



Scale: 5" / 100'
Measured Depth Log

Well Name Pronghorn 21-24-22HNB

Location NWNW Section 22, T5N, R61W

State COLORADO

County WELD

Country USA

Rig Number CADE 25

API Number 05-123-39545-00

AFE # 14308

Region DJ BASIN

Field WATTENBERG

Spud Date 1/10/2015

Drilling Completed 1/17/2015

Surface Coordinates 352' FNL x 1279' FWL

Bottom Hole Coordinates 470' FFSSL x 2000' FFWLL

Ground Elevation 4661'

K.B. Elevation 4678'

Logged Interval 5700' To 10751'

Total Depth 10751'

Formation NIOBRARA B CHALK

Type of Drilling Fluid FW LSND

Operator

Company Bonanza Creek Energy Inc.

Address 410 17th STREET, SUITE 1500
DENVER, CO 80202

Geologist

Name BRANT LOGAN

Company BONANZA CREEK ENERGY INC.

Address 410 17th STREET, SUITE 1500
DENVER, CO 80202

Other

COLUMBINE LOGGING, INC. 602 S. LIPAN STREET
DENVER, COLORADO 80202
WELL SITE GEOLOGISTS JEFF LACY
DAVID FAY

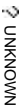

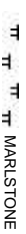
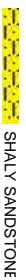

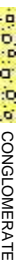

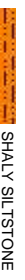



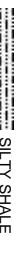

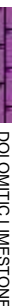








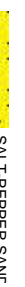





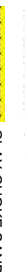





Zone Color Coding

Oil
Note
Error

























































Condensate
Core
Water

Gas
Pres
Sea

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 SANC |  TUFF |
|  CHERT |  IGNEOUS |  SHALE |  WELDED TUFF |
|  CLAY CHOKE SANC |  SIDERITE or LIMONITE |  SHALE COLORED | |
|  CLAYSTONE |  LIMESTONE |  SHALE GRAY | |

Accessories

| | | | |
|--|--|---|---|
|  GASTROPOD |  ARGILLITE GRAIN |  HEAVY MINERAL |  ANHYDRITE STRINGER |
|  INOCERAMUS |  B BENTONITE |  K KAOLIN |  BENTONITE STRINGER |
|  ALGAE |  BITUMENOUS SUBSTANCE |  M MARLSTONE |  COAL STRINGER |
|  AMPHIPORA |  BRECCIA FRAGMENTS |  MICACEOUS |  DOLOMITE STRINGER |
|  BELLENNITE |  CALCAREOUS |  MINERAL CRYSTALS |  GYPSUM STRINGER |
|  BIOCLASTIC |  PELLET |  NODULES |  LIMESTONE STRINGER |
|  BRACHIOPOD |  PISOLITE |  PHOSPHATE PELLETS |  MARLSTONE (CALC) STRG |
|  BRYOZOA |  PLANT REMAINS |  P PYRITE |  MARLSTONE (DOL) STRG |
|  CEPHALOPOD |  PLANT SPORES |  SALT CAST |  SANDSTONE STRINGER |
|  CORAL |  SCAPHOPOD |  SANDY |  SHALE STRINGER |
|  CRINOID |  STROMATOPOROID |  SILICEOUS |  SILTSTONE STRINGER |
|  ECHINOID |  FERRUGINOUS PELLET |  SILTY | |
|  FISH |  FERRUGINOUS |  TUFFACEOUS | |
|  FORAMINIFERA |  ANHYDRITIC |  GLAUCONITE | |
|  F FOSSIL |  ARGILLACEOUS |  GYPSIFEROUS | |

Stringer

Oil Show

- P PINPOINT
- VUGGY






































Engineering

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

Porosity

- CONNECTION GAS
- CONNECTION GAS
- TRIP GAS
- TRIP GAS (LEFT)
- FRACTURE
- INTERCRYSTALLINE
- DOWN TIME GAS
- INTEROOLITIC
- DOWN TIME GAS
- MOLDIC
- CORE - LOST
- 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 |  | MN DEPTH |  | L LITHOGRAPHIC |
|  | OIL SHOW | | |  | MX MICROXLN |
|  | MN DEPTH UP | Rounding | | | |
| | | | |  | MS MUDSTONE |
|  | MN DEPTH (DOWN) |  | ANGULAR |  | PS PACKSTONE |
|  | NORMAL FAULT |  | ROUNDED |  | WS WACKESTONE |
|  | OVERTURNED STRATA |  | SUBANG | | |
|  | REVERSE FAULT |  | SUBRND | Sorting | |
|  | CASING | | |  | M MODERATE |
| Textures | | | | | |
|  | SIDEWALL CORE (LEFT) | | |  | P POOR |
|  | SIDEWALL CORE (RIGHT) |  | BS BOUNDSTONE |  | W WELL |
|  | SLIDE |  | CHALKY | | |
|  | SURVEY |  | CX CRYPTOXLN | | |

| Slide/Rotate | | | | | | | | | | |
|--------------------|--|--|--|--|--|--|--|--|--|--|
| ROP ROP — | <div>ROP Limit 0 to 500 ft/hr</div> <div>Total Gas Limit 0 to 3000 units</div> <div> GAS (units) C1 — C2 — C3 — C4 </div> | | | | | | | | | |
| Depth Labels | <div>5.660 5.670 5.680 5.690 5.700 5.710 5.720 5.730 5.740 5.750 5.760 5.770 5.780 5.790 5.800 5.810 5.820 5.830 5</div> | | | | | | | | | |
| % Lith | | | | | | | | | | |
| Curves GAMMA — | <div>Gamma Limit 0 to 200 API</div> <div>30' Samples</div> <div> GAS (units) C1-C4 (PPM) </div> | | | | | | | | | |
| Well Bore TVD — | <div> Bit Data Bit #: 2 Type: SD1513 Size: 8.75" Depth In: 456' Depth Out: 6,543' Jets: 8x14 S/N: JJ5493 </div> <div> TVD Scale 5600' to 6150' </div> <div> MD: 5.691' TVD: 5,619.31' Inclination: 12.8° Azimuth: 186.3° VS: -234.1° </div> <div> MD: 5.739' TVD: 5,665.7' Inclination: 16.9° Azimuth: 183.4° VS: -222.13° </div> <div> MD: 5.787' TVD: 5,711.09' Inclination: 21° Azimuth: 182° VS: -206.85° </div> <div> MD: 5.835' TVD: 5,754.85' Inclination: 27.4° Azimuth: 184° VS: -187.6° </div> | | | | | | | | | |
| Oil Show | <div> COLUMBINE LOGGING 01/13/2014 MANNED 2-PERSON LOGGING WITH BLOODHOUND GAS CHROMATOGRAPH UNIT #0529 KICKED OFF @ 21:03 MST ON 01/13/2015 </div> <div> 95-100% SLTY SH: lt-medgy, brn, sb pily-biky, occ pily, sft-firm, rthy-gritty, grdg-slst ip, arg-sily, aren 5-0% SHY SS: wh-lgy, s&p, clr grns, sb ang-sr, arg ip, sily, p strd, vf-f grnd, cly cnt, mod cons, frt; O SHOW: v slow stmg, dk bl cut, fnt yel-gn ring, no str, no od </div> <div> 100% SLTY SH: lt-medgy, brn, sb pily-biky, occ pily, sft-firm, rthy-gritty, grdg-slst ip, arg-sily, aren 0% SHY SS: wh-lgy, s&p, clr grns, sb ang-sr, arg ip, sily, p strd, vf-f grnd, cly cnt, mod cons, frt; O SHOW: v slow stmg, bl cut, fnt yel-gn ring, no str, no od </div> <div> 100% SLTY SH: sft-firm, rthy-gritty O SHOW: v slow od </div> | | | | | | | | | |
| Images | | | | | | | | | | |

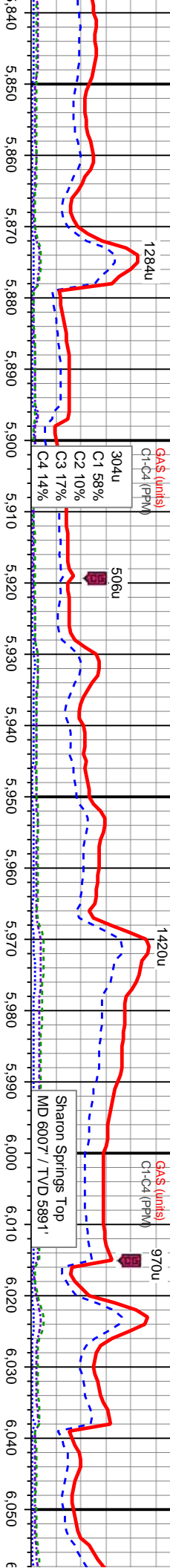
ROP (ft/hr) 164

ROP (ft/hr)

3000

MW 9.7 / VIS 39

3000



MD: 5.882'

TVD: 5.795.56'

Inclination: 32.5°

Azimuth: 183.4°

VS: -164.68'

MD: 5.930'

TVD: 5.834.67'

Inclination: 38.3°

Azimuth: 182.2°

VS: -137.44'

MD: 5.978'

TVD: 5.870.68'

Inclination: 44.4°

Azimuth: 180.4°

VS: -106.22'

MD: 6.026'

TVD: 5.903.99'

Inclination: 47.7°

Azimuth: 179°

VS: -72.03'

TVD (ft)

TVD (ft)

100% SLTY SH: lt-medgy, brn, sb pily-biky, occ pily, silt-frm, rthy-gritty, grdg-silst ip, arg-sily, aren, tr shy ss; O SHOW: slow stimg, bl cut, fnt yel-gn ring, no str, no od

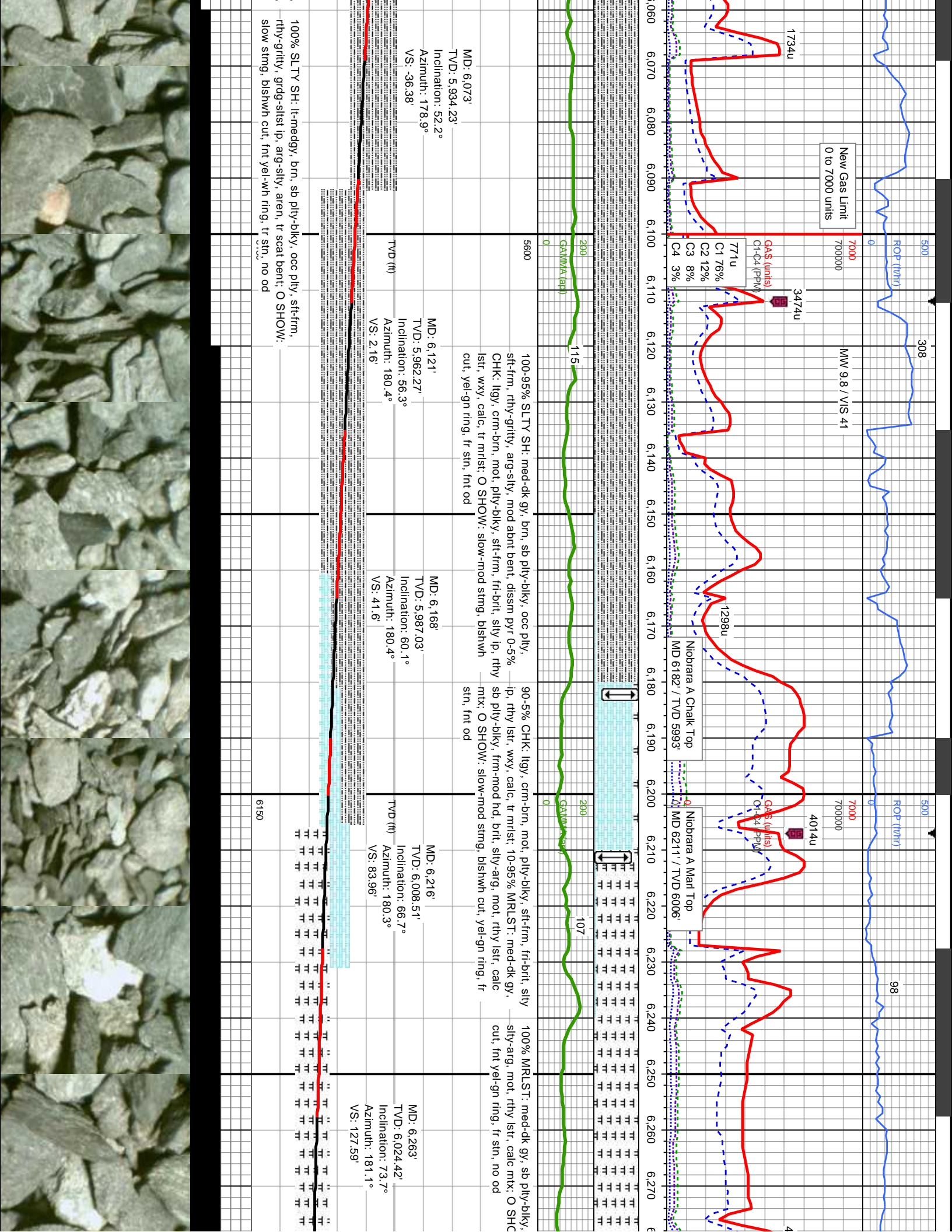
100% SLTY SH: lt-medgy, brn, sb pily-biky, occ pily, silt-frm, rthy-gritty, grdg-silst ip, arg-sily, aren, tr shy ss; O SHOW: slow stimg, bl cut, fnt yel-gn ring, sl tr str, no od

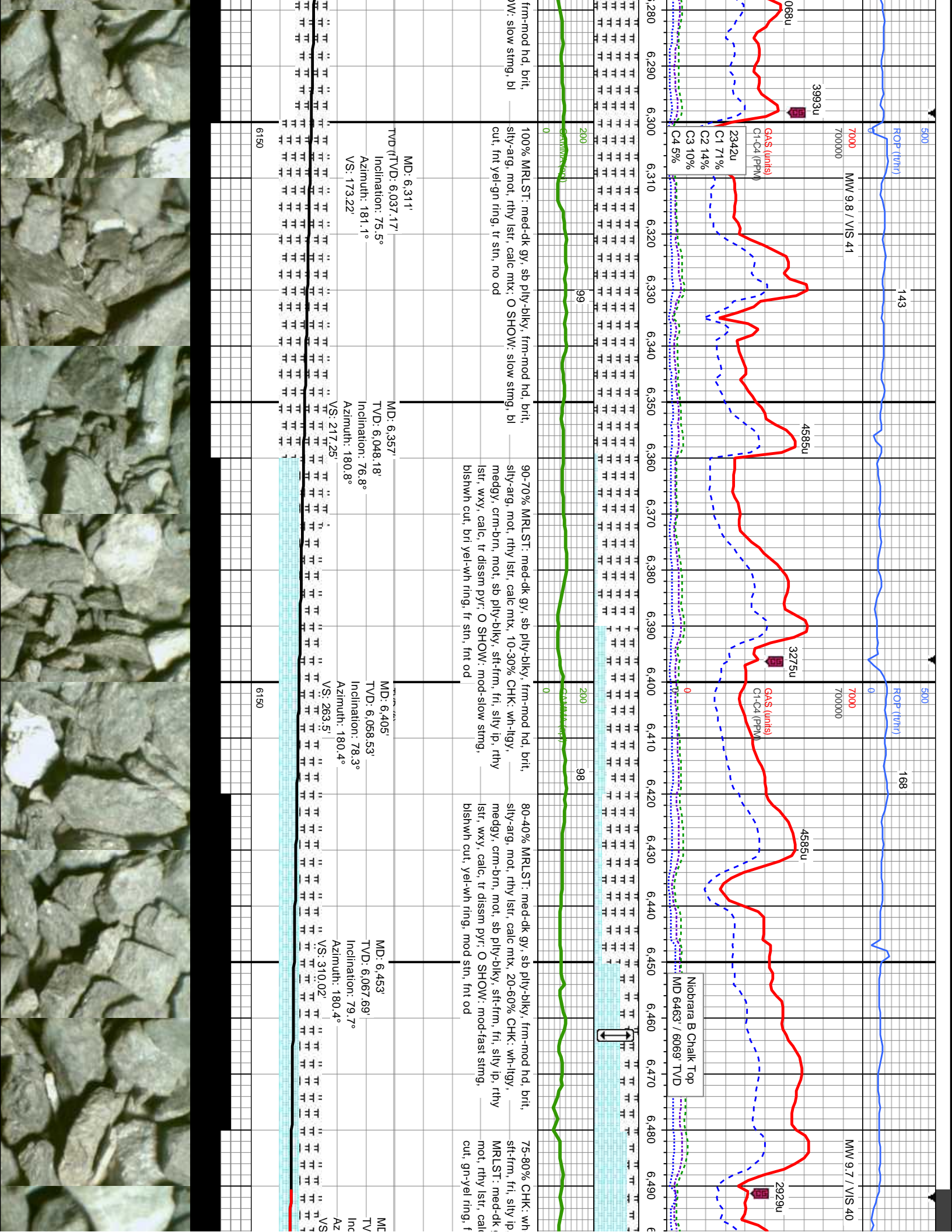
100% SLTY SH: lt-medgy, brn, sb pily-biky, occ pily, silt-frm, rthy-gritty, grdg-silst ip, arg-sily, aren, tr shy ss; O SHOW: slow stimg, bl cut, yel-gn ring, sl tr str, no od

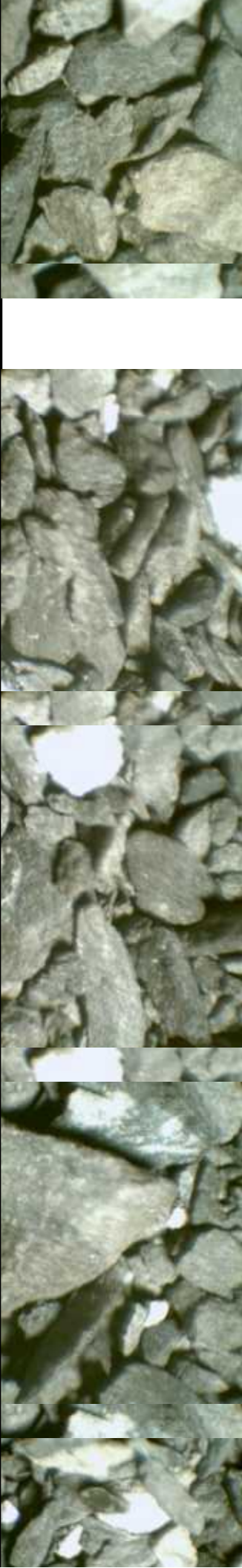
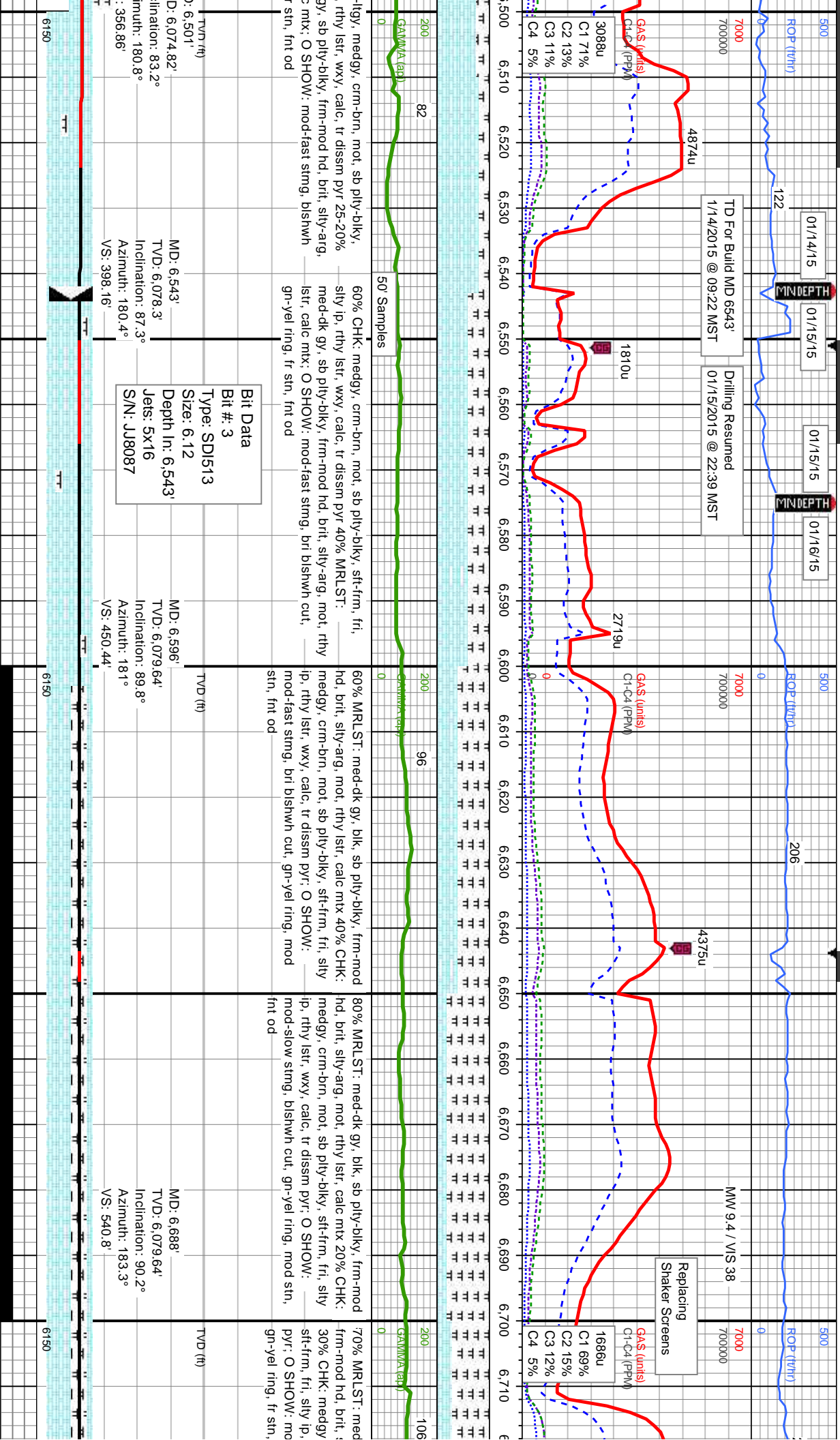
6150

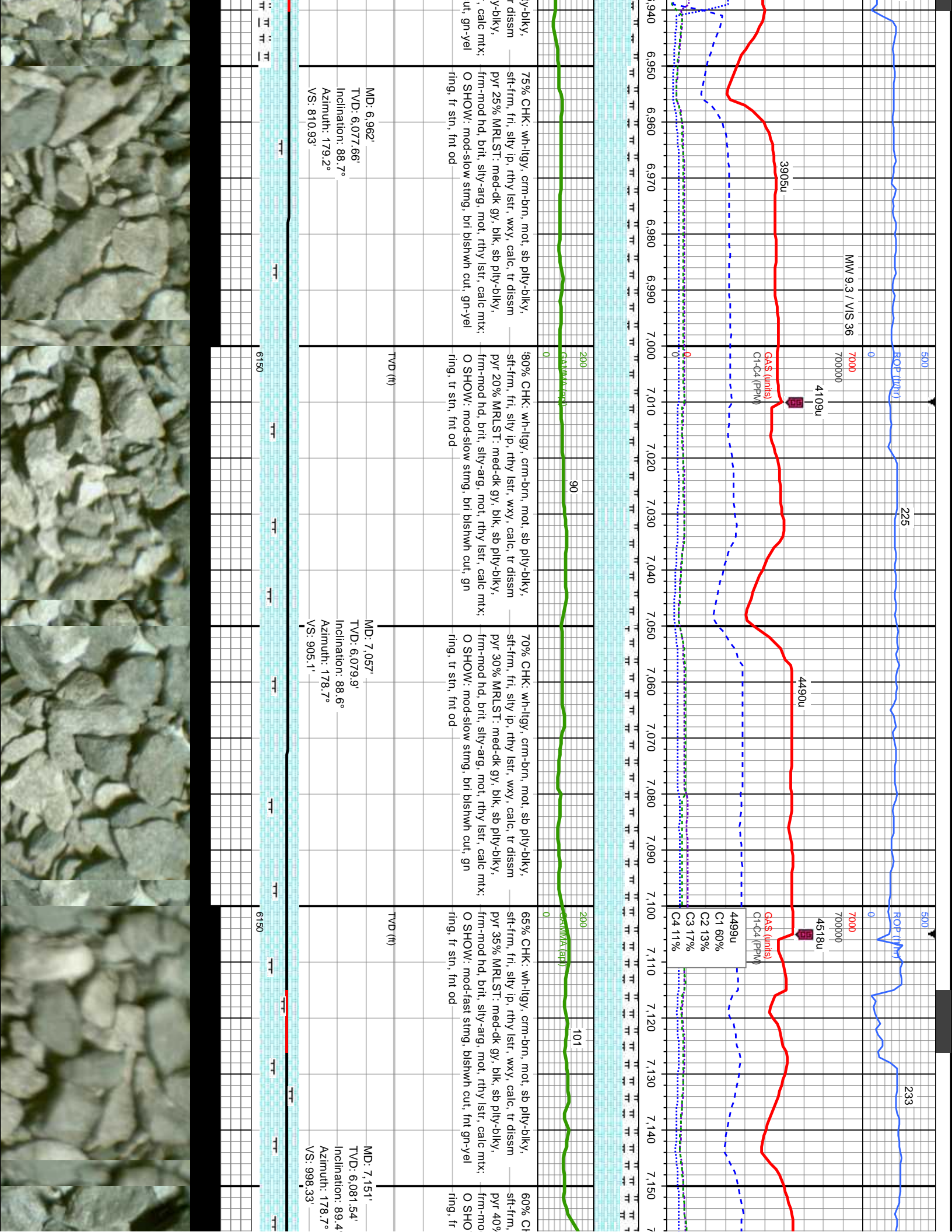
6150

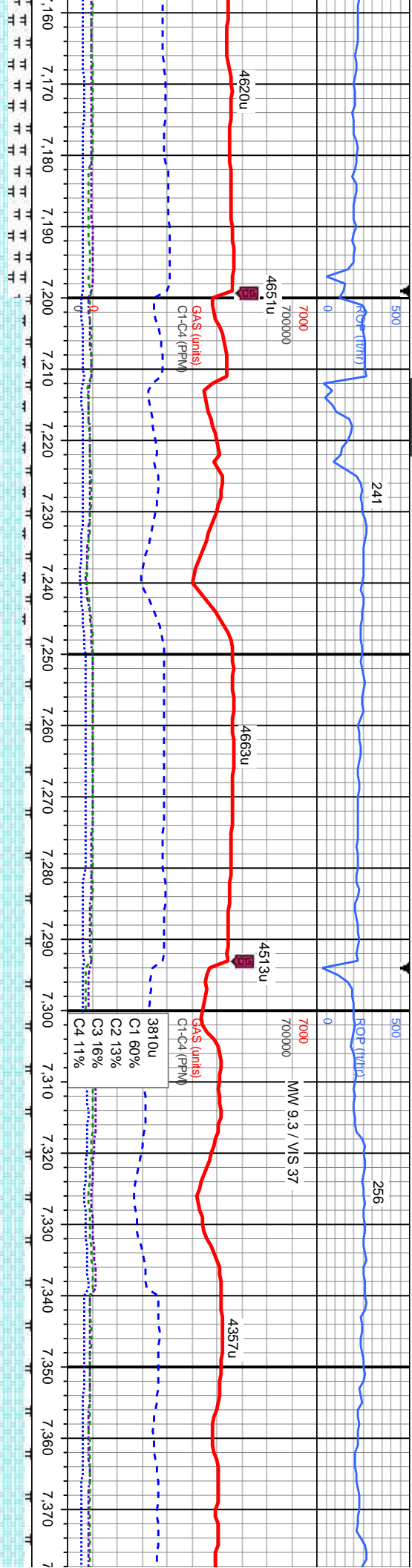








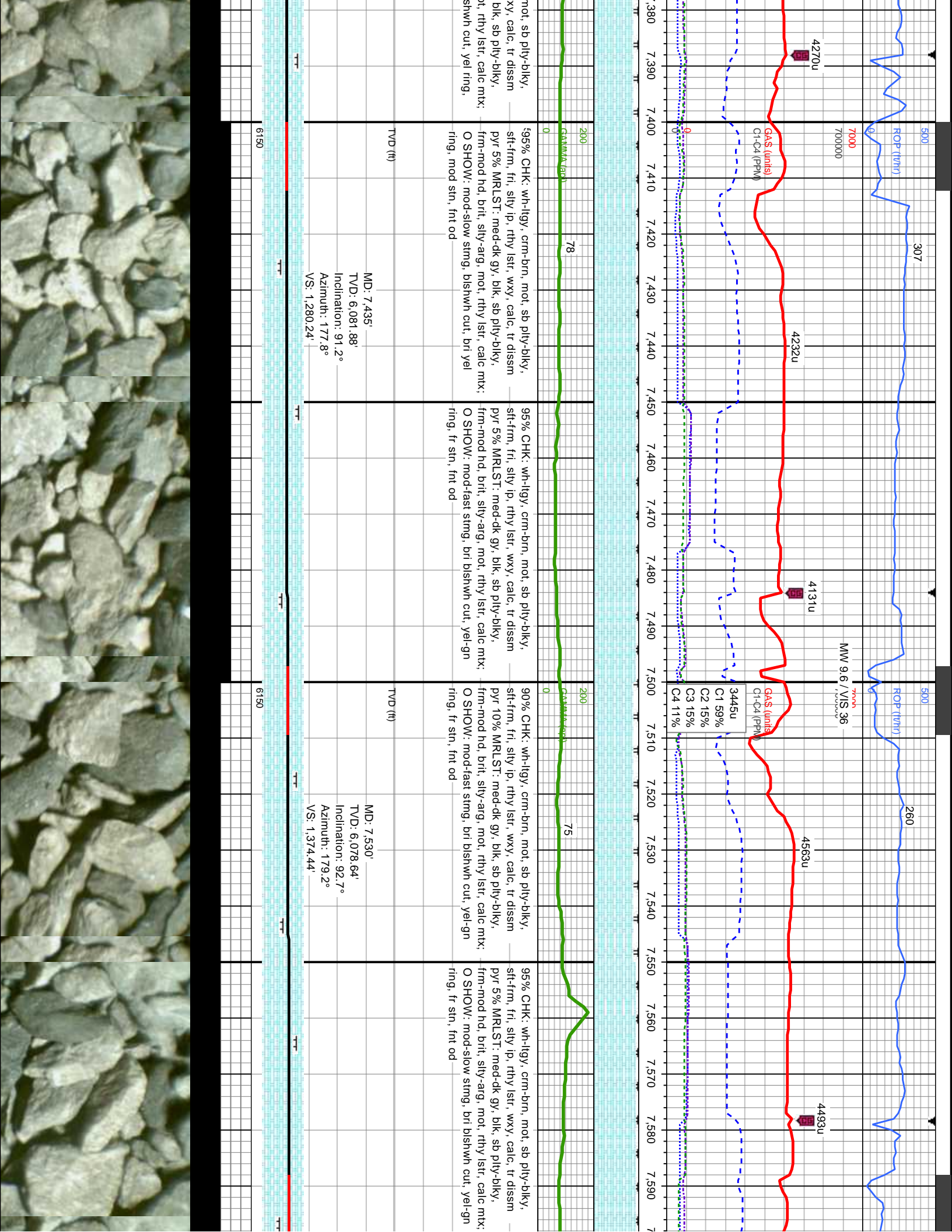


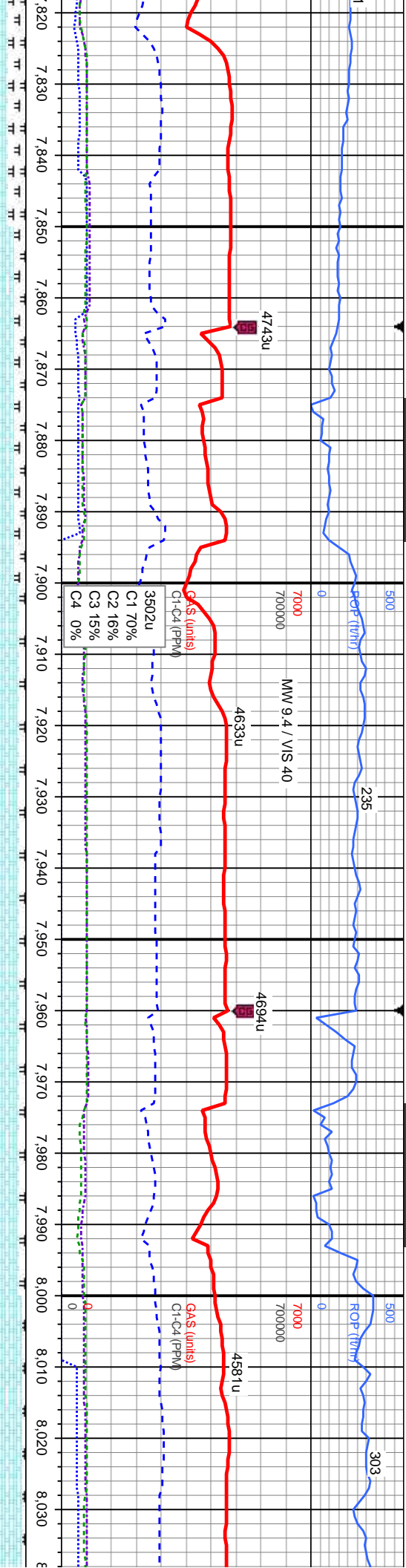


| | | | | |
|--|---|---|---|---|
| HK: wh-llgy, crm-brn, mot, sb pily-biky, frl, silty ip, rthy lstr, wxy, calc, tr diss | 85% CHK: wh-llgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss | 90% CHK: wh-llgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss | 90% CHK: wh-llgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss | 90% CHK: wh-llgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss |
| & MRST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt | pyr 15% MRST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt | pyr 10% MRST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt | pyr 10% MRST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt | pyr 10% MRST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt |
| OW: mod-fast sting, blshwh cut, fnt gn-yel | O SHOW: mod-slow sting, blshwh cut, gn-yel ring, mod stn, fnt od | O SHOW: mod-slow sting, blshwh cut, gn-yel ring, mod stn, fnt od | O SHOW: mod-slow sting, blshwh cut, yel ring, fr stn, fnt od | O SHOW: mod-slow sting, blshwh cut, yel ring, fr stn, fnt od |

| | | | |
|----------|--|----------|---|
| TVD (ft) | MD: 7,246' TVD: 6,081.87' Inclination: 90.2° Azimuth: 179.2° VS: 1,092.49' | TVD (ft) | MD: 7,341' TVD: 6,082.29' Inclination: 89.3° Azimuth: 177.3° VS: 1,186.8' |
|----------|--|----------|---|





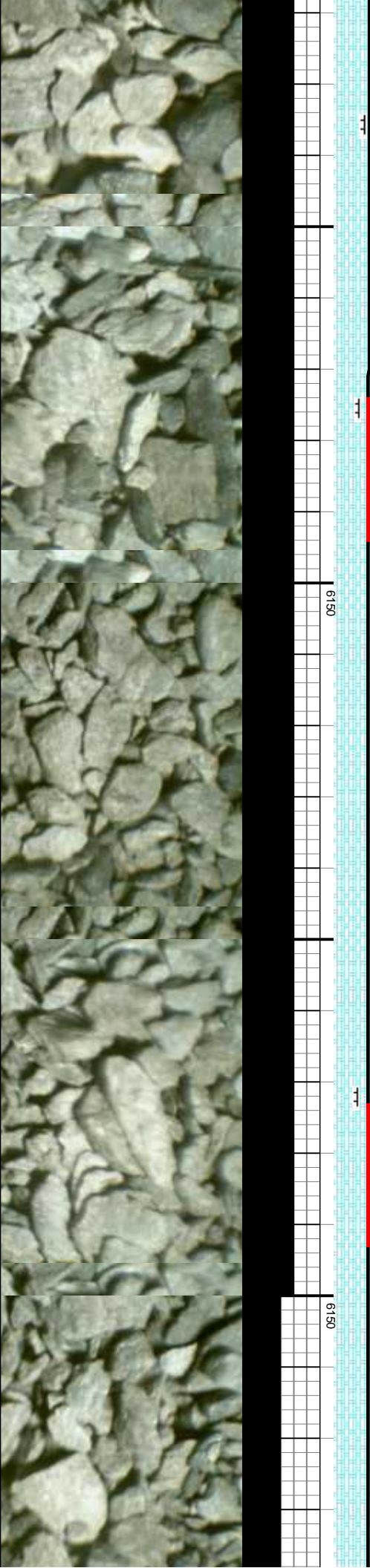


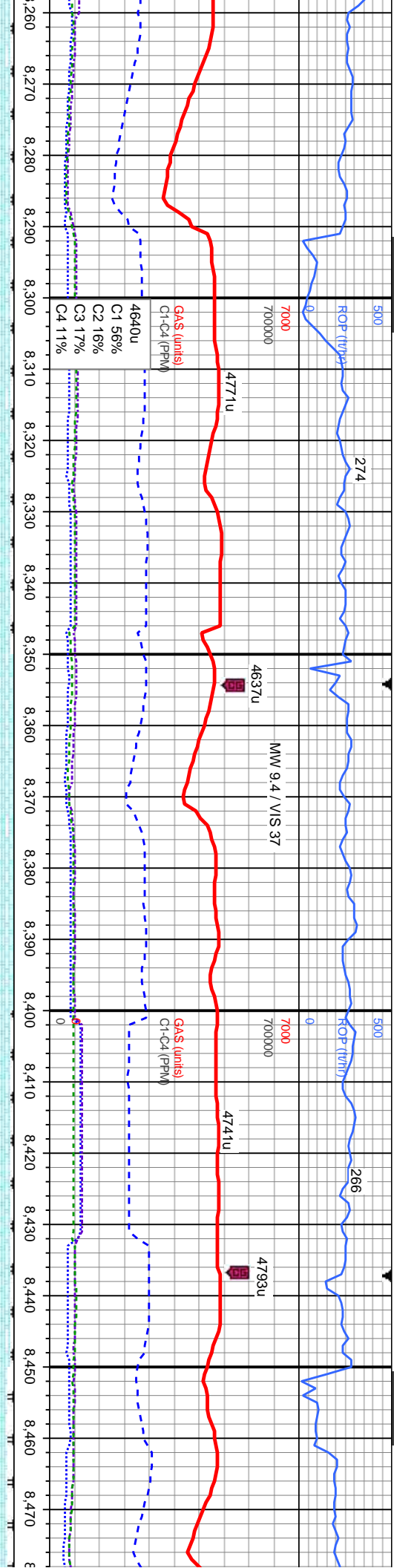
| Depth (ft) | Depth (m) | ROP (ft/hr) | G&S (units) | C1-C4 (PPM) | C1 70% | C2 16% | C3 15% | C4 0% | 80% CHK: wh-llgy, crm-brn, mot, sb ply-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 20% MRLST: med-dk gy, blk, sb ply-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx: O SHOW: mod-slow string, bri bl cut, gn-yel ring, mod stn, fnt od |
|------------|-----------|-------------|-------------|-------------|--------|--------|--------|-------|---|
| 7820 | 2385 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7830 | 2390 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7840 | 2395 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7850 | 2400 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7860 | 2405 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7870 | 2410 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7880 | 2415 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7890 | 2420 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7900 | 2425 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7910 | 2430 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7920 | 2435 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7930 | 2440 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7940 | 2445 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7950 | 2450 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7960 | 2455 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7970 | 2460 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7980 | 2465 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7990 | 2470 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8000 | 2475 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8010 | 2480 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8020 | 2485 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8030 | 2490 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| Depth (ft) | Depth (m) | ROP (ft/hr) | G&S (units) | C1-C4 (PPM) | C1 70% | C2 16% | C3 15% | C4 0% | 90% CHK: wh-llgy, crm-brn, mot, sb ply-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 10% MRLST: med-dk gy, blk, sb ply-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx: O SHOW: mod-fast string, bri bishwh cut, bri yel ring, mod stn, fnt od |
|------------|-----------|-------------|-------------|-------------|--------|--------|--------|-------|--|
| 6150 | 1875 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6160 | 1880 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6170 | 1885 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6180 | 1890 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6190 | 1895 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6200 | 1900 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6210 | 1905 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6220 | 1910 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6230 | 1915 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6240 | 1920 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6250 | 1925 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6260 | 1930 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6270 | 1935 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6280 | 1940 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6290 | 1945 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6300 | 1950 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

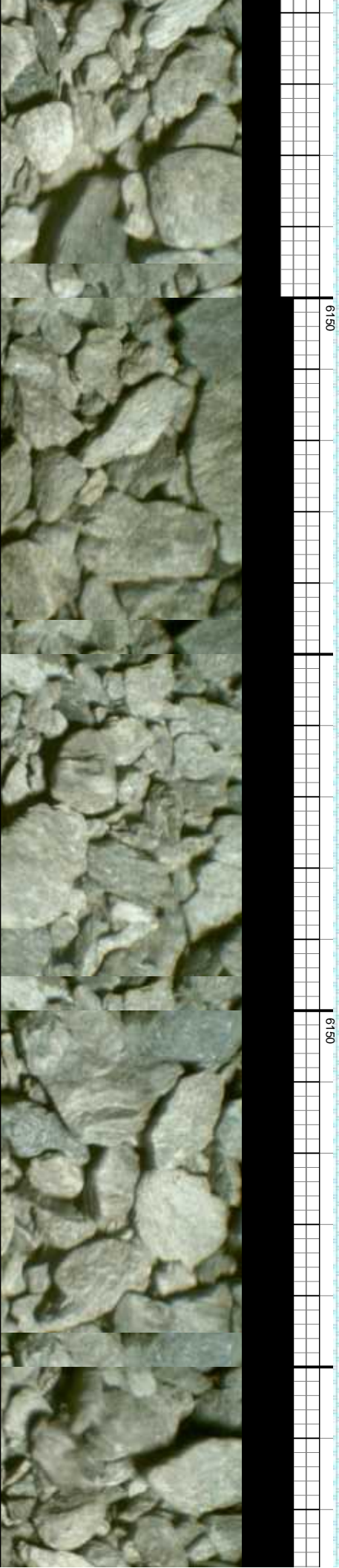
TVD (ft)
MD: 7.912'
TVD: 6,076.72'
Inclination: 90.2°
Azimuth: 179.6°
VS: 1,752.64'

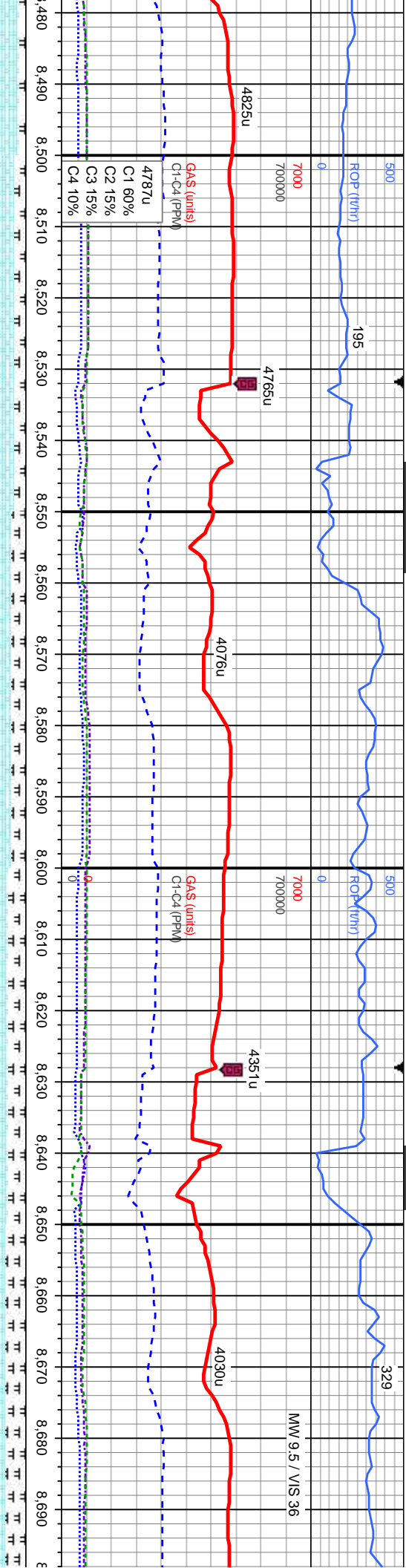
TVD (ft)
MD: 8.008'
TVD: 6,076.22'
Inclination: 90.4°
Azimuth: 182.7°
VS: 1,847.23'



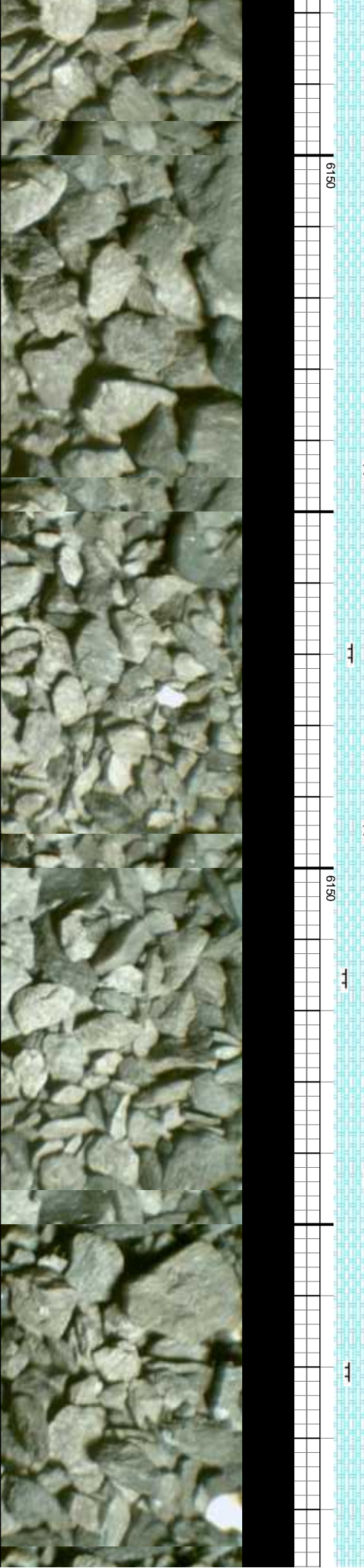


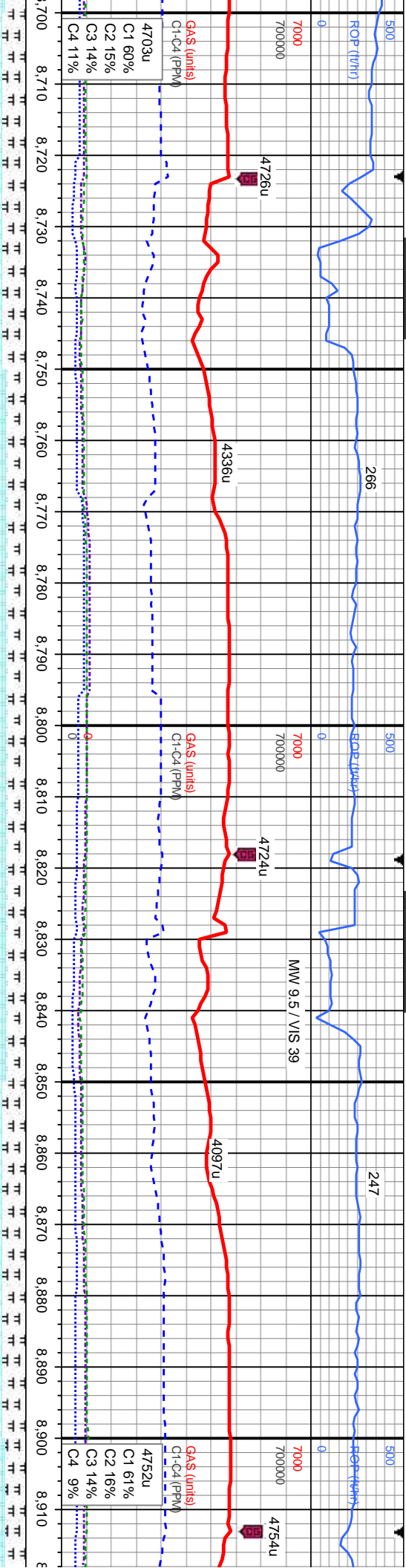
| | | | | |
|---|---|---|---|--|
| JK: wh-llgy, crm-brn, mot, sb pily-biky, frn, silty ip, rthy lstr, wxy, calc, tr diss | 95% CHK: wh-llgy, crm-brn, mot, sb pily-biky, sft-frn, frn, silty ip, rthy lstr, wxy, calc, tr diss pyr 5% MRLST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: mod-fast stmg, blshwh cut, bri yel-wh ring, mod stn, g od | 100% CHK: wh-llgy, crm-brn, mot, sb pily-biky, sft-frn, frn, silty ip, rthy lstr, wxy, calc, tr diss pyr: TR MRLST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: mod-fast stmg, blshwh cut, bri yel-wh ring, mod stn, g od | 95% CHK: wh-llgy, crm-brn, mot, sb pily-biky, sft-frn, frn, silty ip, rthy lstr, wxy, calc, tr diss pyr 5% MRLST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: fast stmg, blshwh cut, bri yel-wh ring, mod stn, g od | 90% CHK: wh-llgy, crm-brn, sft-frn, frn, silty ip, rthy lstr, wxy, calc, tr diss pyr 10% MRLST: med-dk gy, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: fast stmg, blshwh ring, mod stn, g od |
| MD: 8,293' | MD: 8,388' | MD: 8,388' | | |
| TVD: 6,076.29' | TVD: 6,075.88' | TVD: 6,075.88' | | |
| Inclination: 90.1° | Inclination: 90.4° | Inclination: 90.4° | | |
| Azimuth: 179.7° | Azimuth: 179.4° | Azimuth: 179.4° | | |
| VS: 2,128.17' | VS: 2,222.2' | VS: 2,222.2' | | |



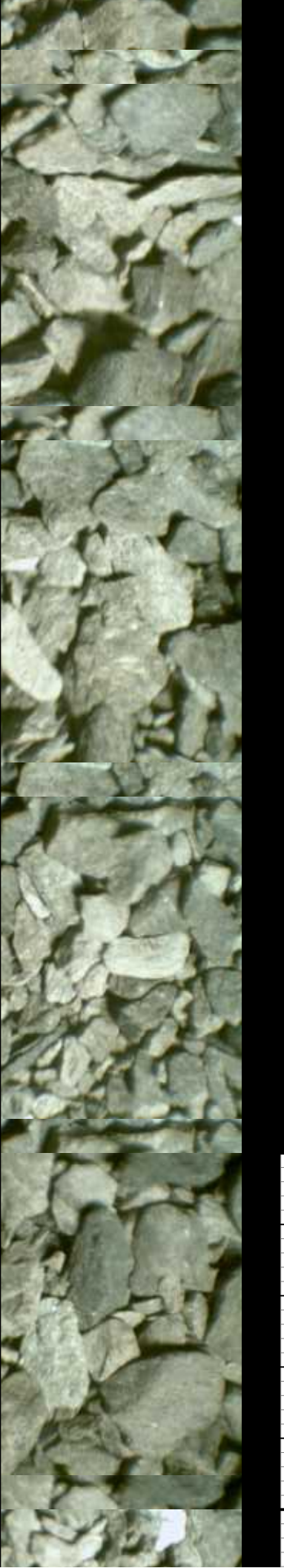
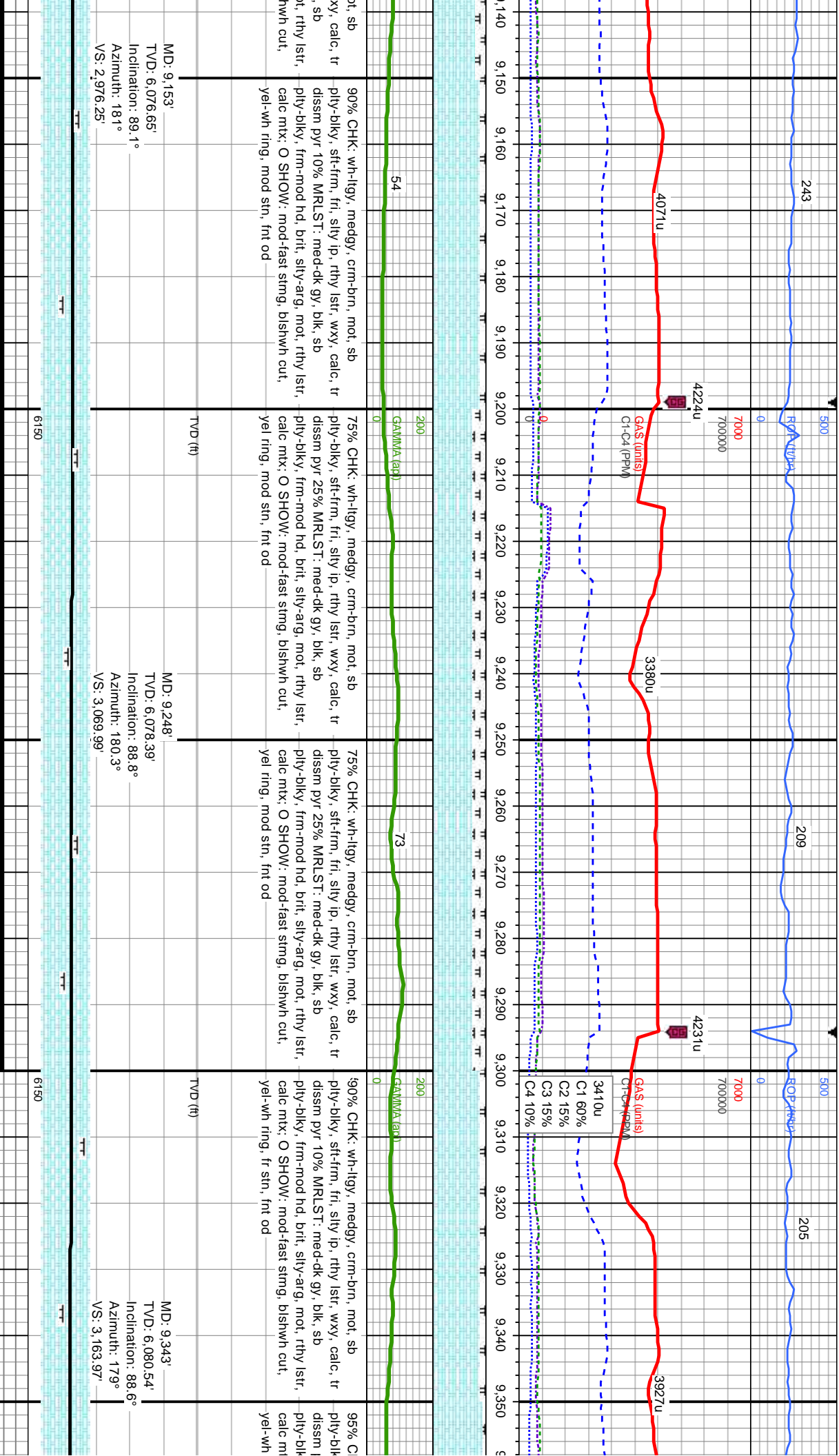


| | | | | |
|---|---|---|---|---|
| mot, sb ply-biky, wxy, calc, tr diss | 80% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fr, silty ip, rthy lstr, wxy, calc, tr diss | 75% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fr, silty ip, rthy lstr, wxy, calc, tr diss | 70% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fr, silty ip, rthy lstr, wxy, calc, tr diss | 65% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fr, silty ip, rthy lstr, wxy, calc, tr diss |
| pyr 20% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx: O SHOW: fast sting, blshwh cut, bri yel ring, mod stn, fr od | pyr 25% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx: O SHOW: fast sting, blshwh cut, bri yel ring, mod stn, fr od | pyr 30% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx: O SHOW: fast sting, blshwh cut, bri yel ring, mod stn, fr od | pyr 35% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx: O SHOW: fast sting, blshwh cut, bri yel ring, mod stn, fr od | pyr 35% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx: O SHOW: fast sting, blshwh cut, bri yel ring, mod stn, fr od |
| MD: 8.484' | MD: 8.580' | MD: 8.676' | MD: 8.676' | MD: 8.676' |
| D: 6.076.47' | TVD: 6.077.97' | TVD: 6.076.8' | TVD: 6.076.8' | TVD: 6.076.8' |
| Inclination: 88.9° | Inclination: 89.3° | Inclination: 92.1° | Inclination: 92.1° | Inclination: 92.1° |
| imuth: 179.2° | Azimuth: 181.1° | Azimuth: 182.4° | Azimuth: 182.4° | Azimuth: 182.4° |
| VS: 2.317.27' | VS: 2.412.13' | VS: 2.506.53' | VS: 2.506.53' | VS: 2.506.53' |





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|--|---|--|--|---|
| 560% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fn, silty ip, rthy lstr, wxy, calc, tr diss pyr 40% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-slow stimg, bl cut, yel-oring ring, mod stn, g od | 70% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fn, silty ip, rthy lstr, wxy, calc, tr diss pyr 30% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-slow stimg, bl cut, yel-oring ring, mod stn, g od | 70% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fn, silty ip, rthy lstr, wxy, calc, tr diss pyr 30% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stimg, blshwh cut, yel-wh ring, mod stn, g od | 60% CHK: lt-medgy, crm-brn, mot, sb ply-biky, sft-frm, fn, silty ip, rthy lstr, wxy, calc, tr diss pyr 40% MRLST: med-dk gy, blk, sb ply-biky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stimg, blshwh cut, yel-wh ring, mod stn, g od | 565% CHK: lt-med sft-frm, fn, silty ip pyr 35% MRLST: frm-mod hd, brit, O SHOW: mod-fa ring, fr stn, fnt od |
| 200 | 75 | 200 | 86 | 200 |
| 0 | 0 | 0 | 0 | 0 |
| GA\$ (units) C1-C4 (PPM) | GA\$ (units) C1-C4 (PPM) | GA\$ (units) C1-C4 (PPM) | GA\$ (units) C1-C4 (PPM) | GA\$ (units) C1-C4 (PPM) |
| 4703u | | | | 4752u |
| C1 60% | | | | C1 61% |
| C2 15% | | | | C2 16% |
| C3 14% | | | | C3 14% |
| C4 11% | | | | C4 9% |
| 4726u | 4336u | 4724u | 4097u | 4754u |
| | | MW 9.5 / VIS 39 | | |
| ROF (ft/hr) | 266 | 247 | | |
| 7000 | | | | 7000 |
| 700000 | | | | 700000 |
| 500 | 500 | 500 | 500 | 500 |
| 8,700 | 8,710 | 8,720 | 8,730 | 8,740 |
| 8,750 | 8,760 | 8,770 | 8,780 | 8,790 |
| 8,800 | 8,810 | 8,820 | 8,830 | 8,840 |
| 8,850 | 8,860 | 8,870 | 8,880 | 8,890 |
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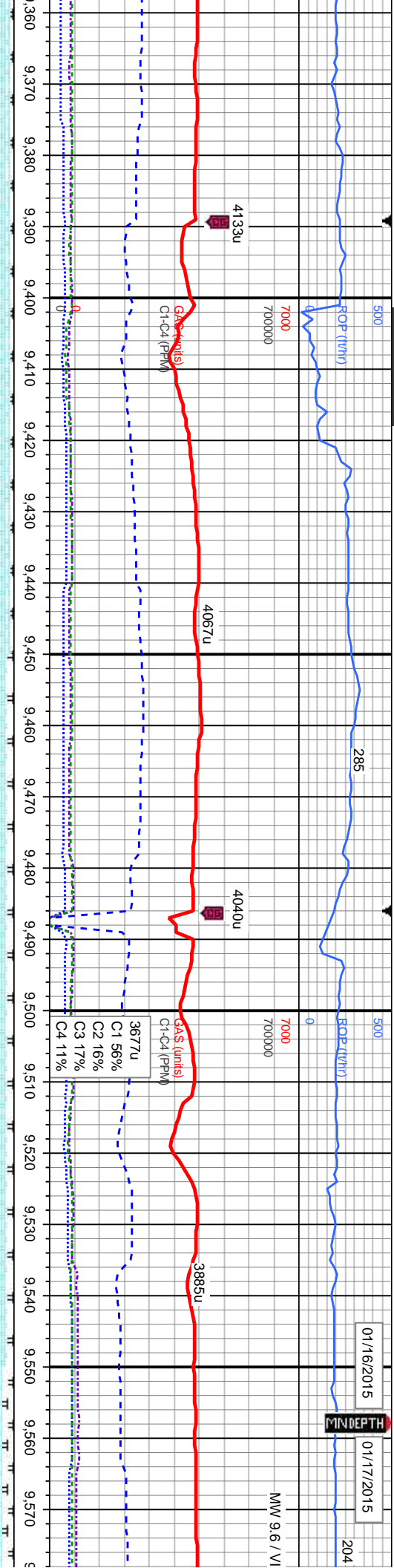
01/16/2015

01/17/2015

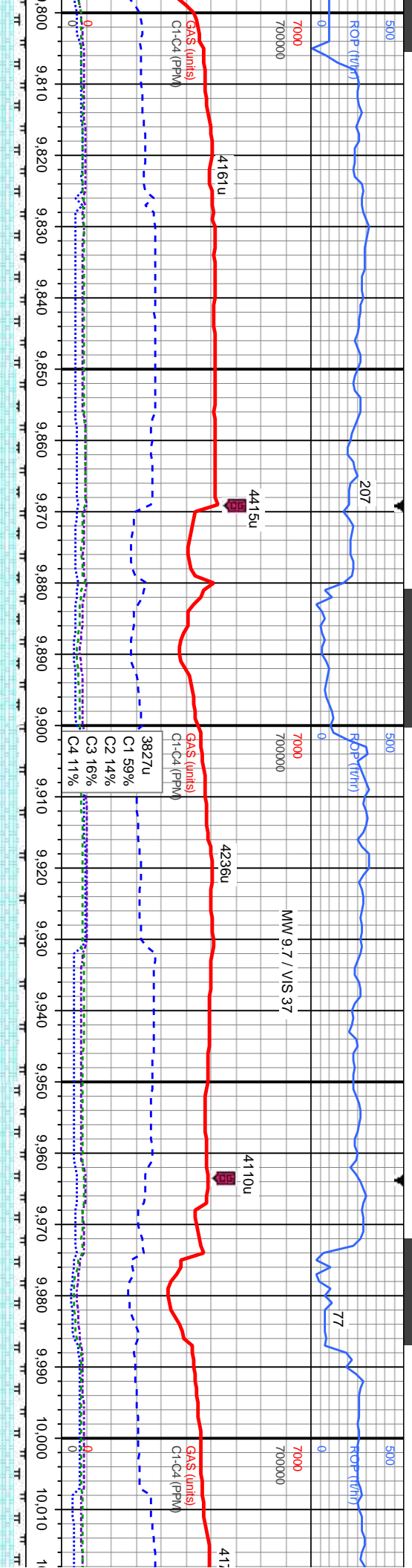
MINDEPTH

204

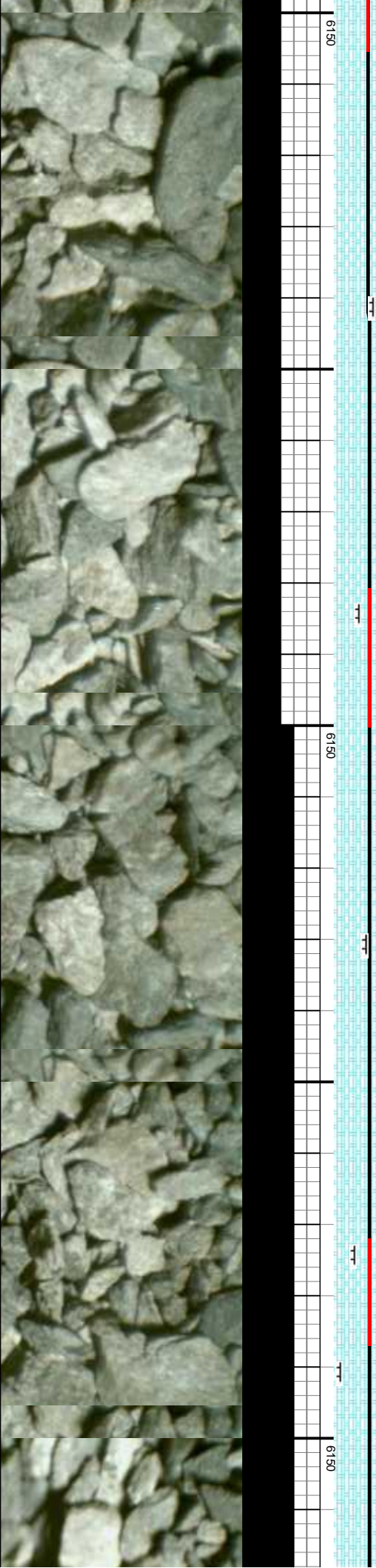
MW 9.6 / VI

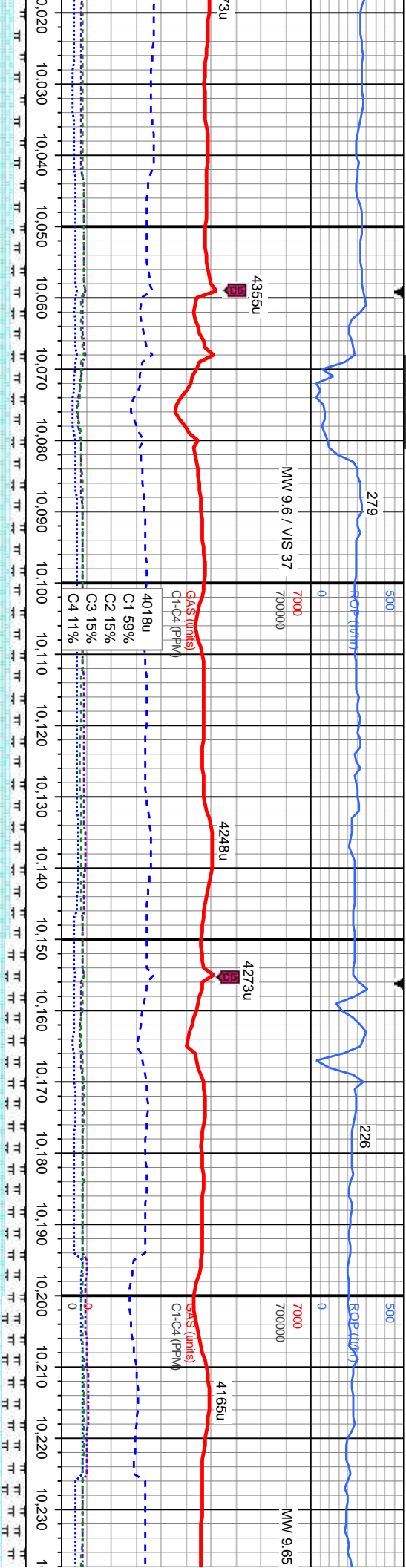


| | | | | |
|--|--|---|---|---|
| 68 | 200 | 90 | 200 | 55 |
| HK: wh-llgy, medgy, crm-brn, mot, sb -ly, stf-frm, frt, silty ip, rthy lstr, wxy, calc, tr 5% MRLST: med-dk gy, blk, sb -ly, frm-mod hd, brit, silty-arg, mot, rthy lstr, ring, fr stn, fnt od | 95% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-blky, stf-frm, frt, silty ip, rthy lstr, wxy, calc, tr dissm pyr 5% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx: O SHOW: mod-fast string, blshwh cut, yel-wh ring, fr stn, fnt od | 90% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-blky, stf-frm, frt, silty ip, rthy lstr, wxy, calc, tr dissm pyr 10% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx: O SHOW: mod-fast string, blshwh cut, yel-wh ring, fr stn, fnt od | 90% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-blky, stf-frm, frt, silty ip, rthy lstr, wxy, calc, tr dissm pyr 10% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx: O SHOW: mod-fast string, blshwh cut, yel-wh ring, fr stn, fnt od | 80% CHK: wh-llgy, medgy, crm-brn, mot, sb ply-blky, stf-frm, frt, silty ip, rthy lstr, wxy, calc, tr dissm pyr 20% MRLST: med-dk gy, blk, sb ply-blky, frm-mod hd, brit, silty-arg, mot, rthy lstr, calc mtx: O SHOW: mod-fast string, blshwh cut, yel-wh ring, fr stn, fnt od |
| TT | TT | TT | TT | TT |
| 6150 | 6150 | 6150 | 6150 | 6150 |
| MD: 9.438' TVD: 6,081.04' Inclination: 90.8° Azimuth: 180.8° VS: 3,257.9' | MD: 9.533' TVD: 6,080.29' Inclination: 90.1° Azimuth: 179.9° VS: 3,351.72' | | | |
| TVD (ft) | TVD (ft) | | | |



| | | | | |
|--|----|-----|----|-----|
| 200 | 94 | 200 | 97 | 200 |
| GAMMA (API) | | | | |
| 0 | | | | |
| 80% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frm, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 20% MRLST: med-dk gy, blk, sb pily-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-slow stmg, bl cut, fnt yel ring, fr stn, fnt od | | | | |
| 85% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frm, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 15% MRLST: med-dk gy, blk, sb pily-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-slow stmg, bl cut, fnt yel ring, fr stn, fnt od | | | | |
| 90% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frm, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 10% MRLST: med-dk gy, blk, sb pily-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, gn-yel ring, mod stn, fnt od | | | | |
| 80% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frm, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 20% MRLST: med-dk gy, blk, sb pily-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx; O SHOW: mod-fast stmg, blshwh cut, gn-yel ring, mod stn, fnt od | | | | |
| 80% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frm, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 20% MRLST: med-dk gy, blk, sb pily-biky, frm-mod hd, brlt, silty-arg, mot, rthy lstr, calc mtx; O SHOW: fast stmg, mod stn, fnt ring, mod stn, fnt | | | | |
| TVD (ft) | | | | |
| MD: 9.820' | | | | |
| TVD: 6,076.2' | | | | |
| Inclination: 91.4° | | | | |
| Azimuth: 180.1° | | | | |
| VS: 3,636.16' | | | | |
| TVD (ft) | | | | |
| MD: 9.915' | | | | |
| TVD: 6,074.87' | | | | |
| Inclination: 90.2° | | | | |
| Azimuth: 181.3° | | | | |
| VS: 3,729.89' | | | | |
| TVD (ft) | | | | |
| MD: 10.011' | | | | |
| TVD: 6,074.45' | | | | |
| Inclination: 90.3° | | | | |
| Azimuth: 183.3° | | | | |
| VS: 3,824.13' | | | | |





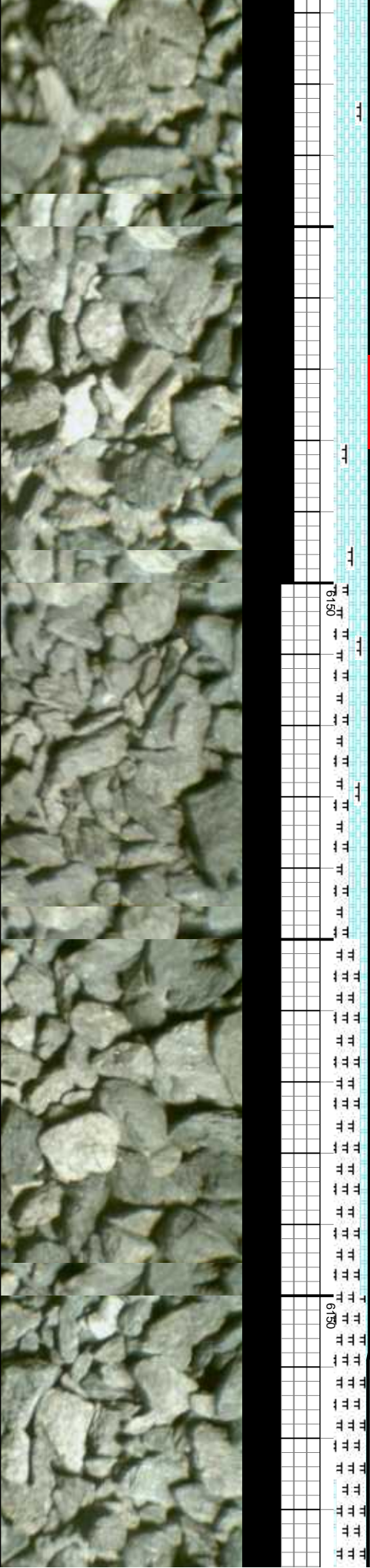
| | | | |
|--|---|---|--|
| 75% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 25% MR.LST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: fast stmg, bri blshwh cut, bri gn-yel ring, mod stn, fnt od | 75% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 25% MR.LST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od | 65% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 35% MR.LST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: slow stmg, blshwh cut, gn-yel ring, fr stn, fnt od | 60% CHK: lt-medgy, crm-brn, mot, sb pily-biky, sft-frn, frl, silty ip, rthy lstr, wxy, calc, tr diss pyr 40% MR.LST: med-dk gy, blk, sb pily-biky, frn-mod hd, brlt, silty-arg, mot, rthy lstr, calc mt; O SHOW: mod-slow stmg, blshwh cut, ring, fr stn, fnt od |
| 87 | 104 | 104 | 104 |
| GA/MWA (pp) | GA/MWA (pp) | GA/MWA (pp) | GA/MWA (pp) |
| 0 | 0 | 0 | 0 |

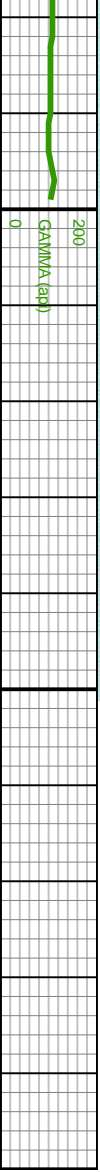
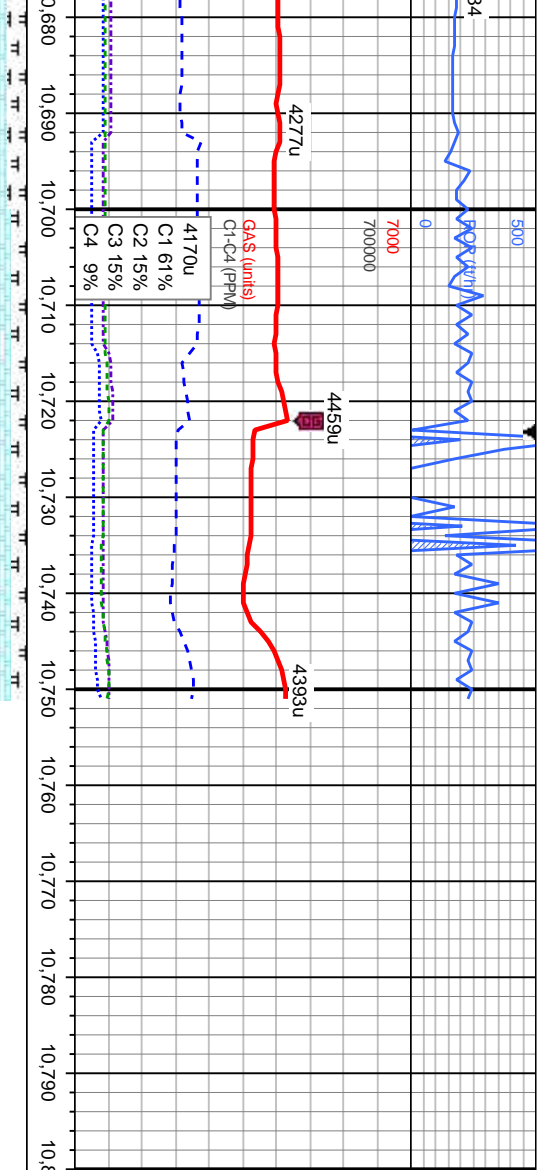
TVD (ft)

MD: 10.107'
TVD: 6.074.79'
Inclination: 89.3°
Azimuth: 182.2°
VS: 3.918.24'

TVD (ft)

MD: 10.203'
TVD: 6.075.79'
Inclination: 89.5°
Azimuth: 181.1°
VS: 4.012.68'





, mot, sb pily-biky, —
xy, calc, tr diss
blk, sb pily-biky,
t, rthy lstr, calc mt;
shw cut, gn-yel

80% CHK: lt-medgy, crm-brn, mot, sb pily-biky,
sft-frm, fri, sily ip, rthy lstr, wxy, calc, tr diss
pyr 20% MRLST: med-dk gy, blk, sb pily-biky,
frm-mod hd, brlt, sily-arg, mot, rthy lstr, calc mt;
O SHOW: mod-slow stng, blshw cut, gn-yel
ring, fr stn, fnt od

TD @ MD 10,751'
1/17/2015 @ 09:50 MST

Thank you for using
Columbine Logging, Inc.

| | | |
|--------------------|--------------------|----------|
| 0.681' | MD: 10.699' | TVD (ft) |
| 6.076.85' | TVD: 6.076.95' | |
| Inclination: 89.6° | Inclination: 89.8° | |
| uth: 179° | Azimuth: 179.4° | |
| VS: 4.502.99' | VS: 4.554.48' | |
| 485.16' | | |
| 6130 | | |

