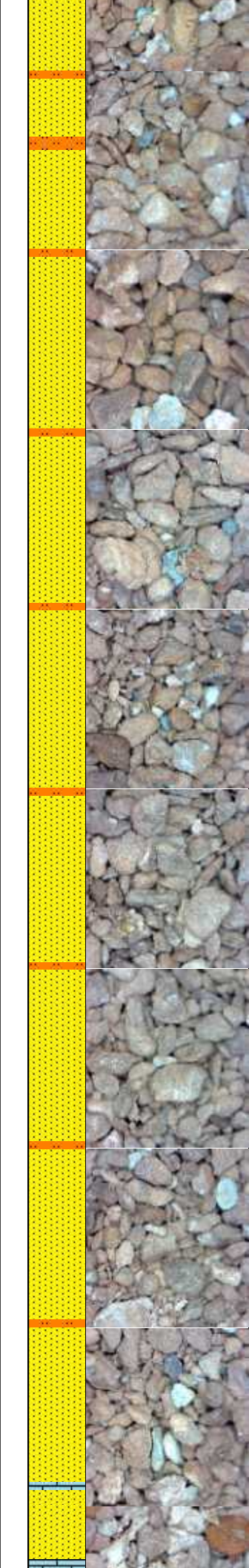
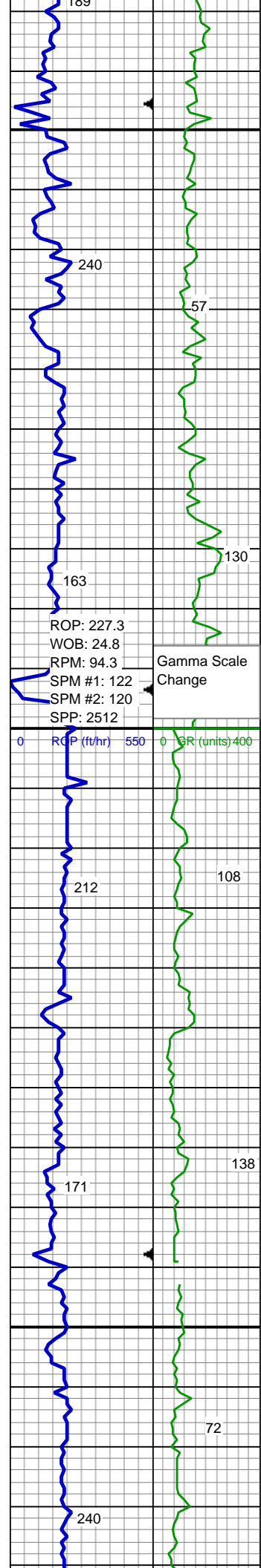
31u
 GAS (units) 250
 C1-C4 (PPM) 25000

SS: pred pink - org/red - tr wh, mod frm - frm, sb blkly - sb ang, vf - lrg gr, p - w srt, sb rnd, w cmt, arg - sil cmt; non calc; com dul org mnrl flr, no cut

MD: 3,035'
 Inclination: 0.96°
 Azimuth: 319.04°
 TVD: 3,034.63'
 VS: -1.67'

SS: pred org/red, mod frm - hd, brit, sb blkly - sb ang, vf - f gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grdg to SLTST: org/red, mod frm, sb blkly, v f gr, w srt, sb rnd, non calc; no mnrl flr, no cut

SS: pred org/red, mod frm - hd, brit, sb blkly - sb ang, vf - f gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grdg to SLTST: org/red, mod frm, sb blkly, v f gr, w srt, sb



SS: pred org/red, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grd to SLTST: org/red, mod frm, sb blkly, v f gr, w srt, sb rnd, non calc; no mnrl flor, no cut

SS: pred org/red, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grd to tr sltst, non calc, no mnrl flor, no cut

MD: 3,131 '
 Inclination: 1 °
 Azimuth: 326.03 °
 TVD: 3,130.61 '
 VS: -0.37 '

SS: pred org/red, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb rnd, mod - w cmt, arg - sil cmt; grd to tr sltst, non calc, no mnrl flor, no cut

SS: pred org/red, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb ang - sb blkly, mod - w cmt, arg - sil cmt; grd to tr sltst, non calc, no mnrl flor, no cut

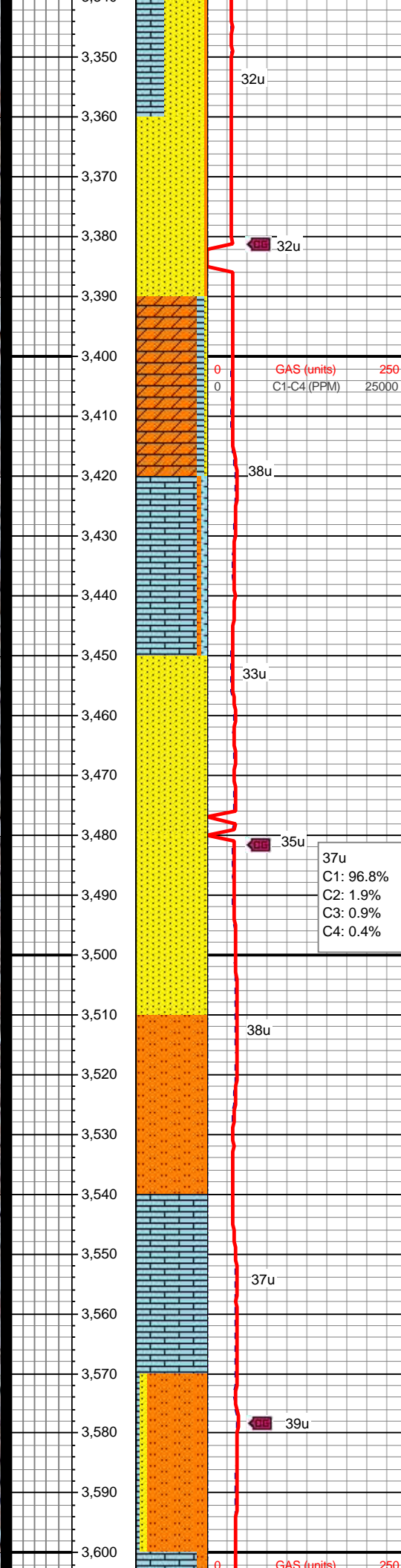
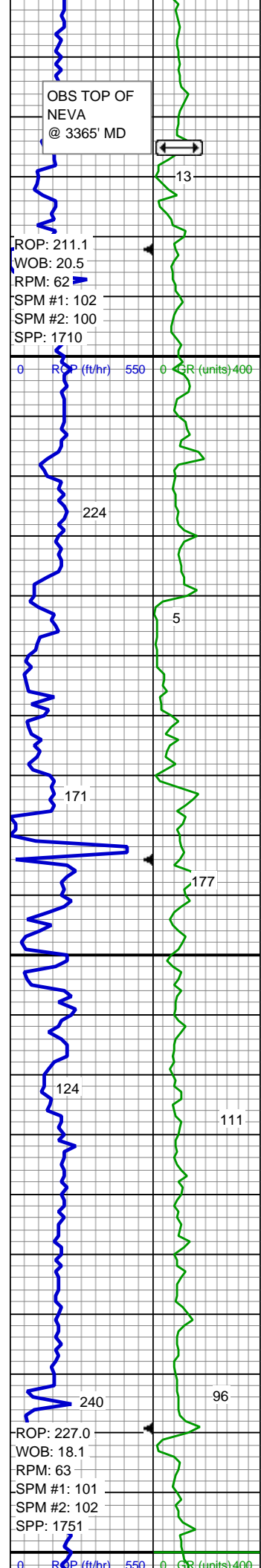
MD: 3,226 '
 Inclination: 1 °
 Azimuth: 323.27 °
 TVD: 3,225.6 '
 VS: 0.98 '

SS: pred org/red, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb ang - sb blkly, mod - w cmt, arg - sil cmt; grd to tr sltst, non calc, no mnrl flor, no cut

SS: pred org/red, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb ang - sb blkly, mod - w cmt, arg - sil cmt; grd to tr sltst, non calc, no mnrl flor, no cut

SS: pred org/red, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb ang - sb blkly, mod - w cmt, arg - sil cmt; grd to tr sltst, sl calc ip, no mnrl flor, no cut

MD: 3,321 '
 Inclination: 1.19 °
 Azimuth: 328.29 °
 TVD: 3,320.58 '
 VS: 2.49 '



SS: pred lt pink/orng, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb ang - sb blkly, mod - w cmt, arg - sil cmt; LMST: wh-crm, mod frm - frm, sb blkly, mic xln, sb wxy - wxy tex, v calc; occ pale yel mnrl flor, no cut

SS: pred orng/red, occ wh, mod frm - frm, brit, sb blkly - sb ang, vf - f gr, w srt, sb ang - sb rnd, mod - w cmt, arg - sil cmt; grdg to tr sltst, sl calc ip, no mnrl flor, no cut

ANHY: wh-crm, mlky, blkly, v sft, non calc; LMST: off wh - crm - lt gy, mod frm - frm, sb blkly, mic xln, sb wxy - wxy tex, calc; tr ss, occ pale yel mnrl flor, no cut

MD: 3,416 '
Inclination: 1.23 °
Azimuth: 333 °
TVD: 3,415.56 '
VS: 4.24 '

LMST: pred lt gy - sme off wh crm, frm, sb blkly, mic xln, sb wxy - wxy tex, v calc; occ clyst, tr ss, occ pale yel mnrl flor, mod slow diffuse dull wh cut

Mud Wt: 8.7 In/ 8.7 Out
Vis 44 In/ 45 Out

SS: red/orng, mod frm, brit, ang - sb blkly, vf - f gr, mod srt, sb ang - sb rnd, mod cmt, sil - calc cmt; calc ip, no mnrl flor, no cut

C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

SS: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb ang - sb rnd, mod cmt, sil - calc cmt; calc ip, no mnrl flor, no cut

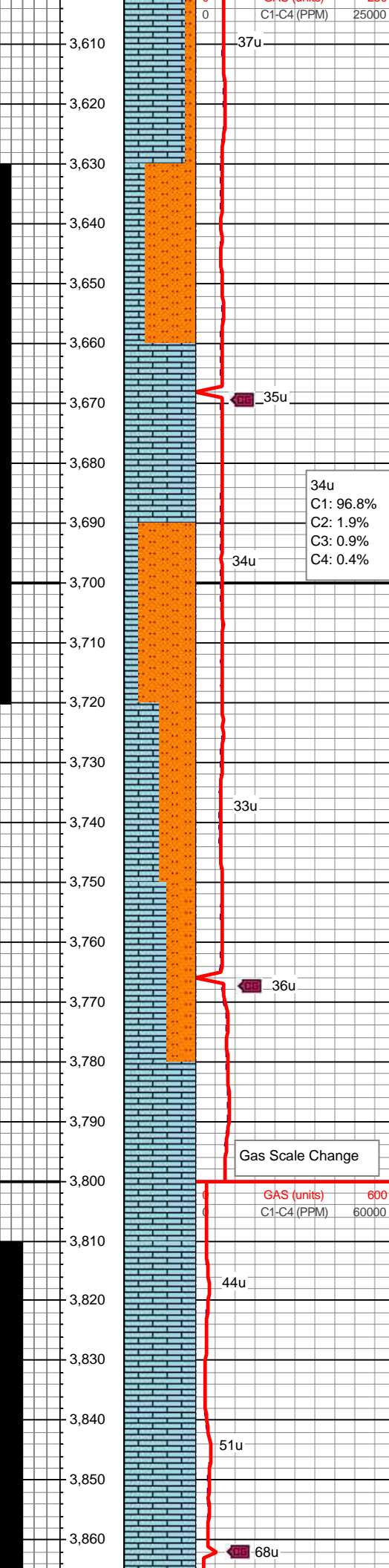
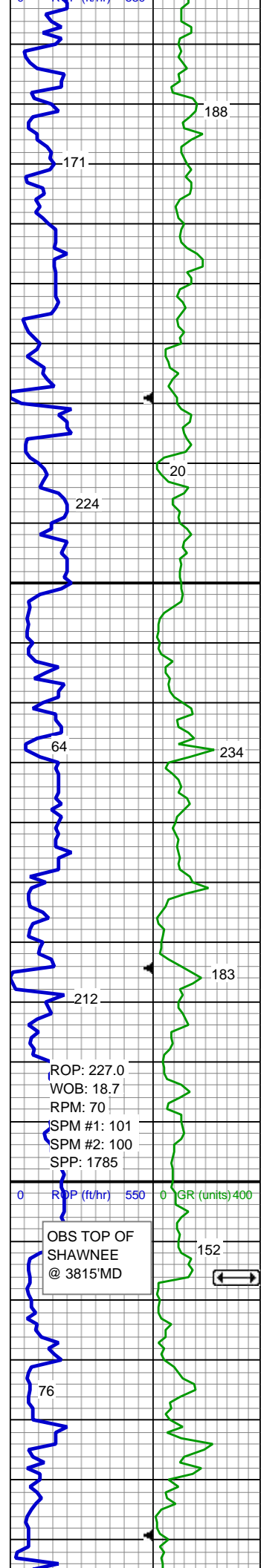
MD: 3,511 '
Inclination: 1.27 °
Azimuth: 330.66 °
TVD: 3,510.54 '
VS: 6.07 '

SLTST: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb ang - sb rnd, mod cmt, sil - calc cmt; calc ip, tr pale orng mnrl flor, no cut

LMST: pred off wh crm - tr lt gy, frm, sb blkly, mic xln, sb wxy - wxy tex, v calc; sl tr sltst, abnt pale yel mnrl flor, mod slow diffuse dull wh cut

SLTST: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb rnd, mod cmt, sil - calc cmt; SS: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb ang - sb rnd, mod cmt, sil - calc cmt; tr lmst, calc ip, tr pale orng mnrl flor, no cut

MD: 3,607 '
Inclination: 1.2 °
Azimuth: 330.87 °
TVD: 3,606.52 '



TVD: 3,606.32
 VS: 7.87'

LMST: pred off wh crm - tr lt gy, frm, sb blkly, mic xln, sb wxy - wxy tex, v calc;
 SLTST: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb rnd, mod cmt, sil - calc cmt; tr pale orng mnrl flr, mod slow diffuse dull wh cut

SLTST: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb rnd, mod cmt, sil - calc cmt; LMST: pred off wh crm - tr lt gy, mod frm, v brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; com pale orng mnrl flr, mod slow diffuse dull wh cut

LMST: off wh crm, mod frm, v brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; tr sltst, abnt pale orng mnrl flr, mod slow diffuse dull wh cut

MD: 3,702'
 Inclination: 1.22°
 Azimuth: 332.51°
 TVD: 3,701.49'
 VS: 9.63'

SLTST: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb rnd, mod cmt, sil - calc cmt; LMST: pred off wh crm - tr lt gy, mod frm, v brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; com pale orng mnrl flr, no cut

SLTST: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb rnd, mod cmt, sil - calc cmt; LMST: pred off wh crm - tr lt gy, frm, v brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; com pale orng mnrl flr, no cut

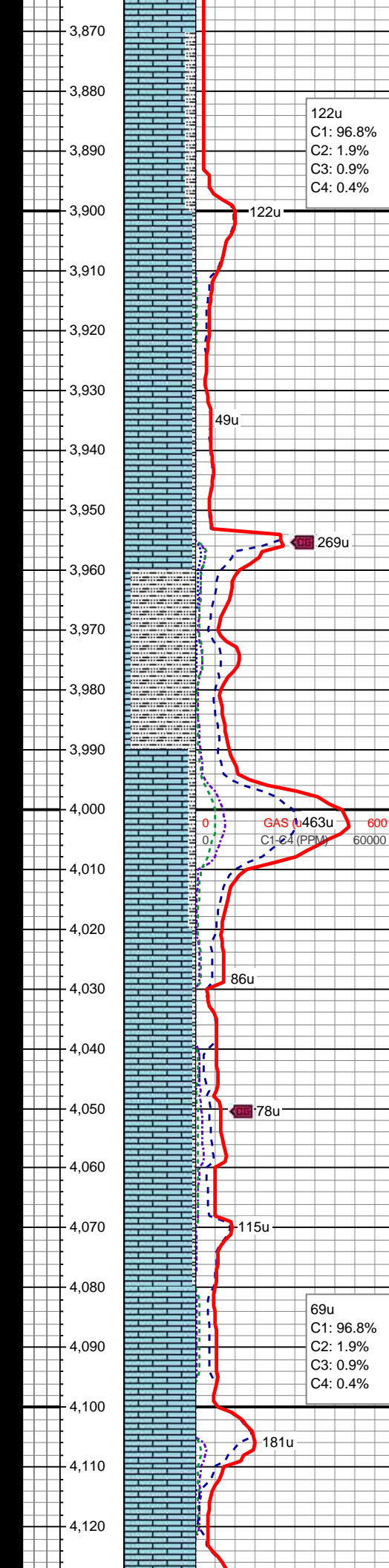
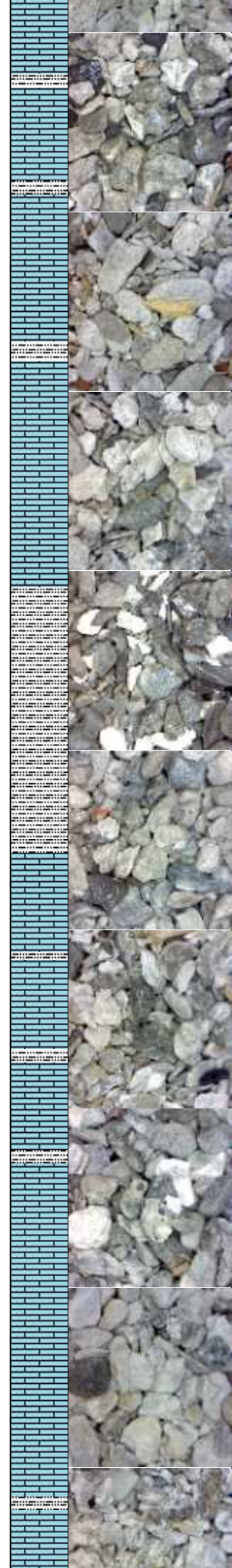
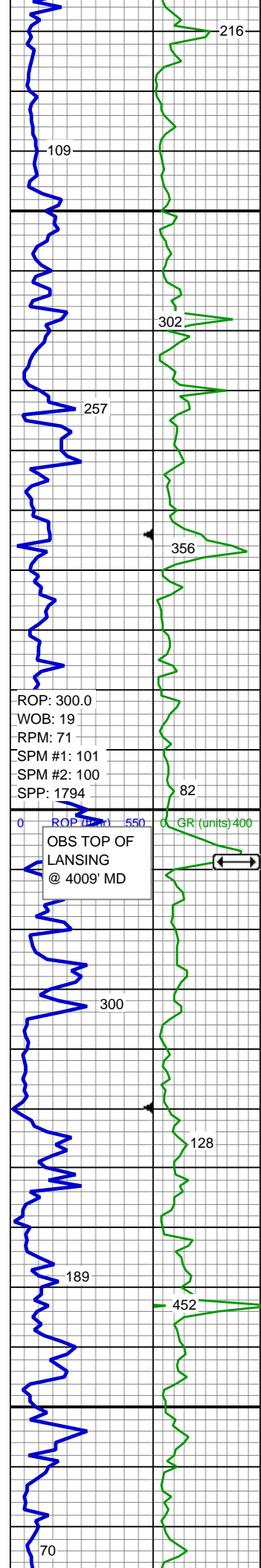
SLTST: red/orng, mod frm, brit, ang - sb blkly, vf gr, w srt, sb rnd, mod cmt, sil - calc cmt; LMST: pred off wh crm - lt pnk, frm, v brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; com pale orng mnrl flr, no cut

LMST: off wh crm, mod frm, brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; sl tr sltst, no mnrl flr, no cut

MD: 3,797'
 Inclination: 1.1°
 Azimuth: 332.23°
 TVD: 3,796.47'
 VS: 11.34'

LMST: off wh crm, mod frm, brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; sl tr sltst, no mnrl flr, no cut

LMST: off wh crm, mod frm, brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; sl tr sltst, sl mnrl flr, no cut



LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb pty v calc, mic xln, sm-wxy, occ rthy SLTY SH: blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc, sl mnrl flr, slow stmg cut

MD: 3,892 '
 Inclination: 1.11 °
 Azimuth: 334.91 °
 TVD: 3,891.46 '
 VS: 12.98 '

LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb pty v calc, mic xln, sm-wxy, occ rthy SLTY SH: red - blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc, sl mnrl flr, slow stmg cut

LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb pty v calc, mic xln, sm-wxy, occ rthy SLTY SH: red - blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc, sl mnrl flr, slow stmg cut

LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb pty v calc, mic xln, sm-wxy, occ rthy SLTY SH: dk gy - blk, frm to hd, sb pty - pty, slty lstr, gty tex, mod calc, no mnrl flr, mod stmg cut

MD: 3,988 '
 Inclination: 1.08 °
 Azimuth: 333.13 °
 TVD: 3,987.44 '
 VS: 14.63 '

LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb pty v calc, mic xln, sm-wxy, occ rthy; SLTY SH: dk gy - blk, frm to hd, sb pty - pty, slty lstr, gty tex, mod calc, sl mnrl flr, slow stmg cut

Mud Wt: 8.7 In/ 8.6 Out
 Vis 41 In/ 41 Out

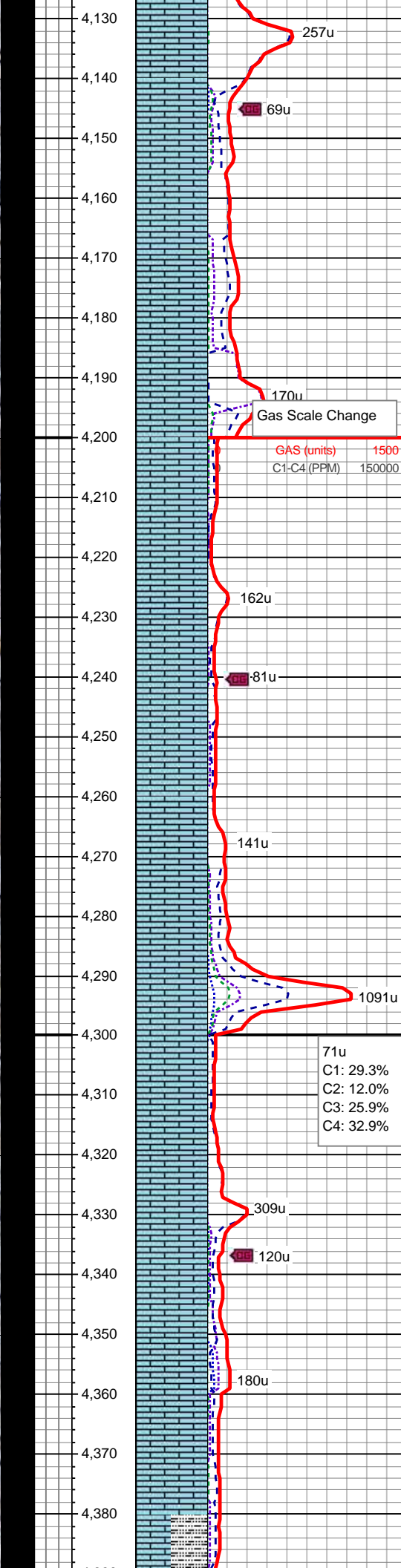
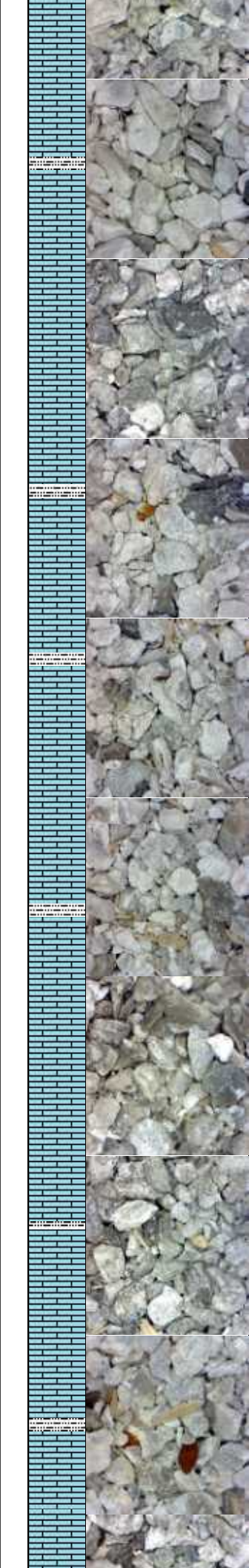
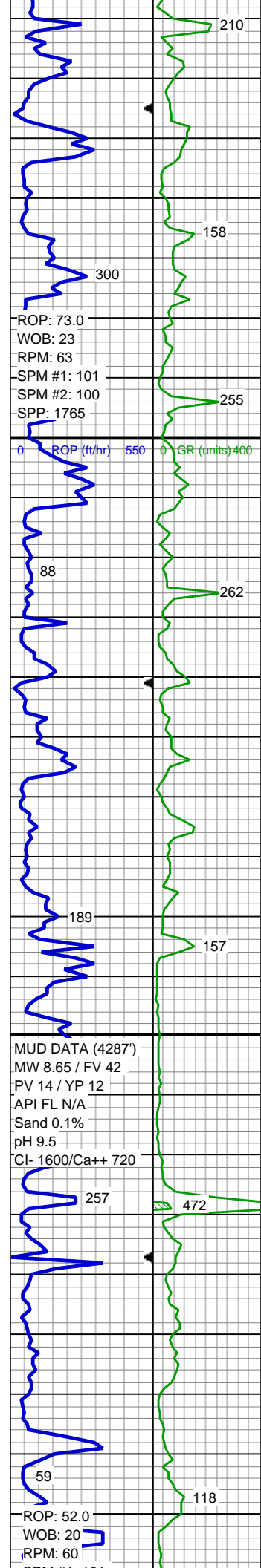
LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb pty v calc, mic xln, sm-wxy, occ rthy; SLTY SH: dk gy - blk, frm to hd, sb pty - pty, slty lstr, gty tex, mod calc, sl mnrl flr, slow no cut

LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb pty v calc, mic xln, sm-wxy, occ rthy SLTY SH: blk, occ dk gy, sft - frm, sb pty - pty, slty lstr, gty tex, non calc

MD: 4,083 '
 Inclination: 1 °
 Azimuth: 336.58 °
 TVD: 4,082.42 '
 VS: 16.19 '

LMST: wh to crm, mod frm, brit, sb blk, mic xln, sb wxy - wxy tex, v calc; tr slty sh, sl mnrl flr, no cut

LMST: wh to crm, mod frm, brit, sb blk, mic xln, sb wxy - wxy tex, v calc; tr slty



sh, sl mnrl flor, no cut

LMST: wh to crm, mod frm, brit, sb blk, mic xln, sb wxy - wxy tex, v calc; sl tr slty sh, mnrl flor, no cut

MD: 4,177 '
Inclination: 0.94 °
Azimuth: 333.72 °
TVD: 4,176.41 '
VS: 17.63 '

LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb plty v calc, mic xln, sm-wxy, occ rthy

LMST: wh to crm, mod frm, brit, sb blk, mic xln, sb wxy - wxy tex, v calc; tr slty sh, sl mnrl flor, no cut

Mud Wt: 8.7 In/ 8.6 Out
Vis 43 In/ 42 Out

LMST: wh to crm, mod frm, brit, sb blk, mic xln, sb wxy - wxy tex, v calc; tr slty sh, sl mnrl flor, no cut

MD: 4,273 '
Inclination: 0.94 °
Azimuth: 329.67 °
TVD: 4,272.4 '
VS: 19.02 '

LMST: wh to crm, mod frm, brit, sb blk, mic xln, sb wxy - wxy tex, v calc; tr slty sh, sl mnrl flor, no cut

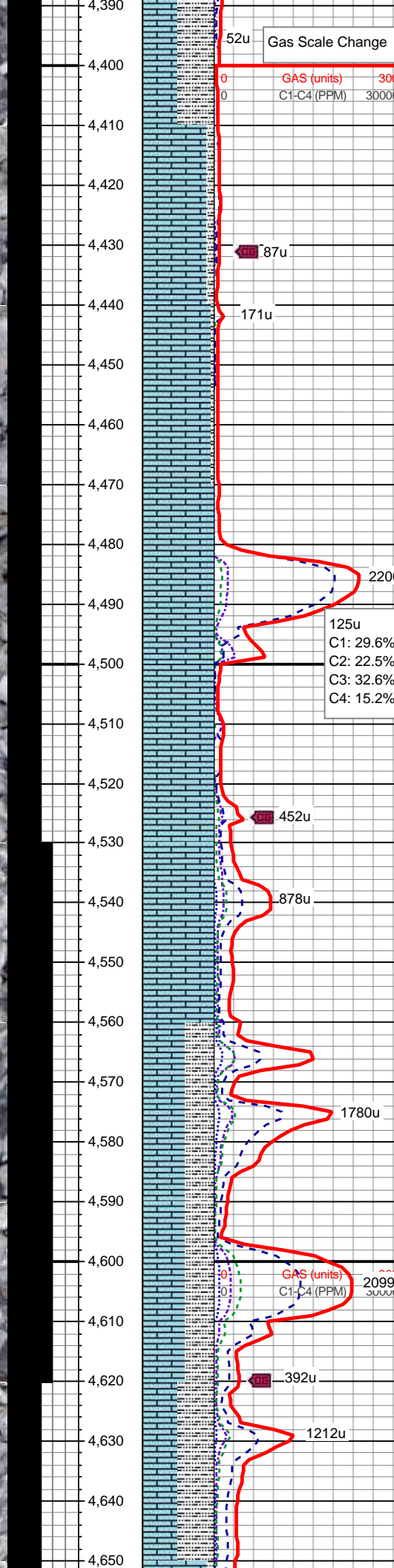
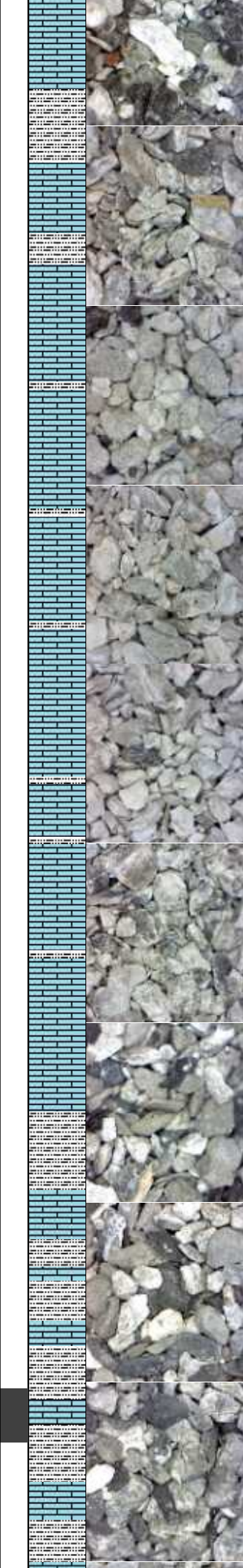
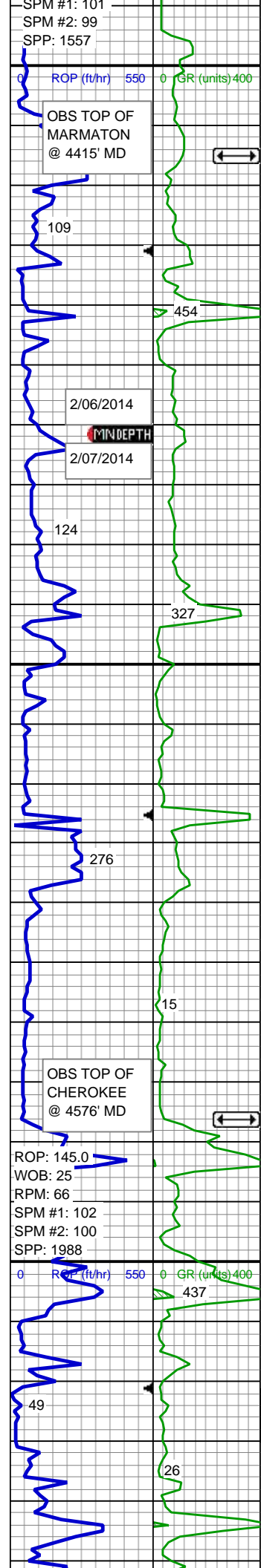
LMST: wh - crm, occ lt gy, frm-mod hd, sb blk- sb plty v calc, mic xln, sm-wxy, occ rthy, tr slty sh, sl mnrl flor, slow stmg cut

Mud Wt: 8.7 In/ 8.7 Out
Vis 42 In/ 41 Out

LMST: wh to crm, mod frm, brit, sb blk, mic xln, sb wxy - wxy tex, v calc; tr slty sh, sl mnrl flor, no cut

MD: 4,368 '
Inclination: 1 °
Azimuth: 325.92 °
TVD: 4,367.38 '
VS: 20.38 '

SLTY SH: lt dkgy - gy blk, mod frm - frm, brit, sb plty - sb ang, rthy - slty tex, calc;



LMST: pred wh - crm, sme lt gy - dk gy, mod frm - hd, tr v sft, sb blkly - sb plty, xln, sm-wxy, v calc; sl mnrl flr, no cut

SLTY SH: lt dkgy - gy blk, mod frm - frm, brit, sb plty - sb ang, rthy - slty tex, calc; LMST: pred wh - crm, sme lt gy - dk gy, mod frm - hd, tr v sft, sb blkly - sb plty, xln, sm-wxy, v calc; sl mnrl flr, no cut

LMST: pred wh - crm, sme lt gy, mod frm - hd, tr v sft, sb blkly - sb plty, xln, sm-wxy - rthy, sme slty, v calc; SLTY SH: lt dkgy - gy blk, mod frm - frm, brit, sb plty - sb ang, rthy - slty tex, calc; sl mnrl flr, slow stmg cut

MD: 4,463 '
 Inclination: 1.05 °
 Azimuth: 326.17 °
 TVD: 4,462.37 '
 VS: 21.78 '

LMST: pred wh - crm, sme lt gy, mod frm - hd, tr v sft, sb blkly - sb plty, xln, sm-wxy - rthy, sme slty, v calc, tr slty sh, sl mnrl flr, slow stmg cut

Mud Wt: 8.6 In/ 8.7 Out
 Vis 43 In/ 40 Out

LMST: wh to crm, mod frm, brit, sb blkly, mic xln, sb wxy - wxy tex, v calc; tr slty sh, sl mnrl flr, no cut

LMST: pred wh - crm, sme lt gy, mod frm - hd, tr v sft, sb blkly - sb plty, xln, sm-wxy - rthy, sme slty, v calc, tr slty sh, sl mnrl flr, slow stmg cut

Mud Wt: 8.6 In/ 8.6 Out
 Vis 42 In/ 44 Out

MD: 4,559 '
 Inclination: 1 °
 Azimuth: 323.1 °
 TVD: 4,558.35 '
 VS: 23.19 '

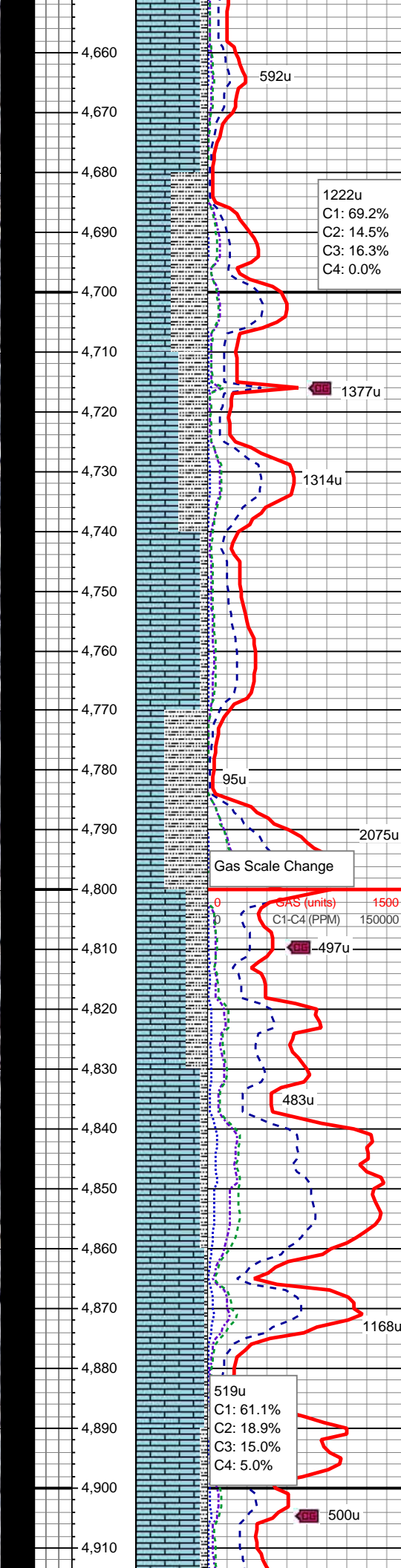
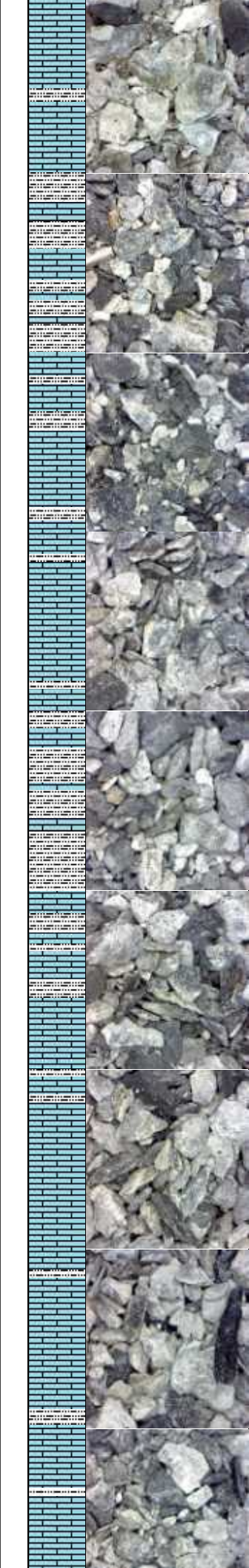
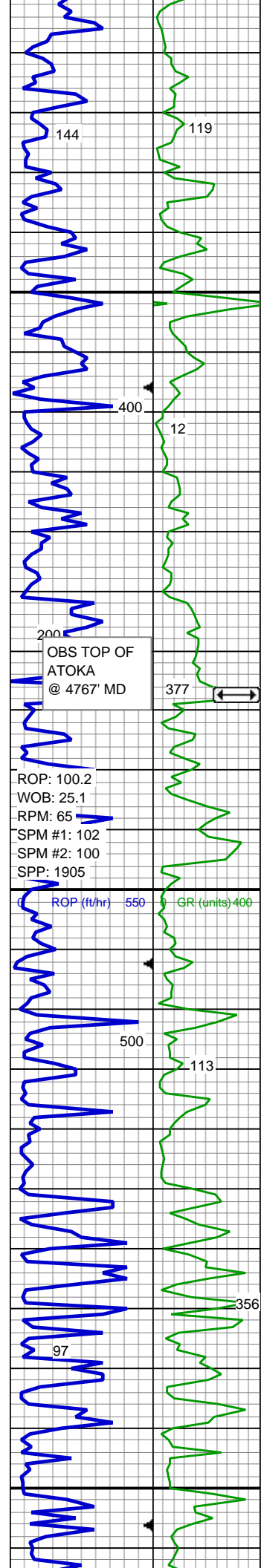
LMST: pred wh - crm, occ gy, mod frm - hd, sb blkly - sb plty, xln, sm-wxy, v calc; SLTY SH: lt - dk gy - blk, mod frm - frm, brit, sb plty - sb ang, rthy - slty tex, mod calc; mod mnrl flr, slow stmg cut

LMST: pred wh - crm, occ gy, mod frm - hd, sb blkly - sb plty, xln, sm-wxy, v calc; SLTY SH: lt - dk gy - blk, mod frm - frm, brit, sb plty - sb ang, rthy - slty tex, mod calc; tr red slst, mod mnrl flr, slow stmg cut

Mud Wt: 8.6 In/ 8.6 Out
 Vis 43 In/ 42 Out

LMST: pred wh - crm, occ gy, mod frm - hd, sb blkly - sb plty, xln, sm-wxy, v calc; SLTY SH: lt - dk gy - blk, mod frm - frm, brit, sb plty - sb ang, rthy - slty tex, mod calc; tr red slst, mod mnrl flr, slow stmg cut

MD: 4,654 '
 Inclination: 0.44 °
 Azimuth: 311.18 °



Azimuth: 241.13 °
 TVD: 4,653.35 '
 VS: 23.68 '

LMST: pred wh - crm, occ gy, mod frm - hd, sb blkly - sb ply, xln, sm-wxy, v calc; SLTY SH: lt - dk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, mod calc; tr red stlst, mod mnrl flor, slow stmg cut

LMST: pred wh - crm, occ gy, mod frm - hd, sb blkly - sb ply, xln, sm-wxy, v calc; SLTY SH: med - dk gy - blk, mod frm, brit, sb ply - sb ang, rthy - slty tex, mod calc ip; tr dull orgn mnrl flor, mod fast sl stmg mod bri bl wh cut

LMST: pred wh - crm, occ gy, mod frm - hd, sb blkly - sb ply, xln, sm-wxy, v calc; SLTY SH: med - dk gy - blk, mod frm, brit, sb ply - sb ang, rthy - slty tex, mod calc ip; tr dull orgn mnrl flor, mod fast sl stmg mod bri bl wh cut

Mud Wt: 8.6+ In/ 8.6+ Out
 Vis 42 In/ 42 Out

LMST: pred mot wh - crm/lt gy, mod frm - hd, brit, sb blkly - sb ply, xln, sm-wxy, v calc; SLTY SH: med - dk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, mod calc ip, tr dissn pyr; tr dull orgn mnrl flor, mod fast sl stmg mod bri bl wh cut

MD: 4,749 '
 Inclination: 0.74 °
 Azimuth: 218.24 °
 TVD: 4,748.34 '
 VS: 23.02 '

SLTY SH: med - dk gy - occ blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, mod calc; LMST: pred lt gy - off wh, sl mot, mod frm - hd, brit, sb blkly - sb ply, xln, sm-wxy, v calc; tr dull orgn mnrl flor, slow diffuse dull bl wh cut

LMST: pred off wh - lt gy, occ mot crm/gy, mod frm - frm, brit, sb blkly - sb ply, xln, sm-wxy-occ rthy tex, v calc; SLTY SH: med - dk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, mod calc; tr dull orgn mnrl flor, mod fast diffuse mod bri bl wh cut

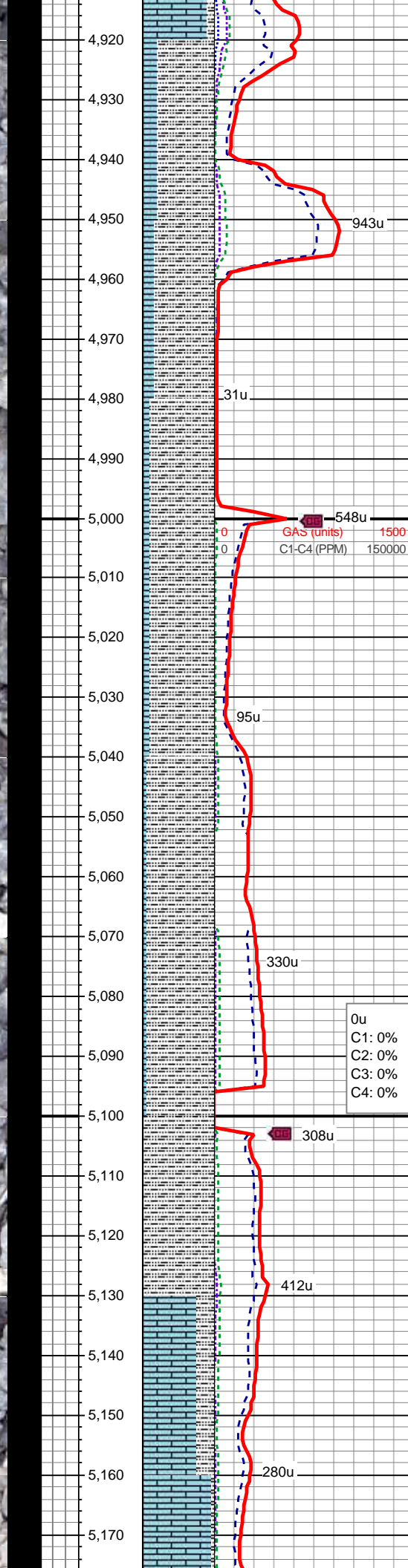
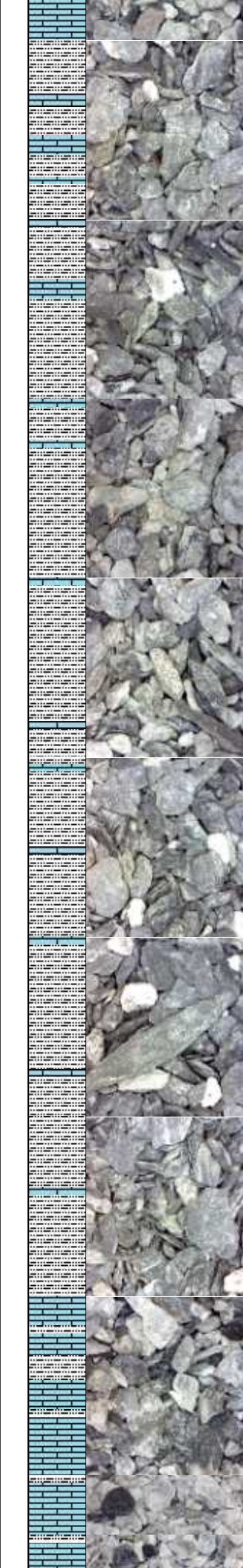
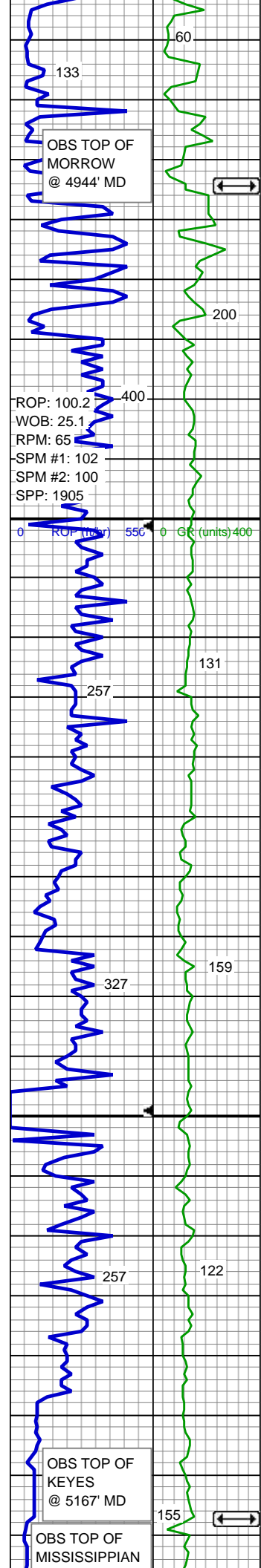
Mud Wt: 8.6 In/ 8.7 Out
 Vis 43 In/ 42 Out

LMST: pred off wh - lt gy, occ mot crm/gy, mod frm - hd, brit, sb blkly - sb ply, mic xln, sm-wxy-occ rthy tex, v calc; SLTY SH: med - dk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, mod calc; occ dull orgn mnrl flor, mod fast diffuse sl stmg mod bri bl wh cut

MD: 4,844 '
 Inclination: 0.8 °
 Azimuth: 216.98 °
 TVD: 4,843.33 '
 VS: 22.01 '

LMST: pred wh, tr lt gy, mod frm - frm, brit, sb blkly - sb ply, mic xln, sm-wxy-occ rthy tex, v calc; tr slty sh; no mnrl flor, mod fast diffuse sl stmg mod bri bl wh cut

LMST: pred off wh - lt gy, occ med gy, mod frm - hd, brit, sb blkly - sb ply, mic xln, sm-wxy-sl rthy tex, v calc; SLTY SH: med - dk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, sl calc; occ dull orgn mnrl flor, fast diffuse mod bri bl wh cut



w/ cut
Mud Wt: 8.65 In/ 8.65 Out
Vis 46 In/ 44 Out

SLTY SH: med - dk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, sl calc; LMST: pred lt gy, mod frm - hd, brit, sb blkly - sb ply, mic xln, sm-wxy-sl rthy tex, v calc; no mnrl flor, v slow diffuse dull bl cut

MD: 4,939 '
Inclination: 0.72 °
Azimuth: 210.39 °
TVD: 4,938.32 '
VS: 20.96 '

SLTY SH: lt - med gy, frm, brit, sb ply - sb ang, rthy - slty tex, sl calc; LMST: pred lt gy, mod frm - hd, brit, sb blkly - sb ply, mic xln, sm-wxy-sl rthy tex, v calc; no mnrl flor, no cut

SLTY SH: pred lt gy, v frm, brit, sb ply - sb ang, rthy - slty tex, sl calc; LMST: pred lt gy, mod frm - hd, brit, sb blkly - sb ply, mic xln, sm-wxy-sl rthy tex, v calc; no mnrl flor, v slow diffuse dull bl cut

SLTY SH: pred lt gy, v frm, brit, sb ply - sb ang, rthy - slty tex, sl calc; LMST: pred lt gy, mod frm - hd, brit, sb blkly - sb ply, mic xln, sm-wxy-sl rthy tex, v calc; no mnrl flor, v slow diffuse dull bl cut

MD: 5,035 '
Inclination: 0.88 °
Azimuth: 204.27 °
TVD: 5,034.32 '
VS: 19.76 '

SLTY SH: pred med - dk gy/blk, v frm, brit, sb ply - sb ang, occ spndly, rthy - slty tex, sl calc; tr lmst; no mnrl flor, no cut

SLTY SH: pred med - dk gy/blk, mod frm, brit, sb ply - sb ang, occ spndly, rthy - slty tex, sl - mod calc ip; tr lmst; no mnrl flor, v slow diffuse fnt bl cut

SLTY SH: pred med - dk gy/blk, mod frm, brit, sb ply - sb ang, occ spndly, rthy - slty tex, mod - calc; sl tr lmst; no mnrl flor, v slow diffuse fnt bl cut

MD: 5,130 '
Inclination: 1.18 °
Azimuth: 196.95 °
TVD: 5,129.3 '
VS: 18.16 '

LMST: pred off wh - crm, frm - hd, brit, sb blkly - sb ply, xln, sm-wxy, v calc; SLTY SH: med - dk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, sl calc; abnt dull orgn mnrl flor, mod fast mod bri bl wh cut

LMST: wh, mod frm - frm, brit, sb blkly - sb ply, xln, sm-wxy, v calc; tr slty sh; abnt dull orgn mnrl flor, mod fast mod bri bl wh mky cut

ROP: 59.2
WOB: 20.5
RPM: 64
SPM #1: 102
SPM #2: 100
SPP: 2024

ROP (ft/hr) 550 GR (units) 400
MUD DATA (5213')
MW 8.65 / FV 46
PV 15 / YP 14
API FL N/A
Sand 0.1%
pH 9.5
CI- 1800/Ca++ 680

OBS TOP OF SPERGEN @ 5235' MD

MINDEPTH
2/07/2014
2/08/2014

16
65
11
19
2/08/2014
2/09/2014
31

OBS TOP OF WARSAW @ 5363' MD

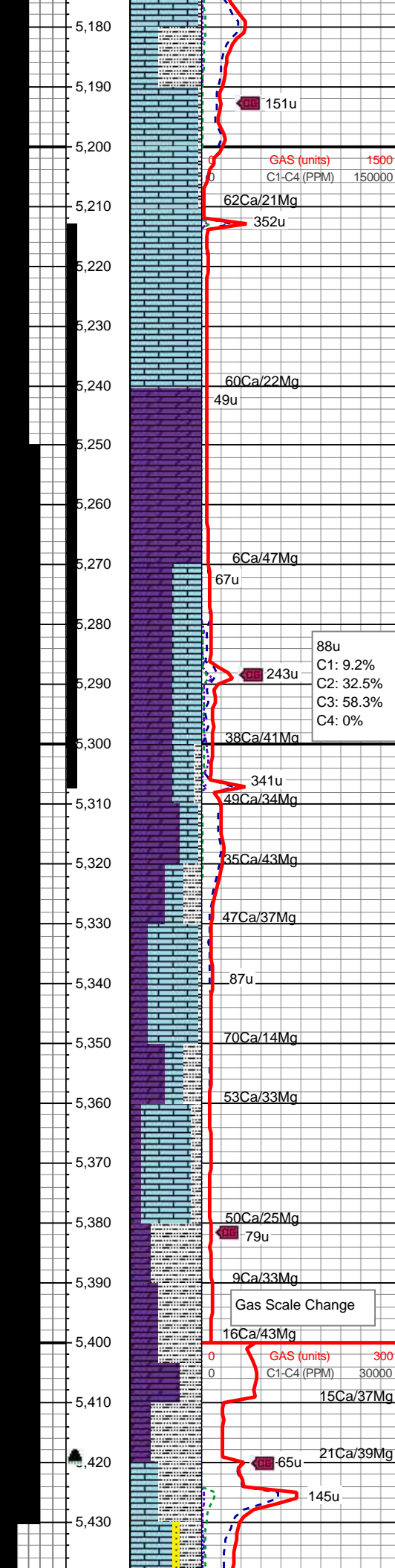
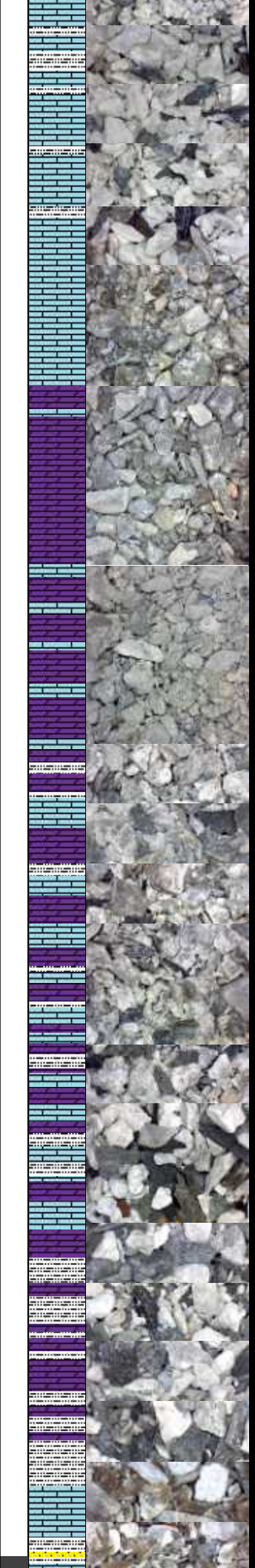
OBS TOP OF HARRISON @ 5385' MD

GAMMA SCALE CHANGE

ROP: 214.3 GR (units) 100
WOB: 17.9
RPM: 64
SPM #1: 99
SPM #2: 98
SPP: 2202

MUD DATA (5420')
MW 8.55 / FV 30
PV 2 / YP 2
API FL N/A

NO GAMMA DATA
2/09/2014
2/12/2014



SLTY SH: pred off wh - blk gy - blk, mod frm - frm, brit, sb ply - sb ang, rthy - slty tex, sl calc; LMST: pred off wh - crm, frm - hd, brit, sb blkly - sb ply, xln, sm-wxy, v calc; occ dull orng mnrl flor, fast diffuse strng mod bri bl wh cut

LMST: wh, mod sft - mod frm, brit, sb blkly - ply, xln, sm-wxy, v calc; tr slty sh; abnt dull orng mnrl flor, mod fast mod bri bl wh mky cut

TOOH @ 11:03 hrs on 2/07/2014 for Coring

Begin Coring @ 5213' MD @ 05:29 hrs on 2/08/2014

LMST: pred lt gy - tan, v hd, brit, blkly, xln, sm-wxy, v calc; occ pale yel mnrl flor, no cut

MD: 5,225'
Inclination: 1.11°
Azimuth: 195.99°
TVD: 5,224.28'
VS: 16.33'

DOL: med gy/brn, v hd, brit, blkly, mic xln, gritty - rthy/suc tex, mod calc; no mnrl flor, slow diffuse dull - mod bri bl cut

DOL: lt gy - lt tan, mod frm, brit, sb blkly - sb ang, mic xln, smwt gritty/suc tex, mod calc; LMST: pred off wh crm, mod sft - frm, brit, sb blkly - ply, xln, sm-wxy, v calc; occ yel/grn mnrl flor, mod slow diffuse mod bri bl cut

End Core Sample @ 5307' MD

TOOH @ 11:30 hrs on 2/08/2014 to Extract Core

RESUME DRILLING ON 2/09/2014 @ 00:53 hrs

DOL: lt gy - lt tan, mod frm, brit, sb blkly - sb ang, mic xln, smwt gritty/suc tex, mod calc; LMST: pred off wh crm, mod sft - frm, brit, sb blkly - ply, xln, sm-wxy, v calc; SLTY SH: pred dk gy/blk, mod frm, brit, sb ply - sb ang, occ spindly, rthy - slty tex, non calc occ yel/grn mnrl flor, mod slow diffuse mod bri bl cut

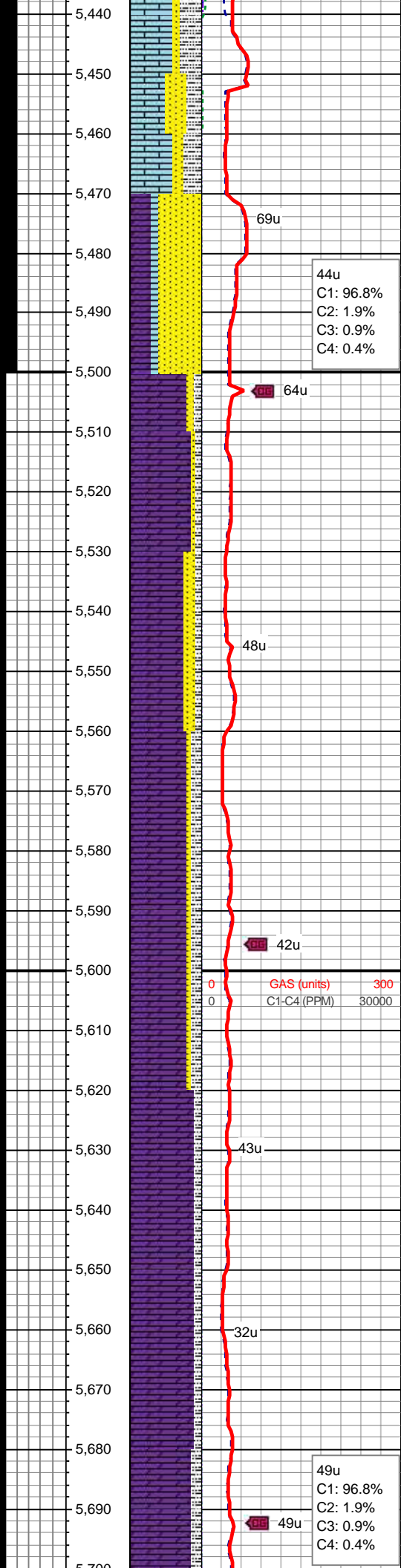
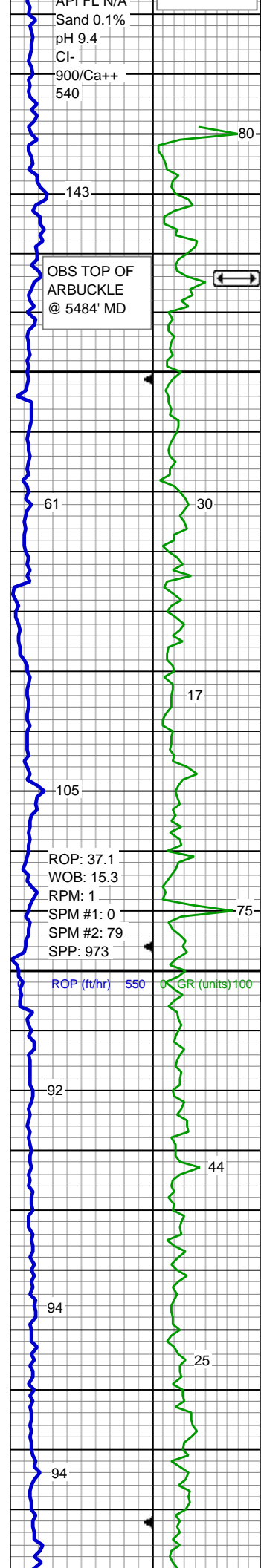
MD: 5,358'
Inclination: 1.1°
Azimuth: 193.34°
TVD: 5,357.26'
VS: 16.89'

LMST: pred off wh crm, mod sft - frm, brit, sb blkly - ply, xln, sm-wxy, v calc; occ yel/grn mnrl flor, mod slow diffuse mod bri bl cut

DOL: lt gy - lt tan - wht, mod frm, brit, sb blkly - sb ang, mic xln, gritty/suc tex, mod calc, tr lmst; SLTY SH: pred dk gy/blk, mod frm, brit, sb ply - sb ang, occ spindly, rthy - slty tex, sl calc occ yel/grn mnrl flor, mod slow diffuse mod bri bl cut

TOOH FOR BHA #4 ON 2/09/2014 @ 03:48 hrs

Bit #: 4
Type: Smith MDSi613
Size: 6.12
Depth In: 5,422'
Depth Out: 5,916'
Jets: 5x12



S/N: JE/231

RESUME DRILLING
ON 2/12/2014 @ 15:55 hrs

LMST: pred tan, occ lt gy, xln, mod frm-hd, sb blkly-blky, v calc, sm-wxy, SS: pred clr-off wh, occ lt gy-tan, vf-f gr, sb ang-sb rd, hd-v hd, p-mod srt, sl calc cmt, arg, uncons ip, SLTY SH: pred dk gy/blk, mod frm, brit, sb plty - sb ang, occ spindly, rthy - slty tex, sl calc occ; yel/grn mnrl flor, slow diffuse p lt bl cut

MD: 5,474 '
Inclination: 1.51 °
Azimuth: 207.67 °
TVD: 5,473.23 '
VS: 11.42 '

DOL: lt gy - lt tan - wht, mod frm, brit, sb blkly - sb ang, xln, gritty/suc tex, mod calc, tr lmst, SS: pred clr-off wh, occ lt gy-tan, vf-f gr, sb ang-sb rd, hd-v hd, p-mod srt, sl calc cmt, arg, uncons ip, SLTY SH: pred dk gy/blk, mod frm, brit, sb plty - sb ang, occ spindly, rthy - slty tex, sl calc; yel/grn mnrl flor, slow diffuse p lt bl cut

MD: 5,537 '
Inclination: 1.31 °
Azimuth: 227.44 °
TVD: 5,536.21 '
VS: 10.2 '

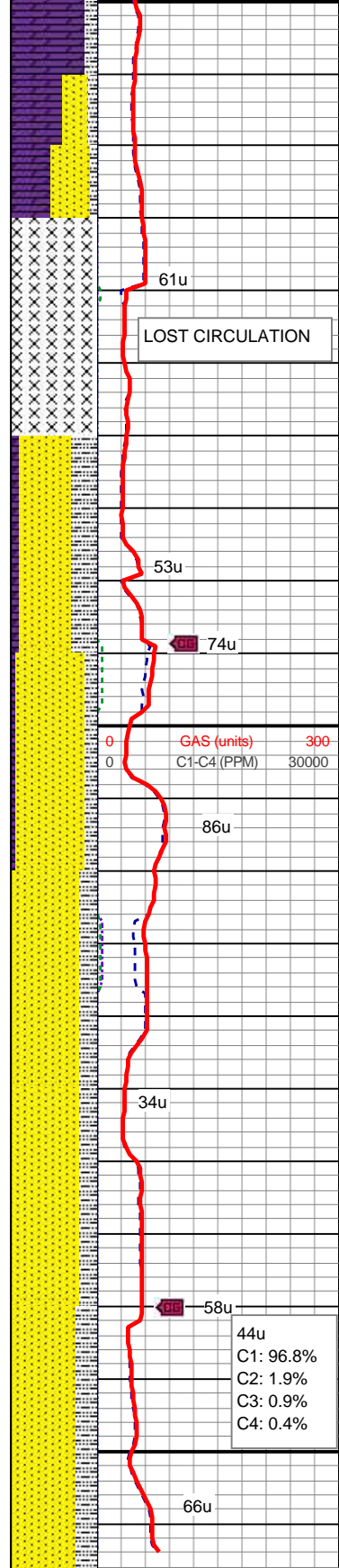
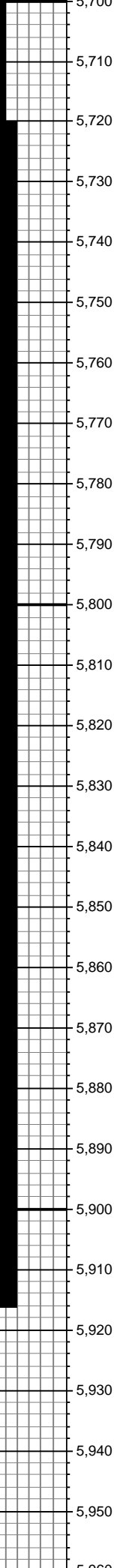
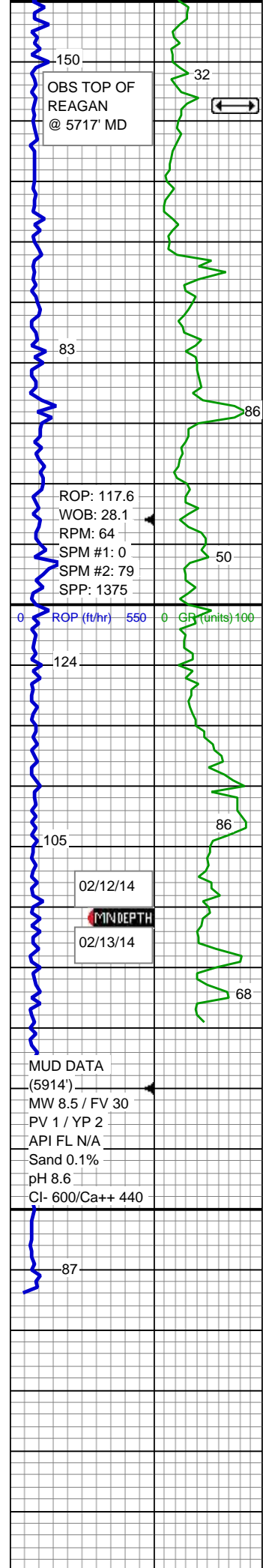
DOL: off wh-lt tan, lt gy ip, mod frm, brit, sb blkly - sb ang, xln, gritty/suc tex, occ lmst, v calc ip, SS: pred clr-off wh, occ lt gy, vf-f gr, sb ang-sb rd, hd-v hd, p-mod srt, sl calc cmt, arg, pred uncons, SLTY SH: pred dk gy/blk, mod frm, brit, sb plty - sb ang, rthy - slty tex, sl calc;; yel/grn mnrl flor, slow diffuse p lt bl cut

DOL: off wh-lt tan, lt gy ip, mod frm, brit, sb blkly - sb ang, xln, gritty/suc tex, occ lmst, v calc ip, SS: pred clr-off wh, occ lt gy, vf-f gr, sb ang-sb rd, hd-v hd, p-mod srt, sl calc cmt, arg, pred uncons, SLTY SH: pred dk gy/blk, mod frm, brit, sb plty - sb ang, rthy - slty tex, sl calc;; yel/grn mnrl flor, slow diffuse p lt bl cut

MD: 5,632 '
Inclination: 1.15 °
Azimuth: 282.3 °
TVD: 5,631.19 '
VS: 9.67 '

DOL: wh-off wh, lt gy ip, mod frm, brit, sb blkly - sb ang, xln, gritty/suc tex, occ lmst, occ v calc, SLTY SH: pred dk gy, sl brn ip, mod frm, brit, sb plty - sb ang, rthy - slty tex, sl calc, sdy ip;; yel/grn mnrl flor, slow diffuse p lt bl-yel cut

DOL: wh-off wh, lt gy ip, mod frm, brit, sb blkly - sb ang, xln, gritty/suc tex, occ lmst, occ v calc, SLTY SH: pred gy, lt brn ip, mod frm, brit, sb plty - sb ang, rthy - slty tex, sl calc, sdy ip;; yel/grn mnrl flor, slow diffuse p lt bl-yel cut



MD: 5,727'
Inclination: 1.33 °
Azimuth: 294.38 °
TVD: 5,726.17'
VS: 10.32'

SS: pred clr-off wh, occ lt gy, vf-f gr, sb ang-sb rd, hd-v hd, p-mod srt, sl calc cmt, SLTY SH: pred dk gy, lt brn ip, mod frm, brit, sb pty - sb ang, rthy - slty tex, sl calc, sdy ip, DOL: wh-off wh, lt gy ip, mod frm, brit, sb blkly - sb ang, xln, gritty/suc tex, occ lmst, occ v calc,; yel/grn mnrl flor, slow diffuse p lt bl-yel cut

SS: pred clr-off wh, occ lt gy, vf-f gr, sb ang-sb rd, hd-v hd, p-mod srt, sl calc cmt, pred uncons, SLTY SH: pred dk gy, lt brn ip, mod frm, brit, sb pty - sb ang, rthy - slty tex, sl calc, sdy ip, DOL: wh-off wh, lt gy ip, mod frm, brit, sb blkly - sb ang, xln, gritty/suc tex, occ lmst, occ v calc,; yel/grn mnrl flor, slow diffuse p lt bl-yel cut

SS: pred clr-off wh, occ lt gy, tr lt brn, vf-f gr, sb ang-sb rd, mod hd-v hd, p-mod srt, p-fr por, occ sl calc cmt, uncons, SLTY SH: pred dk gy, lt brn ip, mod frm, brit, sb pty - sb ang, rthy - slty tex, sl calc, sdy ip, occ ls; yel/grn mnrl flor, slow diffuse bl-yel cut

MD: 5,855'
Inclination: 2.69 °
Azimuth: 246.88 °
TVD: 5,854.09'
VS: 21.57'

SS: pred clr-off wh, occ lt gy, tr lt brn, vf-f gr, sb ang-sb rd, mod hd-v hd, p-mod srt, p-fr por, pred silc cmt, occ calc cmt, SLTY SH: pred dk gy, lt brn ip, mod frm, brit, sb pty - sb ang, rthy - slty tex, sl calc, sdy ip, occ ls; yel/grn mnrl flor, tr lt bl min flor, slow diffuse pale lt bl-yel cut

PROJECTION TO BIT

MD: 5,914'
Inclination: 2.69 °
Azimuth: 246.88 °
TVD: 5,913.03'
VS: 23.54'

TD CABOOSE 1548-21-44-SWD @ 5914' MD 00:55 MST on 2/13/14

THANK YOU FOR USING COLUMBINE LOGGING INC.