

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

Well Name    Anschutz State 5-61 -19-6457CH2

Location    SWSW S19 T5N 61W

State    COLORADO    County    WELD

Country    USA    Rig Number    CADE 24

API Number    05-123-39447    AFE #    18766D

Region    DJ BASIN    Field    RIVERSIDE - #73800

Spud Date    7/2/2014    Drilling Completed    7/12/2014

Surface Coordinates    NWNW 19 5N 61W 6 PM  
Footage: 955 FSL 300 FWL

Ground Elevation    4531'    K.B. Elevation    4547'

Logged Interval    4500' To    15934'    Total Depth    15934'

Formation    SHANNON SHALE-NIOBRARA C CHALK

Type of Drilling Fluid    LSND - WATER POLY MUD

## Operator

Company    BILL BARRETT CORPORATION

Address    1099 18TH STREET, SUITE 2300  
DENVER, CO 80202

## Geologist

Name    BLAINE MARTIN

Company    BILL BARRETT CORPORATION

Address    1099 18TH STREET, SUITE 2300  
DENVER, CO 80202

## Other

LEAD GEOLOGIST    KYLE KNIGHT

SECOND GEOLOGIST    ERIC BERNARDO

## Zone Color Coding

Oil  
Note  
Error

Condensate  
Core  
Water

Gas  
Pressure  
Seal

Rock Types

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

Accessories

|                |                      |                    |                       |
|----------------|----------------------|--------------------|-----------------------|
| GASTROPOD      | ARGILLITE GRAIN      | HEAVY MINERAL      | ANHYDRITE STRINGER    |
| INOCERAMUS     | B BENTONITE          | K KAOLIN           | BENTONITE STRINGER    |
| OOLITE         | BITUMENOUS SUBSTANCE | M MARLSTONE        | COAL STRINGER         |
| OSTRACOD       | BRECCIA FRAGMENTS    | M MICACEOUS        | DOLOMITE STRINGER     |
| PELECYPOD      | CALCAREOUS           | M MINERAL CRYSTALS | GYPSUM STRINGER       |
| PELLET         | CARBONACEOUS FLAKES  | N NODULES          | LIMESTONE STRINGER    |
| PISOLITE       | CHTDK                | PHOSPHATE PELLETS  | MARLSTONE (CALC) STRG |
| PLANT REMAINS  | CHTLT                | P PYRITE           | MARLSTONE (DOL) STRG  |
| PLANT SPORES   | COAL - THIN BEDS     | S SALT CAST        | SANDSTONE STRINGER    |
| SCAPHOPOD      | DOLOMITIC            | S SANDY            | SHALE STRINGER        |
| STROMATOPOROID | FELDSPAR             | S SILICEOUS        | SILTSTONE STRINGER    |
| ECHINOID       | FERRUGINOUS PELLET   | S SILTY            |                       |
| FISH           | FERRUGINOUS          | TUFACEOUS          |                       |
| FORAMINIFERA   | ANHYDRITIC           | GLAUCONITE         |                       |
| F FOSSIL       | ARGILLACEOUS         | GYPSIFEROUS        |                       |

Stringer

Oil Show

|            |
|------------|
| P PINPOINT |
| V VUGGY    |
































Engineering

|                  |                 |
|------------------|-----------------|
| D DEAD           |                 |
| EVEN             |                 |
| QUESTIONABLE     | BIT             |
| SPOTTED STAINING | CONNECTION (UP) |

Porosity

|                   |                       |
|-------------------|-----------------------|
| CONNECTION (DOWN) | CONNECTION GAS        |
| E EARTHY          | CONNECTION GAS (LEFT) |
| FENESTRAL         | TRIP GAS              |
| F FRACTURE        | TRIP GAS (LEFT)       |
| INTERCRYSTALLINE  | DOWN TIME GAS         |
| INTEROOULTIC      | DOWN TIME GAS (LEFT)  |
| MOLDIC            | CORE - LOST           |
| ORGANIC           | CORE - RECOVERED      |

## Other Symbols

|   |                       |   |                        |   |                |
|---|-----------------------|---|------------------------|---|----------------|
|  | DST INTERVAL          |  | WIRELINE TESTED - LEFT |  | E EARTHY       |
|  | FAULT                 |  | WIRELINE TESTED - RT   |  | FX FINELYXLN   |
|  | FORMATION TOP         |  | DRILL STEM TEST        |  | BS GRAINSTONE  |
|  | GAS SHOW              |  | MINDEPTH MN DEPTH      |  | L LITHOGRAPHIC |
|  | OIL SHOW              |   |                        |  | MX MICROXLN    |
|  | MINDEPTH UP           |   |                        |  | MS MUDSTONE    |
| Rounding  |                       |   |                        |   |                |
|    | MINDEPTH (DOWN)       |    | A ANGULAR              |    | PS PACKSTONE   |
|    | NORMAL FAULT          |    | R ROUNDED              |    | WS WACKSTONE   |
|    | OVERTURNED STRATA     |    | B SUBANG               |   |                |
|    | REVERSE FAULT         |    | N SUBRND               |   |                |
| Sorting   |                       |   |                        |   |                |
|    | CASING                |   |                        |    | M MODERATE     |
| Textures  |                       |   |                        |   |                |
|    | SIDEWALL CORE (LEFT)  |   |                        |    | P POOR         |
|    | SIDEWALL CORE (RIGHT) |    | BS BOUNDSTONE          |    | W WELL         |
|    | SLIDE                 |    | C CHALKY               |   |                |
|    | SURVEY                |    | CX CRYPTOXLN           |   |                |

Slide/Rotate

ROP  
ROF  
GAMMA

ROP (min/hr)  
GAMMA (cp)

MUD WT 9.2 VIS 34 IN  
MUD WT 9.2 VIS 45 OUT

119

Total Gas & Chromatograph

GAS  
C1  
C2  
C3  
C4

COLUMBINE LOGGING INC.  
RIGGED UP ON 07/04/2014  
MANNED 2-PERSON LOGGING  
WITH BLOODHOUND GAS  
CHROMATOGRAPH UNIT #0583  
BEGAN LOGGING ON  
07/05/2014 @ 06:00 MST

Bit Data  
Bit #: 1  
Type: SMITH SD1513  
Size: 8.75"  
Jets: 5X18/3 X16  
S/N: JH9501

GAS (units)  
C1-C4 (units)

605u

Depth Labels

% Lith

Well Bore  
TVD

50' Sample Intervals  
100' Sample Descriptions

MD: 4,512'  
TVD: 4,476.66'  
Inclination: 6.7°  
Azimuth: 216.6°  
VS: -252.17'

MD: 4,608'  
TVD: 4,572.01'  
Inclination: 6.7°  
Azimuth: 217.7°  
VS: -258.99'

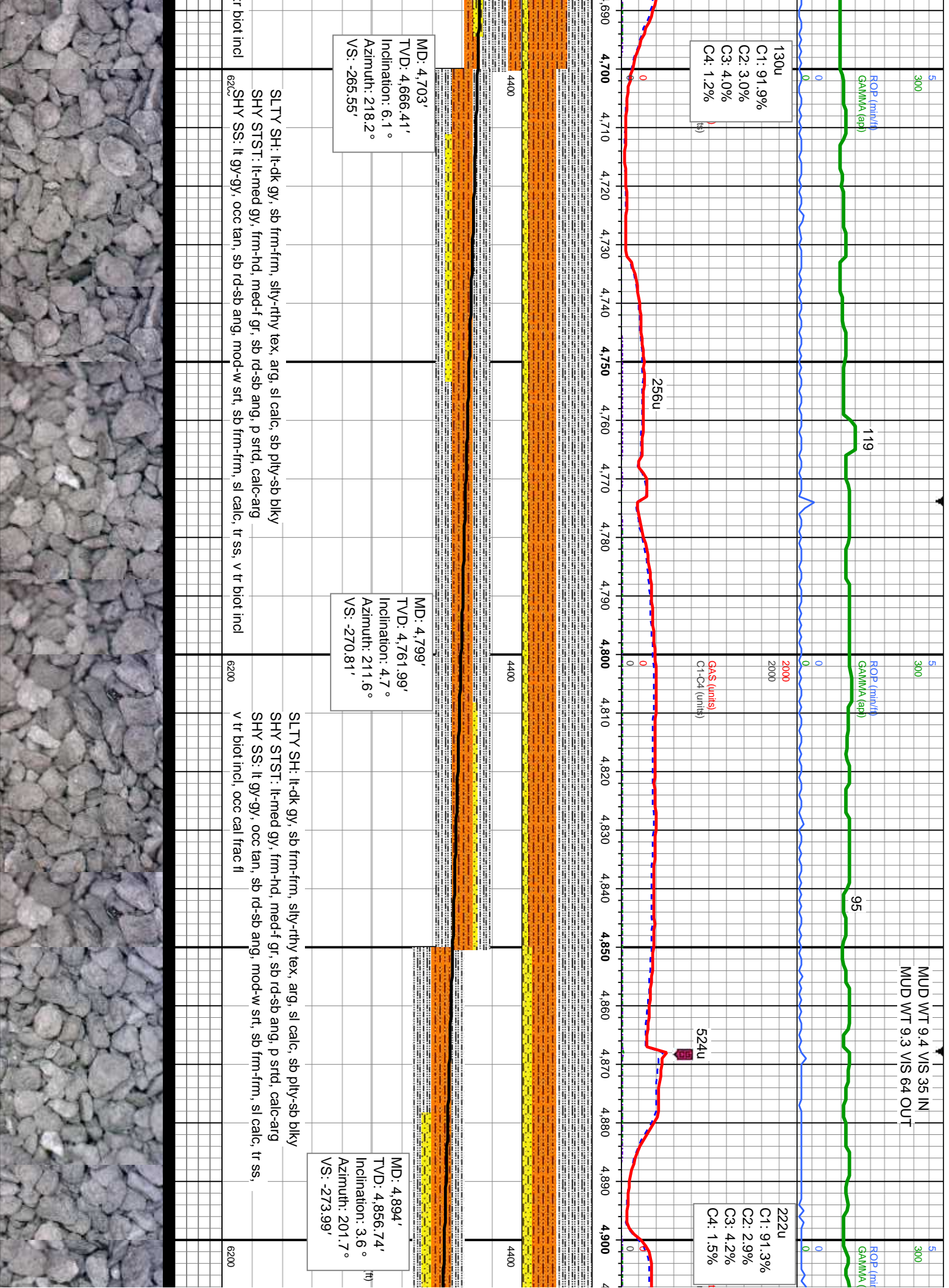
SLTY SH: lt-dk gy, sb frm-frm, silty-rthy tex, arg, sl calc, sb pily-sb blkly  
SHY STST: lt-med gy, frm-hd, med-f gr, sb rd-sb ang, p strd, calc-arg  
SHY SS: lt gy-gy, occ tan, sb rd-sb ang, mod-w srt, sb frm-frm, sl calc, tr ss, v tr biot incl

SLTY SH: lt-dk gy, sb frm-frm, silty-rthy tex, arg, sl calc, sb pily-sb blkly  
SHY STST: lt-med gy, frm-hd, med-f gr, sb rd-sb ang, p strd, calc-arg  
SHY SS: lt gy-gy, occ tan, sb rd-sb ang, mod-w srt, sb frm-frm, sl calc, tr ss, v tr biot incl

Oil Show

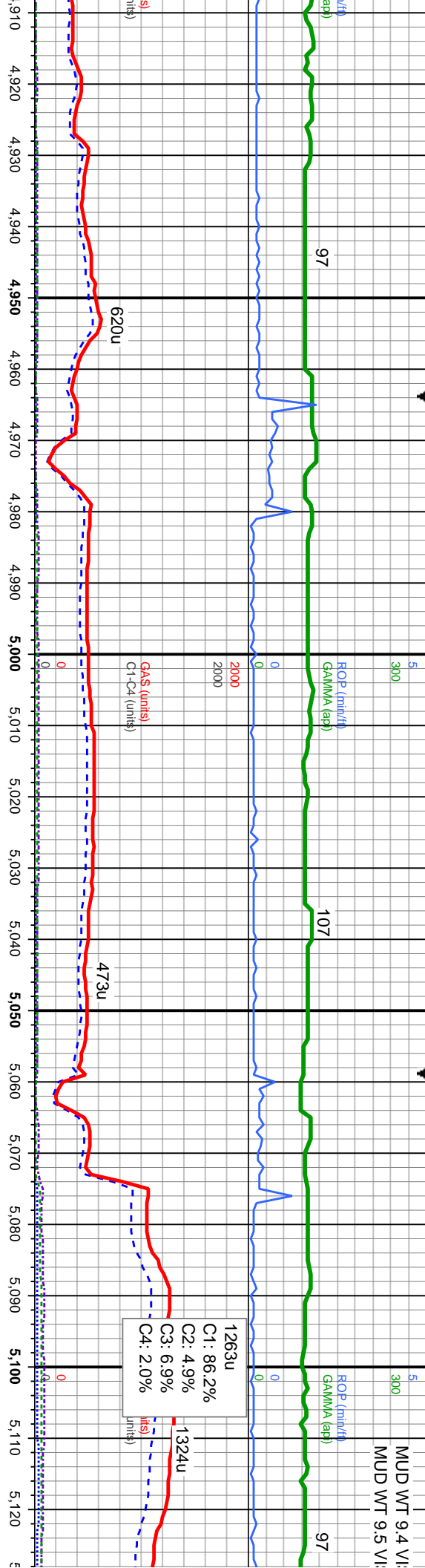
Images







MUD WT 9.4 VI  
MUD WT 9.5 VI



MD: 4,990'  
TVD: 4,952.61'  
Inclination: 2.3 °  
Azimuth: 218 °  
VS: -276.32'

MD: 5,084'  
TVD: 5,046.56'  
Inclination: 1.4 °  
Azimuth: 240.7 °  
VS: -278.5'

SLTY SH: lt-dk gy, sb frm-frm, silty-rthy tex, arg, sl calc, sb pily-sb blk  
SHY STST: lt-med gy, frm-hd, med-f gr, sb rd-sb ang, p strd, calc-arg  
SHY SS: lt gy-gy, occ tan, sb rd-sb ang, mod-w str, sb frm-frm, sl calc, tr ss,  
v tr biot incl, occ cal frac fl

SLTY SH: lt-dk gy, sb frm-frm, silty-rthy tex, arg, sl calc, sb pily-sb blk  
SHY STST: lt-med gy, frm-hd, med-f gr, sb rd-sb ang, p strd, calc-arg  
SHY SS: lt gy-gy, occ tan, sb rd-sb ang, mod-w str, sb frm-frm, sl calc, tr ss,  
v tr biot incl, occ cal frac fl

SLTY SH: lt-dk gy  
SHY STST: lt-med  
SHY SS: lt gy-gy,  
v tr biot incl, occ c



S 33 IN  
S 56 OUT

5  
300

ROP (mbl/hr)  
GAMMA (cp)

114

ROP (mbl/hr)  
GAMMA (cp)

107

GAS SCALE CHANGE  
0-4000u

415u  
C1: 81.5%  
C2: 5.5%  
C3: 8.8%  
C4: 4.1%

ITS  
units

703u

1862u

2264u

217u

MD: 5,179'  
TVD: 5,141.55'  
Inclination: 0.7°  
Azimuth: 345.4°  
VS: -279.65'

MD: 5,273'  
TVD: 5,235.52'  
Inclination: 0.6°  
Azimuth: 69.5°  
VS: -279.33'

TVD (ft)

TVD (ft)

sb frm-frm, silty-rthy tex, arg, sl calc, sb ply-sb blkly  
gy, frm-hd, med-f gr, sb rd-sb ang, p srt, calc-arg  
occ tan, sb rd-sb ang, mod-w srt, sb frm-frm, sl calc, tr ss,  
al frac fl

SLTY SH: lt-dk gy, sb frm-frm, silty-rthy tex, arg, sl calc, sb ply-sb blkly  
SHY STST: lt-med gy, frm-hd, med-f gr, sb rd-sb ang, p srt, calc-arg, tr shy ss,  
occ cal frac fl

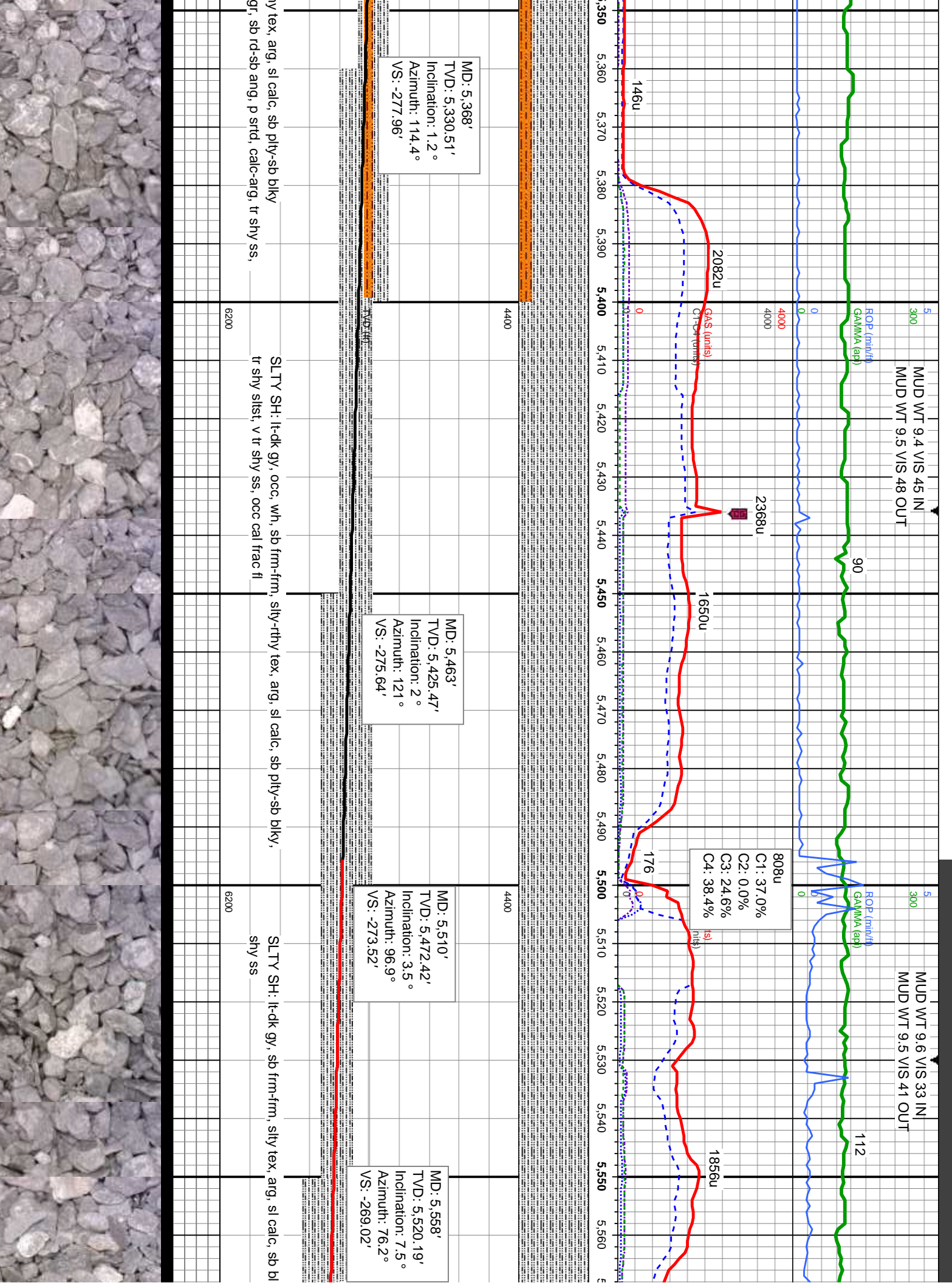
SLTY SH: lt-dk gy, sb frm-frm, silty-rth  
SHY STST: lt-med gy, frm-hd, med-f  
occ cal frac fl

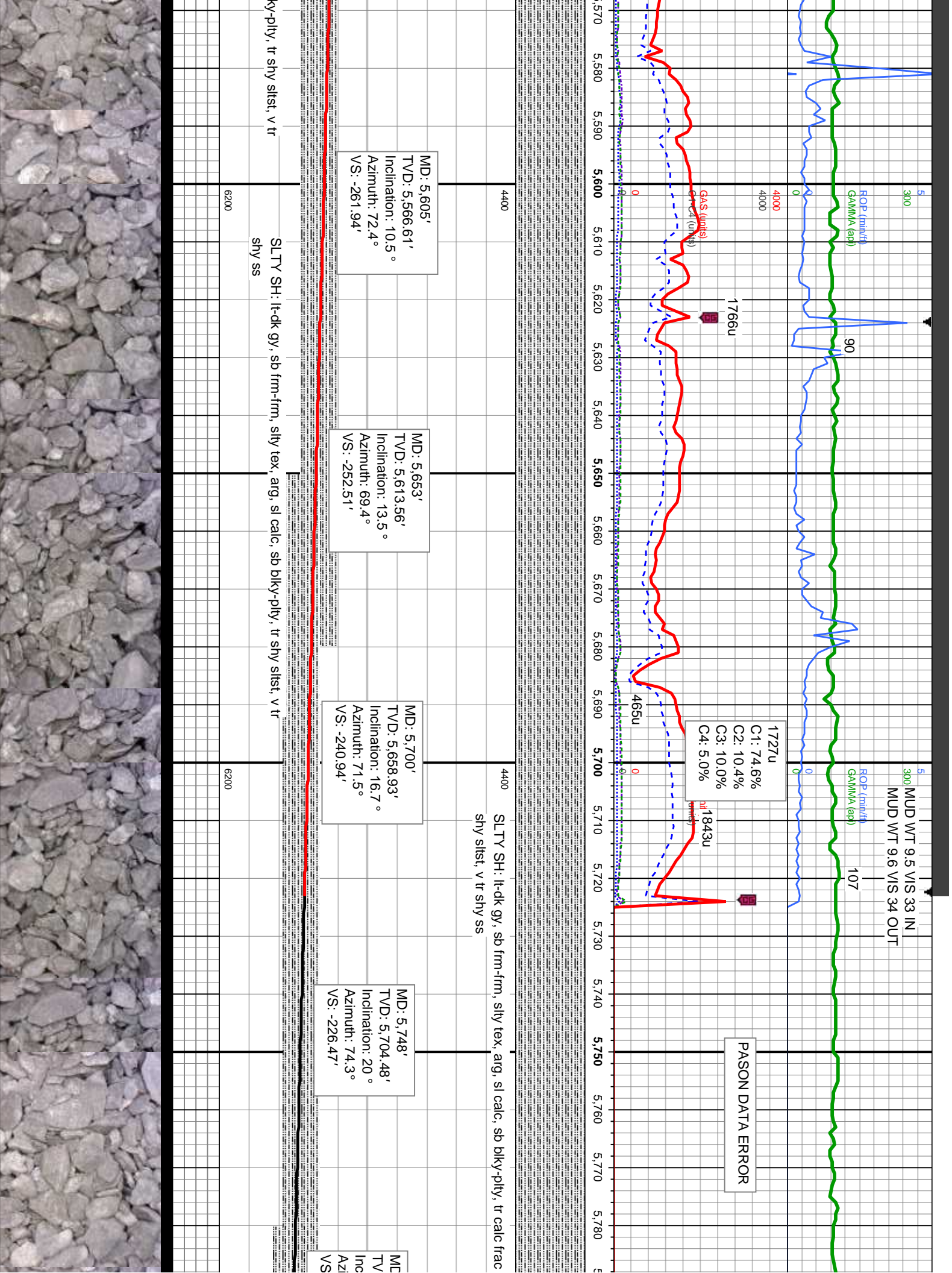
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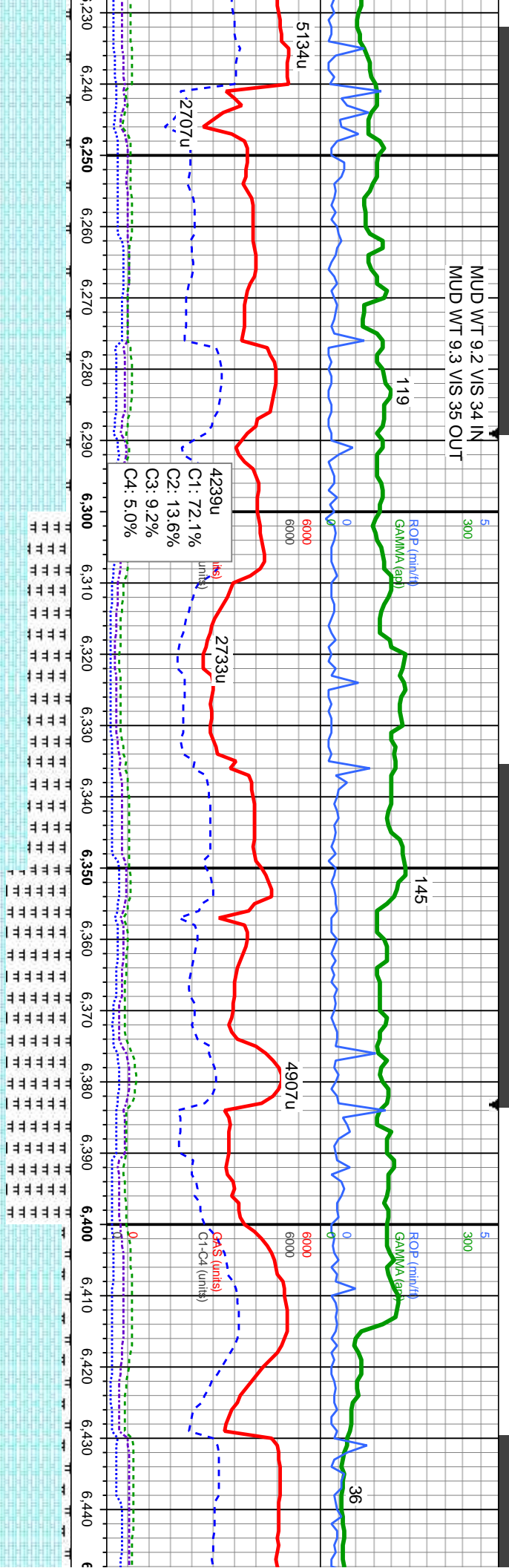








MUD WT 9.2 VIS 34 IN  
MUD WT 9.3 VIS 35 OUT



wh, stri- mot, occ fiss, v sft-sft, sb pty-pty, occ blk, v calc  
ri, sft-frm, sb pty-pty, fri- brit, mod calc, tr Inoc, occ cal frac fl

NIOBRARA B MARL TOP @  
6301' MD, 6061' TVD

CHK: lt-dk gy, occ wh, stri- mot, occ fiss, v sft-sft, sb pty-pty, occ blk, v calc  
MRLST: dk gy, stri, sft-frm, sb pty-pty, fri- brit, mod calc, tr Inoc, occ cal frac fl

NIOBRARA C CHALK TOP  
@ 6407' MD, 6081' TVD

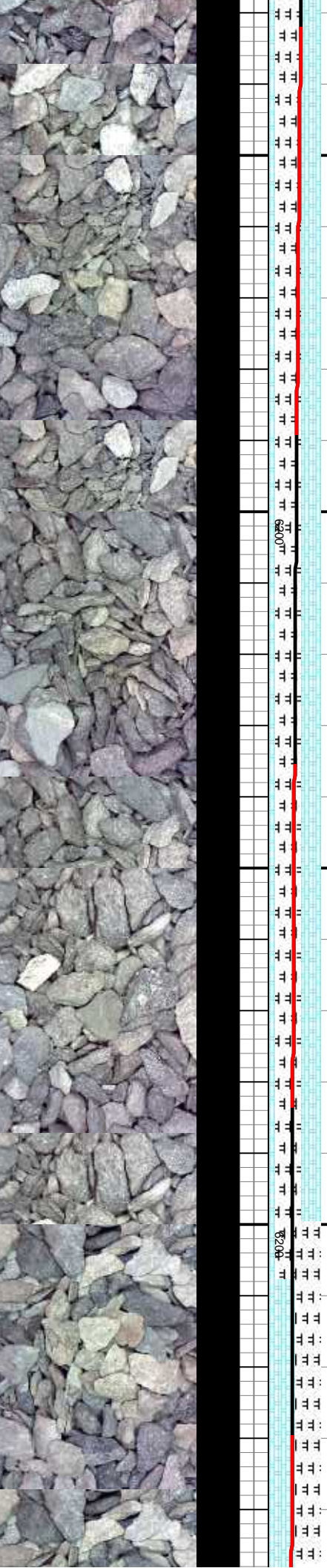
CHK: lt-dk gy, occ wh, stri- mot, occ f  
MRLST: dk gy, stri, sft-frm, sb pty-pty

MD: 6,268'  
TVD: 6,051.8'  
Inclination: 71.2°  
Azimuth: 84.7°  
VS: 137.7'

MD: 6,316'  
TVD: 6,065.43'  
Inclination: 75.8°  
Azimuth: 84.6°  
VS: 183.54'

MD: 6,363'  
TVD: 6,075.08'  
Inclination: 80.5°  
Azimuth: 85.4°  
VS: 229.38'

MD: 6,417'  
TVD: 6,082.5'  
Inclination: 83.7°  
Azimuth: 86.6°  
VS: 282.75'





MUD WT 9.0 VIS 43 IN  
MUD WT 9.2 VIS 38 OUT

7/7/14-7/8/14

5 300

ROP (min/ft)  
GAMMA (cp)

177

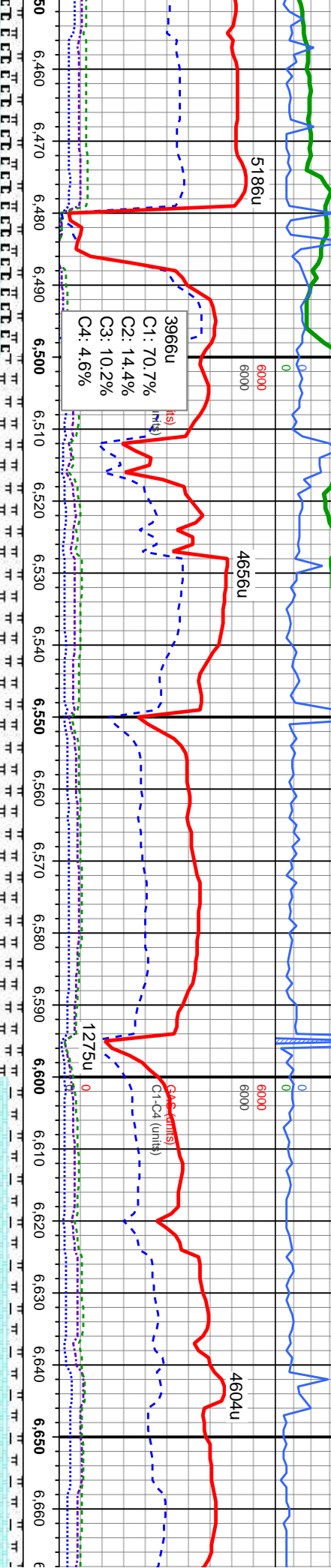
162

MUD WT 8.8 VIS 35 IN  
MUD WT 8.8 VIS 34 OUT

5 300

ROP (min/ft)  
GAMMA (cp)

4604u



TD CURVE @ 6484' MD @  
06:50 MST 07/06/2014

RESUME DRILLING @  
10:25 MST 07/08/2014

4400

CHK: lt-dk gy, occ wh, stri-mot, occ fiss, v sft-sft, sb pty-pty, occ blk, v calc  
MRLST: dk gy, stri, sft-fm, sb pty-pty, fri-brit, mod calc, tr inoc, occ cal frac fl

4400

CHK: lt-dk gy, occ wh, stri-mot, occ fiss, v sft-sft, sb pty-pty, fri-brit, mod calc  
MRLST: dk gy, stri, sft-fm, sb pty-pty, fri-brit, mod calc

MD: 6,527'  
TVD: 6,088.26'  
Inclination: 90.3°  
Azimuth: 90.9°  
VS: 389.5'

MD: 6,571'  
TVD: 6,087.91'  
Inclination: 90.6°  
Azimuth: 91°  
VS: 436.49'

MD: 6,663'  
TVD: 6,087.1'  
Inclination: 90°  
Azimuth: 91.4°  
VS: 528.45'

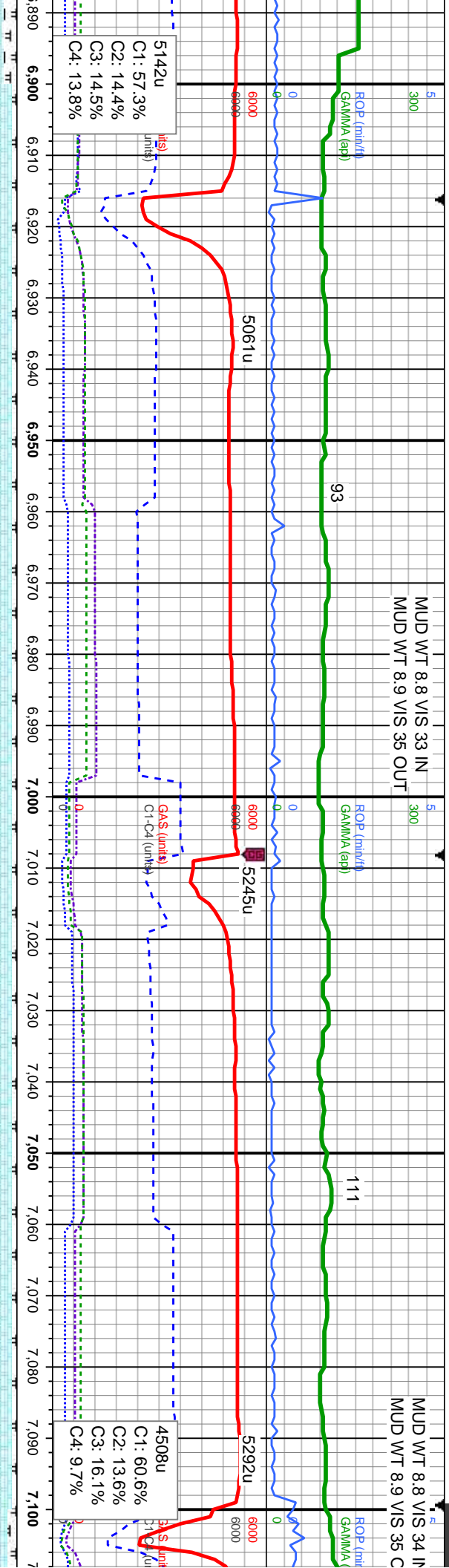
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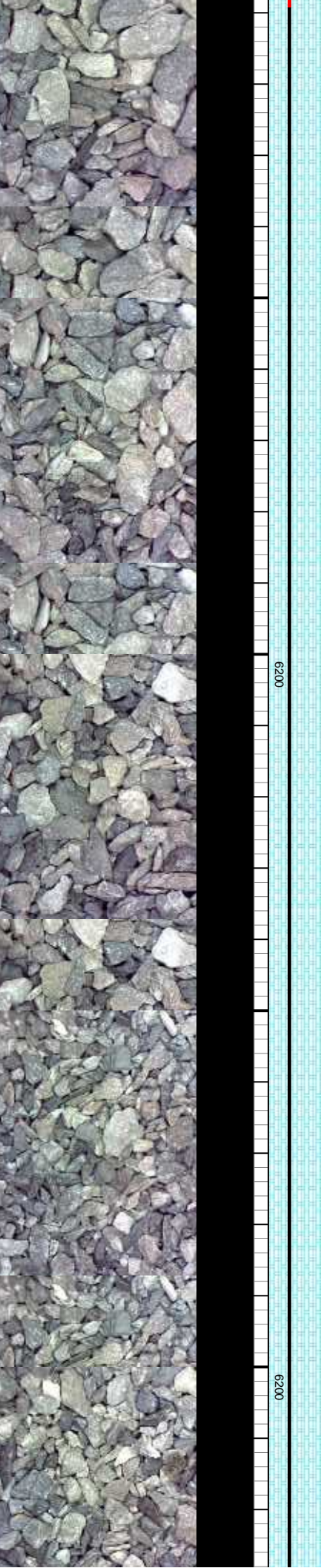
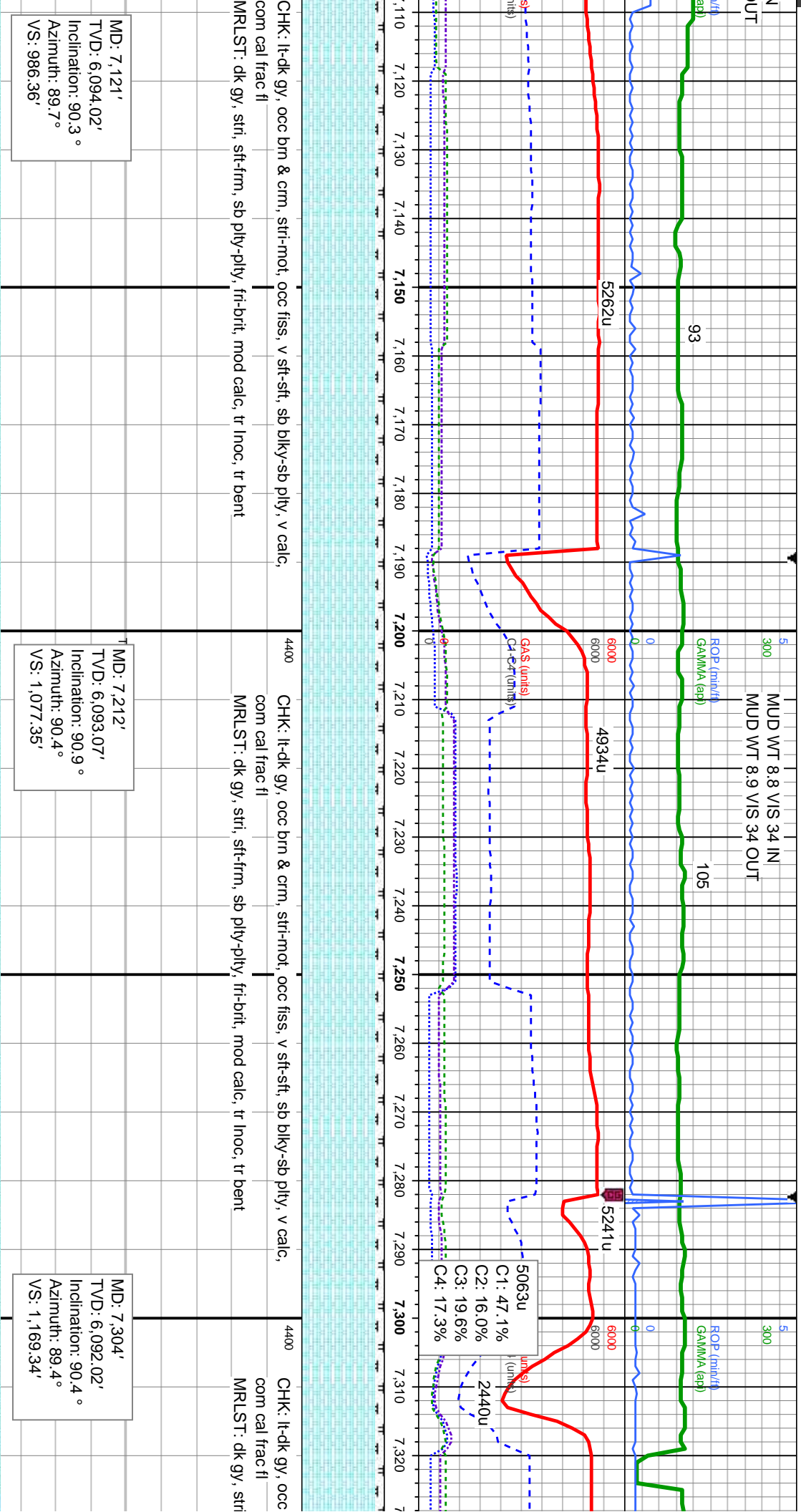




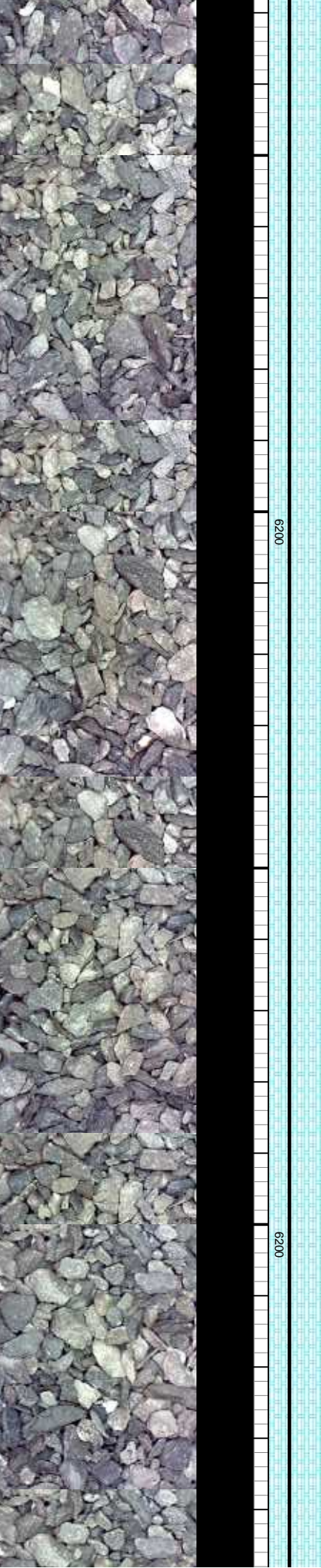
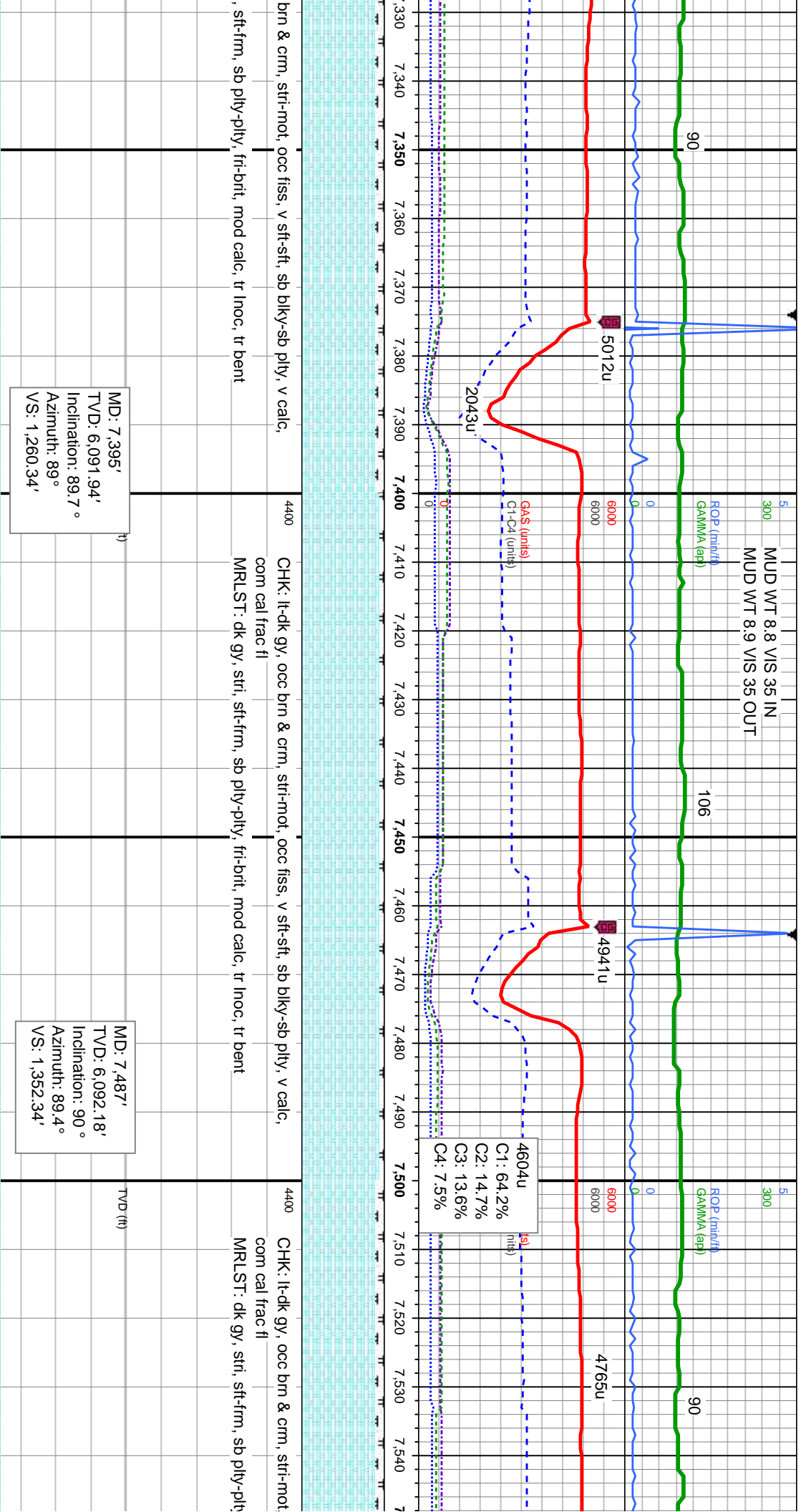
|  |  |
|--|--|
| MUD WT 8.8 VIS 33 IN<br>MUD WT 8.9 VIS 35 OUT  |  |
| 93   | 111  |
| 4400   | 4400   |
| cal frac fl  | cal frac fl  |
| MRIST: dk gy, stri, sft-frm, sb pty-pty, fri-bit, mod calc, tr inoc, tr bent         | MRIST: dk gy, stri, sft-frm, sb pty-pty, fri-bit, mod calc, tr inoc, tr bent         |
| CHK: lt-dk gy, occ brn, stri-mot, occ fiss, v sft-sft, sb blk-ty-sb pty, v calc, com | CHK: lt-dk gy, occ brn, stri-mot, occ fiss, v sft-sft, sb blk-ty-sb pty, v calc, com |
| ac fl  | ac fl  |
| TVD (ft)   | TVD (ft)   |
| MD: 6,938'<br>TVD: 6,091.47'<br>Inclination: 89.5°<br>Azimuth: 89.9°<br>VS: 803.39'  | MD: 7,029'<br>TVD: 6,093.06'<br>Inclination: 88.5°<br>Azimuth: 90.3°<br>VS: 894.37'  |

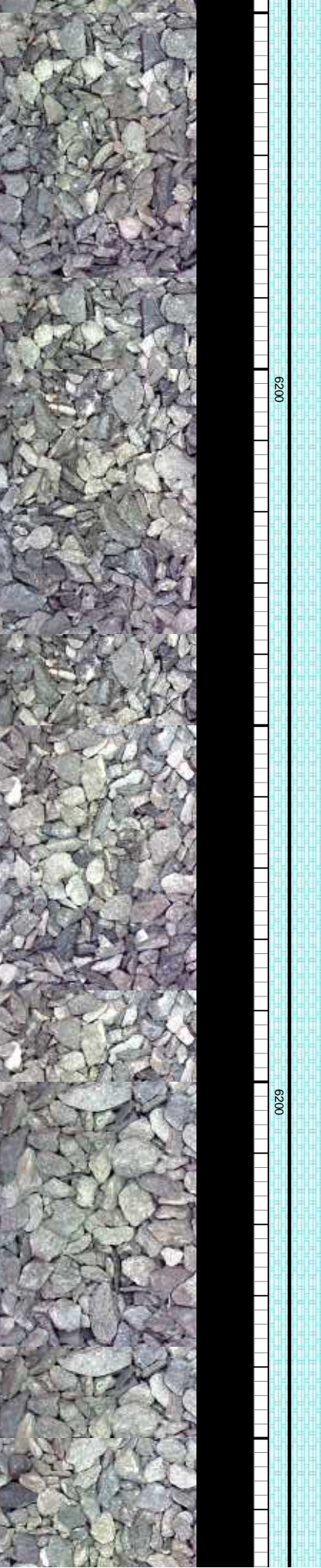
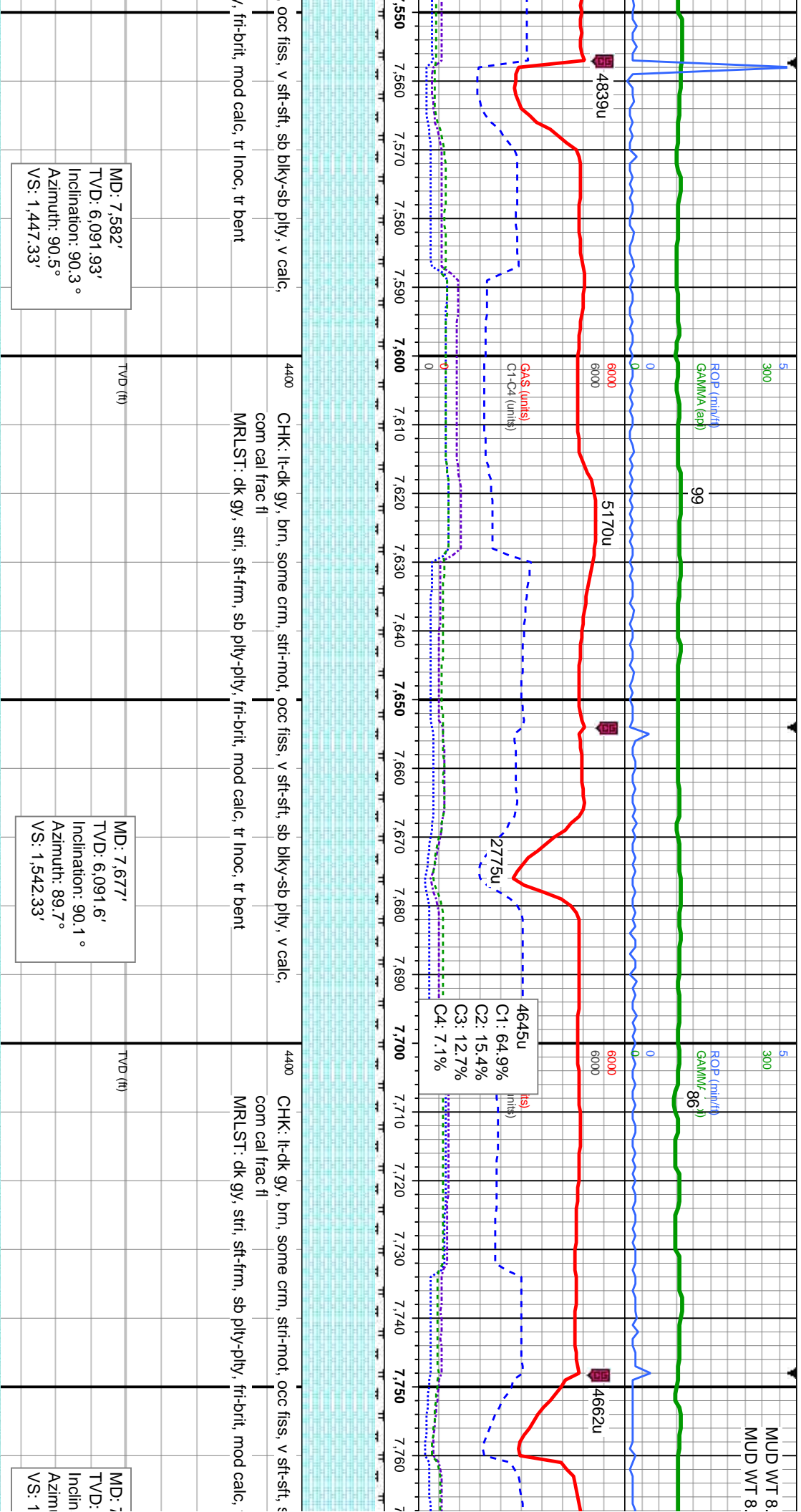






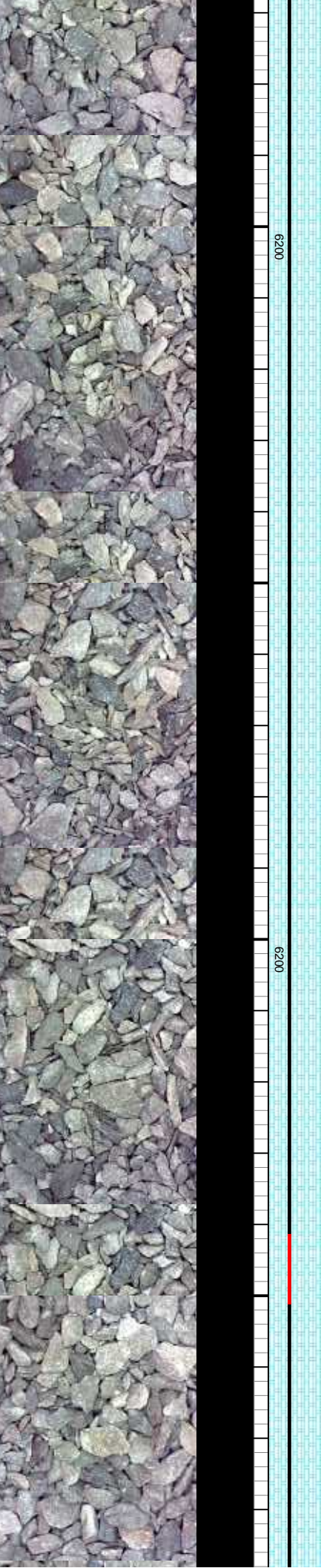


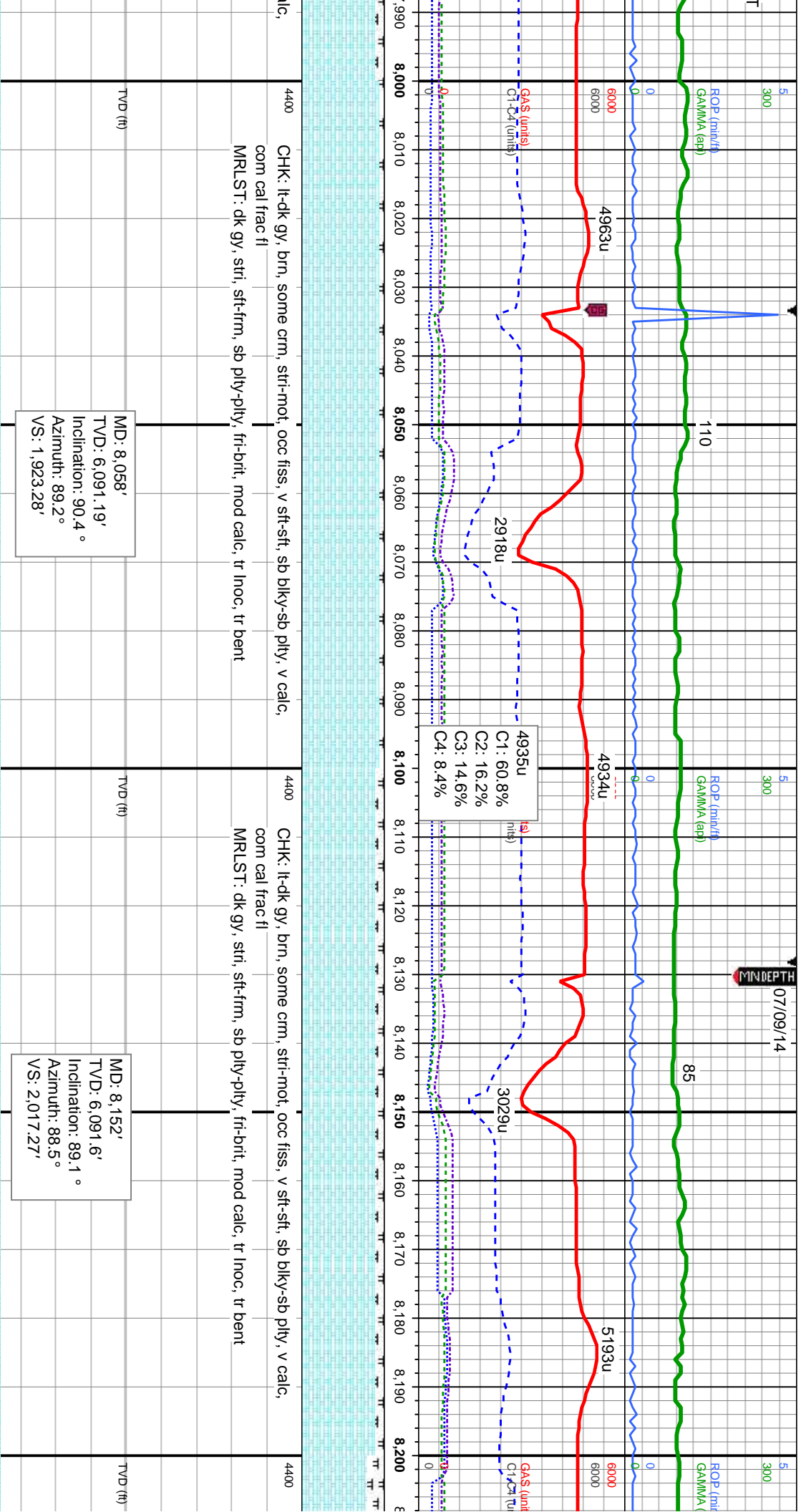






MUD WT 8.8 VIS 36 IN  
MUD WT 8.9 VIS 36 OU





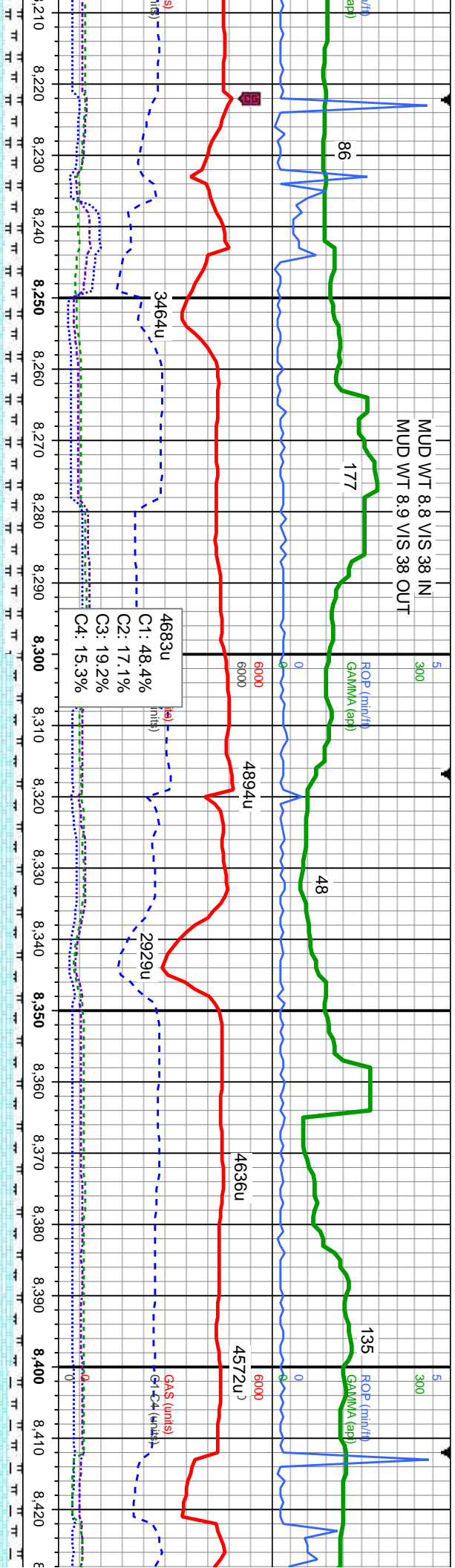
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4683u  
C1: 48.4%  
C2: 17.1%  
C3: 19.2%  
C4: 15.3%

MD: 8,247'  
TVD: 6,091.11'  
Inclination: 91.5 °  
Azimuth: 90.6 °  
VS: 2,112.25'

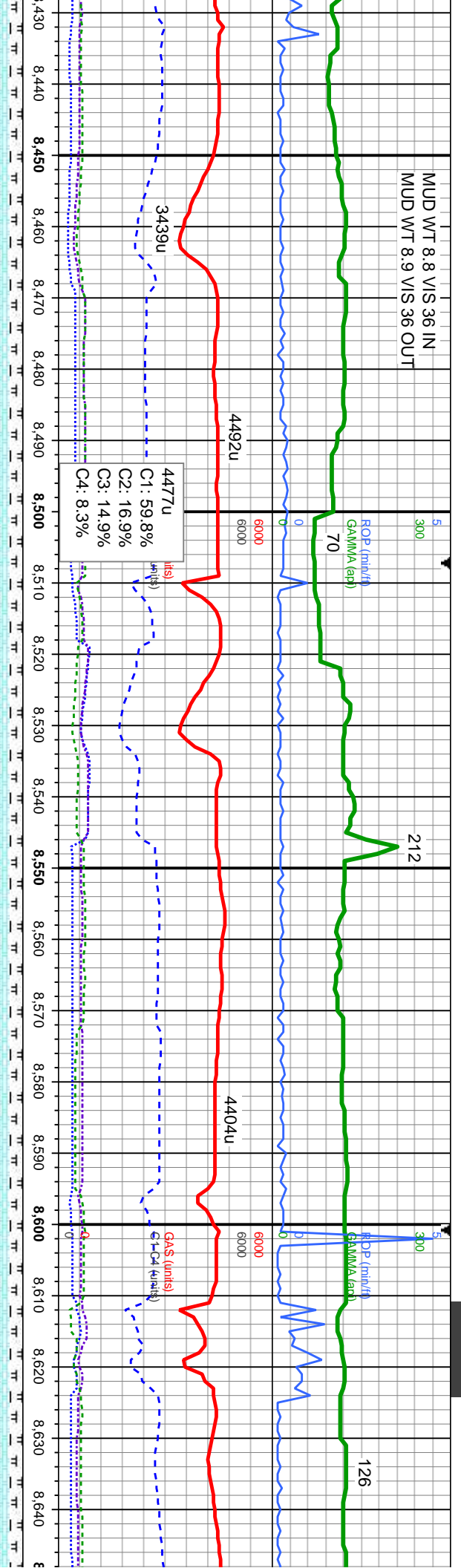
MD: 8,342'  
TVD: 6,088.29'  
Inclination: 91.9 °  
Azimuth: 90.3 °  
VS: 2,207.2'

6200

6200

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|--|------|--|------|
| CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl<br>MRLST: dk gy, stri, sft-frm, sb pty-ply, fri-brit, mod calc, tr inoc, tr bent | 4400 | CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl<br>MRLST: dk gy, stri, sft-frm, sb pty-ply, fri-brit, mod calc, tr inoc, tr bent | 4400 |
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MUD WT 8.8 VIS 36 IN  
MUD WT 8.9 VIS 36 OUT



some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc,  
i, sft-frm, sb pty-pty, fri-bit, mod calc, tr inoc, tr bent

4400 CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc,  
com cal frac fl  
MRLST: dk gy, stri, sft-frm, sb pty-pty, fri-bit, mod calc, tr inoc, tr bent

4400 CHK: lt-dk gy, brn, some crm, stri-mot,  
com cal frac fl  
MRLST: dk gy, stri, sft-frm, sb pty-pty

MD: 8,437'  
TVD: 6,087.79'  
Inclination: 90.3°  
Azimuth: 88.9°  
VS: 2,302.18'

MD: 8,531'  
TVD: 6,087.95'  
Inclination: 89.5°  
Azimuth: 87.9°  
VS: 2,396.15'

MD: 8,626'  
TVD: 6,088.78'  
Inclination: 89.5°  
Azimuth: 89°  
VS: 2,491.13'

6200

6200





MUD WT 8.9 VIS 36 IN  
MUD WT 8.8 VIS 36 OUT

MUD V  
MUD V

ROP (min/ft)  
GAMMA (cp)  
120

91

ROP (min/ft)  
GAMMA (cp)

4597u

4864u

3351u

4951u

4318u  
C1: 61.2%  
C2: 16.7%  
C3: 14.3%  
C4: 7.9%

Gas (units)  
C1-C4 (units)

lt, occ fiss, v sft-sft, sb blk-y-sb ply, v calc,

CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v calc,

CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft,

y, fri-bit, mod calc, tr inoc, tr bent

MRLST: dk gy, stri, sft-frm, sb ply-ply, fri-bit, mod calc, tr inoc, tr bent

MRLST: dk gy, stri, sft-frm, sb ply-ply, fri-bit, mod calc,

TVD (ft)

MD: 8,720'  
TVD: 6,089.11'  
Inclination: 90.1°  
Azimuth: 90.9°  
VS: 2,585.12'

TVD

MD: 8,815'  
TVD: 6,089.61'  
Inclination: 89.3°  
Azimuth: 90.2°  
VS: 2,680.11'

6200

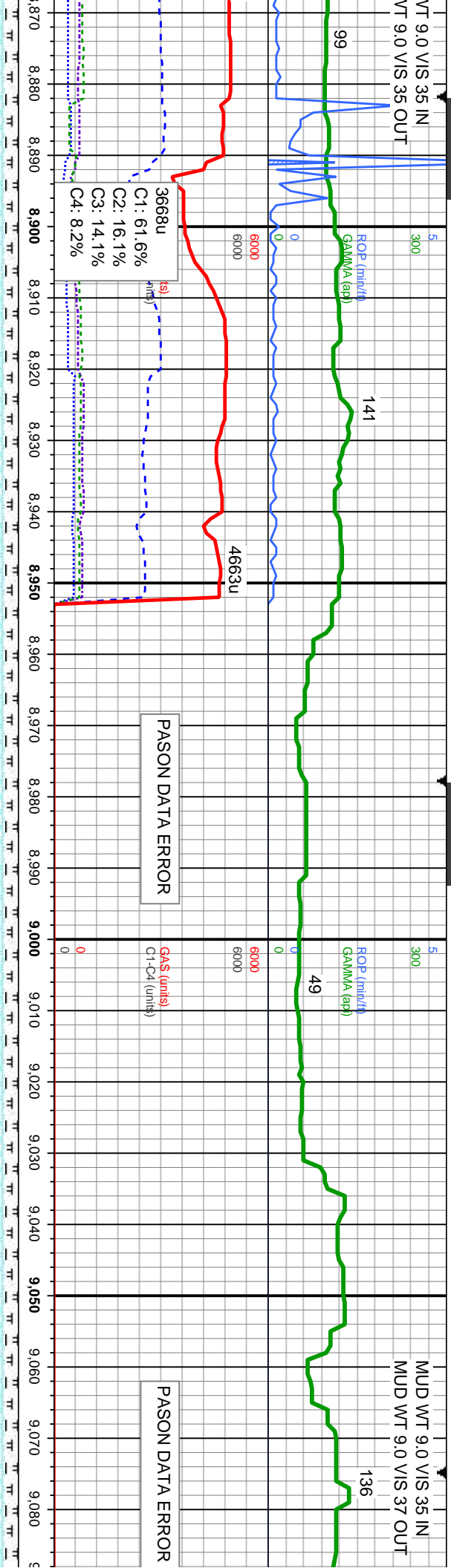
6200



WT 9.0 VIS 35 IN  
WT 9.0 VIS 35 OUT

MUD WT 9.0 VIS 35 IN  
MUD WT 9.0 VIS 37 OUT

MUD WT 9.0 VIS 37 OUT



sb blk-y-sb plty, v calc,

| tr Inoc, tr bent |

4400

CHK: It-*dk gy*, *brn*, some *crn*, *stri-mot*, *occ fiss*, *v sft-sft*, *sb blk-y-sb ply*, *v calc*,

com cal frac fl

MRLST: dk gy, stri, sft frm, sb plty-plty, fri-brit, mod calc, tr inoc, tr bent

4400

CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft, sb blkly-sb ply, v c

com cal frac fl

MRLST: dk gy, stri, sft frm, sb plty-plty, fri-brit, mod calc, tr lnc, tr bent

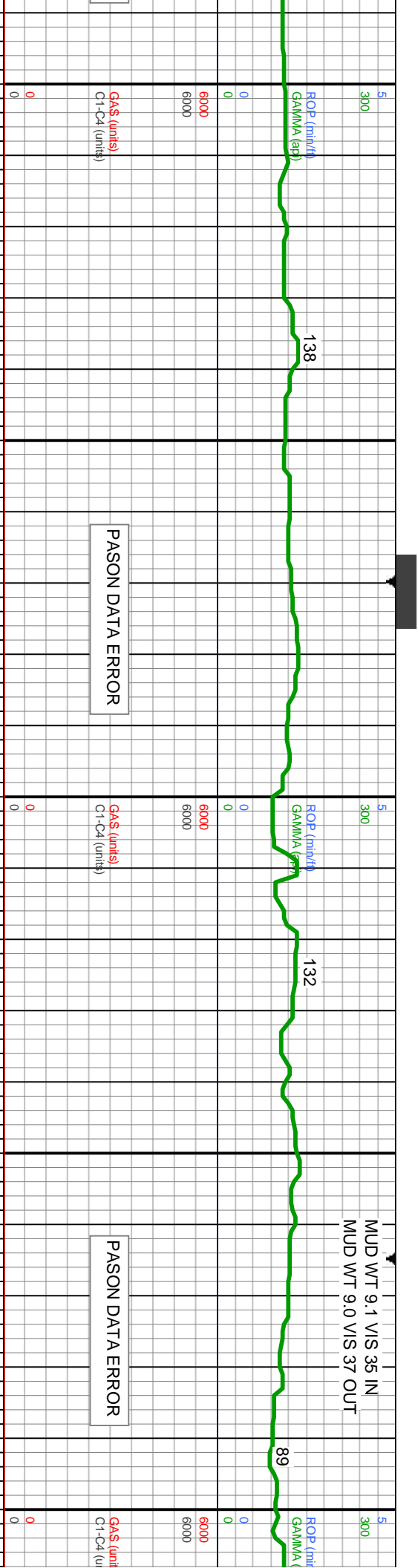
MD: 8,911'  
TVD: 6,092.12'  
Inclination: 87.7°  
Azimuth: 90.9°  
VS: 2,776.06'

MD: 9,005'  
TVD: 6,093.59'  
Inclination: 90.5°  
Azimuth: 90.3°  
VS: 2,870.02'

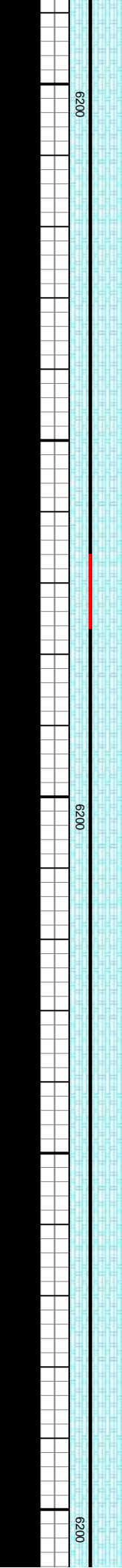
6200

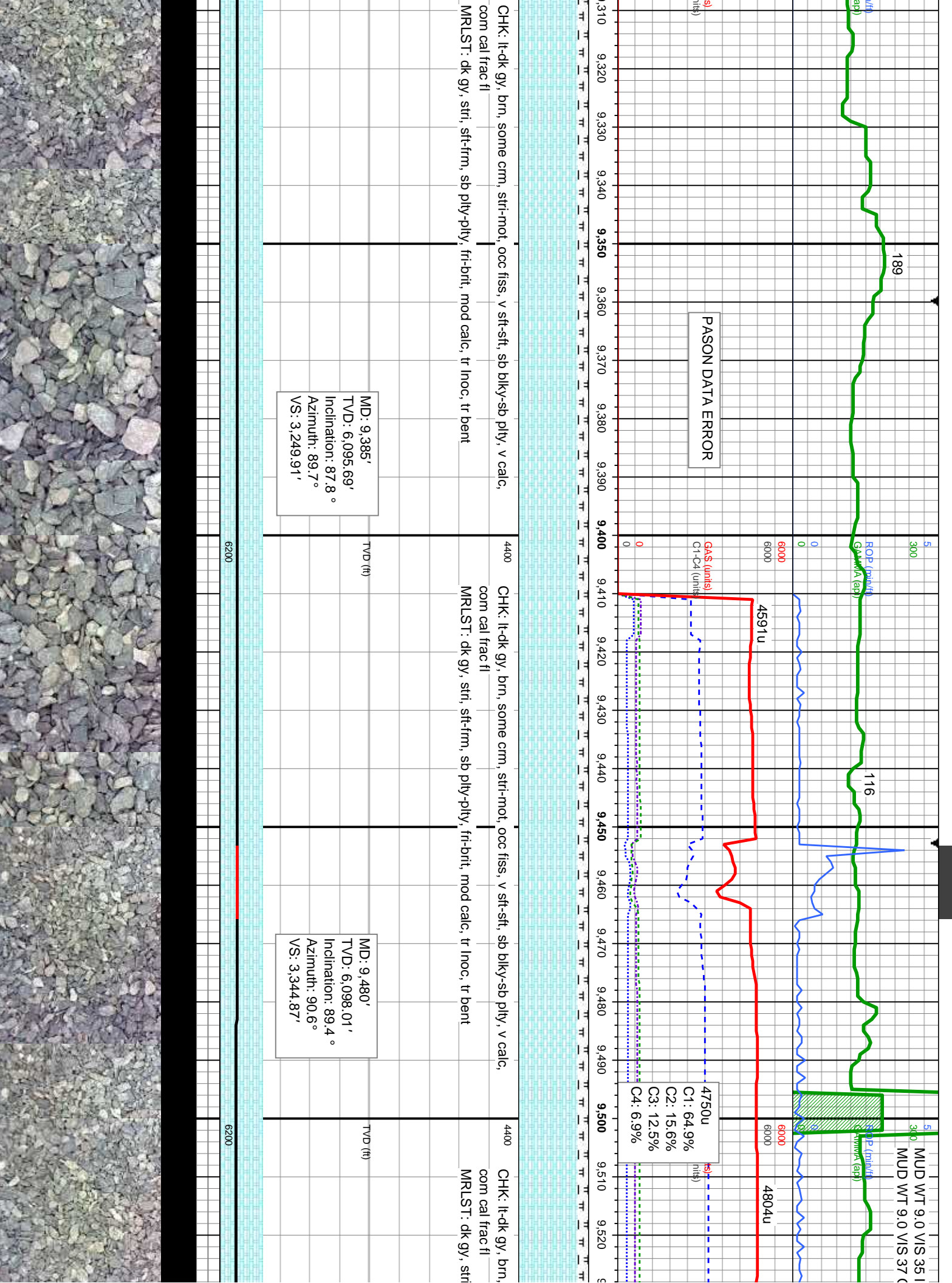
6200





|   |   |      |   |      |
|---|---|------|---|------|
| 4400  | CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl | 4400 | CHK: lt-dk gy, brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl | 4400 |
|   | MRLST: dk gy, stri, sft-frn, sb pty-pty, fri-brit, mod calc, tr inoc, tr bent                         |      | MRLST: dk gy, stri, sft-frn, sb pty-pty, fri-brit, mod calc, tr inoc, tr bent                         |      |
| MD: 9,099'<br>TVD: 6,092.12'<br>Inclination: 91.3°<br>Azimuth: 91°<br>VS: 2,964'      |   |      |   |      |
| MD: 9,195'<br>TVD: 6,091.7'<br>Inclination: 89.2°<br>Azimuth: 90.9°<br>VS: 3,059.97'  |   |      |   |      |
| MD: 9,289'<br>TVD: 6,093.09'<br>Inclination: 89.1°<br>Azimuth: 89.8°<br>VS: 3,153.95' |   |      |   |      |

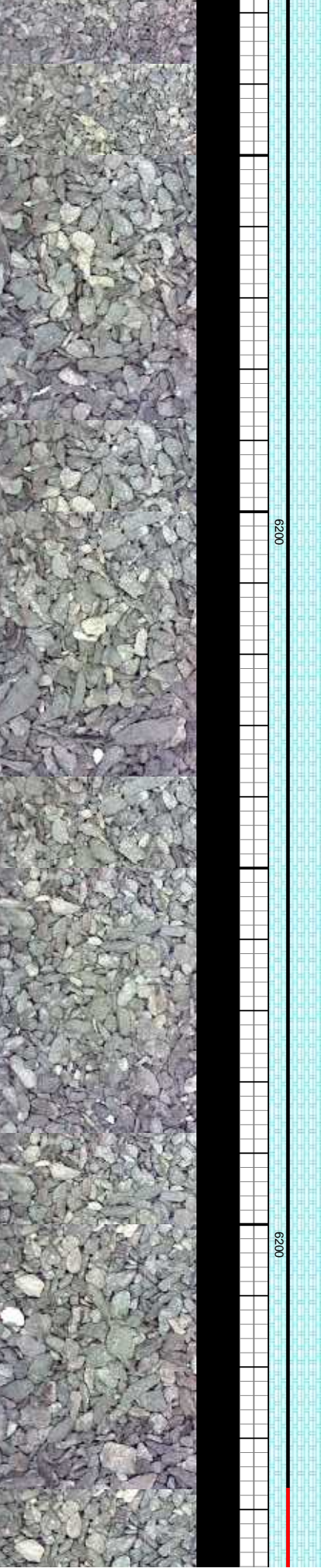
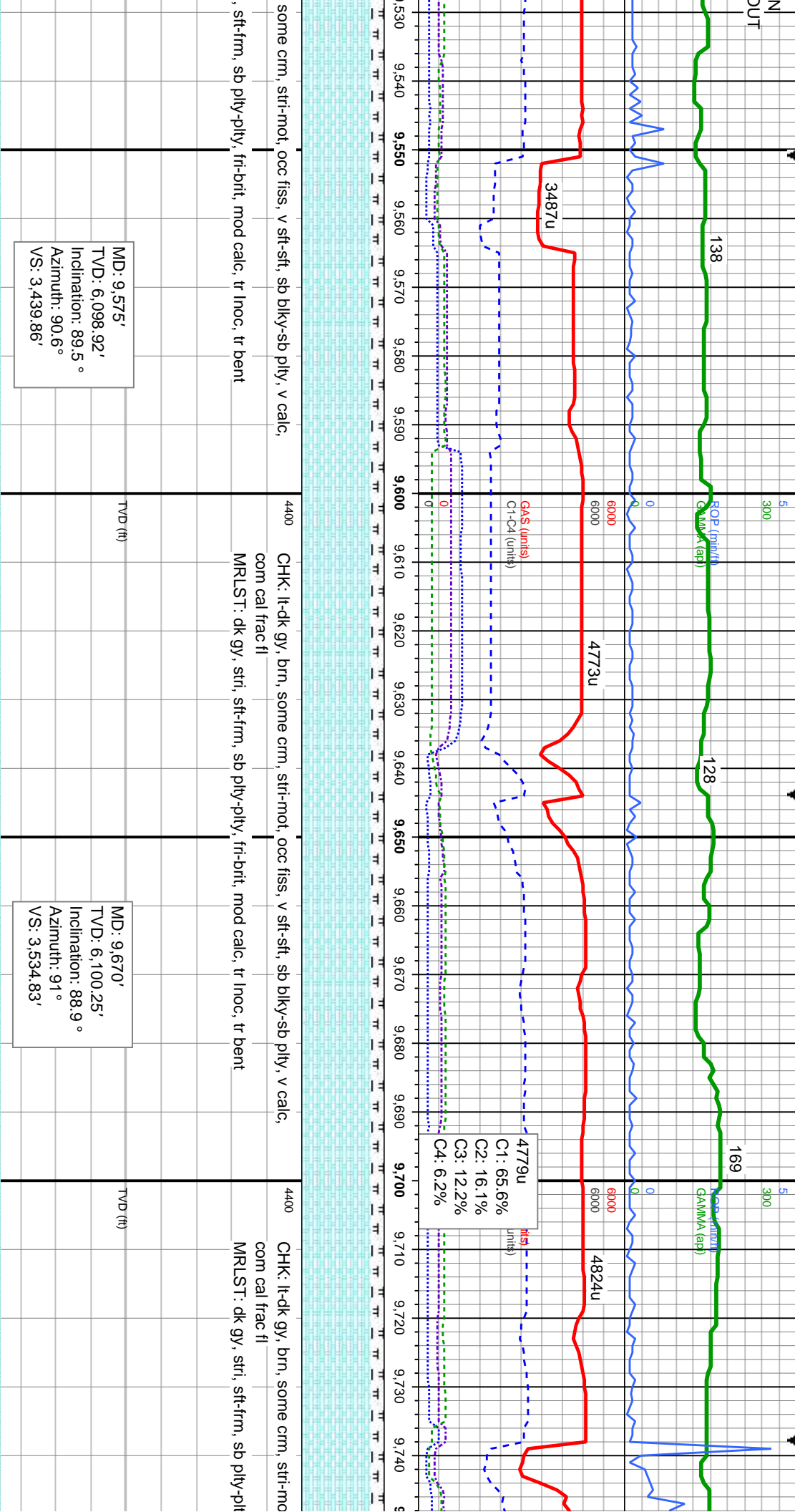


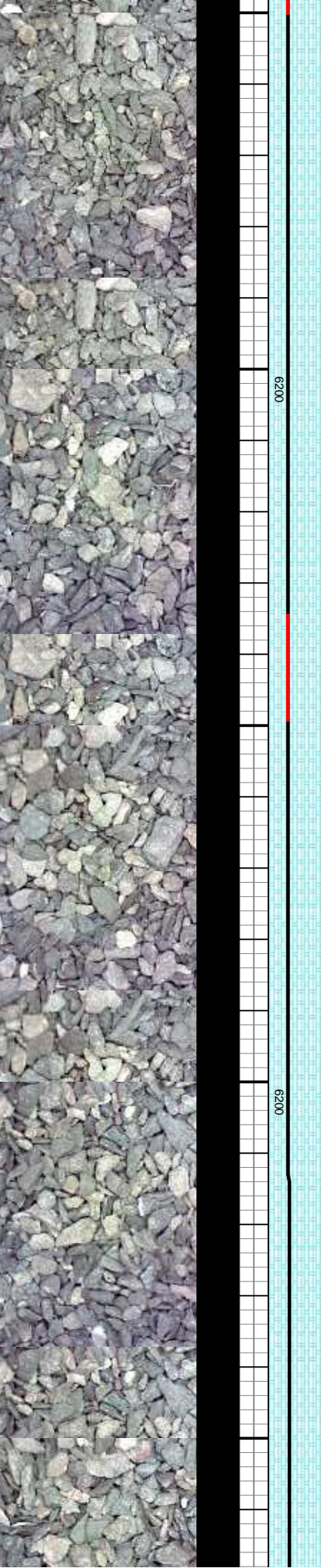
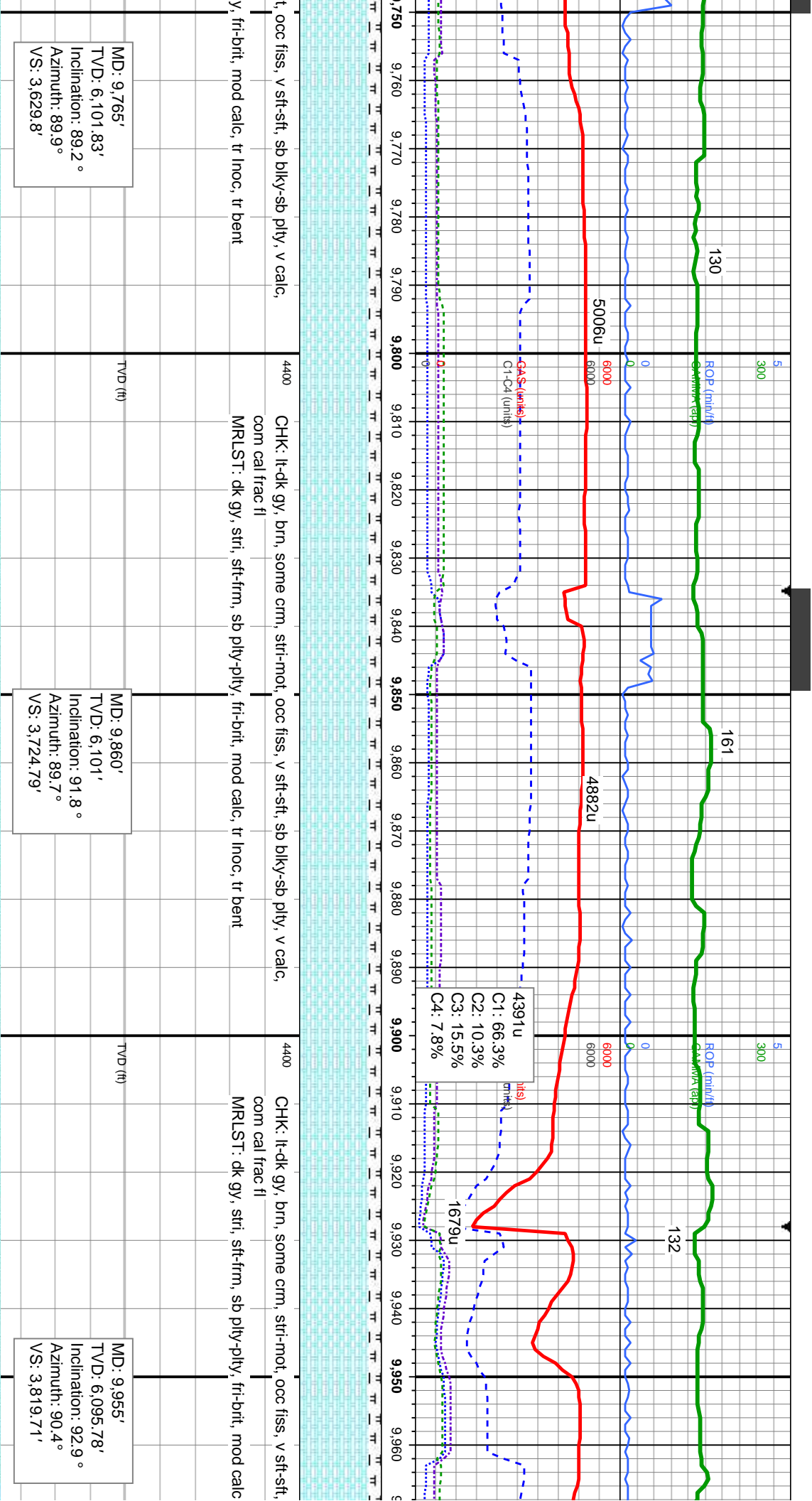




IN

OUT





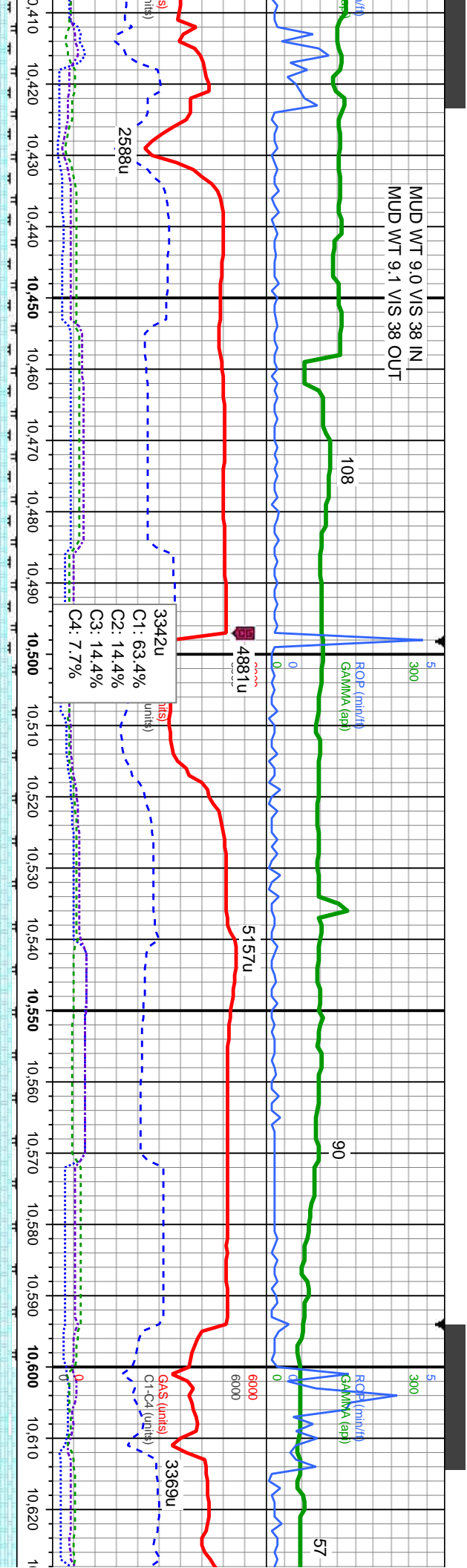








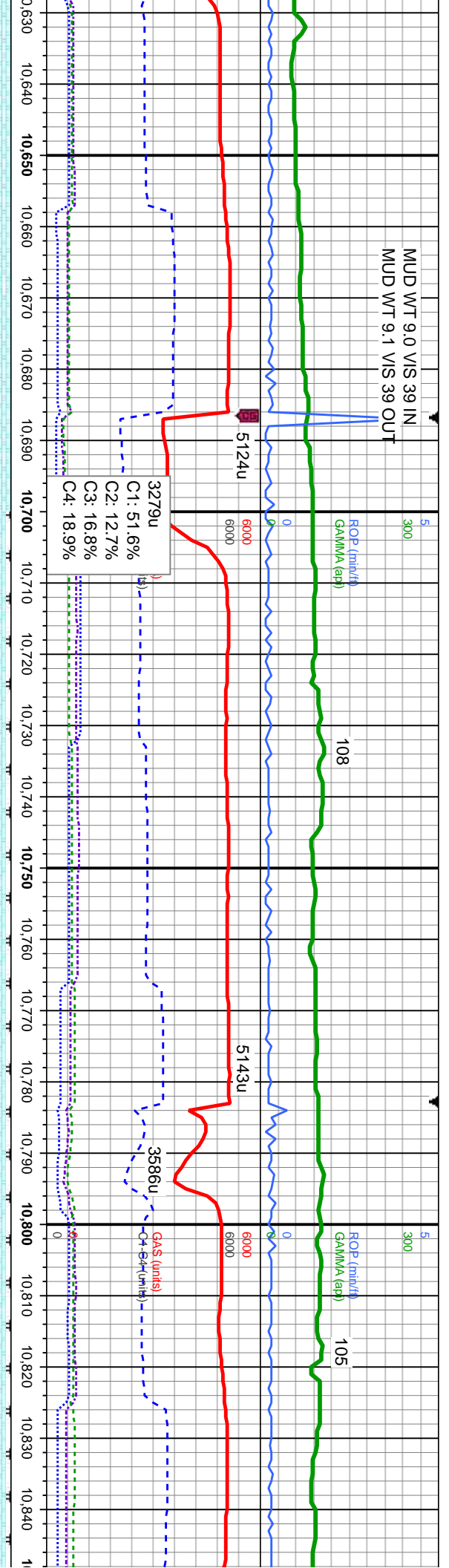




|  |      |   |      |                                |
|--|------|---|------|--------------------------------|
| CHK: lt-dk gy, some crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl | 4400 | CHK: lt-dk gy, com brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl | 4400 | CHK: lt-dk gy, com cal frac fl |
| MRLST: dk gy, stri, sft-frn, sb pty-pty, fri-bit, mod calc,sl tr inoc                                |      | MRLST: dk gy, stri, sft-frn, sb pty-pty, fri-bit, mod calc,sl tr inoc                                     |      |                                |
| MD: 10,428'<br>TVD: 6,085.64'<br>Inclination: 89.0°<br>Azimuth: 88.4°<br>VS: 4,292.45'               |      |   |      |                                |
| MD: 10,522'<br>TVD: 6,087.77'<br>Inclination: 88.4°<br>Azimuth: 89.3°<br>VS: 4,386.42'               |      |   |      |                                |
| MD: 10,616'<br>TVD: 6,088.75'<br>Inclination: 90.4°<br>Azimuth: 90.9°<br>VS: 4,480.4'                |      |   |      |                                |



MUD WT 9.0 VIS 39 IN  
MUD WT 9.1 VIS 39 OUT



|  |      |  |      |  |
|--|------|--|------|--|
| brn, some crm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v | 4400 | CHK: lt-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc.    | 4400 | CHK: lt-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc.    |
| l, tr MRLST  |      | com cal frac fl  |      | com cal frac fl  |
|  |      | MRLST: dk gy, stri, sft-frn, sb pty-ply, fri-bit, mod calc.sl tr inoc                  |      | MRLST: dk gy, stri, sft-frn, sb pty-ply, fri-bit, mod calc.sl tr inoc                  |
|  |      | MD: 10,711'<br>TVD: 6,087.67'<br>Inclination: 90.9°<br>Azimuth: 91.2°<br>VS: 4,575.37' |      | MD: 10,806'<br>TVD: 6,087.26'<br>Inclination: 89.6°<br>Azimuth: 89.8°<br>VS: 4,670.35' |

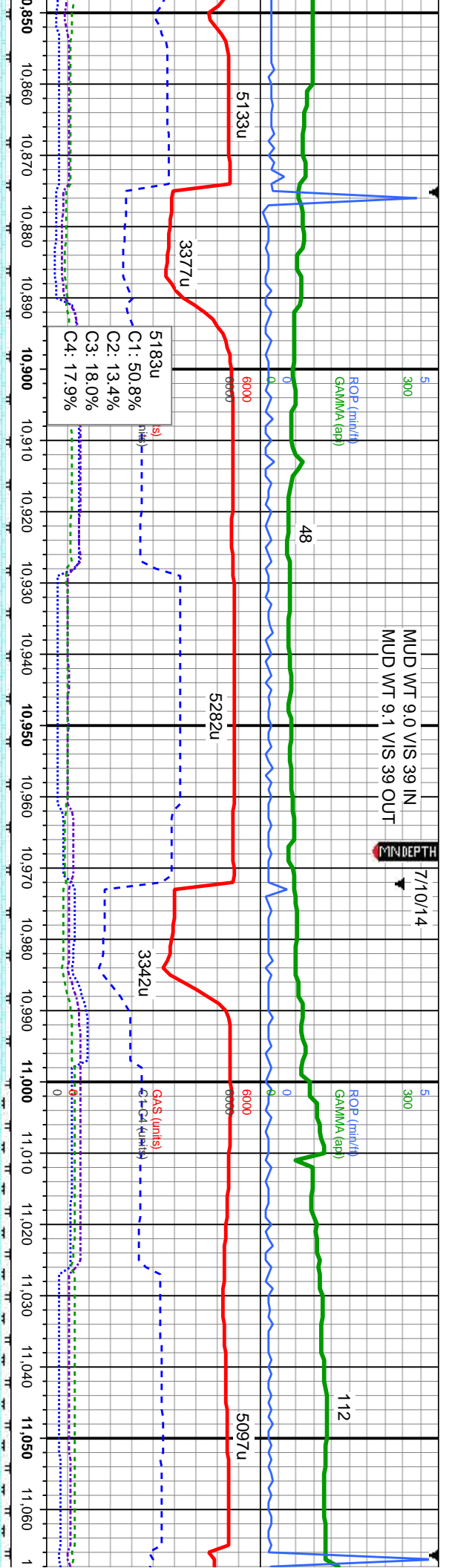
6200 6200





MUD WT 9.0 VIS 39 IN  
MUD WT 9.1 VIS 39 OUT

7/10/14  
MINDEPTH



MD: 10,900'  
TVD: 6,088'  
Inclination: 89.5°  
Azimuth: 89.7°  
VS: 4,764.35'

MD: 10,996'  
TVD: 6,089.17'  
Inclination: 89.1°  
Azimuth: 90.3°  
VS: 4,860.34'

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6200



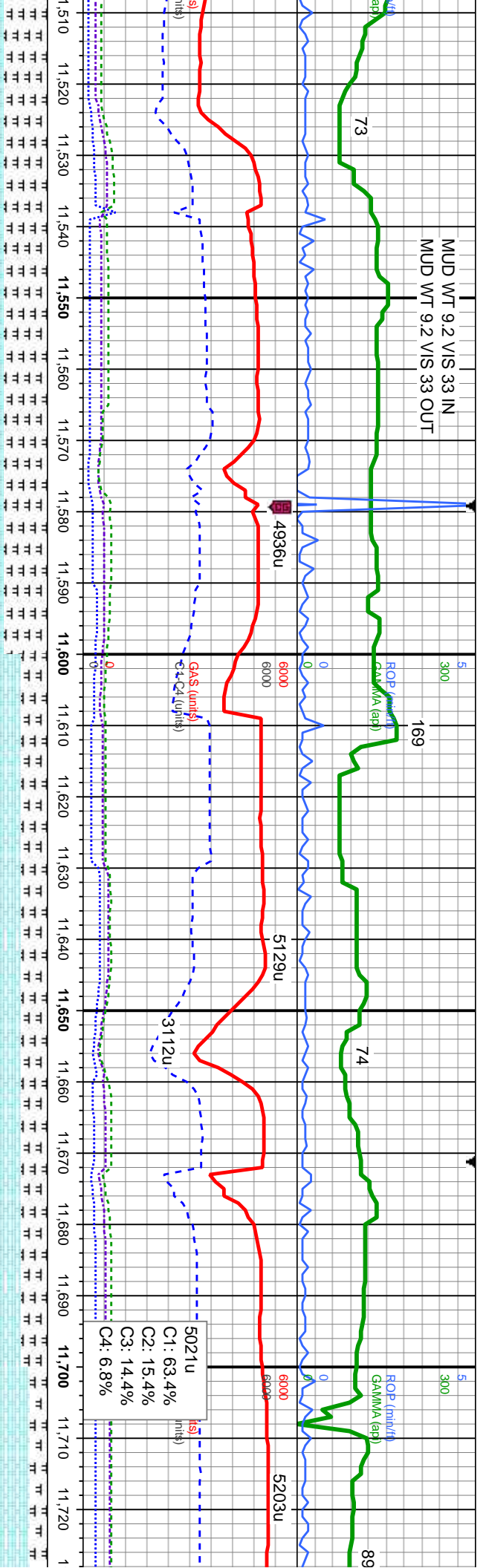








MUD WT 9.2 VIS 33 IN  
MUD WT 9.2 VIS 33 OUT



CHK: lt-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v calc,  
com cal frac fl

MRLST: dk gy, stri-mot, sft-frm, sb ply-ply, fri-brit, mod calc, sl tr Inoc, sl tr  
bent, tr cal

510'  
091.04'  
com: 90.3°  
i: 90.1°  
VS: 4.08'

MD: 11,601'  
TVD: 6,090.24'  
Inclination: 90.7°  
Azimuth: 90.1°  
VS: 5,465.08'

CHK: lt-dk gy, abnt crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v calc,  
com cal frac fl

MRLST: dk gy, stri, sft-frm, sb ply-ply, fri-brit, mod calc, sl tr Inoc, sl tr bent, tr  
cal

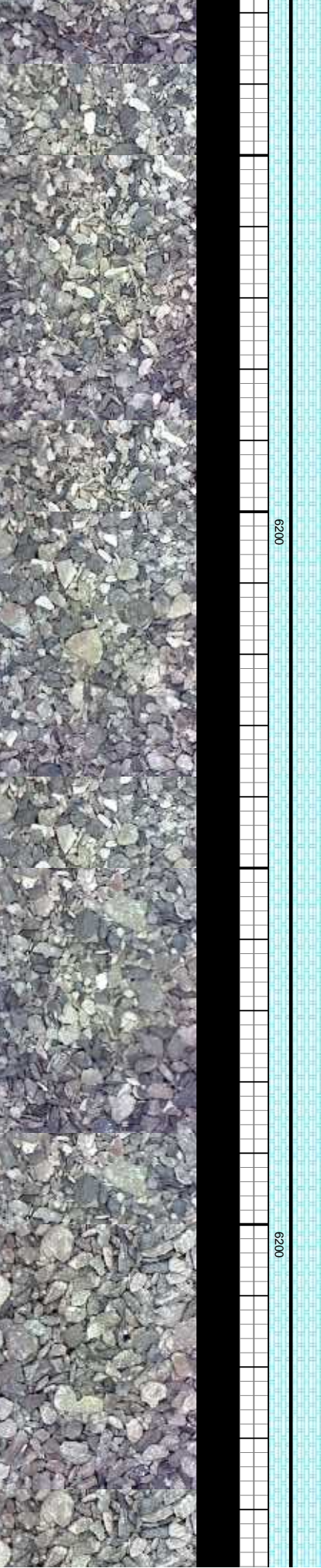
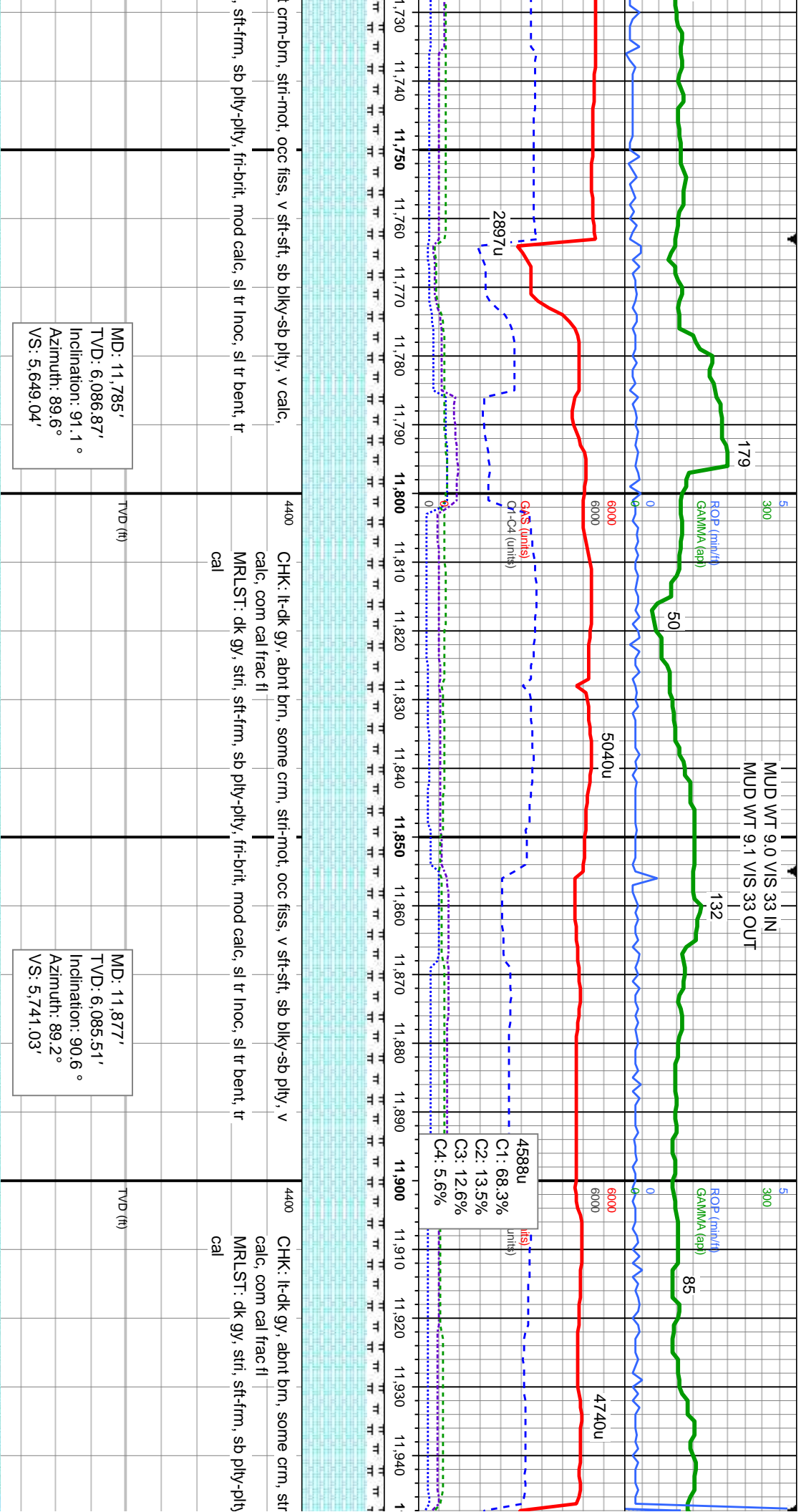
MD: 11,693'  
TVD: 6,088.72'  
Inclination: 91.2°  
Azimuth: 89.7°  
VS: 5,557.06'

CHK: lt-dk gy, abn  
com cal frac fl

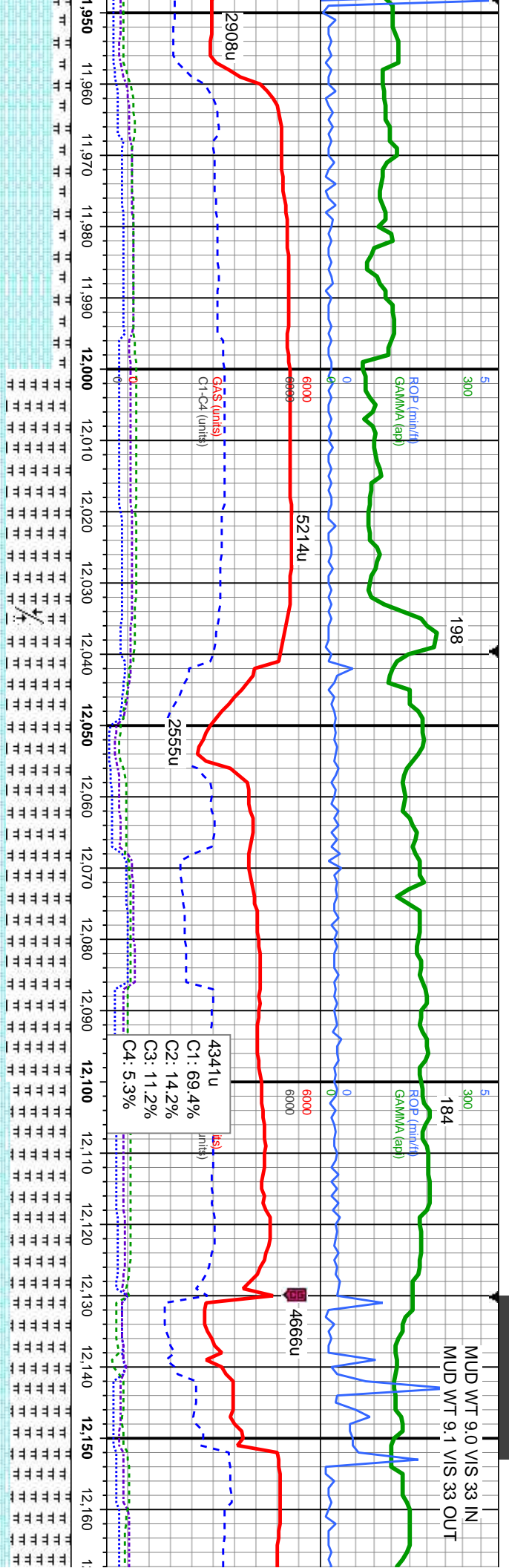
MRLST: dk gy, stri  
cal







MUD WT 9.0 VIS 33 IN  
MUD WT 9.1 VIS 33 OUT



i-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v  
fri-brit, mod calc, sl tr inoc, sl tr bent, tr

CHK: lt-dk gy, brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v calc, com cal  
frac fl  
MRLST: dk gy, stri-mot, sft-firm, sb ply-ply, fri-brit, mod calc, sl tr inoc, sl tr bent, tr cal

MD: 11,968'  
TVD: 6,084.24'  
Inclination: 91°  
Azimuth: 89°  
VS: 5,832.02'

MD: 12,060'  
TVD: 6,081.83'  
Inclination: 92°  
Azimuth: 88.1°  
VS: 5,923.97'

MD: 12,152'  
TVD: 6,079.74'  
Inclination: 90.6°  
Azimuth: 88.1°  
VS: 6,015.91'

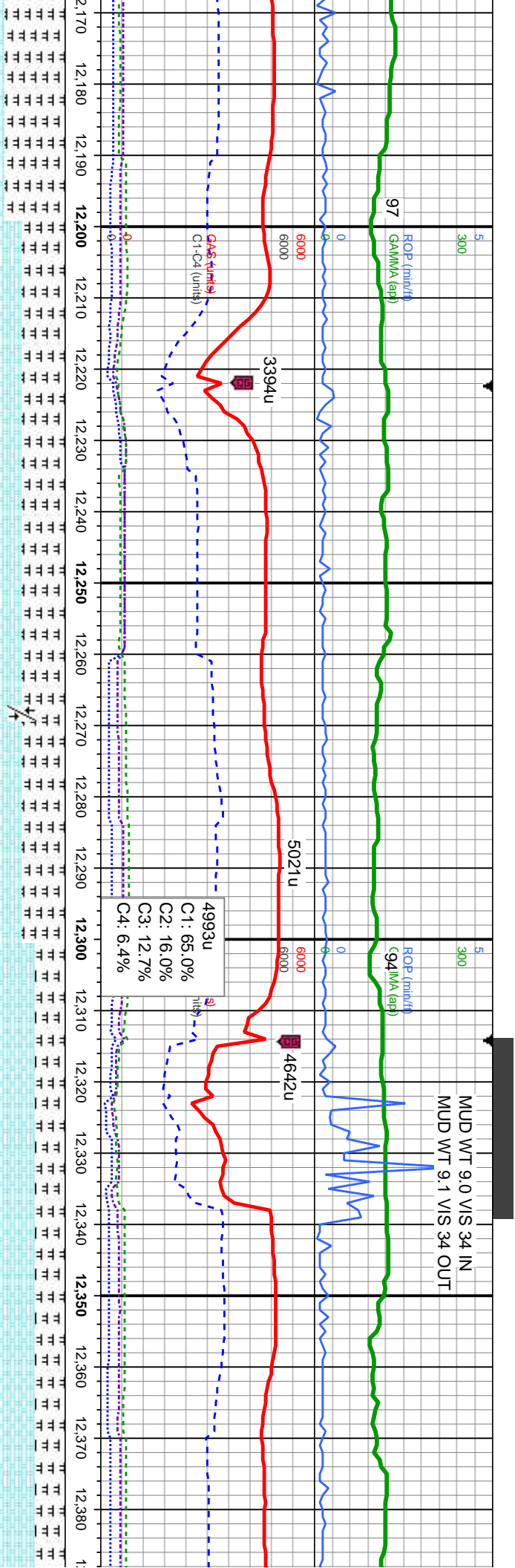
ENTER GRABEN AND B MARL @ 12,034' MD

6200

6200



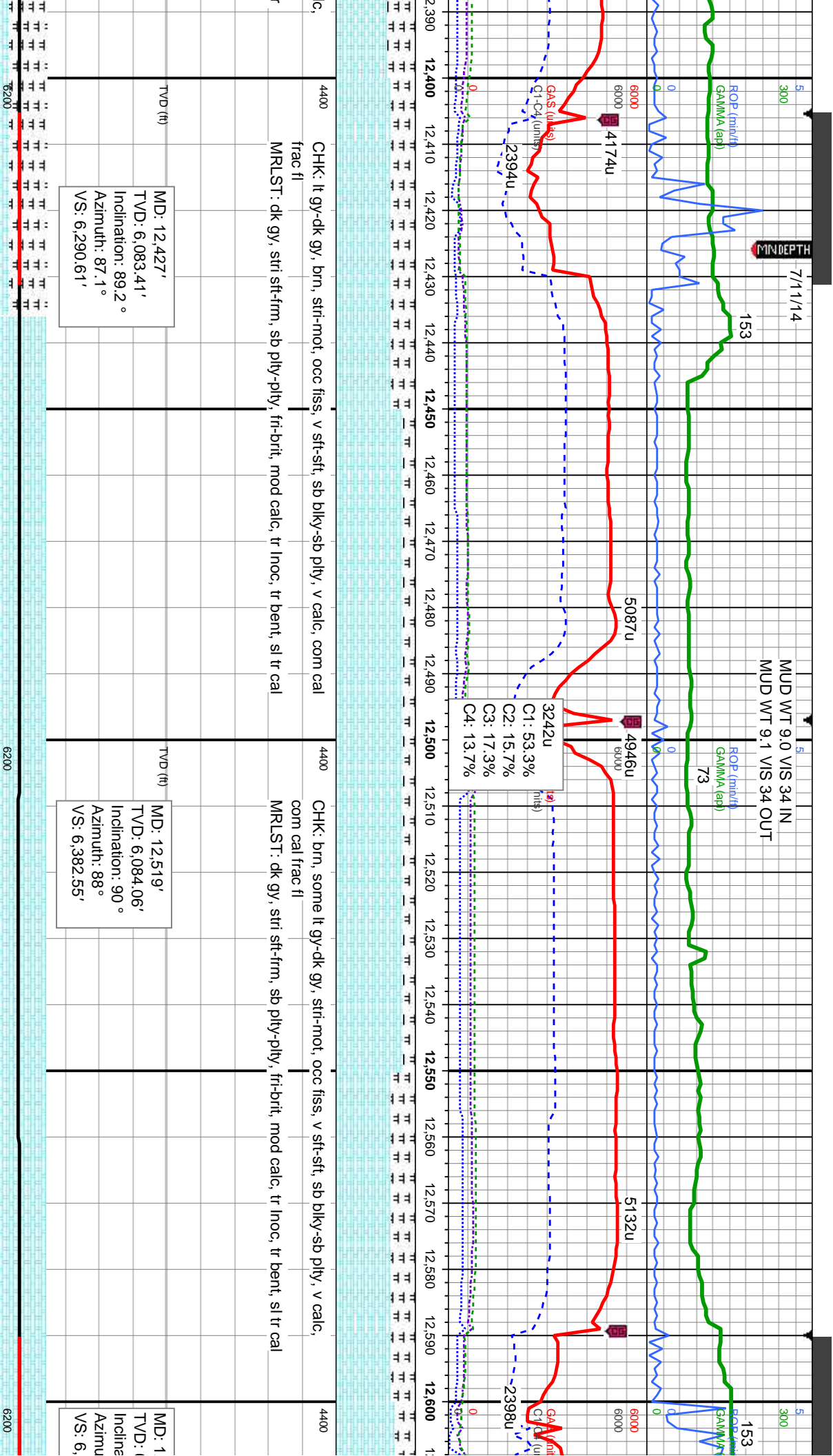




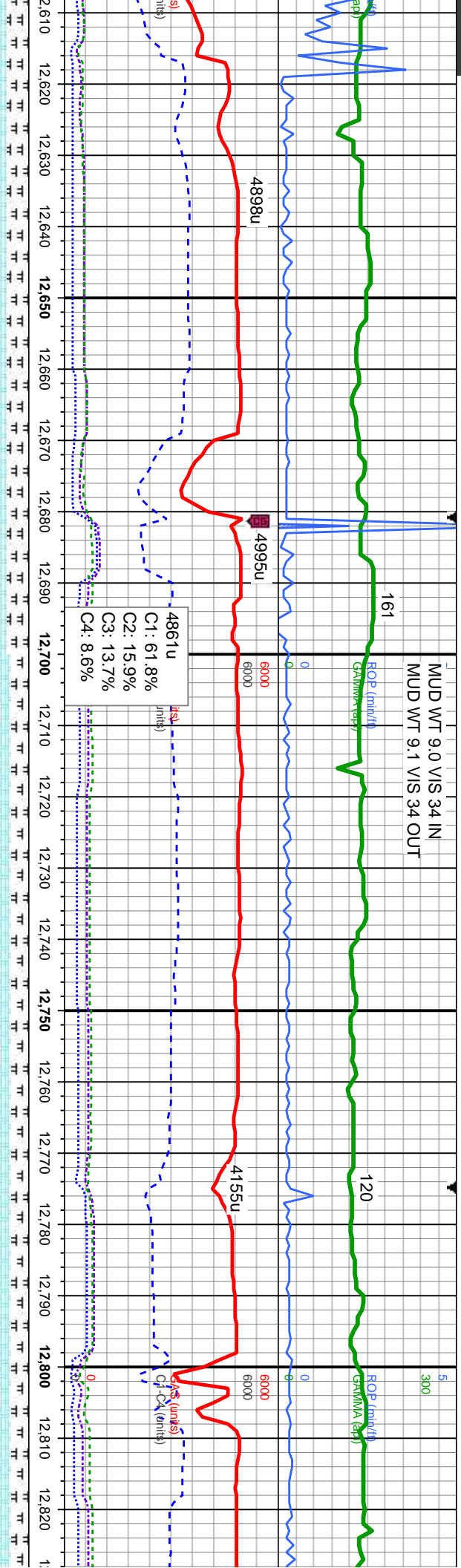
|                         |      |  |      |  |
|-------------------------|------|--|------|--|
| ply, v calc, com cal    | 4400 | CHK: lt-dk gy, brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v calc, com cal                        | 4400 | CHK: brn, some lt gy-dk gy, stri-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v calc, com cal                        |
| calc, sl tr Inoc, sl tr |      | frac fl<br>MRLST: dk gy, stri-mot, sft-frn, sb ply-ply, fri-brit, mod calc, sl tr Inoc, sl tr bent, tr cal |      | com cal frac fl<br>MRLST: dk gy, stri-mot, sft-frn, sb ply-ply, fri-brit, mod calc, sl tr Inoc, sl tr bent, tr cal |
|                         |      | EXIT GRABEN AND REENTER C CHALK @ 12,268' MD   |      |  |
|                         |      | MD: 12,244'<br>TVD: 6,079.5'<br>Inclination: 89.7°<br>Azimuth: 86.5°<br>VS: 6,107.83'                      |      | MD: 12,335'<br>TVD: 6,081.25'<br>Inclination: 88.1°<br>Azimuth: 87.6°<br>VS: 6,198.71'                             |
|                         |      | TVD (ft)   |      | TVD (ft)   |
|                         | 6200 |  |      | 6200   |









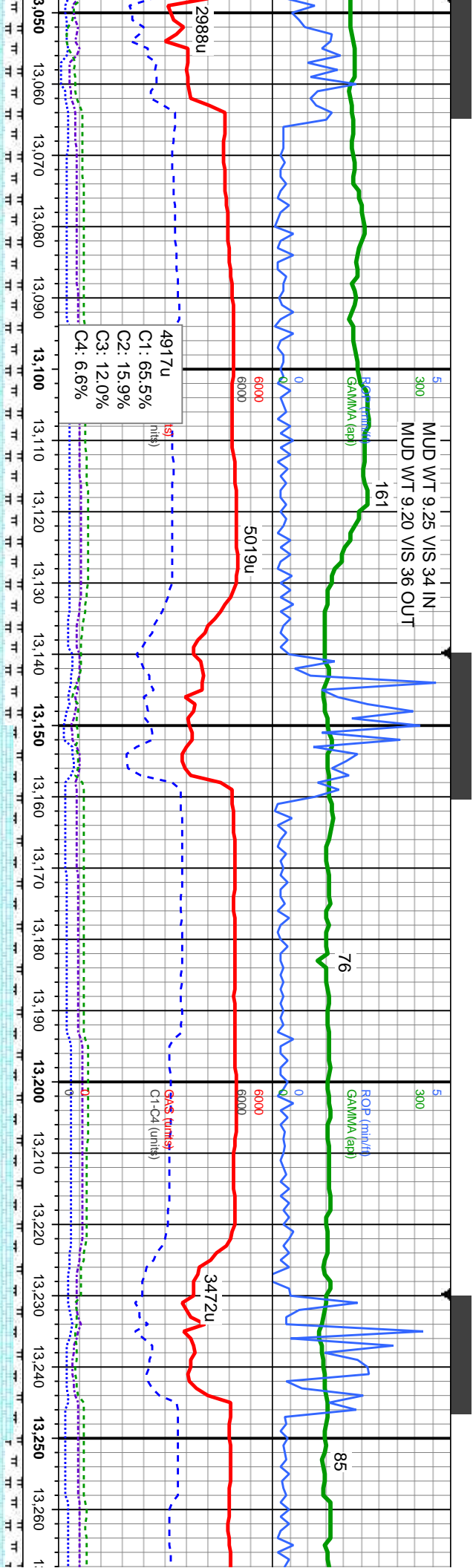


|   |      |   |      |   |
|---|------|---|------|---|
| CHK: brn-dk gy, some lt gy, stri-mot, occ flss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl   | 4400 | CHK: brn-dk gy, some lt gy, stri-mot, occ flss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl | 4400 | CHK: brn-dk gy, some lt gy, stri-mot, occ flss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl |
| MRLST: dk gy, stri sft-firm, sb pty-ply, fri-brit, mod calc, com inoc, com cal                        |      | MRLST: dk gy, stri sft-firm, sb pty-ply, fri-brit, mod calc, com inoc, com cal                      |      | MRLST: dk gy, stri sft-firm, sb pty-ply, fri-brit, mod calc, com inoc, com cal                      |
| <div>MD: 12,703'<br/>TVD: 6,084.82'<br/>Inclination: 90.3°<br/>Azimuth: 90.3°<br/>VS: 6,566.53'</div> |      |   |      |   |
| <div>MD: 12,795'<br/>TVD: 6,085.3'<br/>Inclination: 89.1°<br/>Azimuth: 89°<br/>VS: 6,658.53'</div>    |      |   |      |   |

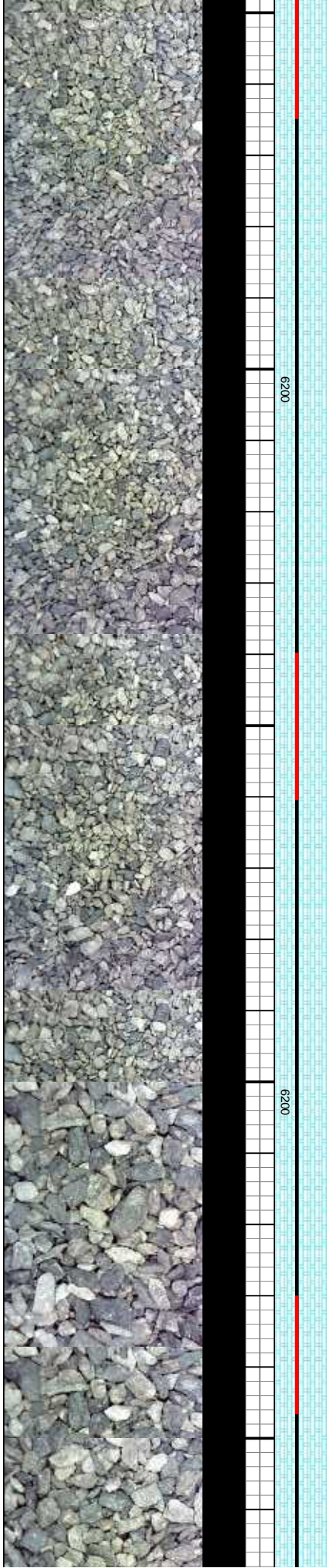








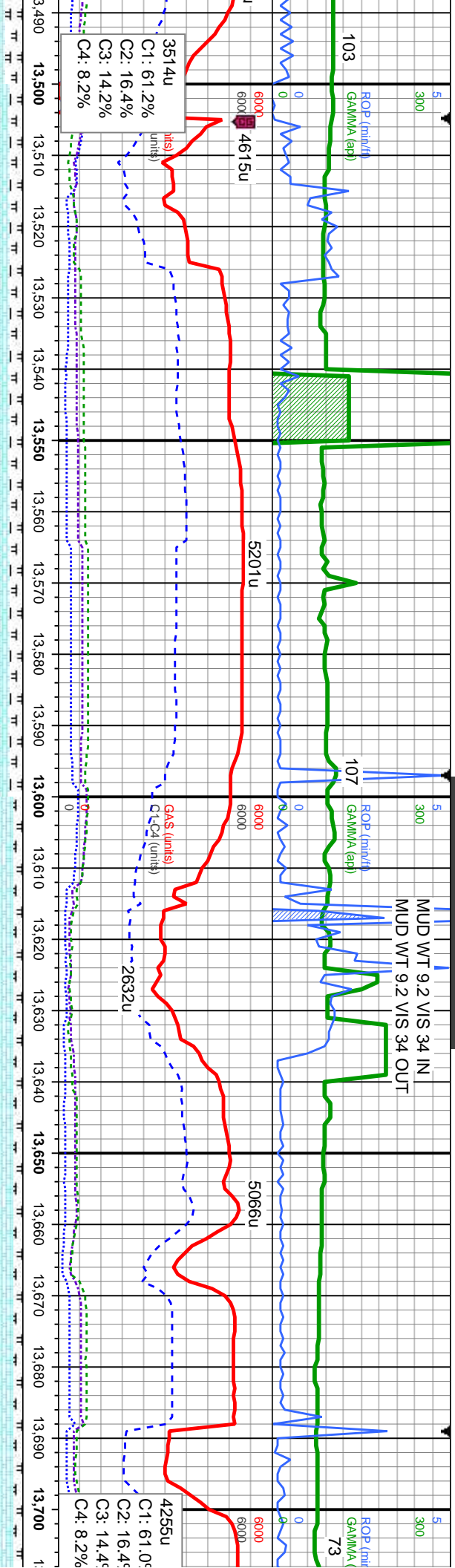
|   |          |   |          |   |
|---|----------|---|----------|---|
| occ fiss, v sft-sft, sb blkly-sb ply, v calc,<br>y, fri-brit, mod calc, com Inoc, com cal | 4400     | CHK: brn-dk gy, some lt gy, stri-mot, occ fiss, v sft-sft, sb blkly-sb ply, v calc,<br>com cal frac fl<br>MRLST: dk gy, stri sft-frm, sb ply-ply, fri-brit, mod calc, com Inoc, com cal | 4400     | CHK: brn-dk gy, some lt gy, stri-mot, occ fiss, v sft-sft, sb blkly-sb ply, v calc,<br>com cal frac fl<br>MRLST: dk gy, stri sft-frm, sb ply-ply, fri-brit, mod calc, |
| MD: 13,070'<br>TV/D: 6,086.4'<br>Inclination: 87.5 °<br>Azimuth: 90 °<br>VS: 6,933.49'    | TVD (ft) | MD: 13,162'<br>TV/D: 6,089.13'<br>Inclination: 89.1 °<br>Azimuth: 87.6 °<br>VS: 7,025.43'   | TVD (ft) | MD: 13,254'<br>TV/D: 6,089.13'<br>Inclination: 90.9 °<br>Azimuth: 86.4 °<br>VS: 7,117.33'   |



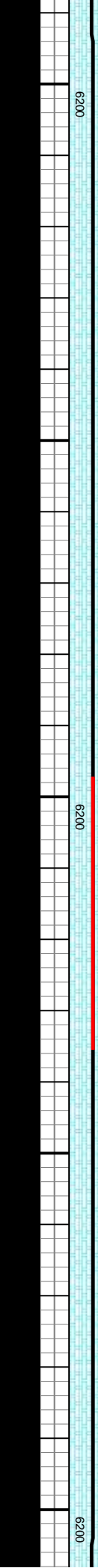






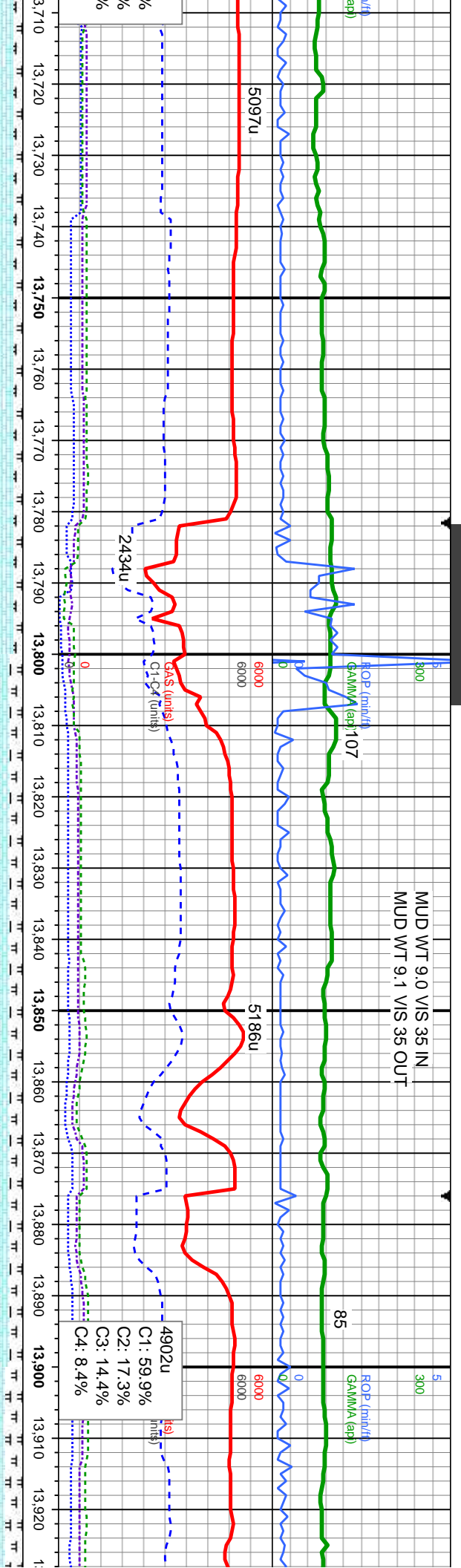


|      |   |  |
|------|---|--|
| 4400 | CHK: It gy-brn, some crm & dk gy, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pily, v calc, com cal frac fl<br>MRLST: dk gy, stri sft-firm, sb pily-pily, fri-brt, mod calc, tr Inoc, tr cal, sl tr bent |  |
| 4400 | CHK: It gy-brn, some crm & dk gy, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pily, v calc, com cal frac fl<br>MRLST: dk gy, stri sft-firm, sb pily-pily, fri-brt, mod calc, tr Inoc, tr cal, sl tr bent |  |
| 4400 | MD: 13,528'<br>TVD: 6,083.27'<br>Inclination: 91°<br>Azimuth: 89°<br>VS: 7,390.89'  | MD: 13,620'<br>TVD: 6,083.03'<br>Inclination: 89.3°<br>Azimuth: 89°<br>VS: 7,482.88' |





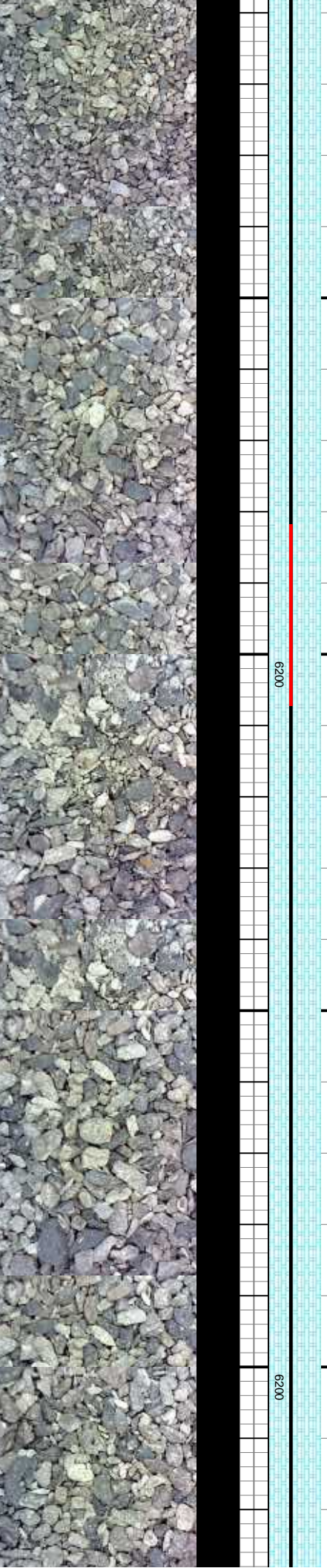
MUD WT 9.0 VIS 35 IN  
MUD WT 9.1 VIS 35 OUT



CHK: lt gy-brn, some crm & dk gy, stri-mot, occ fiss, v sft-sft, sb blk-ly-sb pty, v calc, com cal frac fl  
MRLST: dk gy, stri sft-frm, sb pty-pty, fri-brit, mod calc, tr inoc, tr cal, sl tr bent

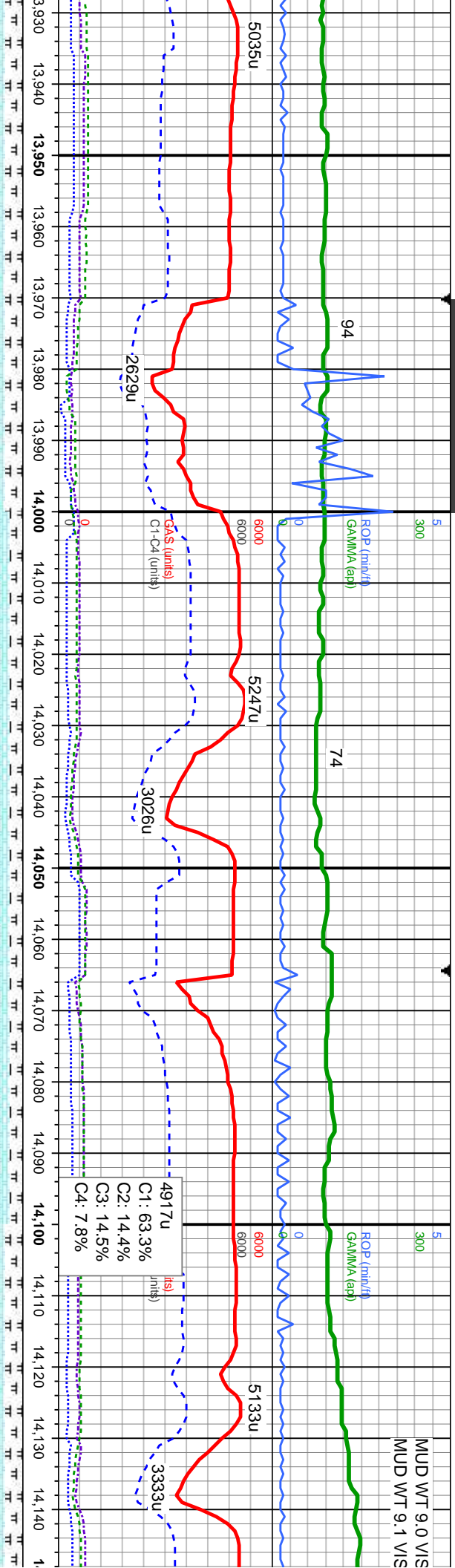
MD: 13,806'  
TVD: 6,084.56'  
Inclination: 90 °  
Azimuth: 93 °  
VS: 7,668.78'

MD: 13,900'  
TVD: 6,085.13'  
Inclination: 89.3 °  
Azimuth: 92.6 °  
VS: 7,762.64'





MUD WT 9.0 VIS  
MUD WT 9.1 VIS



|   |      |   |      |   |
|---|------|---|------|---|
| stri-crm, stri-mot, occ fiss, v sft-sft, sb blkly-sb pty, v calc, | 4400 | CHK: lt gy-dk gy, brn-crm, stri-mot, occ fiss, v sft-sft, sb blkly-sb pty, v calc,<br>com cal frac fl | 4400 | CHK: lt gy-dk gy, brn-crm, stri-mot, occ fiss, v sft-sft, sb blkly-sb pty, v calc,<br>com cal frac fl |
| sft-firm, sb pty-pty, fri-brit, mod calc, tr inoc, tr cal         |      | MRLST: dk gy, stri sft-firm, sb pty-pty, fri-brit, mod calc, tr inoc, tr cal                          |      | MRLST: dk gy, stri sft-firm, sb pty-pty, fri-brit, mod calc, tr inoc, tr cal                          |

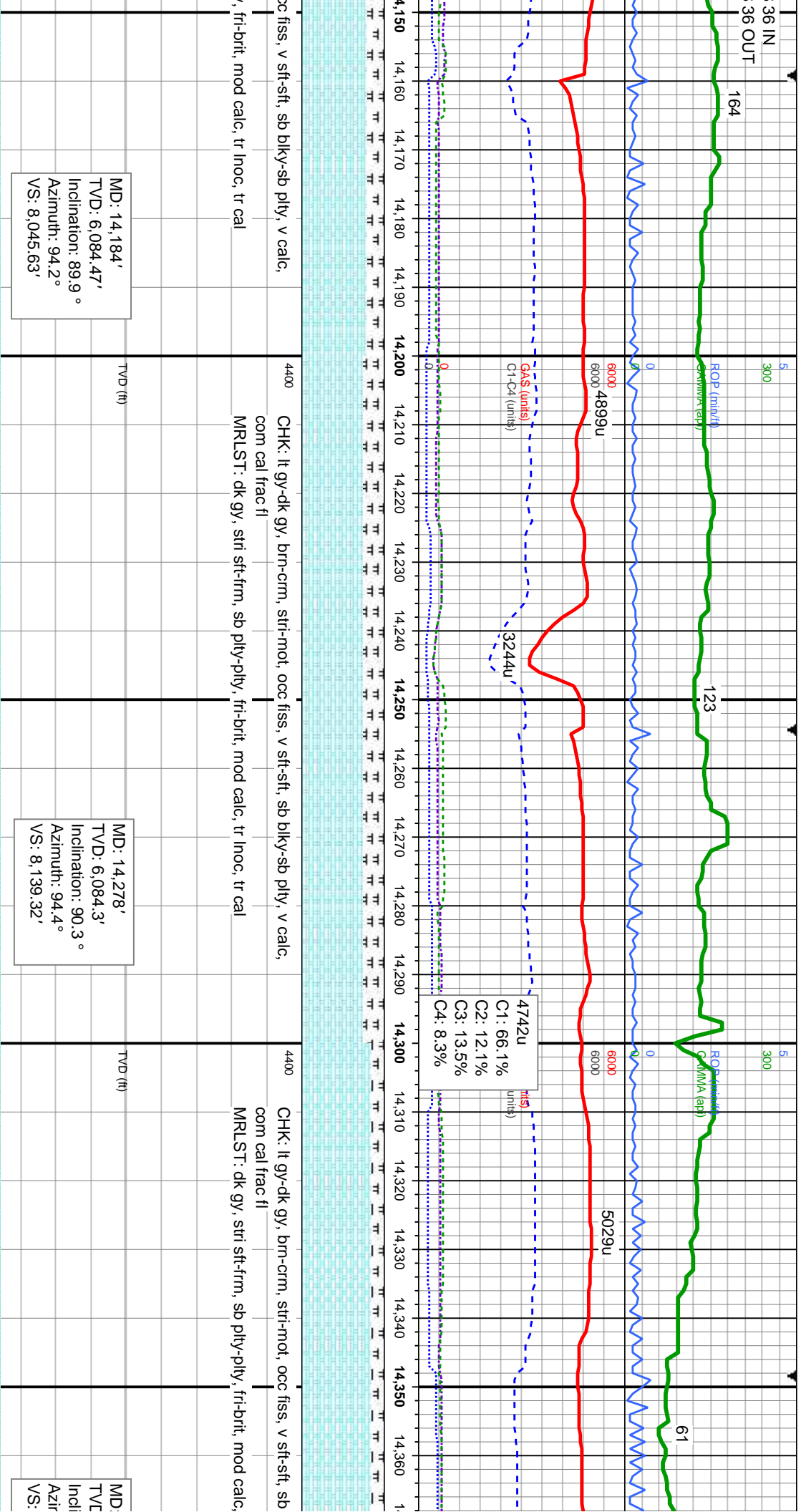
MD: 13,994'  
TVD: 6,085.13'  
Inclination: 90.7°  
Azimuth: 95.4°  
VS: 7,856.35'

MD: 14,089'  
TVD: 6,084.47'  
Inclination: 90.1°  
Azimuth: 94.4°  
VS: 7,950.95'

6200

6200



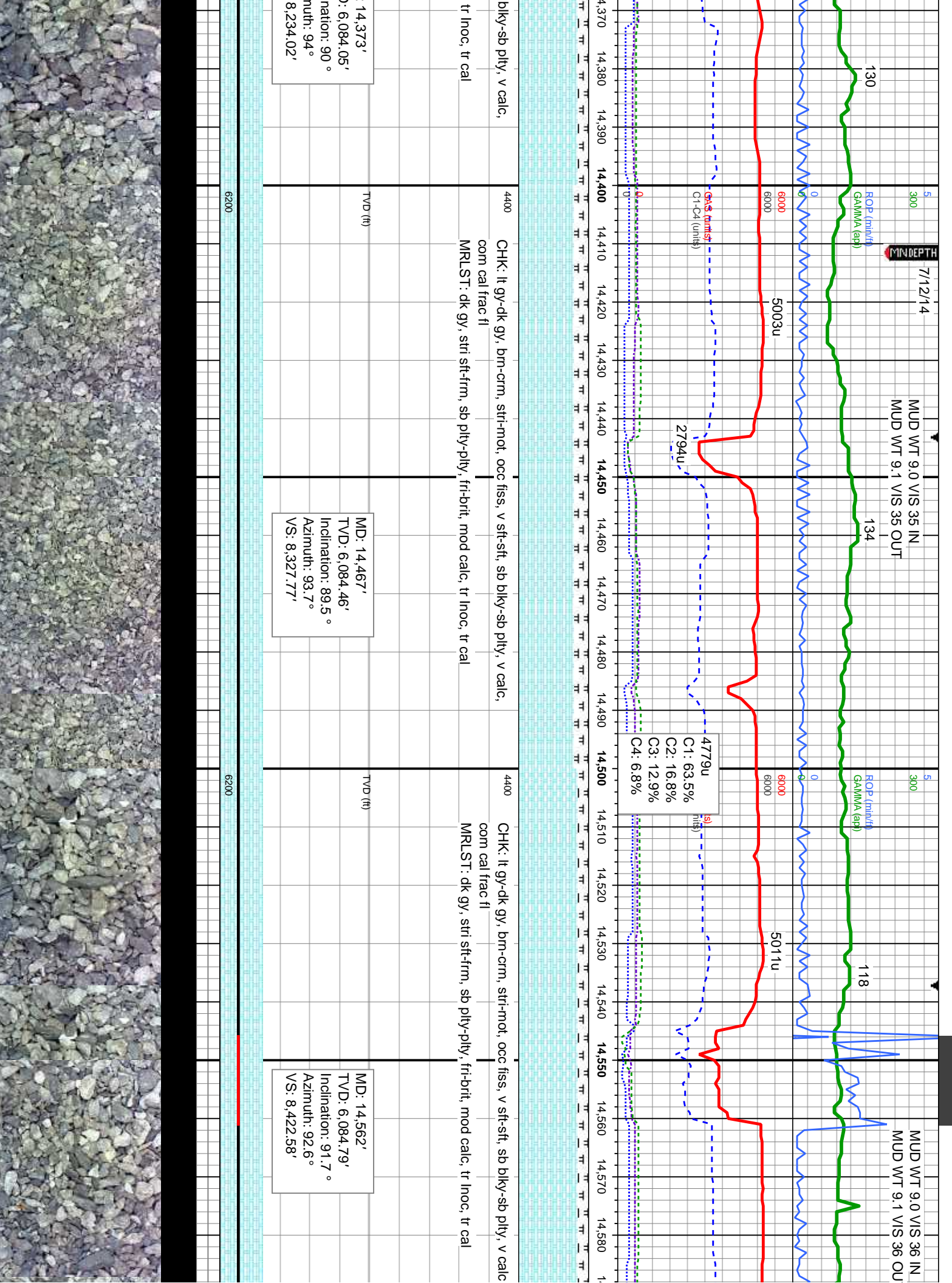


6200

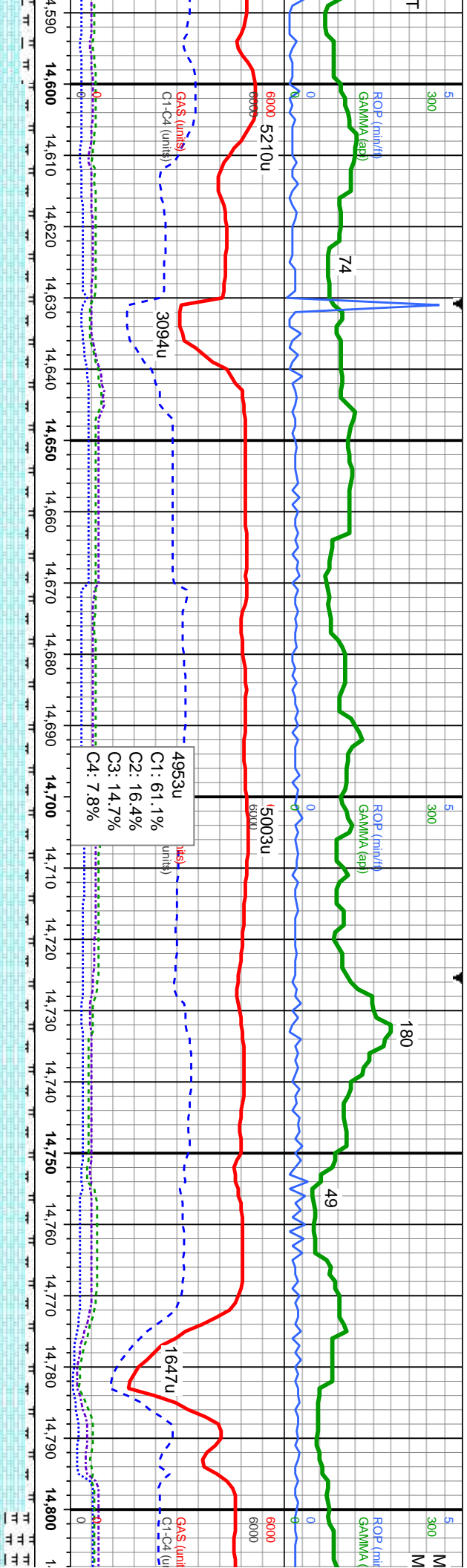
6200



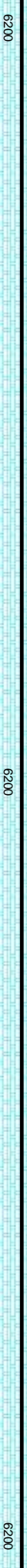








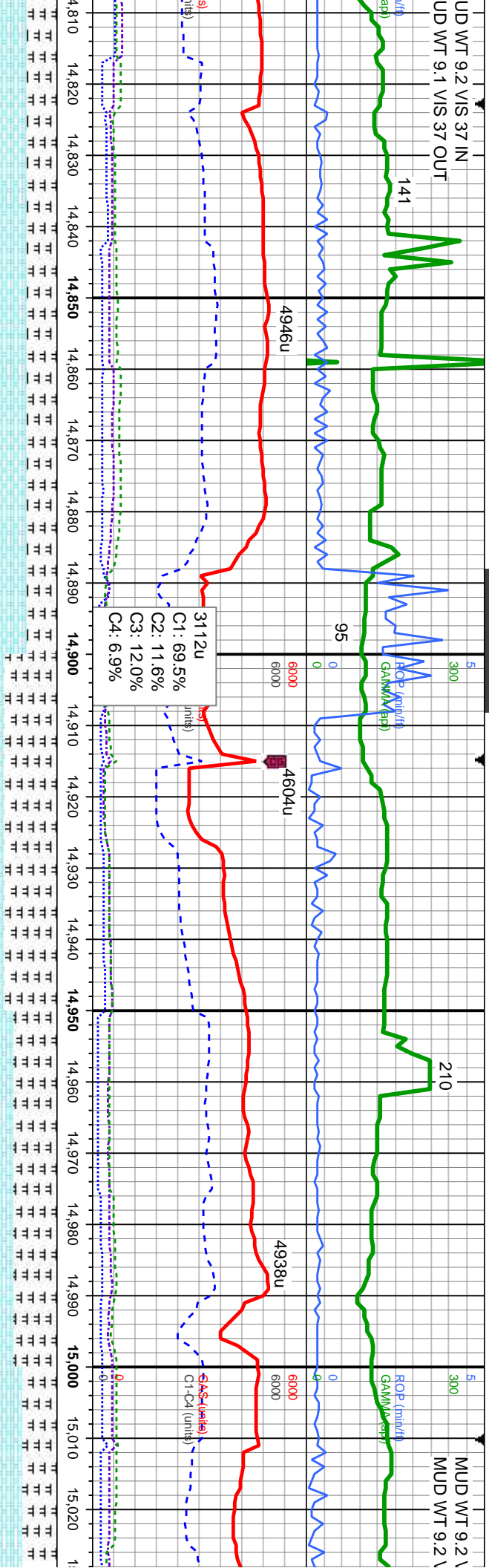
|   |   |          |   |          |
|---|---|----------|---|----------|
| 4400  | CHK: lt-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc, com cal frac fl<br>MRLST: dk gy, stri, sft-fm, sb pty-pty, fri-brit, mod calc, sl tr Inoc | 4400     | CHK: lt-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc<br>MRLST: dk gy, stri, sft-fm, sb pty-pty, fri-brit, mod calc, sl tr Inoc, occ mas cal | 4400     |
| TVD (ft)  |   | TVD (ft) |   | TVD (ft) |
| <div>MD: 14,657'<br/>TVD: 6,082.06'<br/>Inclination: 91.6 °<br/>Azimuth: 91.7 °<br/>VS: 8,517.44'</div> |   |          |   |          |
| <div>MD: 14,753'<br/>TVD: 6,079.21'<br/>Inclination: 91.8 °<br/>Azimuth: 91.2 °<br/>VS: 8,613.35'</div> |   |          |   |          |





|           |        |     |
|-----------|--------|-----|
| UD WT 9.2 | VIS 37 | IN  |
| UD WT 9.1 | VIS 37 | OUT |

MUD WT 9.2 V  
MUD WT 9.2 V



CHK: It-dk gy, com crm-bm, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc  
MRLST: dk gy, stri, sft-frn, sb pty-pty, fri-bri, mod calc, sl tr Inoc, occ mas cal

CHK: It-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb ply, v calc  
 MRLST: dk gy, stri, sft-frm, sb ply-ptly, tri-brt, mod calc, sl tr lnoc, occ mas cal

CHK: It-dk gy, cor  
MRLST: dk gy, sti

MD: 14,847'  
TVD: 6,076.58'  
Inclination: 91.4 °  
Azimuth: 91 °  
VS: 8,707.29'

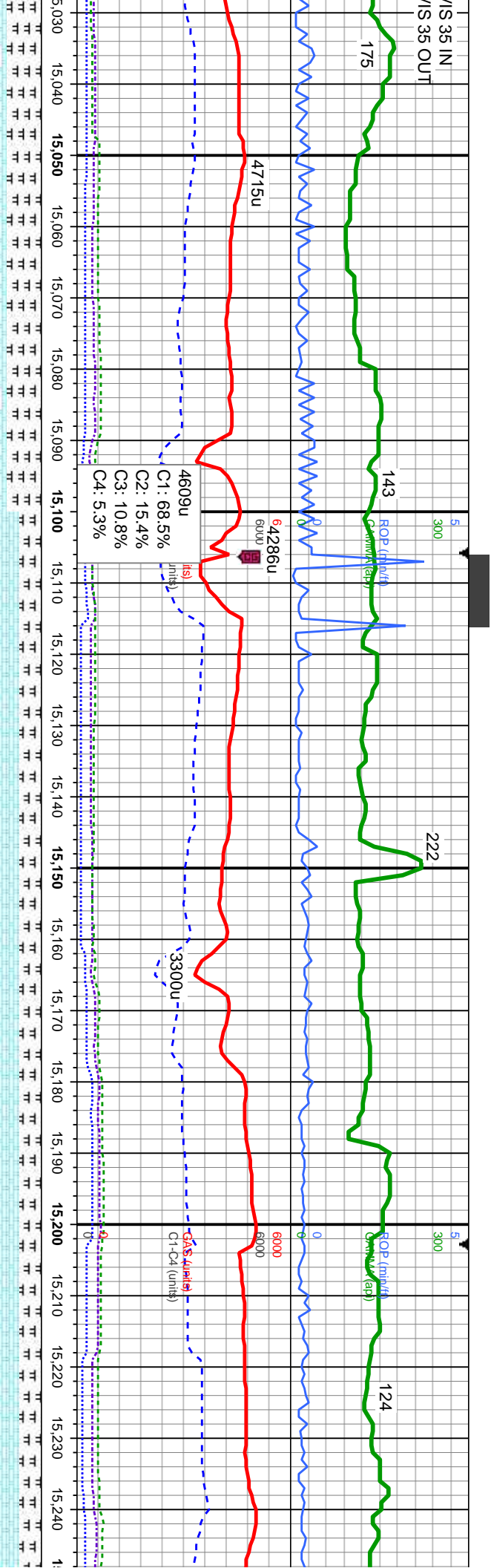
MD: 14,942'  
TVD: 6,076'  
Inclination: 89.3°  
Azimuth: 88.9°  
VS: 8,826.2'

6200

6200





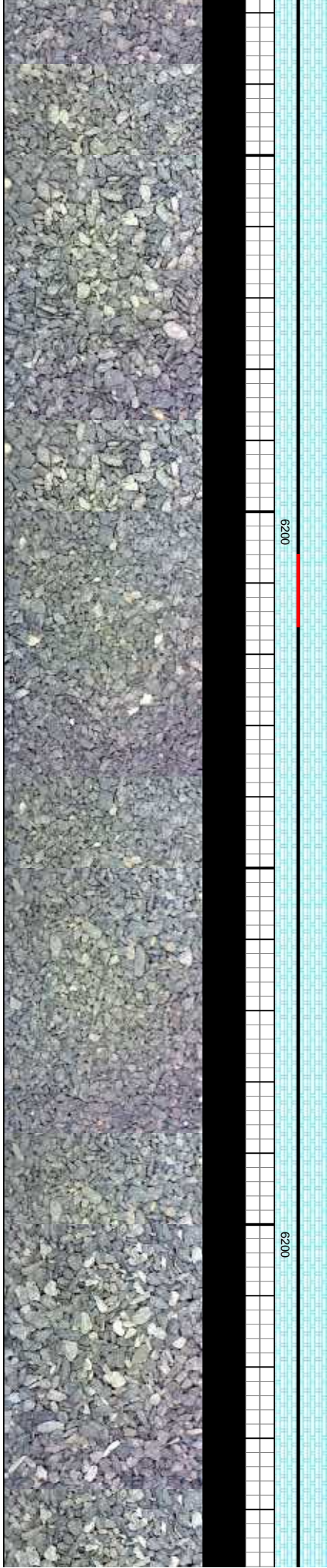


|   |      |  |      |  |
|---|------|--|------|--|
| i, sft-frn, sb ply-pty, fri-brit, mod calc, sl tr Inoc, occ mas cal | 4400 | CHK: lt-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc   | 4400 | CHK: lt-dk gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc   |
|   |      | MRLST: dk gy, stri, sft-frn, sb ply-pty, fri-brit, mod calc, sl tr Inoc, occ mas cal |      | MRLST: dk gy, stri, sft-frn, sb ply-pty, fri-brit, mod calc, sl tr Inoc, occ mas cal |

MD: 15,037'  
TVD: 6,077.66'  
Inclination: 88.7°  
Azimuth: 88.5°  
VS: 8,921.18'

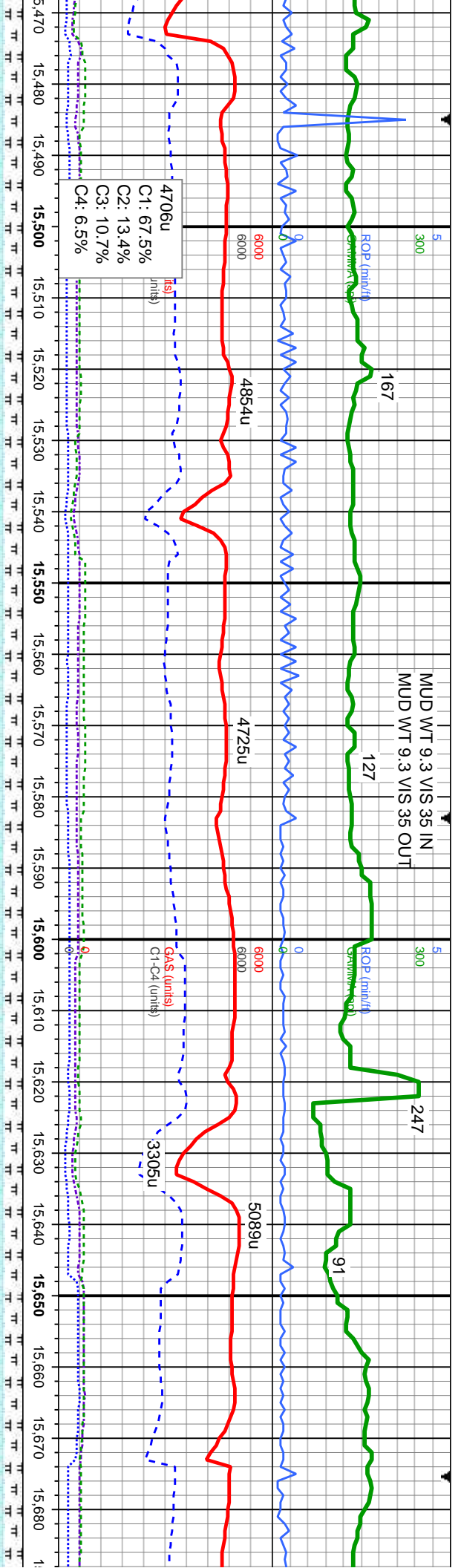
MD: 15,132'  
TVD: 6,079.49'  
Inclination: 89.1°  
Azimuth: 87.9°  
VS: 9,016.14'

MD: 15,227'  
TVD: 6,080.23'  
Inclination: 90°  
Azimuth: 87.6°  
VS: 9,111.1'









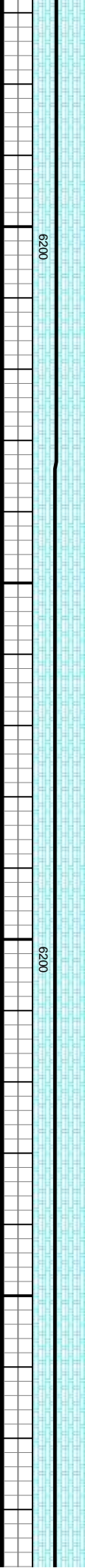
sb bilky-sb plty, v calc  
sl tr lnoc, occ mas cal

4400  
CHK: It-med gy, com crm-bm, stri-mot, occ fiss, v sft-sft, sb biky-sb ply, v calc  
MRLST: dk gy, stri, sft-firm, sb ply-ply, fri-brit, mod calc, sl tr inoc, occ mas cal

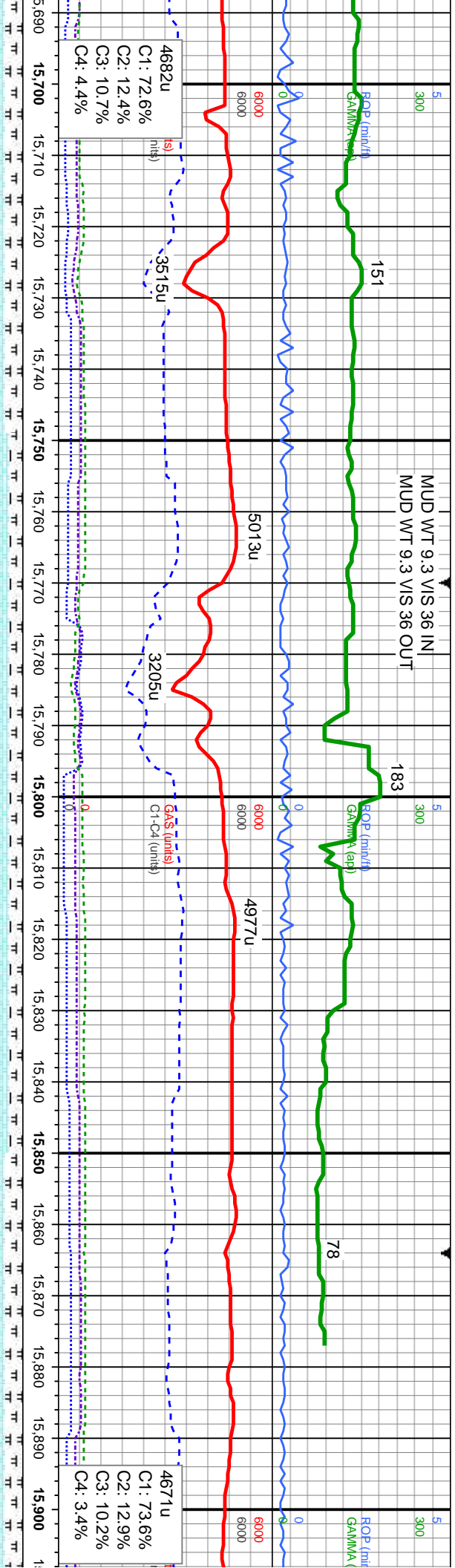
4400  
CHK: It-med gy, com crm-bm, sti-mot, occ flss, v sft-sft, sb bly-sb ply, v c  
MRLST: dk gy, sti, sft-frm, sb ply-ply, fri-bit, mod calc, sl tr noc, occ mass

MD: 15,510'  
TVD: 6,083.53'  
Inclination: 89 °  
Azimuth: 86.1 °  
VS: 9,369.75'

MD: 15,605'  
TVD: 6,085.35'  
Inclination: 88.8 °  
Azimuth: 85.9°  
VS: 9,464.54'

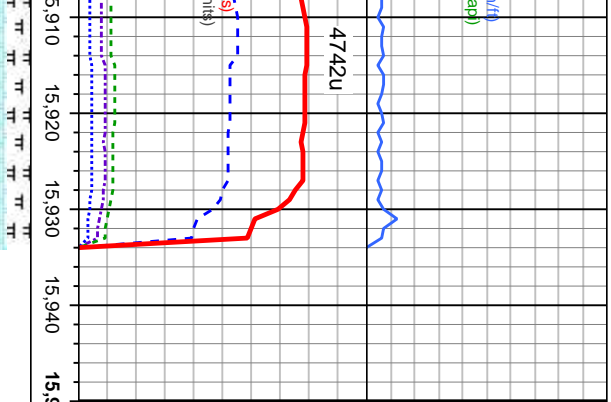






|   |   |  |   |  |   |
|---|---|--|---|--|---|
| 4400  | CHK: lt-med gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc<br>MRLST: dk gy, stri, sft-frm, sb pty-pty, fri-brit, mod calc, sl tr Inoc, occ mas cal | 4400   | CHK: lt-med gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc<br>MRLST: dk gy, stri, sft-frm, sb pty-pty, fri-brit, mod calc, sl tr Inoc, occ mas cal | 4400   | CHK: lt-med gy, com crm-brn, stri-mot, occ fiss, v sft-sft, sb blk-y-sb pty, v calc<br>MRLST: dk gy, stri, sft-frm, sb pty-pty, fri-brit, mod calc, sl tr Inoc, occ mas cal |
| MD: 15,700'<br>TVD: 6,086.92'<br>Inclination: 89.3°<br>Azimuth: 85.4°<br>VS: 9,559.3' |   | MD: 15,794'<br>TVD: 6,087.83'<br>Inclination: 89.6°<br>Azimuth: 85.5°<br>VS: 9,653.04' |   | MD: 15,864'<br>TVD: 6,088.38'<br>Inclination: 89.5°<br>Azimuth: 85.3°<br>VS: 9,722.85' |   |





TD Lateral- 15.934' MD  
07/12/2014 @ 15:31 MST

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