

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name LAST WOMAN STANDING 943-15-24-D

Location SEC 15, T9N, R43W

State Colorado

County Sedgwick

Country United States

Rig Number Murfin Rig #20

API Number 05-115-06111

Field Wildcat

Geographic Region DJ Basin

Drilling Completed 11/5/2015

Spud Date 10/28/2015

Surface Coordinates SEC 15, T9N, R43W
600' FSL, 1575' FWL

Bottom Hole Coordinates SEC 15, T9N, R43W
600' FSL, 1575' FWL

Ground Elevation 3643'

K.B. Elevation 3654'

Logged Interval 2000' To 5726'

Total Depth 5726'

Formation Pierre, Niobrara, Carlile, Greenhorn, Dakota, Skull Creek, Lakota, Morrison, Blain, Leonard, Wolfcamp, Foraker

Type of Drilling Fluid Water Based Mud/ LSND

Operator

Company Black Raven Energy Inc.

Address 1331 17th St #350, Denver, CO 80202


Geologist

Name David Kunovic

Company EnerJex Resources

Address 165 S. Union Blvd, Suite 410
Lakewood, Colorado 80228
303-308-1330

Zone Color Coding

 Oil	 Condensate	 Gas
 Note	 Core	 Pressure
 Error	 Water	 Seal

Other

Well Site Logging Company Columbine Logging Inc.

Senior Well Site Geologist Brad Wilson
Well Site Geologist Andrew Martens

Rock Types

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

Accessories

Fossils

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

MARCASITE

MARLSTONE

MICACEOUS

MINERAL CRYSTALS

NODULES

PHOSPHATE PELLETS

PYRITE

SALT CAST

SANDY

SIDERITE

SILICEOUS

SILTY

TUFFACEOUS

Stringer

ANHYDRITE STRINGER
BENTONITE STRINGER
COAL STRINGER
DOLOMITE STRINGER
GYPNUM 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
Q INTEROOLITIC
M MOLDIC

ORGANIC

P PINPOINT

V VUGGY

Engineering

BIT CHANGE
CONNECTION (LEFT)
CONNECTION (RIGHT)
CONNECTION GAS
TRIP GAS
DOWN TIME GAS
CORE - LOST
CORE - RECOVERED
DST INTERVAL

FAULT

FORMATION TOP

GAS SHOW

OIL SHOW

MN DEPTH MN DEPTH

MN DEPTH MN DEPTH (RIGHT)

NORMAL FAULT

OVERTURNED STRATA

REVERSE FAULT

CASING

SIDEWALL CORE (LEFT)

SIDEWALL CORE (RIGHT)

SLIDE

SURVEY

DST DRILL STEM TEST

WIRELINE TESTED - LEFT

WIRELINE TESTED - RT

Rounding

ANGULAR
ROUNDED
SUBANG
SUBRND

Textures

BOUNDSTONE
CHALKY
CRYPTOXLN

E EARTHY

FX FINELYXLN

GS GRAINSTONE

L LITHOGRAPHIC

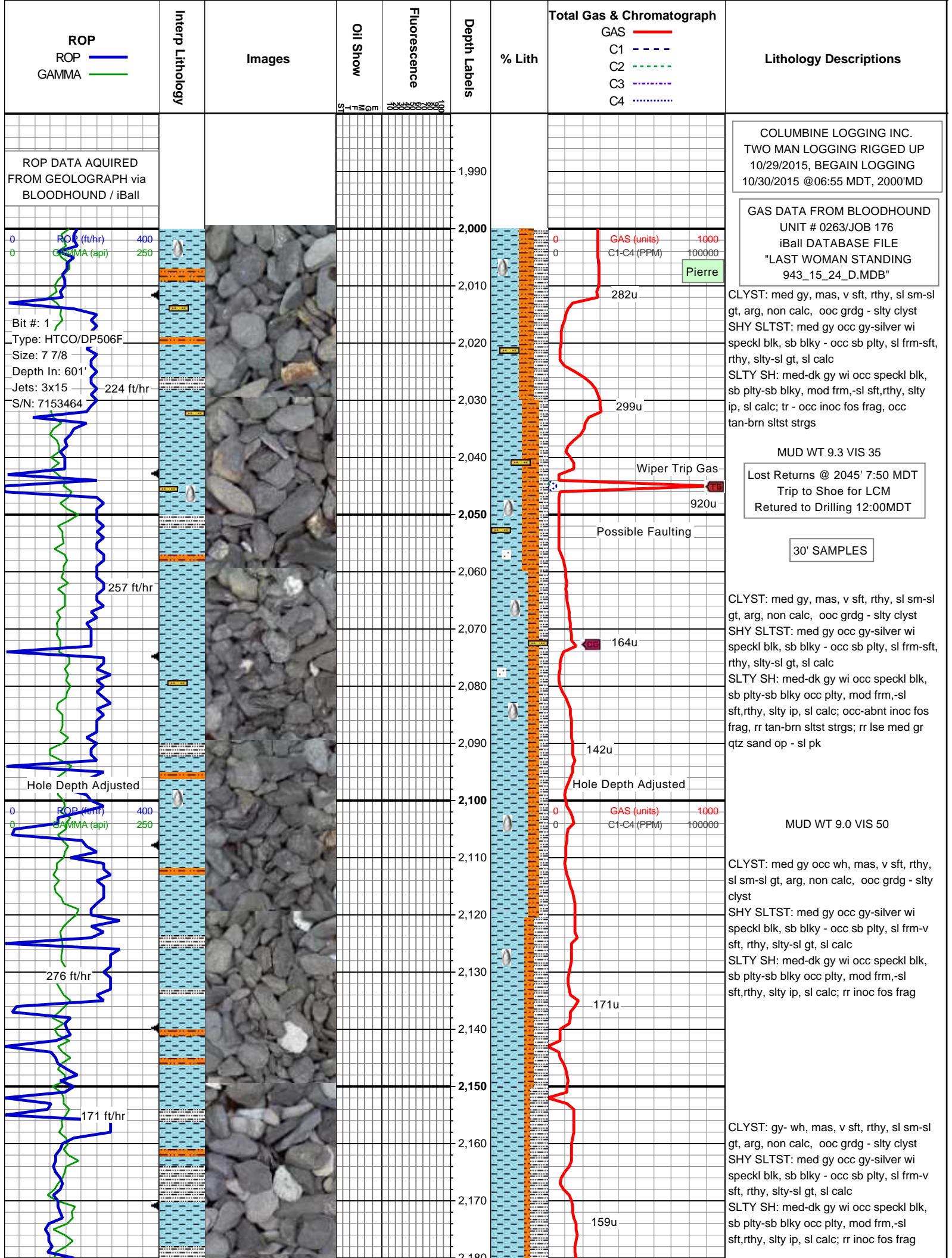
MX MICROXLN

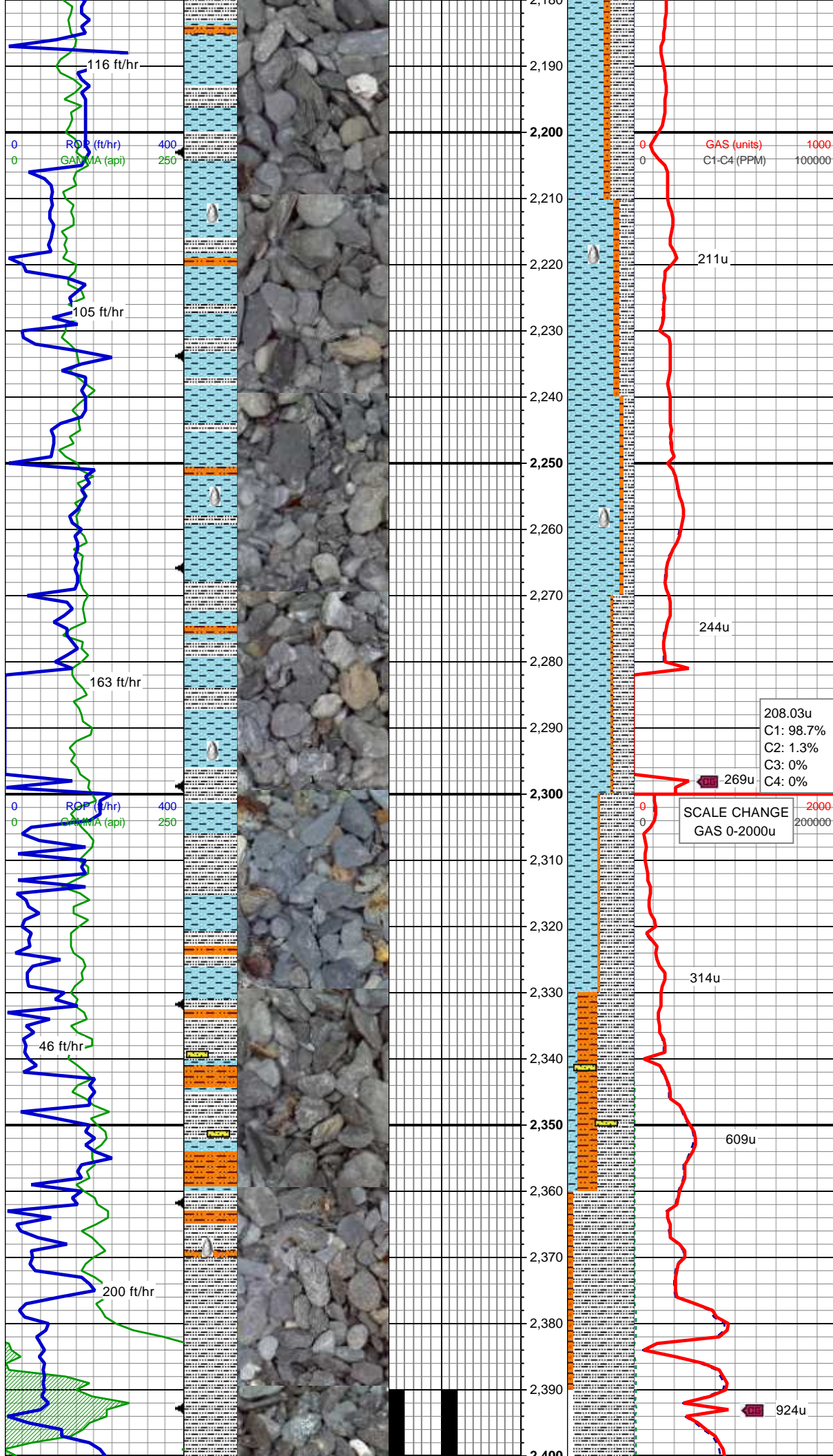
MS MUDSTONE

 PS PACKSTONE || WS WACKESTONE |

Sorting

M MODERATE
P POOR
W WELL





MUD WT 9.2 VIS 64

SLTY CLYST: med gy-gy, mas, v sft, rthy, sl sm-sl gt, arg, non calc
SLTY SH: med-dk gy wi occ speckl blk, sb plty-sb blkly occ plty, mod frm,-sl sft,rthy, slty ip, sl calc
SHY SLTST: med gy occ gy-silver wi speckl blk, sb blkly - occ sb plty, sl frm-v sft, rthy, slty-sl gt, sl calc; rr inoc fos frag

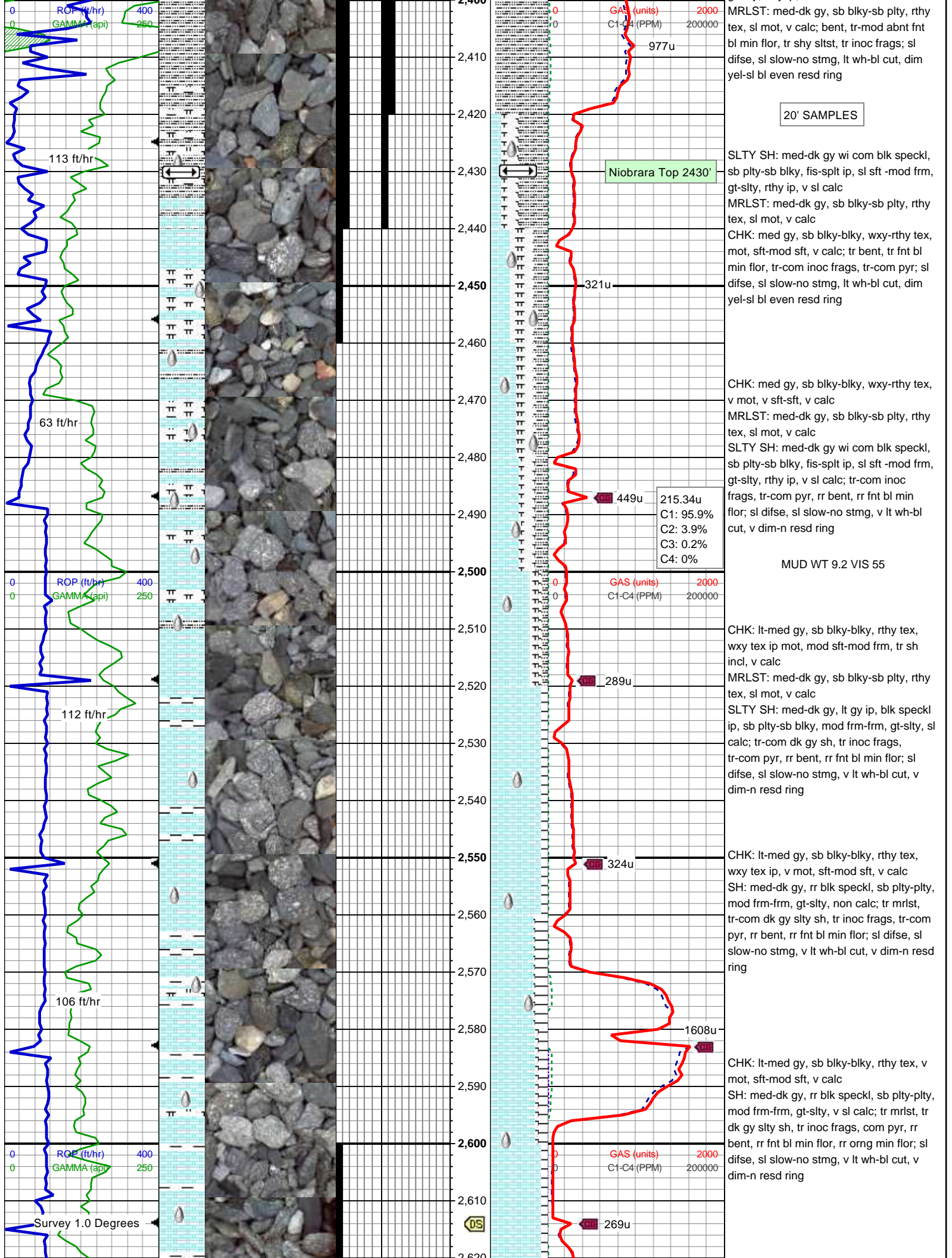
SLTY CLYST: med gy-gy, mas, v sft, rthy, sl sm-sl gt, arg, non calc
SLTY SH: med-dk gy wi occ speckl blk, sb plty-sb blkly occ plty, mod frm,-sl sft,rthy, slty ip, sl calc
SHY SLTST: med gy occ gy-silver wi speckl blk, sb blkly - occ sb plty, sl frm-v sft, rthy, slty-sl gt, sl calc; rr inoc fos frag

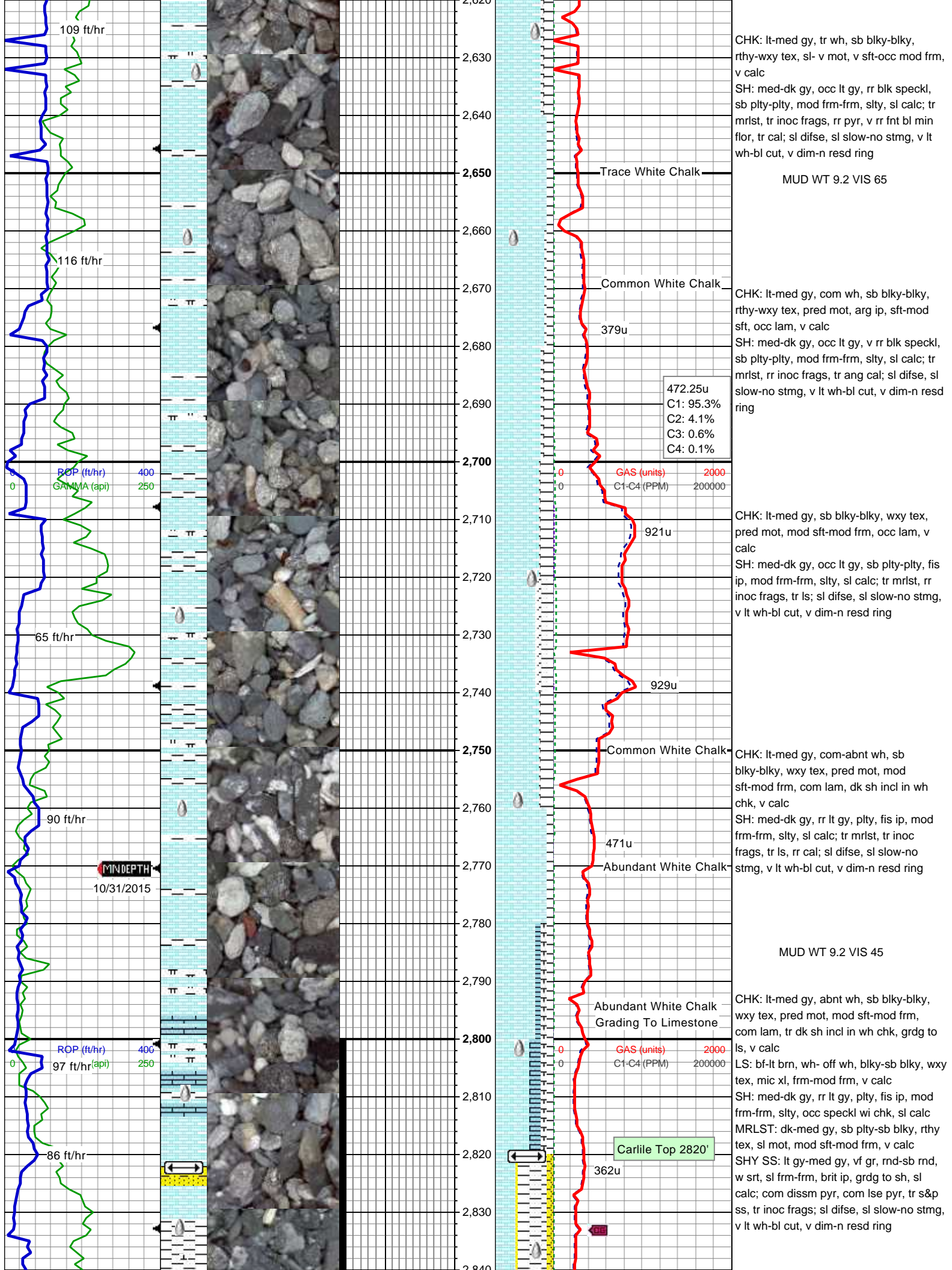
SLTY CLYST: med gy-gy, mas, v sft, rthy, sl sm-sl gt, arg, non calc
SLTY SH: med-dk gy wi occ speckl blk, sb plty-sb blkly occ plty, mod frm,-sl sft,rthy, slty ip, sl calc
SHY SLTST: med gy occ gy-silver wi speckl blk, sb blkly - occ sb plty, sl frm-v sft, rthy, slty-sl gt, sl calc; rr inoc fos frag, tr pyr

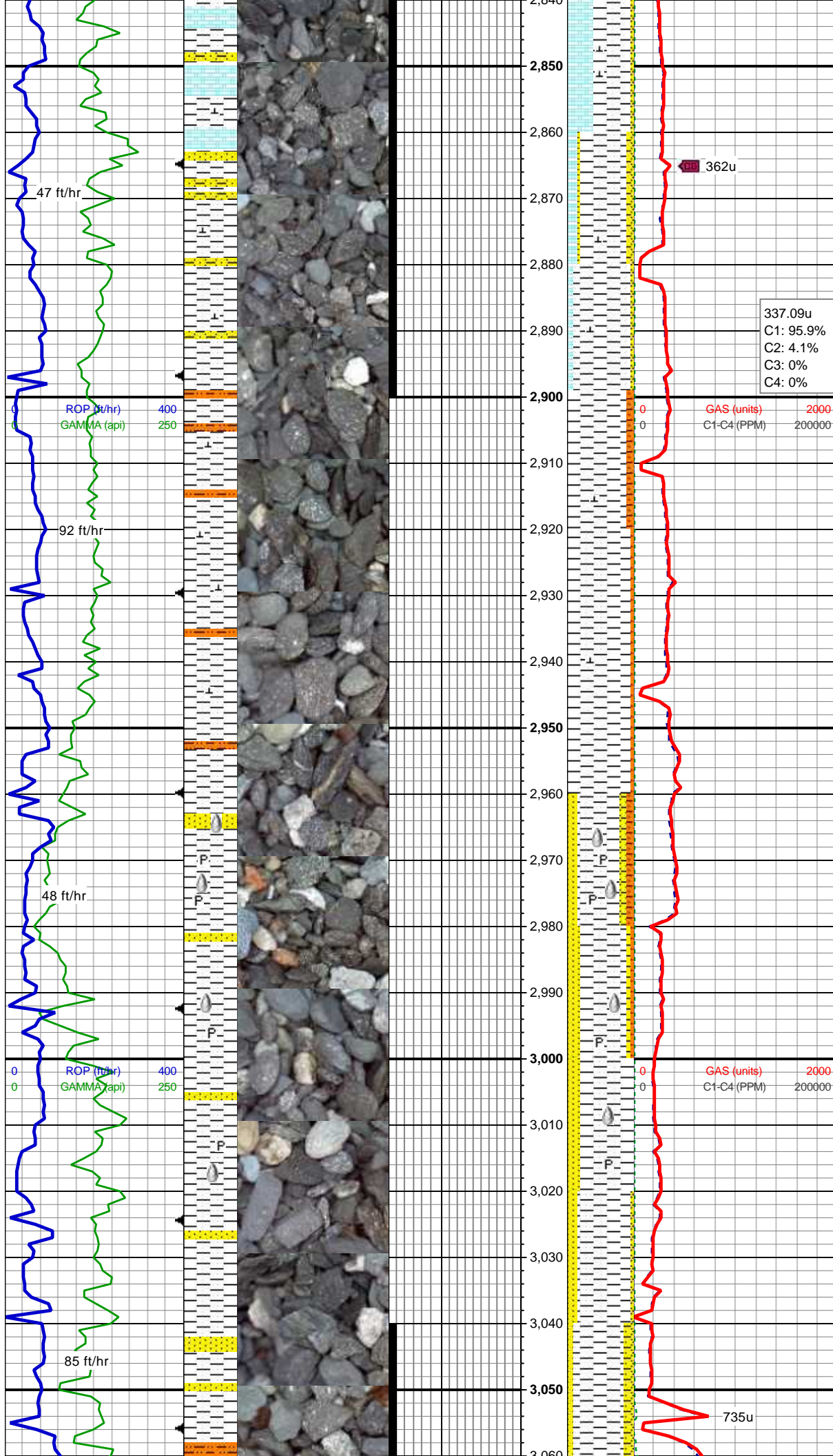
SLTY SH: med-dk gy wi occ speckl blk, sb plty, fis-splt ip, occ plty, sl sft -mod frm, gt, rthy ip, v sl calc
SHY SLTST: med gy occ gy-silver wi speckl blk, sb blkly - occ sb plty, sl frm-v sft, rthy, slty-sl gt, v sl calc
SLTY CLYST: med gy-gy, occ lt gy, v sft, rthy, sl sm-sl gt, arg, non calc; tr ss strg, tr shy ss, rr inoc fos frag, rr pyr, rr cal, rr bl min flor

MUD WT 9.1 VIS 45

SLTY SH: med-dk gy wi com blk speckl, sb plty-sb blkly, fis-splt ip, sl sft -mod frm, gt-slty, rthy ip, v sl calc







SH: med-dk gy, plty-sb blkly, fis ip, sl sft-frm, rthy-slty tex, pred speckl w chk, sl calc-calc
CHK: lt gy-med gy, occ crm, rr wh chk, blkly-sb blkly, wxy tex, v mot, sft-mod frm, occ grdg to ls, v calc; com inoc fos frags, com pyr, tr ls, tr shy ss, rr ss; sl difse, v sl stmg, wh/bl cut, yel resd ring

MUD WT 9.2 VIS 53

SH: med-dk gy pred speck wh, plty-sb blkly, fis ip, sl sft-frm, rthy-slty tex, calc
SHY SLTST: gy-brn, sb blkly, sl frm -sft, rthy, slty-gt, sl calc; sl difse, v sl stmg, fnt wh/bl cut, dul yel resd ring

SH: med-dk gy pred speck wh, plty-sb blkly, fis ip, sl sft-frm, rthy-slty tex, calc
SHY SLTST: gy-brn, sb blkly, sl frm -sft, rthy, slty-gt, sl calc; sl difse, sl stmg, fnt wh/bl cut, dul yel resd ring

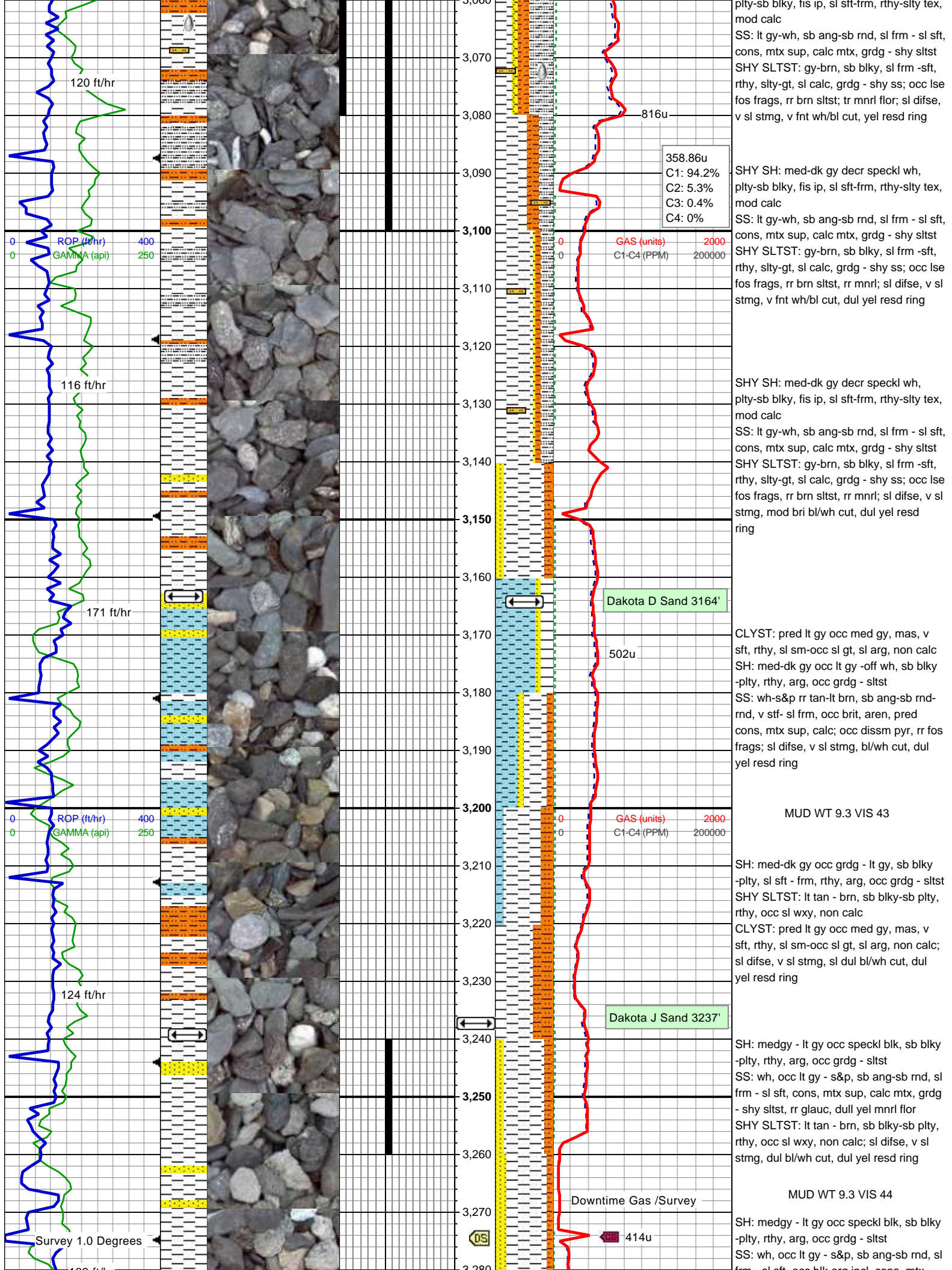
SH: med-dk gy pred speckl wh, plty-sb blkly, fis ip, sl sft-frm, rthy-slty tex, calc
SS: lt gy-wh, sb ang-sb rnd, sl frm - sl sft, cons, mtx sup, calc mtx
SHY SLTST: gy-brn, sb blkly, sl frm -sft, rthy, slty-gt, sl calc, grdg - shy ss; abnt lse fos frags and pyr, occ cal; sl difse, sl stmg, wh/bl cut, dul yel-orig resd ring

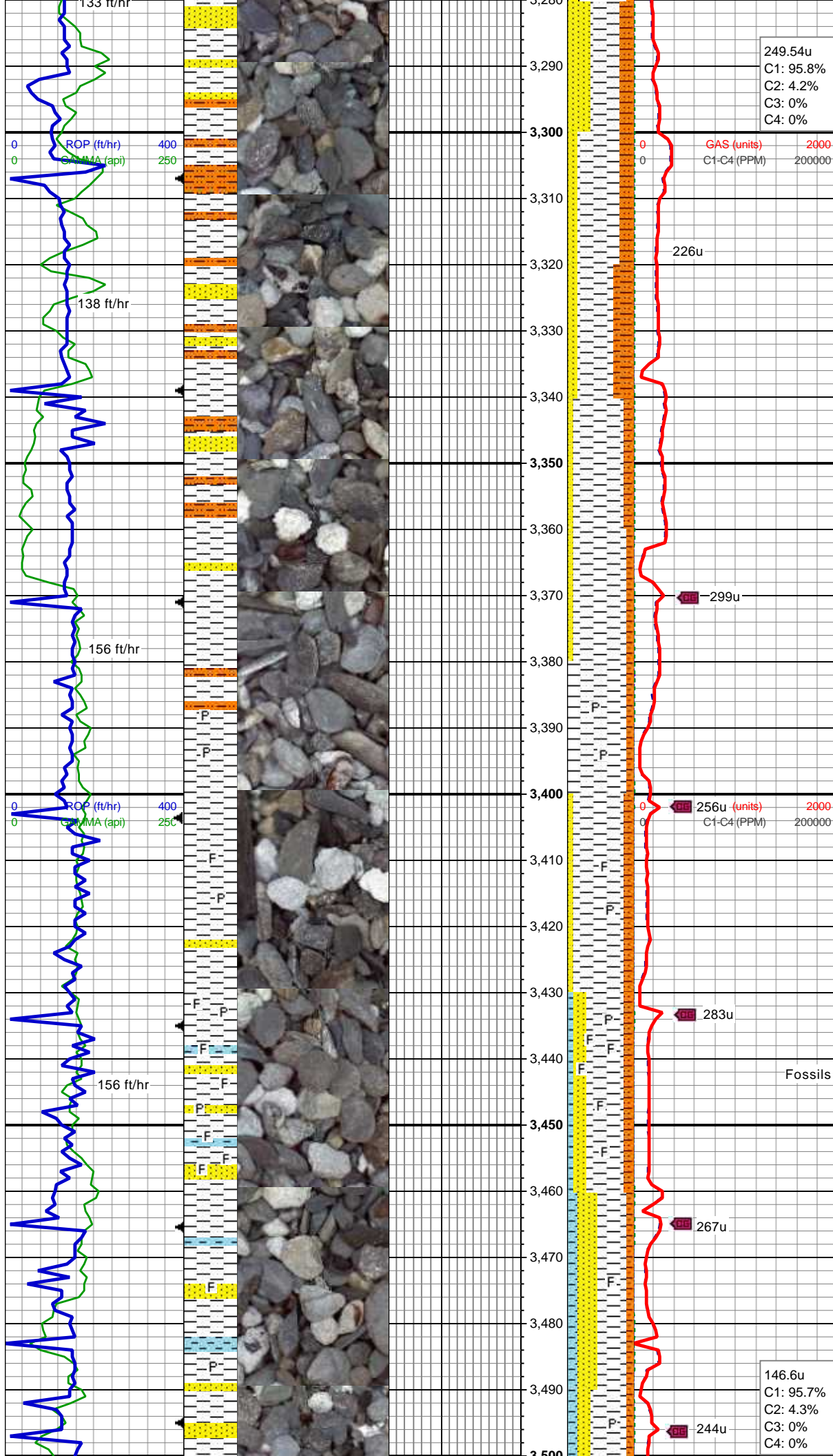
SH: med-dk gy pred speckl wh, plty-sb blkly, fis ip, sl sft-frm, rthy-slty tex, calc
SS: lt gy-wh, sb ang-sb rnd, sl frm - sl sft, cons, mtx sup, calc mtx
SHY SLTST: gy-brn, sb blkly, sl frm -sft, rthy, slty-gt, sl calc, grdg - shy ss; abnt lse fos frags and pyr, occ cal; sl difse, v sl stmg, wh/bl cut, dul yel resd ring

SH: med-dk gy pred speckl wh, plty-sb blkly, fis ip, sl sft-frm, rthy-slty tex, calc
SS: lt gy-wh, sb ang-sb rnd, sl frm - sl sft, cons, mtx sup, calc mtx, grdg - shy sltst
SHY SLTST: gy-brn, sb blkly, sl frm -sft, rthy, slty-gt, sl calc, grdg - shy ss; occ - rr lse fos frags and pyr, rr mnrl flor; sl difse, v sl stmg, v fnt wh/bl cut, dul yel resd ring

Bottoms-Up Timer Changed
From 0.6 to 0.65 min/100ft

SHY SH: med-dk gy decr speckl wh,





lim - sl sft, occ blk org incl, cons, mtx
sup, calc mtx, grdg - shy sltst, rr glauc,
occ dull yel mnrl flor

SHY SLTST: lt tan - brn, sb blkly-sb plty,
rthy, occ sl wxy, non calc; sl difse, v sl
stmng, dul bl/wh cut, dul yel resd ring

MUD WT 9.4 VIS 42

SH: medgy - lt gy occ speckl blk, sb blkly
-plty, sl sft - frm, rthy, arg, occ grdg -
sltst, occ bdg wi ss

SHY SLTST: lt tan - brn, sb blkly-sb plty,
rthy, occ sl wxy, non calc

SS: wh, occ lt gy - s&p, sb ang-sb rnd, sl
frm - sl sft, occ blk org incl, cons, mtx
sup, calc mtx, grdg - shy sltst, rr glauc,
occ dull yel mnrl flor; sl difse, sl stmng,
dul bl/wh cut, dul yel resd ring

SH: medgy -dk gy, sb blkly -plty, sl sft -
frm, rthy, arg, occ grdg - sltst, occ bdg
wi ss

SHY SLTST: lt tan - brn, sb blkly-sb plty,
rthy, occ sl wxy, non calc

SS: wh, occ lt gy - s&p, sb ang-sb rnd, sl
frm - sl sft, occ blk org incl, cons, mtx
sup, calc mtx, grdg - shy sltst, rr glauc,
occ dull yel mnrl flor; sl difse, sl fnt
bl/wh cut, v dim dk yel resd, sl tr - no o

Bottoms-Up Timer Changed
From 0.65 to 0.68 min/100ft

30' Samples

SH: medgy - dk gy, sb blkly -plty, sl sft -
frm, rthy, arg, occ grdg - sltst, occ bdg
wi ss

SHY SLTST: lt tan - brn, sb blkly-sb plty,
rthy, occ sl wxy, non calc

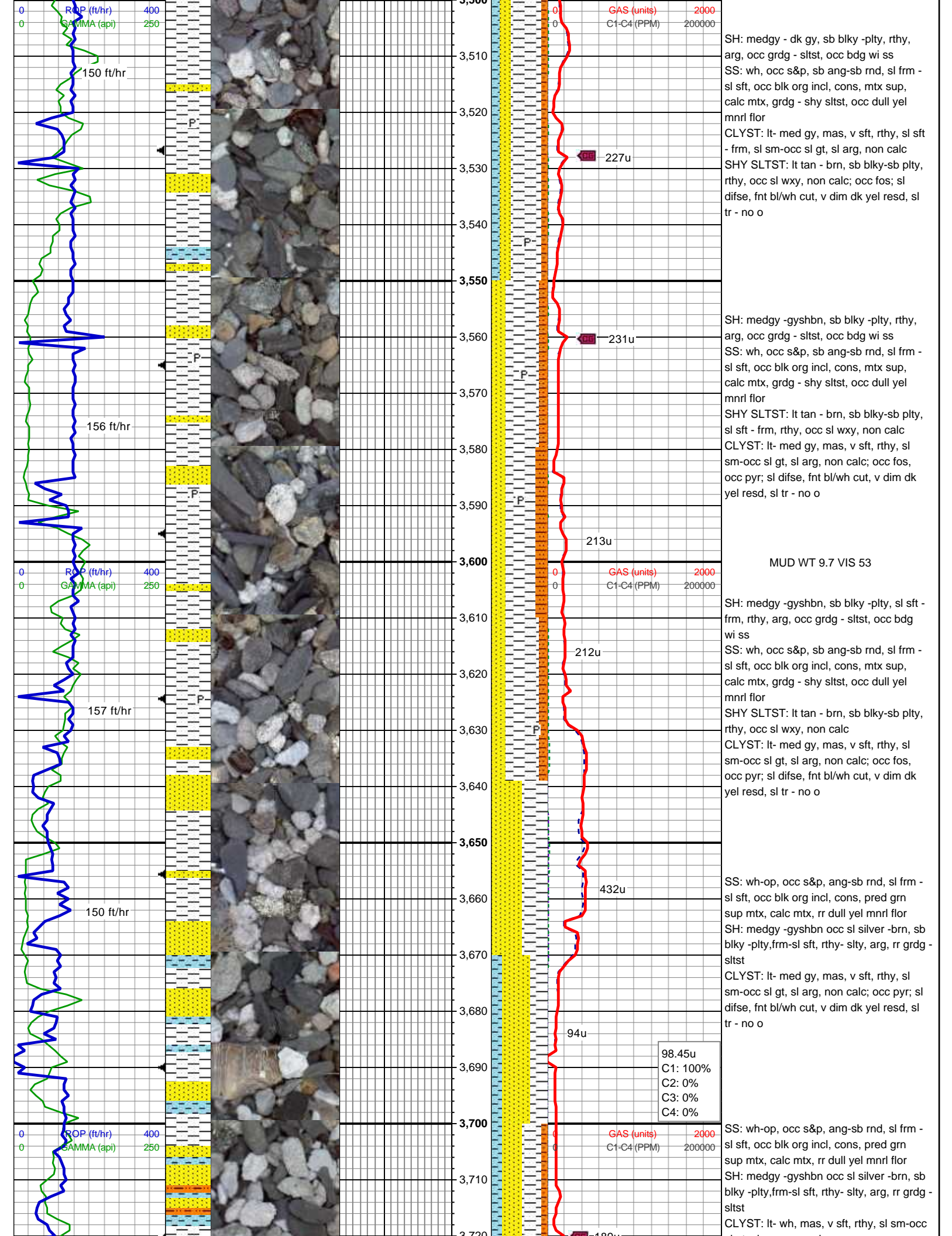
SS: wh, occ lt gy - s&p, sb ang-sb rnd, sl
frm - sl sft, occ blk org incl, cons, mtx
sup, calc mtx, grdg - shy sltst, occ dull
yel mnrl flor; abnt fos, rr fos cgl'n; sl
difse, sl fnt bl/wh cut, v dim dk yel resd,
sl tr - no o

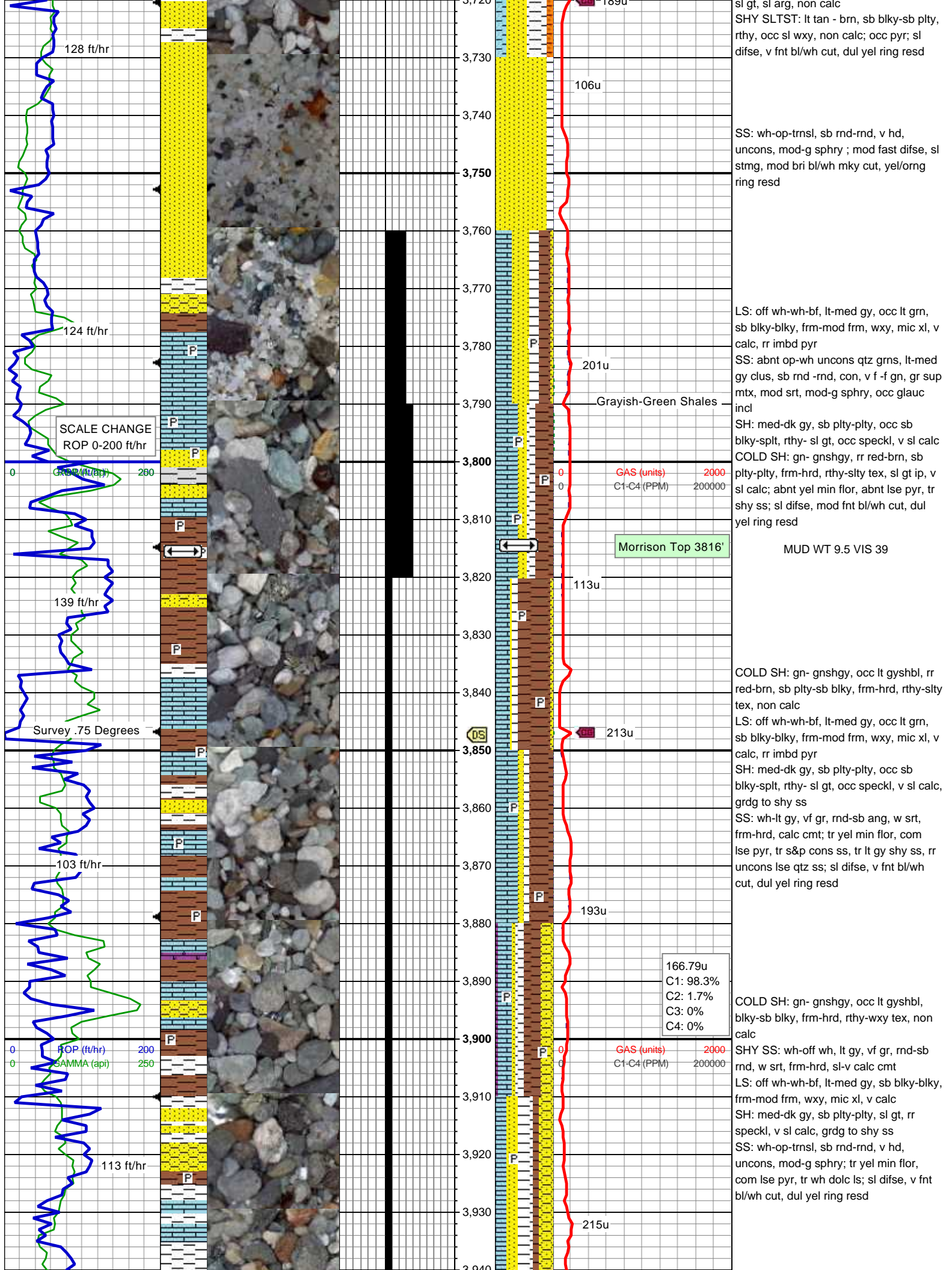
SH: medgy - dk gy, sb blkly -plty, rthy,
arg, occ grdg - sltst, occ bdg wi ss

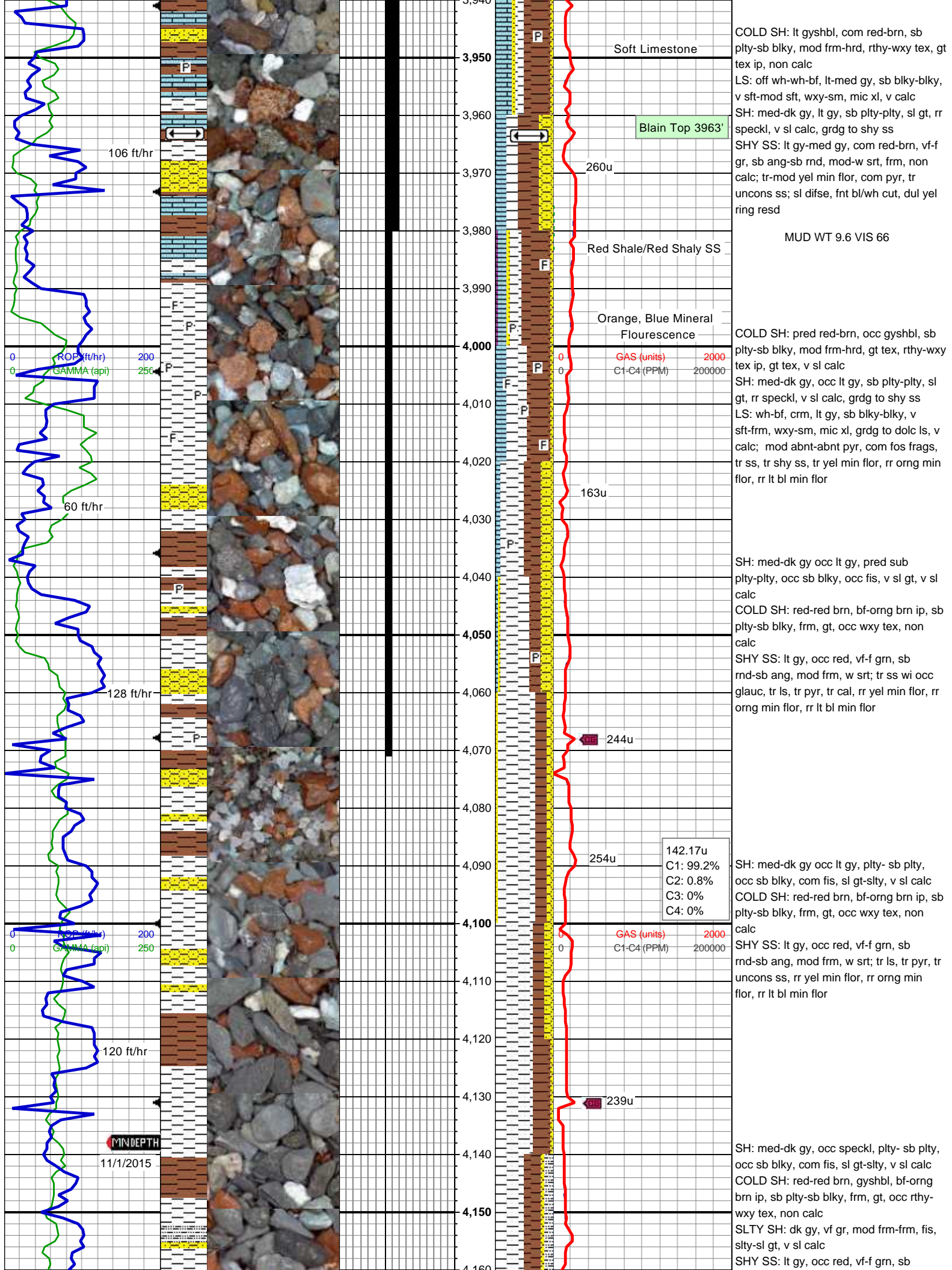
SS: wh, occ s&p, sb ang-sb rnd, sl frm -
sl sft, occ blk org incl, cons, mtx sup,
calc mtx, grdg - shy sltst, occ dull yel
mnrl flor

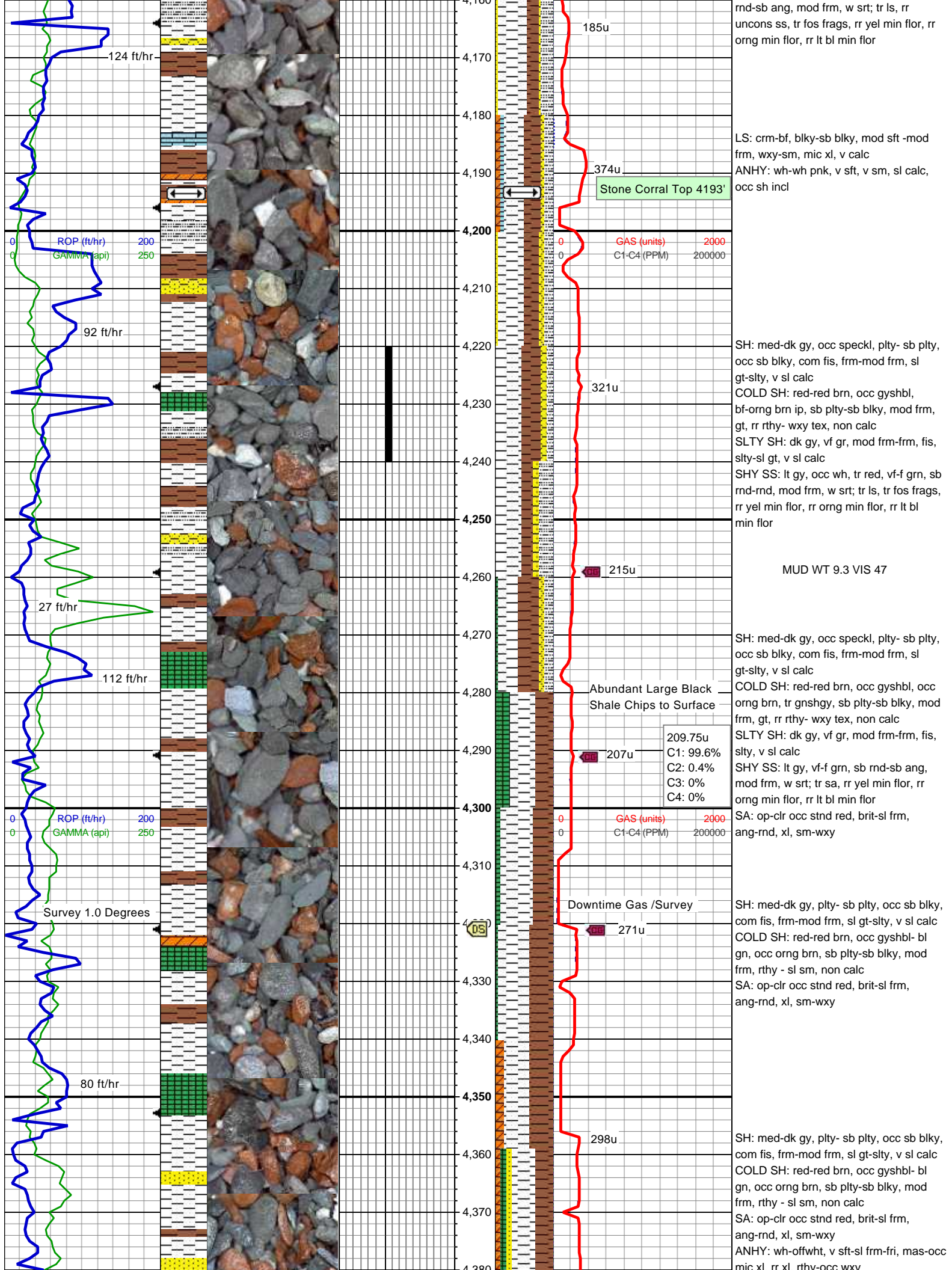
CLYST: lt- med gy, mas, v sft, rthy, sl sft
- frm, sl sm-occ sl gt, sl arg, non calc

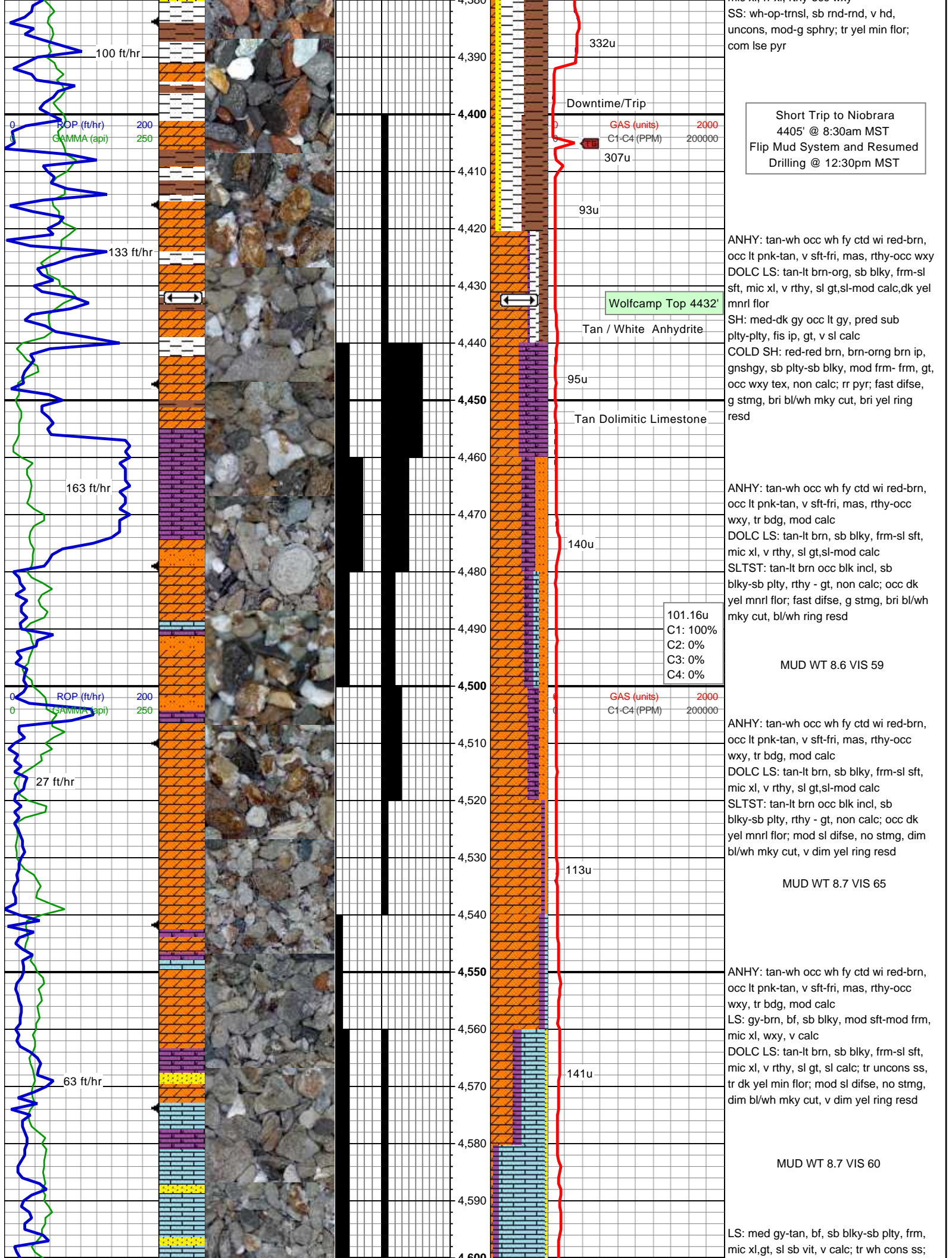
SHY SLTST: lt tan - brn, sb blkly-sb plty,
rthy, occ sl wxy, non calc; occ fos; sl
difse, fnt bl/wh cut, v dim dk yel resd, sl
tr - no o

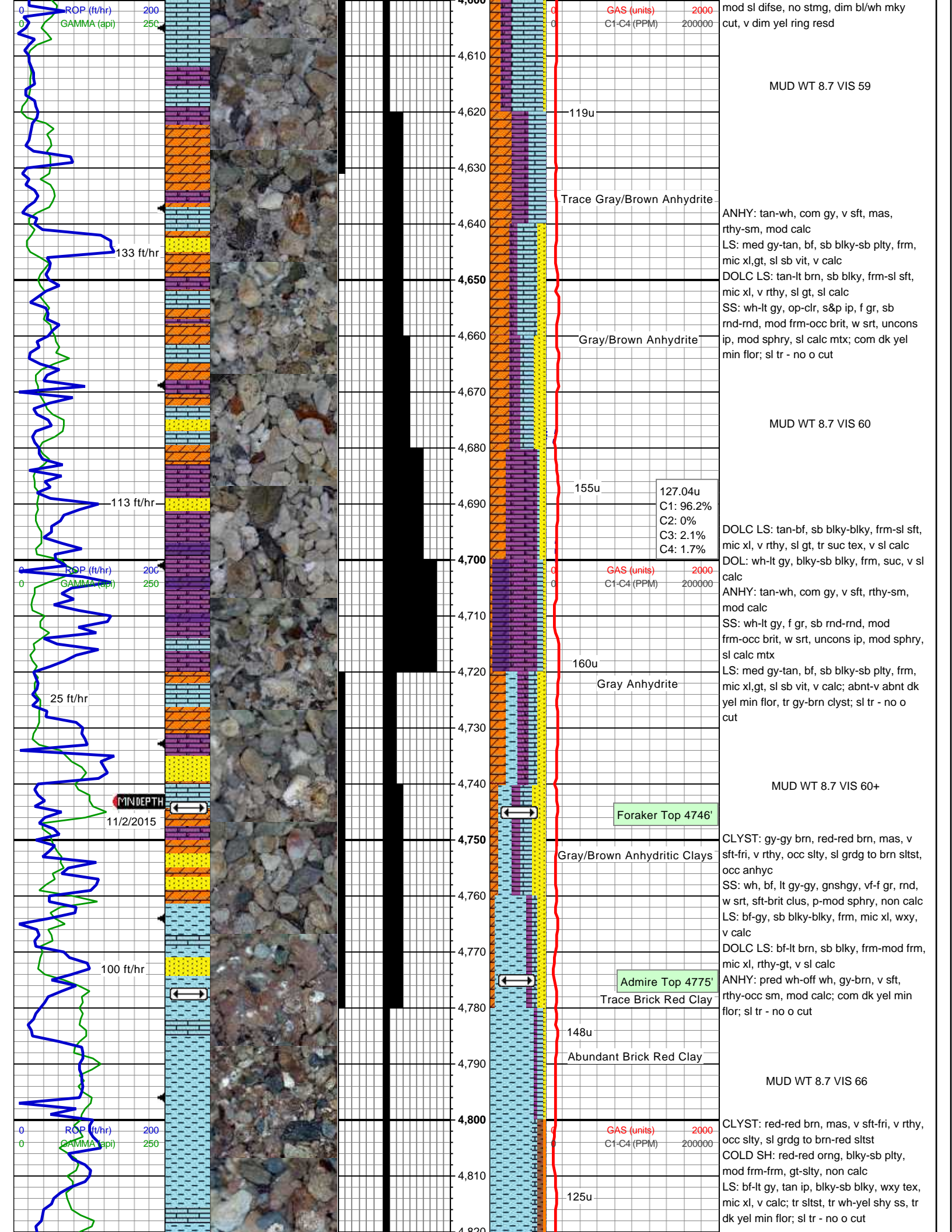


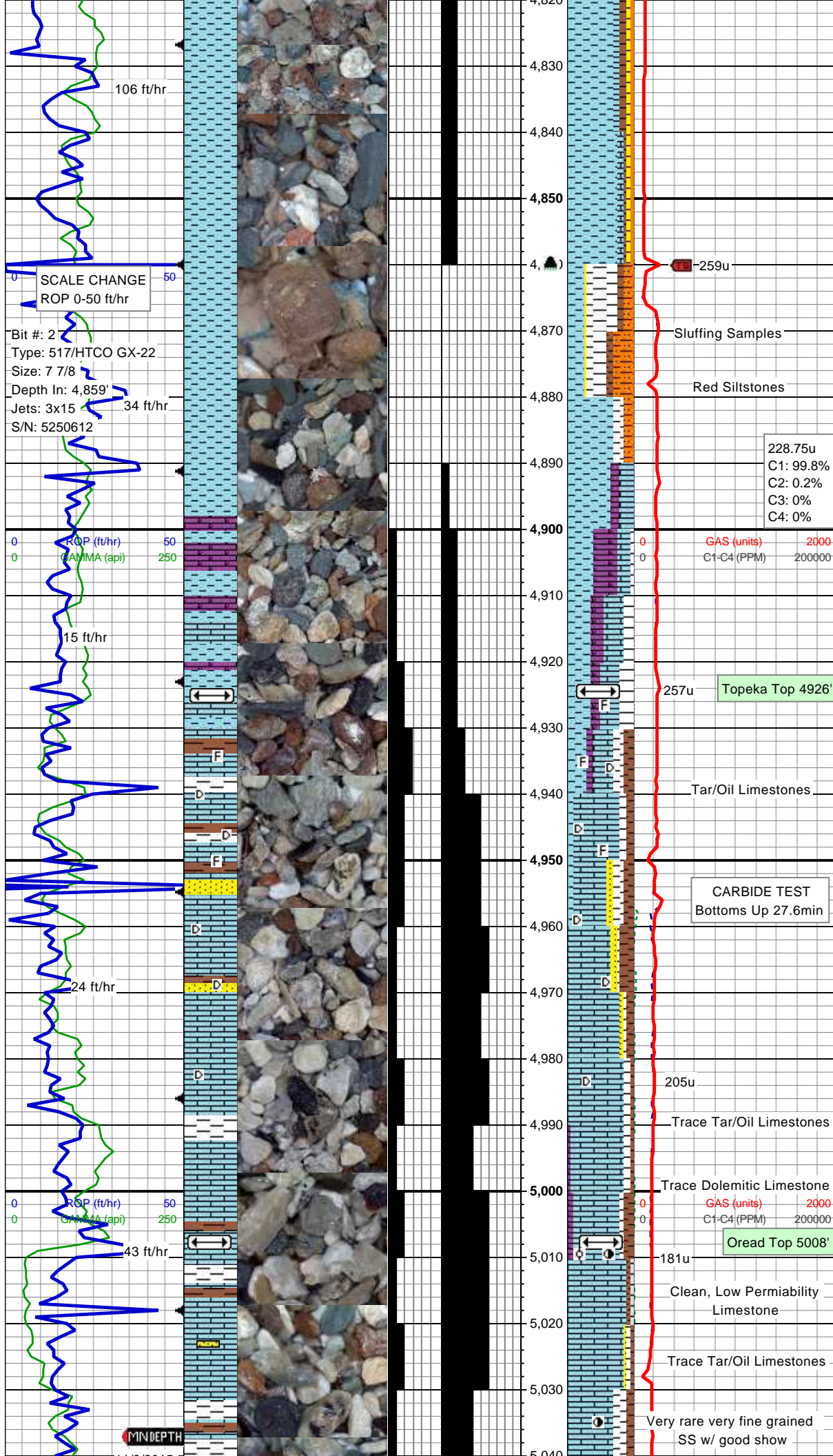












CLYST: red-red brn, mas, v sft-fri, v rthy, occ slty, sl grdg to brn-red sltst
COLD SH: red-red orgng, blkly-sb plty, mod frm-frm, gt-slty, non calc
LS: bf-lt gy, tan ip, blkly-sb blkly, wxy tex, mic xl, v calc; tr sltst, tr wh-yel shy ss, tr dk yel min flor; sl tr - no o cut

TOOH For Bit @ 4859'
3:00AM MST 11/2/2015
Resumed Drilling
11:00AM MST 11/2/2015

10' Samples

MUD WT 8.7 VIS 59

CLYST: red-red brn, mas, v sft-fri, v rthy, occ slty, sl grdg to brn-red sltst
SHY SLTST: red-brick- red- org red, sb blkly, sl sft -sl frm, v slty - gt, rthy, sl calc

LS: redish pk -sl red occ pk-bf, brit-sl sft, sb blkly, gt, xl -sl suc, v calc
DOLC LS: tan-bf occ sl pk, sb blkly-sb plty, frm-sl hd, mic xl, sl wxy-sm dim dk yel mnrl flor sl calc; slow difse, no stmg, dim bl/wh mky cut, dim yel ring resd

MUD WT 8.8 VIS 60

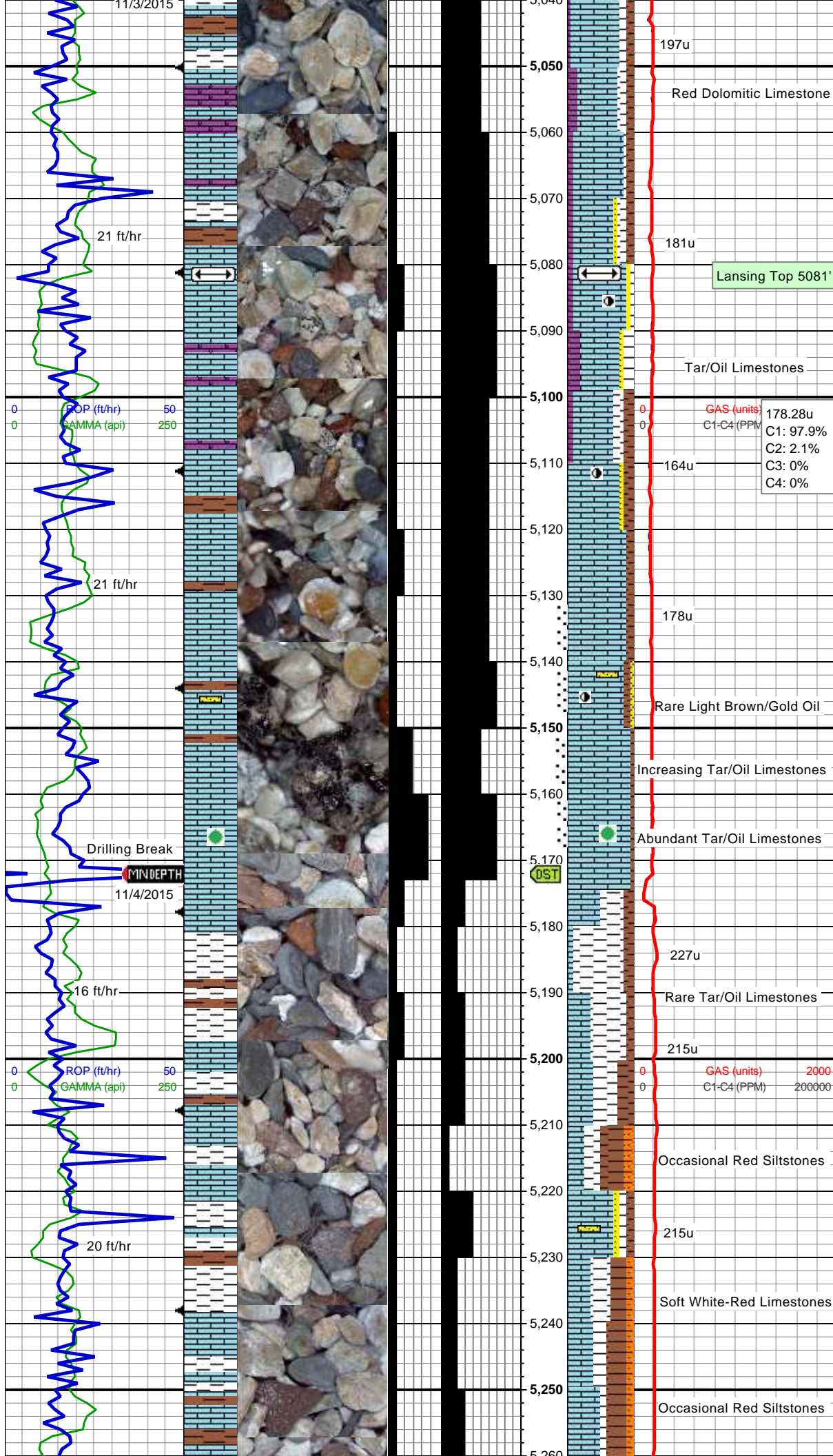
LS: tan-bf, lt gy-brn, brit-mod frm, sb blkly, wxy, sl dolc ip, mic xl- suc, v calc, occ -abnt imbd org mat v calc
COLD SH: red-red brn, lt bl- gysbbl, plty-sb plty, gt-slty, mod frm-frm, non calc; com-abnt dk yel min flor, com red clyst, tr fos frags; mod fast difse, g stmg, bri bl/wh mky cut, spty bri yel ring resd

LS: tan-bf, lt gy-brn, brit-mod frm, occ sft, sb blkly, wxy, mic xl- suc, v calc, tr-occ imbd org mat v calc, tr imbd pyr
COLD SH: red-red brn, tr lt bl- gysbbl, plty-sb plty, gt-slty, mod frm-frm, non calc
SS: wh, vf-f gr, sb rnd-rnd, w srt, brit-fri, mod sphry, sl calc; tr dolc ls, com-abnt dk yel min flor, tr shy ss, tr red-red brn clyst, rr fos frags; slow-mod fast difse, sl stmg, mod bri bl/wh mky cut, spty bri yel-gn ring resd

MUD WT 8.9 VIS 58

LS: tan-bf, crm-wh, occ lt gy, mod frm-frm, sb blkly-blky, mic xl, pred wxy-sm, suc, v calc, tr imbd org mat v calc, rr imbd pyr
COLD SH: red-red brn, tr lt bl- gysbbl, plty-sb plty, gt-slty, mod frm-frm, non calc; com-abnt dk yel min flor, rr red clyst, rr fos frags; tr lse pyr, tr dolc ls, tr wh-bf ss, slow- mod fast difse, sl stmg, mod bri bl/wh mky cut, spty mod bri yel ring resd

11/3/2015



MUD WT 8.9 VIS 68

LS: tan-bf, occ lt gy, mod frm-frm, sb blkylky, mic xl, wxy, v calc
 DOLC LS: red-red org, lt brn-bf ip, sft-fri, sb blkyl, gt-suc, mod-v calc
 SH: med- dk gy, plty-sb plty, mod frm, pred gt, slty ip, non calc
 COLD SH: red-red brn, tr bl-gn, occ spty, plty-sb plty, gt-slty, mod frm-frm, non calc; tr pyr, tr ss; slow difse, sl stmg, mod bri bl/wh mky cut

LS: tan-bf-off wh, occ lt gy - sl pink, mod frm-frm, sb blkylky, mic xl, wxy, v calc, occ blk o stng pred dead o
 COLD SH: gyshbl-gy occ blk brn, plty-sb plty, rthy- sl slty, mod frm-frm, non calc; mod difse, occ mod stmg cut, even yel ring

MUD WT 9.0 VIS 65

LS: tan-bf-off wh, occ lt gy - sl pink, mod frm-frm, sb blkylky, mic xl, wxy, v calc, occ blk o stng pred dead o, rr brn - gold col o stng, g cut, no free o
 COLD SH: gyshbl-gy occ blk brn, plty-sb plty, rthy- sl slty, mod frm-frm, non calc; mod difse, occ mod stmg cut, even yel ring

TOOH for DST @ 5173'
 10:00AM 11/3/2015
 Resumed Drilling
 5:00AM MST 11/4/2015

LS: off wh-bf, occ lt gy, mod frm-frm, sb blkylky, mic xl, wxy, v calc
 SH: med- dk gy, plty-sb plty, mod frm, pred gt, slty ip, non calc, occ carb incl
 COLD SH: sl bl-sl gn- gyshgn-lt gy occ red, occ sptyred and gyshgn, plty-sb plty, gt-slty, mod frm-frm, non calc; occ pyr, tr ss; slow difse, sl stmg, mod bri bl/wh mky cut

MUD WT 9.2 VIS 57

LS: off wh-bf, occ lt gy, mod frm-frm, occ sft wi red stng, sb blkylky, mic xl, wxy, v calc
 SHY SLTST: red-org, frm - sl sft, sb blkyl, rthy, slty occ sl gt, aren
 SS: wh, tr s&p, sb rnd, frm- brit, v f gr, cons, mtx sup, mod calc mtx

LS: off wh-bf occ red stng, mod sft-sl frm, sb blkylky, mic xl, occ xl wi g por, wxy, rr blk o stng wi g stmg cut
 SHY SLTST: red-org, frm - sl sft, sb blkyl, rthy, slty occ sl gt, aren
 COLD SH: sl bl-sl gn- gyshgn-lt gy occ red, occ sptyred and gyshgn, plty-sb plty, gt-slty, mod frm-frm, non calc

GAS (units)

C1-C4 (PPM)

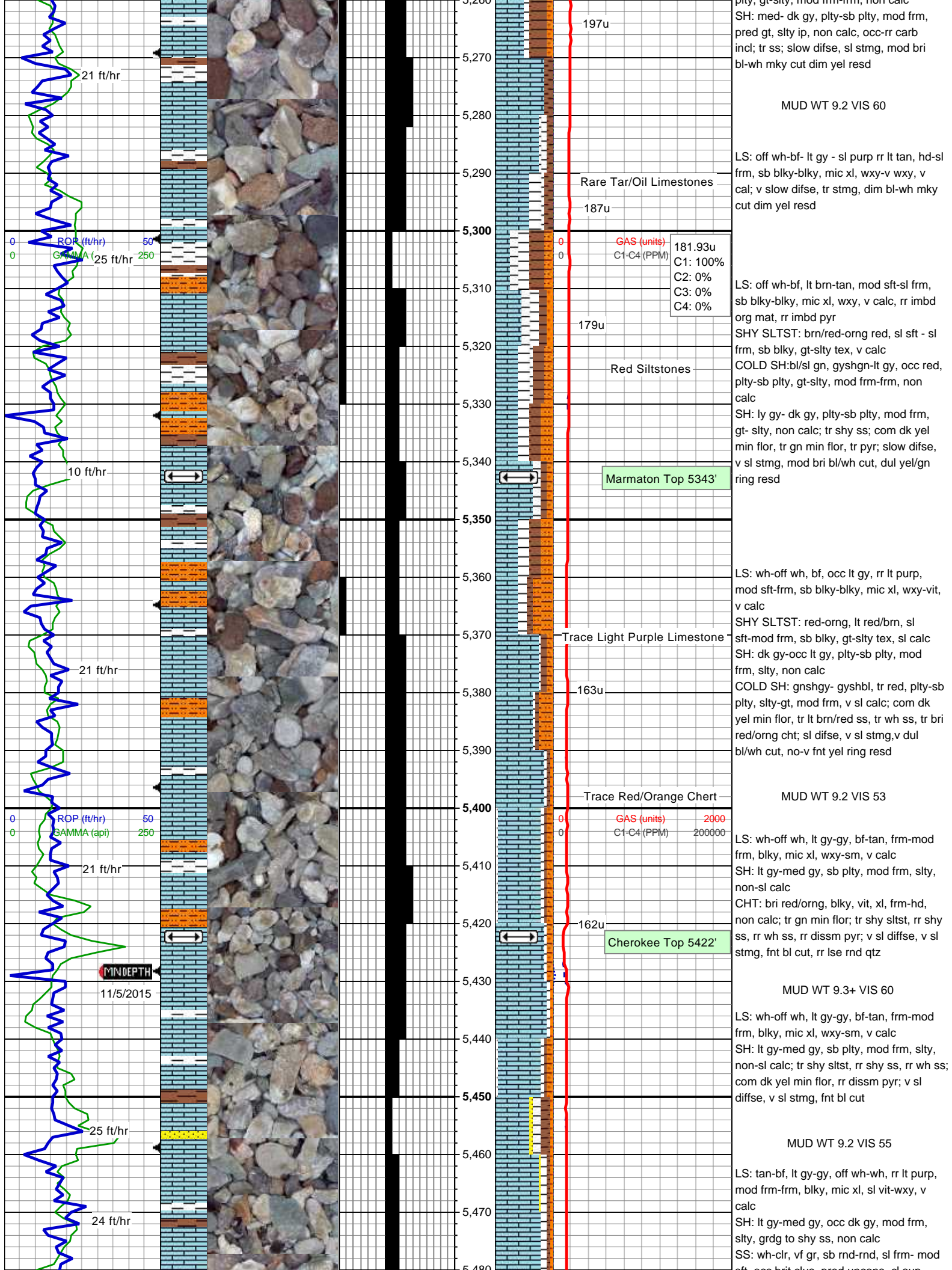
178.28u

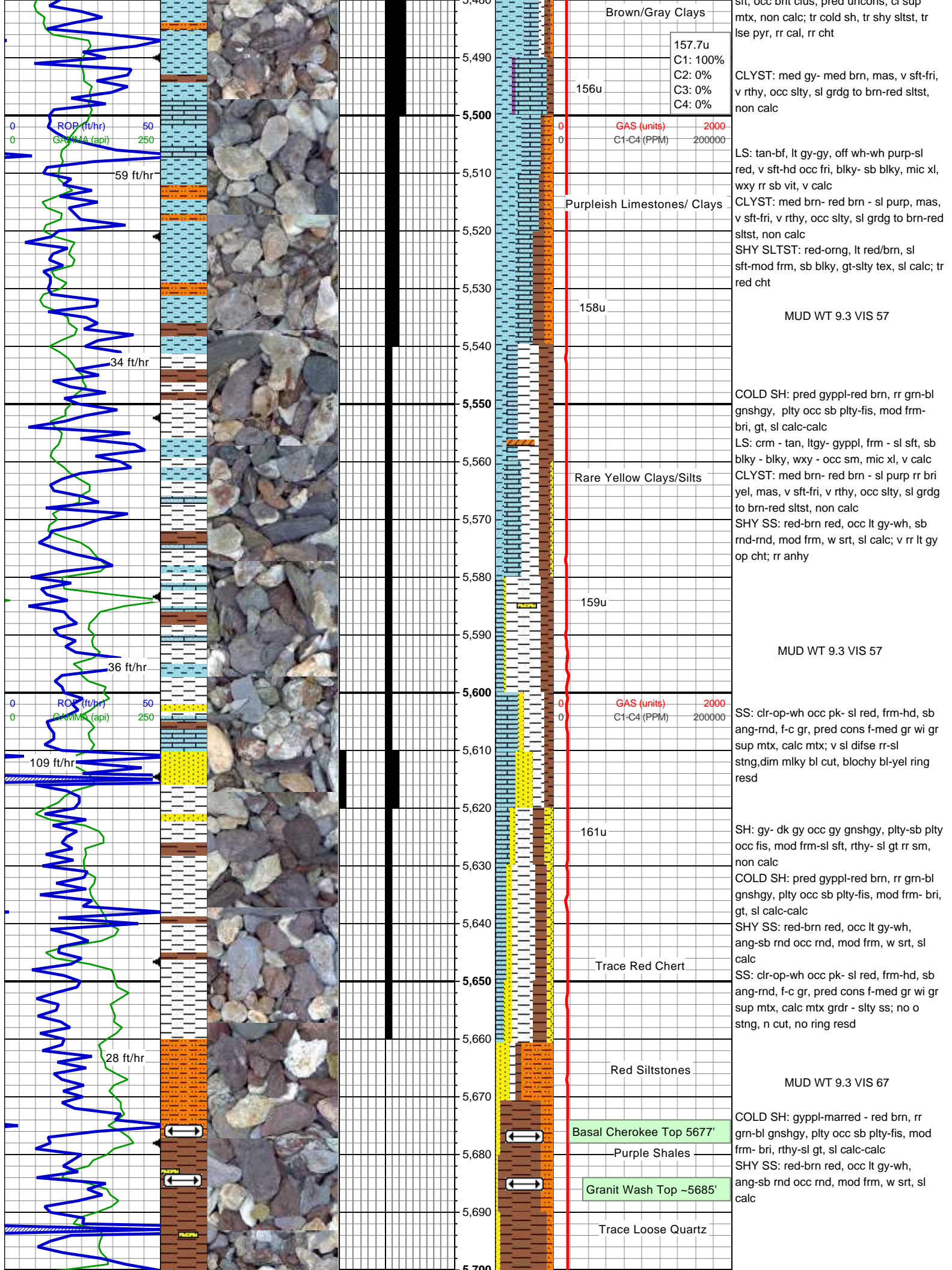
C1: 97.9%

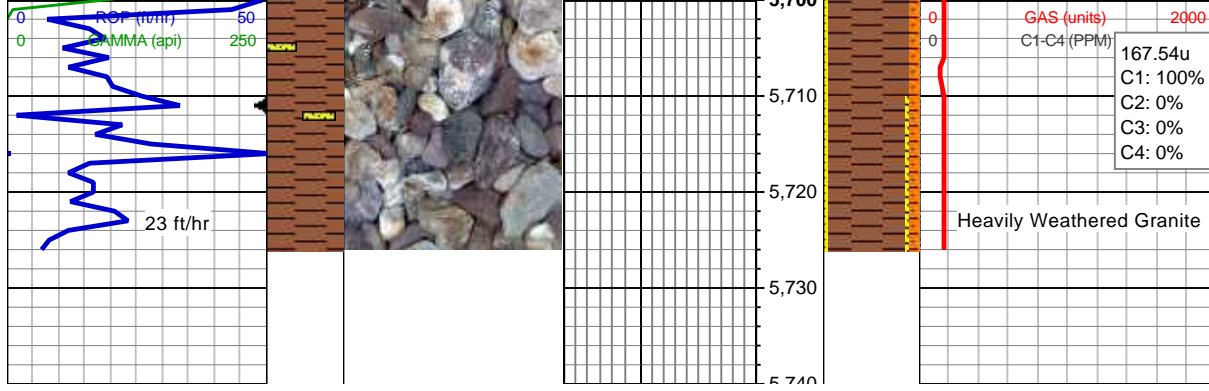
C2: 2.1%

C3: 0%

C4: 0%







COLD SH: gyppl-marred - red brn, rr
grn-bl gnshgy, plty- sb plty, occ fis, bri,
rthy-sl gt, sl calc-calc; tr lse rnd-ang qtz,
tr cal, tr shy sltst, tr shy ss, tr ss

TD Well @ 5726' MD
At 5:00PM MST 11/5/15

Thank You for Choosing
Columbine Logging Inc.