



Scale: 2" / 100'
Measured Depth Log

Well Name Sharp 24-3-11HC

Location Sec.24-T1S-R67W

State CO

County Adams

Country USA

Rig Number Frontier 28

API Number 05-001-09801

Spud Date 6/9/2014

Drilling Completed TBD

Surface Coordinates 250' FSL, 190' FWL
39° 56' 38.5074"
-104° 50' 45.78"

Bottom Hole Coordinates 460'FNL, 880' FWL
Coordinates not available

Ground Elevation 5019.0'

K.B. Elevation 5044.0'

Logged Interval 4500' MD **To** TBD

Total Depth TBD

Formation Codell

Type of Drilling Fluid Water Based Mud

Operator

Company Ward Petroleum Corporation

Address Box 1187, 502 S. Fillmore
Enid, Oklahoma 73702

Geologist

Name Mick Thomas, Alea Neil

Company Empirica, LLC

Address Empirica, LLC
6360 W Sam Houston Pkwy N
Suite 100
Houston, TX 77041

Other

Additional Information

2-Man Logging & Geosteering Service
 Start Date: 6/7/2014
 Release Date: TBD
 Equipment: ML-128

Rock Types

| | | | |
|----------------------|-----------|---------------|-------------|
| UNKNOWN | DOLOMITE | SILTY SHALE | TILL |
| ANHYDRITE | CHERT | SHALE COLORED | BENTONITE |
| GYPSUM | COAL | SILTSTONE | TUFF |
| SALT | MARLSTONE | SANDSTONE | IGNEOUS |
| SIDERITE or LIMONITE | CLAYSTONE | CONGLOMERATE | METAMORPHIC |
| LIMESTONE | SHALE | BRECCIA | CEMENT |

Accessories

Fossils

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

F FOSSIL

- GASTROPOD
- 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
- M MOLDIC

- O ORGANIC
- P PINPOINT
- V VUGGY

Engineering

- BIT
- CASING
- 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
- F SUBRBD

Textures

- BS BOUNDSTONE
- C CHALKY
- CX CRYPTOXLN
- E EARTHY
- FX FINELYXLN
- GS GRAINSTONE

- L LITHOGRAPHIC
- MX MICROXLN
- MS MUDSTONE
- PS PACKSTONE
- WS WACKESTONE

Sorting

- M MODERATE
- P POOR
- W WELL

ROP
 ROF ———
 GAMMA - - - -
 GR ———

Slide/Rate
 Depth Labels

% Litho

Litho Interp

Lithology Descriptions

Oil Show

Images

Total Gas & Chromatograph
 GAS ———
 C1 ———
 C2 - - - -
 C3 - - - -
 C4 - - - -

Loggers: Mick Thomas & Alea Neil
 ALS Empirica
 Start Date: 6/16/14 @ 06:00 hrs.

4,460
4,470
4,480
4,490
4,500



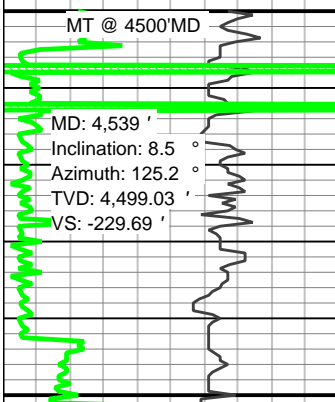
Ward Petroleum Corporation
 Well: Sharp 24-3-11HC
 Rig: Frontier 28

4500-4530: SLTST: pred med- lt gy, tr bf, w srt, sb ang grs, fri, blk- pty, v f gr, ip arg- sly, ply cmtd, no cut

TR
FR
mo



Bit #: 2
 Type: Smith
 Size: 8.75
 Depth In: 1260
 Jets: 6*15
 S/N: JH9140



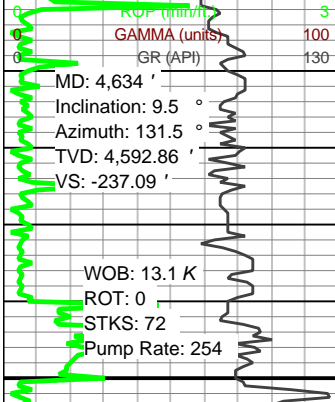
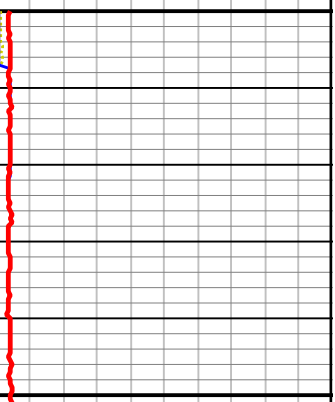
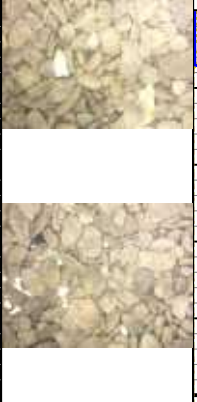
4,510
4,520
4,530
4,540
4,550
4,560
4,570
4,580
4,590
4,600



4530-4590: STST/SS: lt- pred med gy, sme bf- off wh, tr sl trnsl clus, blk- pty, w srt, sb ang grs, mod frm, v f gr, ip sly- arg, w cmtd, pred clus, sl- mod calc, lith frags

4590-4650: STST/SS: lt- pred med gy, sme bf- off wh, tr sl trnsl clus, blk- pty, w srt, sb ang grs, mod frm, v f gr, ip sly- arg, w cmtd, pred clus, sl- mod calc, lith frags, tr carb no cut

TR
FR
mo



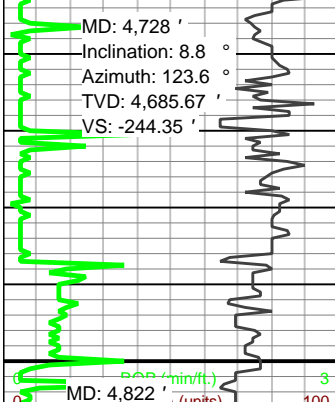
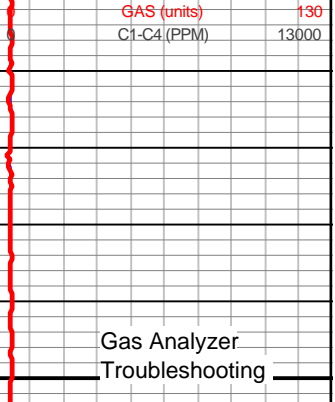
4,610
4,620
4,630
4,640
4,650
4,660
4,670
4,680
4,690
4,700



4650-4710: STST/SS: lt- pred med gy, sme bf- off wh, tr sl trnsl clus, blk- pty, w srt, sb ang grs, mod frm, v f gr, ip sly- arg, w cmtd, pred clus, sl calc, lith frags, tr carb no cut

4710-4750: SLTST: pred med- lt gy, tr bf, w srt, sb ang grs, fri, blk- pty, v f gr, ip arg- sly, ply cmtd, no cut, tr ss

TR
FR
mo



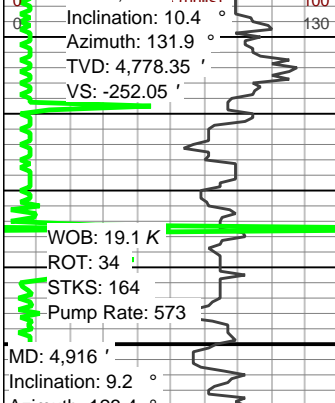
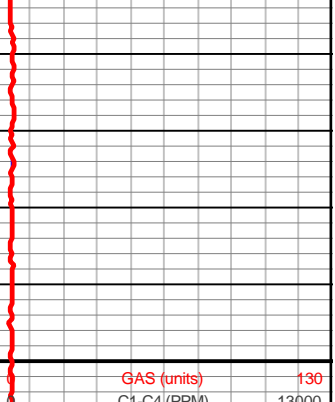
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4,720
4,730
4,740
4,750
4,760
4,770
4,780
4,790
4,800



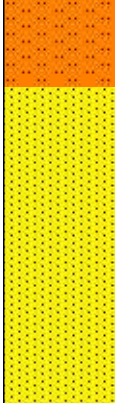
4750-4800: SLTST: pred med- lt gy, tr bf, w srt, sb ang grs, fri, blk- pty, v f gr, ip arg- sly, ply cmtd, no cut

4800-4830: SLTST: pred med- lt gy, tr bf, w srt, sb ang grs, fri, blk- pty, v f gr, ip arg- sly, ply cmtd, no cut

TR
FR
mo



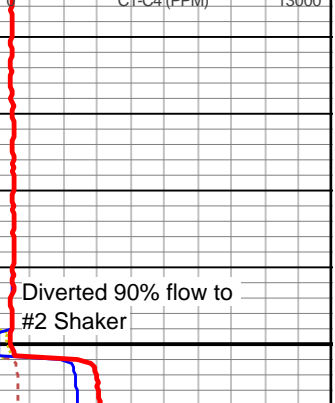
4,810
4,820
4,830
4,840
4,850
4,860
4,870
4,880
4,890
4,900



4830-4890: SS: lt- pred med gy, sme bf- off wh, sme sl trnsl clus, blk- pty, p srt, sb ang grs, mod frm, v f gr, pred sly- arg, w cmtd, pred clus, sl- mod calc, lith frags, ip stst, fnt lt bl cut

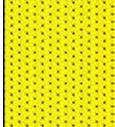
4890-4950: SS: lt- pred med gy, sme bf- off wh, sme sl trnsl clus, blk- pty, p srt, sb ang grs, mod frm, v f gr, pred sly- arg, w cmtd, pred clus,

TR
FR
mo



MD: 4,916 '
 Inclination: 9.2 °
 Azimuth: 123.4 °
 TVD: 4,870.98 '
 VS: -259.87 '
 WOB: 19.1 K
 ROT: 34
 STKS: 164
 Pump Rate: 573

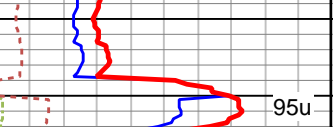
4,910
4,920
4,930
4,940
4,950



4890-4950: SS: lt- pred med gy, sme bf- off wh, sme sl trnsl clus, blk- pty, p srt, sb ang grs, mod frm, v f gr, pred sly- arg, w cmtd, pred clus,

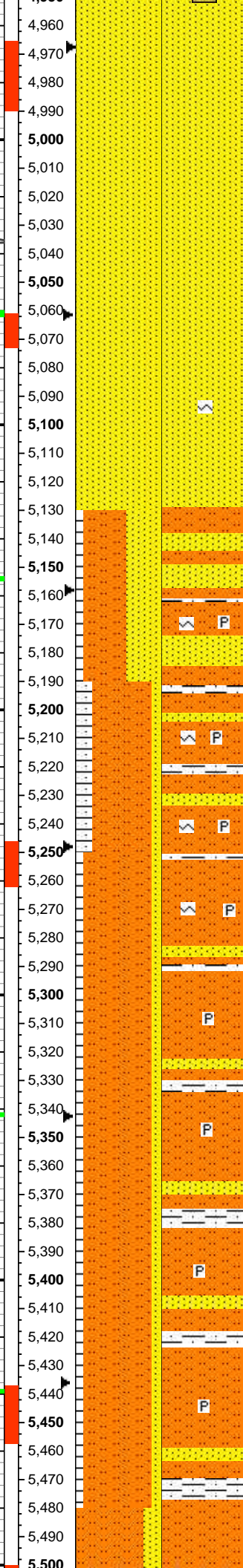
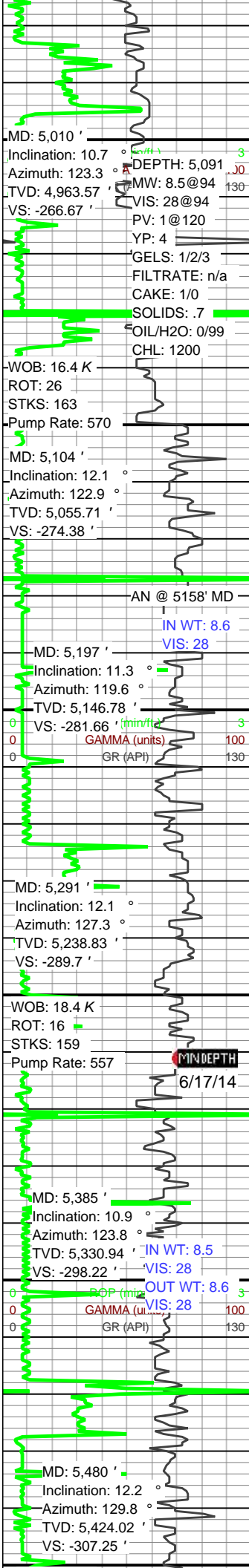
4890-4950: SS: lt- pred med gy, sme bf- off wh, sme sl trnsl clus, blk- pty, p srt, sb ang grs, mod frm, v f gr, pred sly- arg, w cmtd, pred clus,

TR
FR
mo



Diverted 90% flow to #2 Shaker

95u



sl- mod calc, lith frags, tr stst, fnt lt bl cut

4950-5010: SS: lt- pred med gy, sme bf- off wh, sme sl trnsl clus, blk- pty, p srt, sb ang grs, mod frm, v f gr, pred slty- arg, w cmtd, pred clus, sl- mod calc, lith frags, no cut

5010-5070: SS: lt- pred med gy, sme bf- off wh, sme sl trnsl clus, blk- pty, p srt, sb ang grs, mod frm, v f gr, pred slty- arg, w cmtd, pred clus, sl- mod calc, lith frags, no cut

5070-5130: SS: lt- pred med gy, sme bf- off wh, sme sl trnsl clus, blk- pty, p srt, sb ang grs, mod frm, v f gr, pred slty- arg, w cmtd, pred clus, sl- mod calc, fnt lt bl cut

5130-5190: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; SS: lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, w cmtd, lith frags, tr glau, tr SH: dk gy- blk, slty, elg, frm-occ sft, tr imbd pyr

5190-5250: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; mod SLTY SH: dk gy- blk, frm-occ sft, tr imbd pyr; occ SS

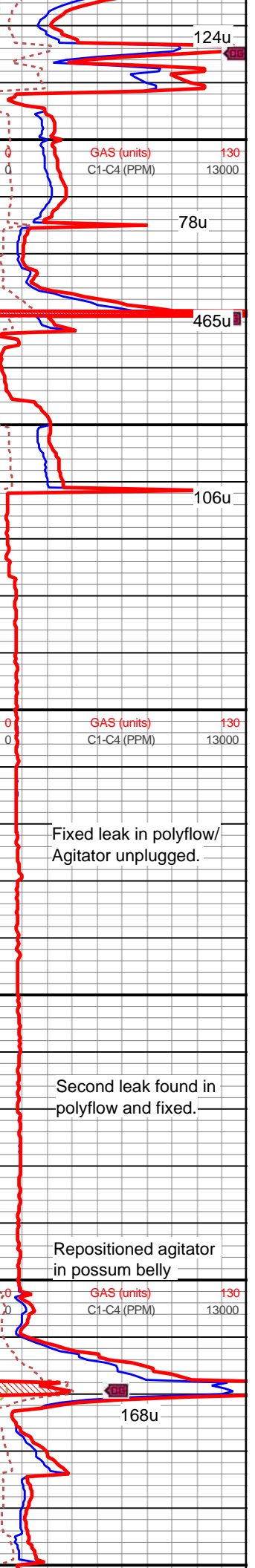
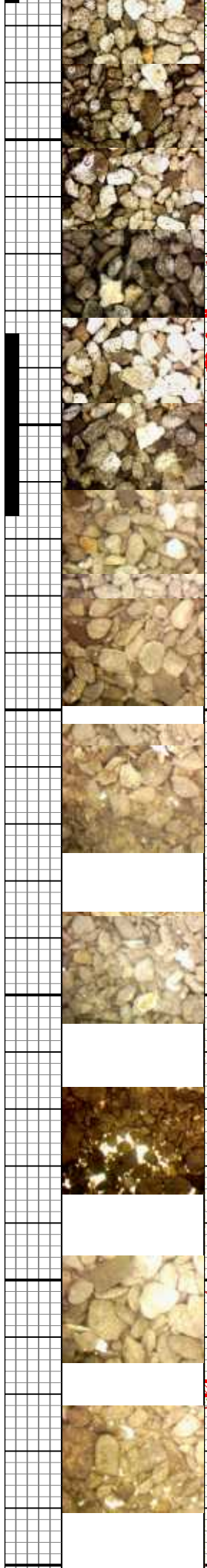
5250-5310: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; mod SLTY SH: dk gy- blk, frm-occ sft, tr imbd pyr; occ SS

5310-5370: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; mod SLTY SH: dk gy- blk, frm-occ sft, tr imbd pyr; occ SS

5370-5430: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; mod SLTY SH: dk gy- blk, frm-occ sft, tr imbd pyr; occ SS

5430-5490: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, imbd ss, tr calc, mod cal; mod SLTY SH: dk gy- blk, frm-occ sft, tr imbd pyr; tr SS

5490-5550: SLTST: pred dk gy - mod gy, sr-sub ang, mod



WOB: 8.7 K
 ROT: 17
 STKS: 157
 Pump Rate: 551

MD: 5,574 '
 Inclination: 11.3 °
 Azimuth: 125.2 °
 TVD: 5,516.05 '
 VS: -316.53 '

ROP (min/ft.) 3
 GAMMA (units) 100
 GR (API) 130

MD: 5,668 '
 Inclination: 10.5 °
 Azimuth: 122.6 °
 TVD: 5,608.35 '
 VS: -324.14 '

WOB: 20.6 K
 ROT: 15
 STKS: 163
 Pump Rate: 570

MD: 5,763 '
 Inclination: 9.9 °
 Azimuth: 118.3 °
 TVD: 5,701.85 '
 VS: -330.42 '

ROP (min/ft.) 3
 GAMMA (units) 100
 GR (API) 130

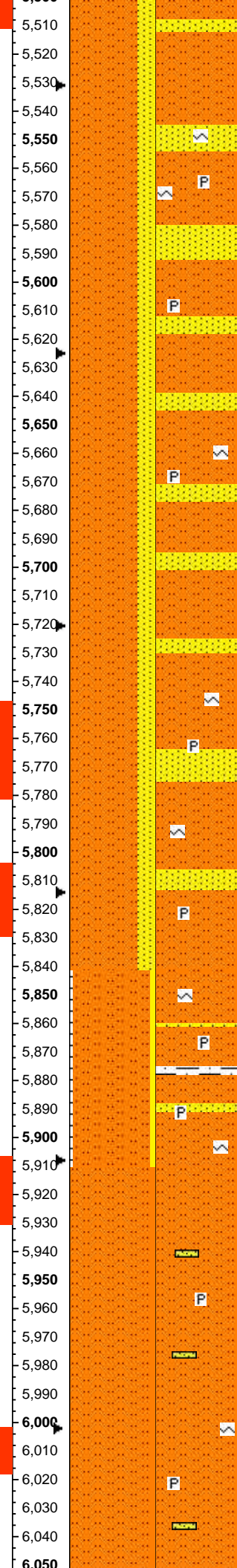
MD: 5,857 '
 Inclination: 10.6 °
 Azimuth: 116.1 °
 TVD: 5,794.35 '
 VS: -335.75 '

WOB: 13.4 K
 ROT: 30
 STKS: 187
 Pump Rate: 585

MD: 5,951 '
 Inclination: 8.7 °
 Azimuth: 122.9 °
 TVD: 5,887.02 '
 VS: -341.28 '

ROP (min/ft.) 3
 GAMMA (units) 100
 GR (API) 130

MD: 6,045 '
 Inclination: 9.7 °
 Azimuth: 128 °
 TVD: 5,979.81 '



srt, mod frm, vfg, pred slty, tr calc, mod cal; SS; lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, w cmtd, lith frags, tr glau, tr SH: dk gy- blk, slty, elg, frm-occ sft, tr imbd pyr

5550-5610: SLTST/SS: pred dk gy - mod gy, sr-sub ang, mod srt, vfg, pred slty, tr calc, p srt, mod frm, v f gr, w cmtd, lith frags, tr pyr

5610-5670: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; SS; lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, w cmtd, lith frags, tr glau, tr SH: dk gy- blk, slty, elg, frm-occ sft, tr imbd pyr

5670-5730: SLTST/SS: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal, p srt, sb ang grs, w cmtd, lith frags, tr glau, tr imbd pyr, lt bl cut

5730-5790: SLTST/SS: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal, p srt, sb ang grs, w cmtd, lith frags, tr glau, tr imbd pyr, mod bl cut

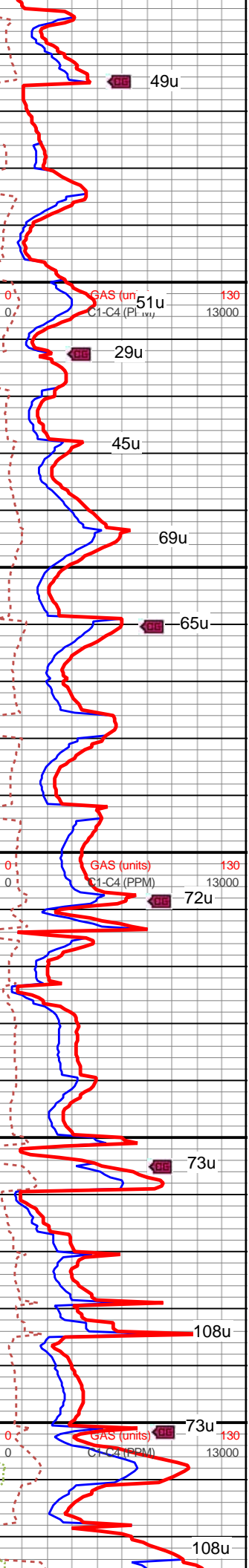
5790-5850: SLTST/SS: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal, p srt, sb ang grs, w cmtd, lith frags, tr glau, tr imbd pyr, mod bl cut

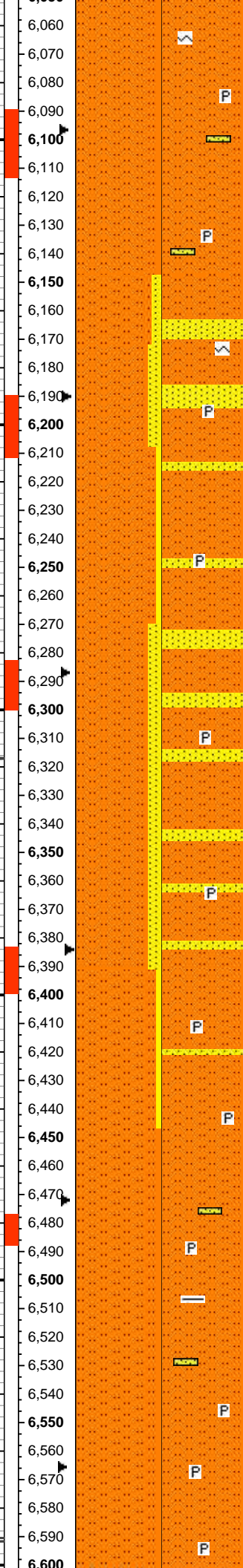
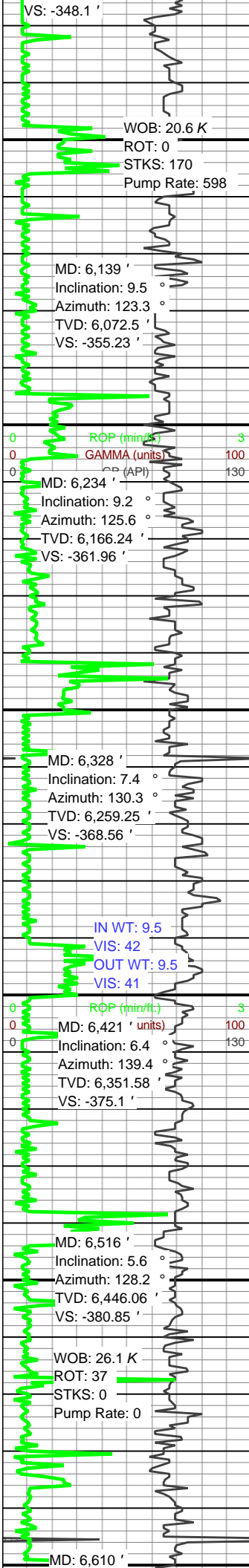
5850-5910: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; SS; lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, w cmtd, lith frags, tr glau, tr SH: dk gy- blk, slty, elg, frm-occ sft, tr imbd pyr, mod bl cut

5910-5970: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal, lith frags, tr glau tr imbd pyr

5970-6030: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, tr calc, mod cal, lith frags, tr imbd glau, tr imbd pyr

6030-6090: SLTST: pred dk





6090-6150: SLTST: pred dk gy - mod gy, sr-sub ang, blk- sb spl, mod srt, mod frm, vfg, tr calc, mod cal, lith frags, tr imbd glau, tr imbd pyr

6150-6210: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; SS; lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, w cmt, lith frags, tr glau

6210-6270: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; SS; lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, w cmt, lith frags, tr pyr

6270-6330: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, tr calc, mod cal; SS; lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, w cmt, few lith frags, tr pyr

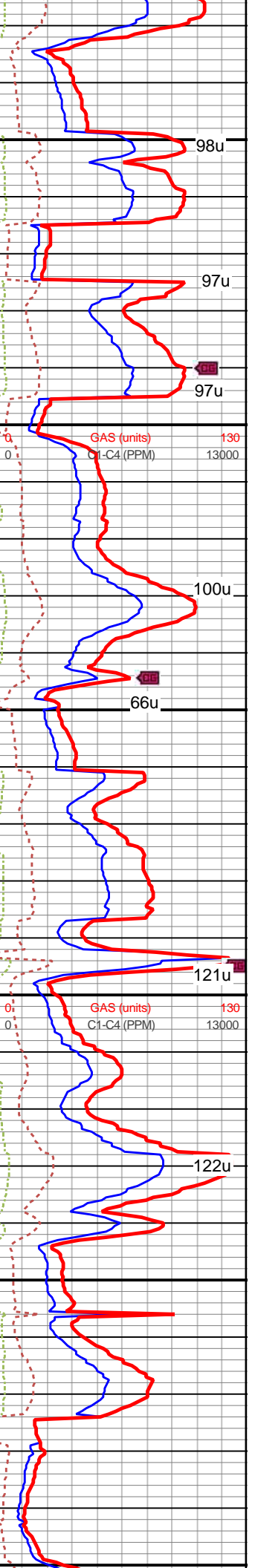
6330-6390: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, mrly, tr calc, mod cal; SS; lt- pred med gy, p srt, sb ang grs, mod frm, v f gr, mod w cmt, few lith frags, tr pyr

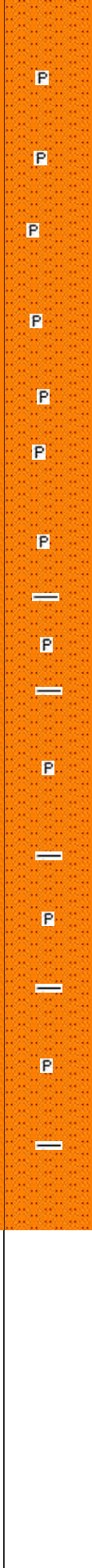
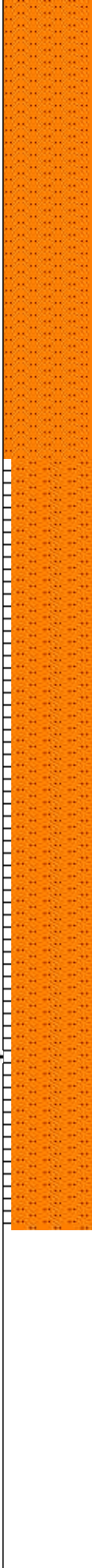
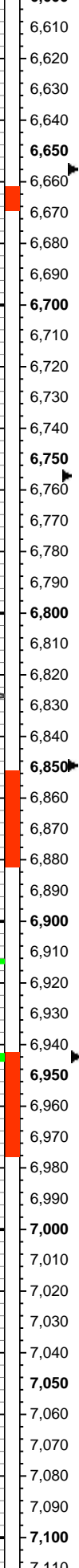
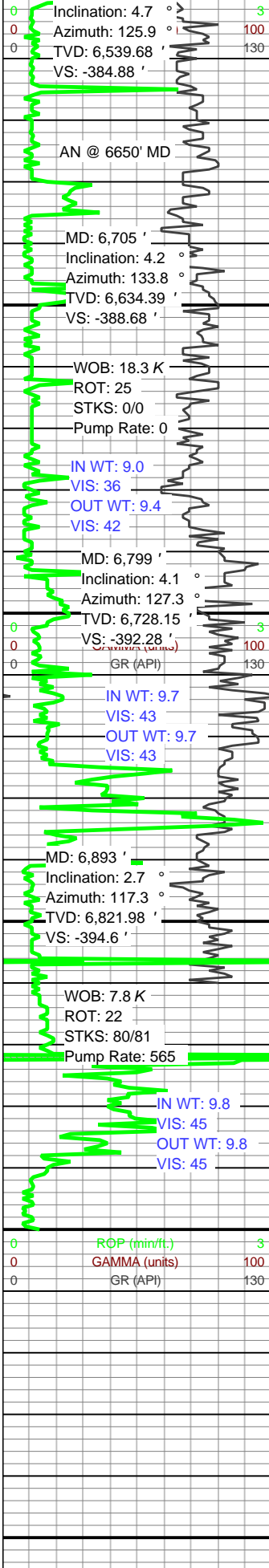
6390-6450: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, predy mrly, tr calc, mod cal, few lith frags, tr pyr

6450-6510: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, mod frm, vfg, pred slty, predy mrly, ip lam, tr calc, mod cal, few lith frags, tr pyr

6510-6570: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, blk- sb-spl, mod frm, vfg, pred slty, predy mrly, ip lam, tr calc, mod cal, few lith frags, tr pyr

6570-6630: SLTST: pred dk





gy - mod gy, sr-sub ang, mod srt, blk- sb-splt, mod frm, vfg, pred slty, predy mrlly, ip lam, tr calc, mod cal, few lith frags, tr pyr
 6630-6690: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, blk- sb-splt, mod frm, vfg, pred slty, predy mrlly, ip lam, tr calc, mod cal, few lith frags, tr pyr
 6690-6750: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, blk- sb-splt, mod frm, vfg, pred slty, predy mrlly, ip lam, tr calc, mod cal, few lith frags, tr pyr
 6750-6810: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, blk- sb-splt, mod frm, vfg, pred slty, predy mrlly, ip lam, tr calc, imbd micln py, few lith frags, occ pyr clus, tr dk gy slty sh wi imbd blk sh
 6810-6870: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, blk- sb-splt, mod frm, vfg, pred slty, predy mrlly, ip lam, tr calc, imbd micln py, few lith frags, occ pyr clus, tr dk gy slty sh wi imbd blk sh
 6870-6930: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, blk- sb-splt, mod frm, vfg, pred slty, predy mrlly, ip lam, tr calc, imbd micln py, few lith frags, occ pyr clus, tr dk gy slty sh wi imbd blk sh
 6930-7000: SLTST: pred dk gy - mod gy, sr-sub ang, mod srt, blk- sb-splt, mod frm, vfg, pred slty, predy mrlly, ip lam, tr calc, imbd micln py, few lith frags, occ pyr clus, tr dk gy slty sh wi imbd blk sh
 Continued on Horizontal Log

