



Santa Rosa, CA

COMPANY Calpine Corporation
 WELL MLM 5 Fork
 FIELD Geysers
 COUNTY/STATE Lake County, California
 WELL HEAD COORDINATES
 405397N 1796516E
 ELEVATION 2171'GL KB=30'
 RIG ON DAY RATE 8/24/08
 TD DATE 10/2/08
 TOTAL DEPTH 9080'
 TRUE VERTICAL DEPTH 8674'
 TD LOCATION 485483N 1796516E
 CONTRACTOR/RIG Kenai Rig #6
 COMPANY REPRESENTATIVE Power, Potter

LOG INTERVAL

DATE LOGGED 8/26/08 TO 10/07/08
 DEPTH LOGGED 3560' TO 9080'
 MUD DRILLING 3557' TO 3698'
 AIR DRILLING 3698' TO 9080'
 LOG SCALE 1:600 UNIT NO. 326
 LOGGING GEOLOGISTS
 Booker, Schepflin
 Boschmann

HOLE

8.5	TO	9080
0	TO	0
0	TO	0
0	TO	0
0	TO	0
0	TO	0

CASING

10.75	FROM	0	TO	1784
9.625	FROM	1775	TO	3557
0	FROM	0	TO	0
0	FROM	0	TO	0
0	FROM	0	TO	0
0	FROM	0	TO	0

ABBREVIATIONS

NB New Bit	BHT Bottom Hole Temp
RRB Re-run Bit	C Carbide Test
CB Core Bit	NR No Returns
WOB Weight On Bit	LAT Logged After Trip
SPM Strokes per Minute	CFM Cubic Feet per Min
PP Pump Pressure	BUT Bottoms Up Temp
RPM Revolutions per Min	

SYMBOLS

Wireline Log	Casing Shoe
Steam/Water Entry	Flow Test
Deviation Survey	Cored Interval
	No Recovery

LITHOLOGY

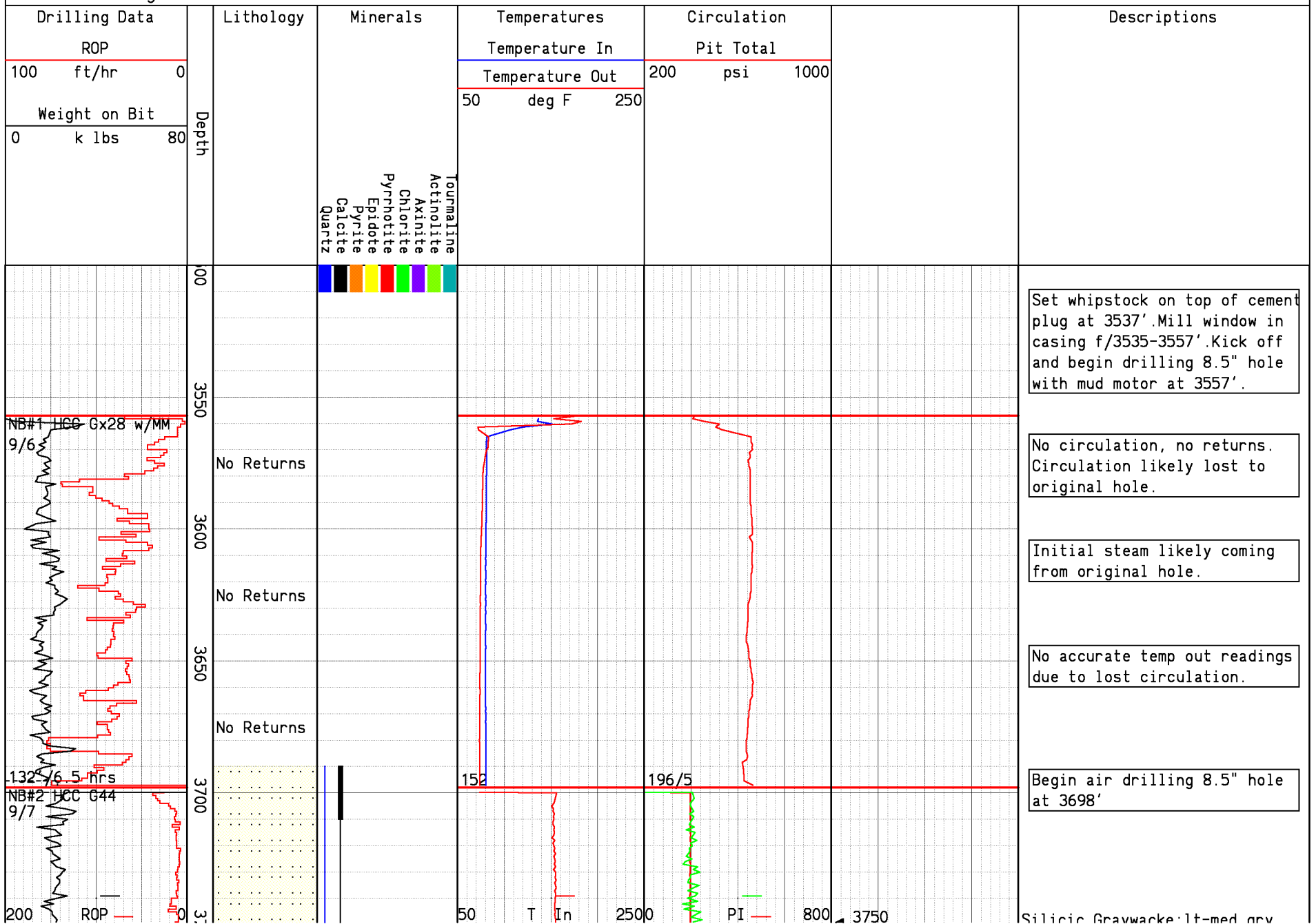
Argillite	Argillaceous Graywacke
Chert	Volcanic Graywacke
Phyllite	Siliceous Graywacke
Greenstone	Weak Foliation
Serpentine	Strong Foliation
Blueschist	Marginal Alteration
Felsite	Pervasive Alteration
Rhyolite	Weakly Hornfelsic
Clay	Strongly Hornfelsic
Lithic Graywacke	

REMARKS

All depths from Kelly Bushing. KB=30'
 Top of window 3537'
 Bottom of window 3555'

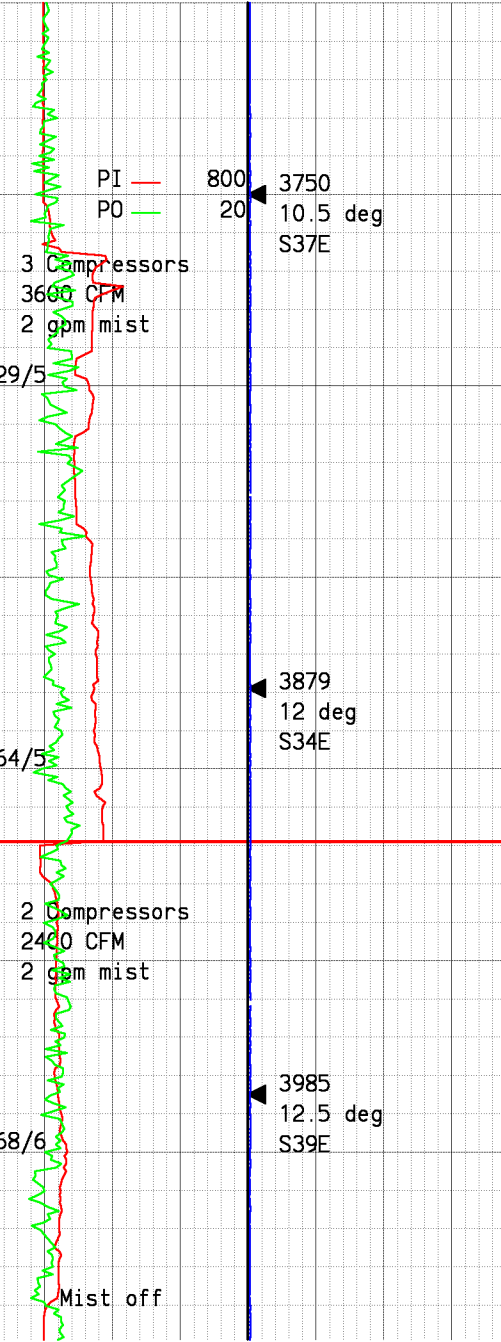
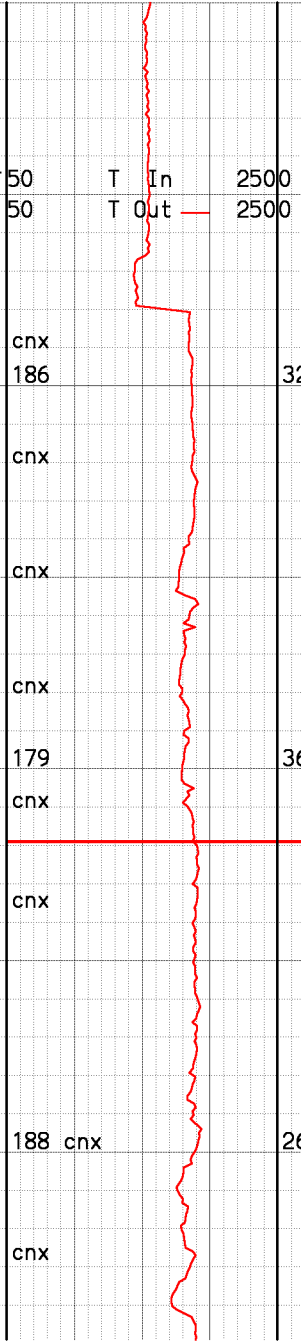
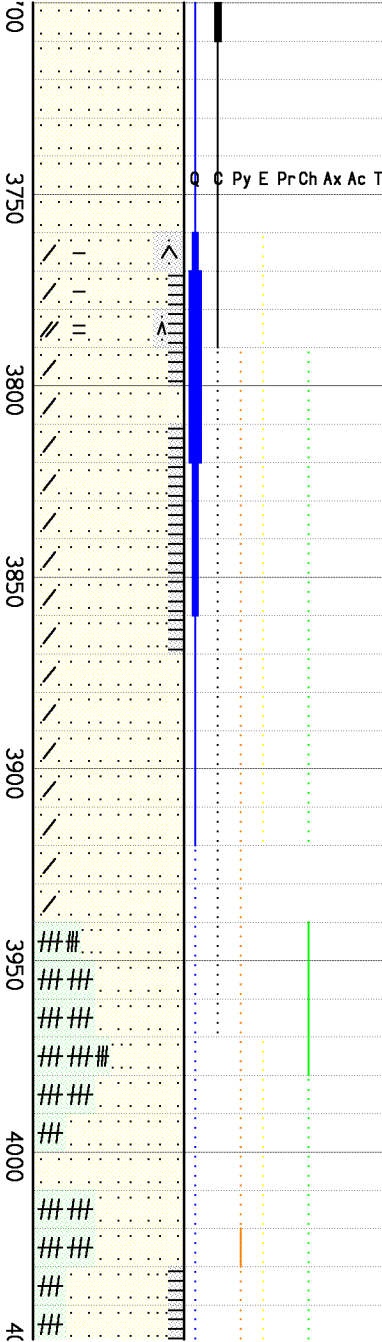
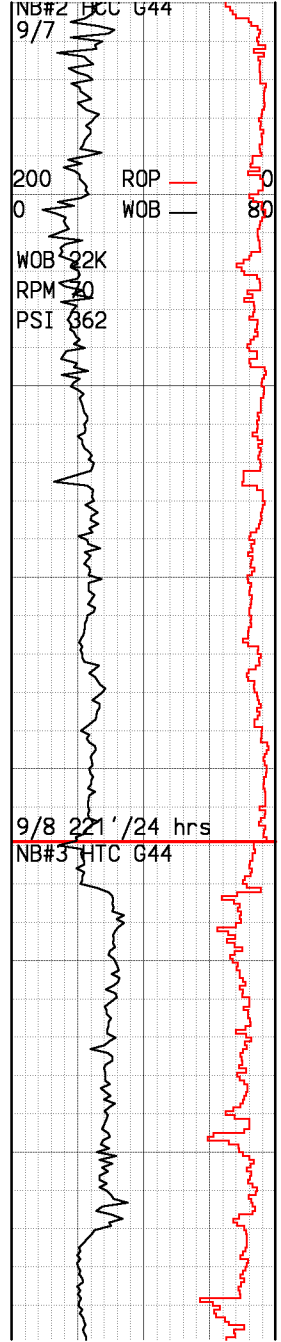
SECONDARY MINERALS

Q = Quartz	Rare	<< 1%
C = Calcite	Trace	< 1%
P = Pyrite	Minor	1% to 4%
E = Epidote	Common	4% to 7%
R = Pyrrhotite	Abundant	7% to 10%
Ch = Chlorite		> 10%
X = Axinite		
A = Actinolite		
T = Tourmaline		



Silicic Graywacke: lt-med grv

at 3698'



Silicic Graywacke:lt-med gry,
 wht,overall pale green cast,
 com blched app,hd-v hd,occ mod
 altrd,com gneissic texture,occ
 wk foliated texture,fn-med gr,
 pr srted,fr-mod dist gr bndrs,
 com flattened arg grs,tex,tr-com
 clr & wht Qtz vng,r-mnr wht
 calc vng & vn frags decr with
 depth,r vn pyr & pyr grs,r can
 yellow epid,r chlortzd grs,
 intrbdd w/Argillite:dk gry-blk,
 firm-mod hd,mass,mod foliation,
 pred wk-phyll shn,com dull,r-com
 milky white Qtz frac fill,r wht
 calc vng.

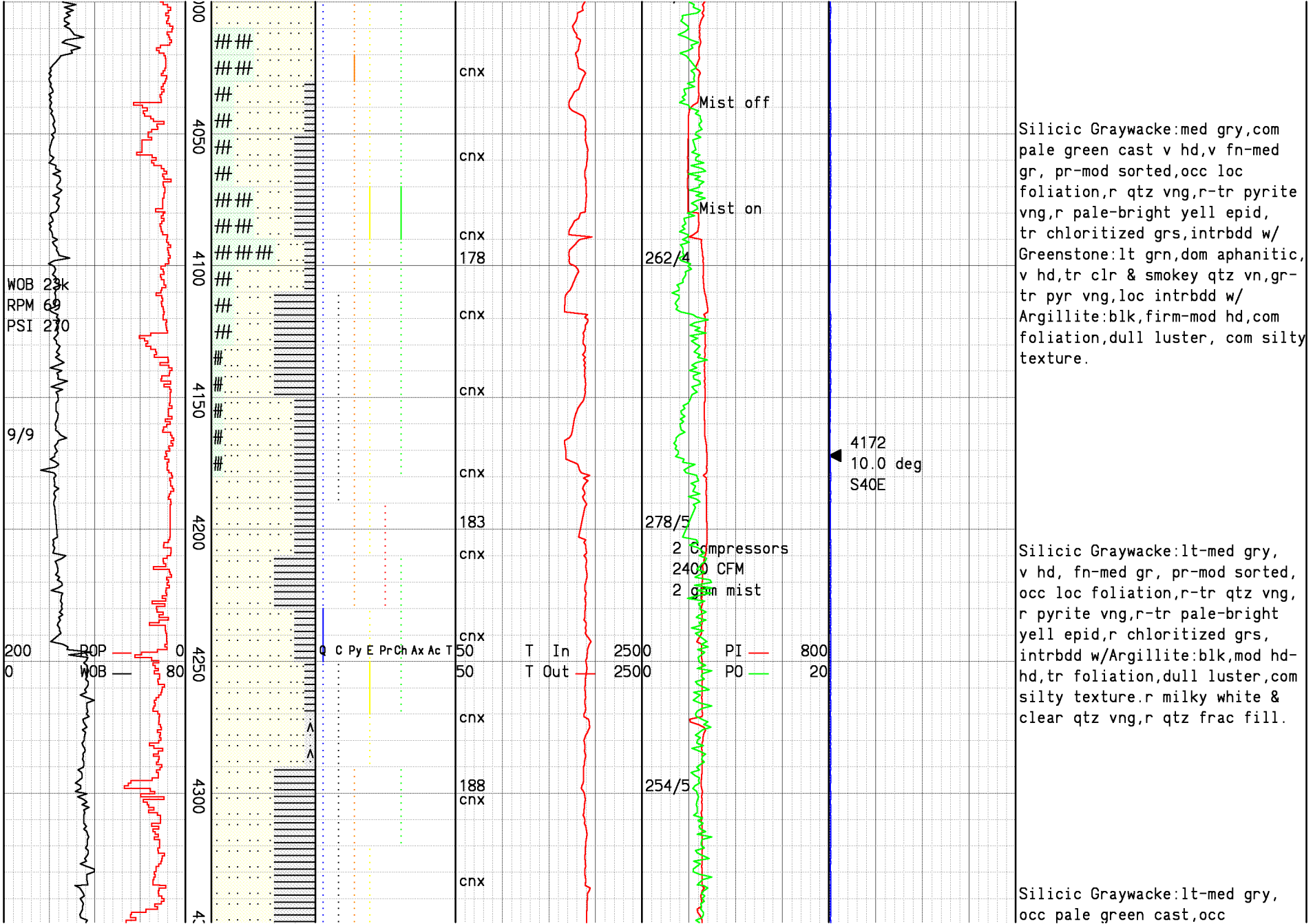
Silicic Graywacke:lt-med gry,
 hd,v fn-med gr, pr sorted,loc
 foliated,r-tr Qtz vng,r calc,
 r pyrite vng,r pale yell epid,
 tr chlor,intrbdd w/Greenstone:
 lt gry-pale grn,aphanitic,v hd,
 tr clr & smokey Qtz vng.

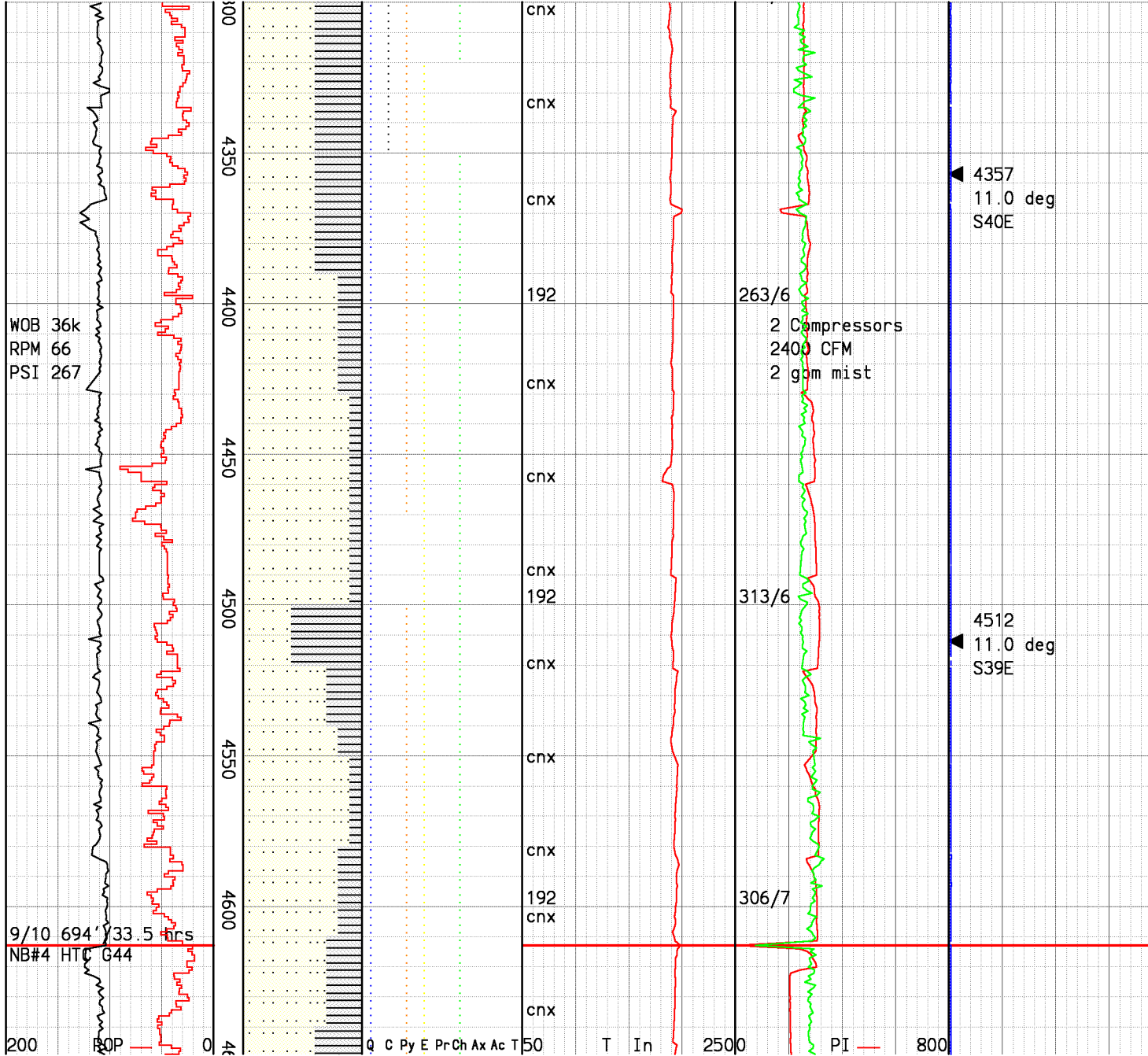
Silicic Graywacke:med gry com

3750
10.5 deg
S37E

3879
12 deg
S34E

3985
12.5 deg
S39E





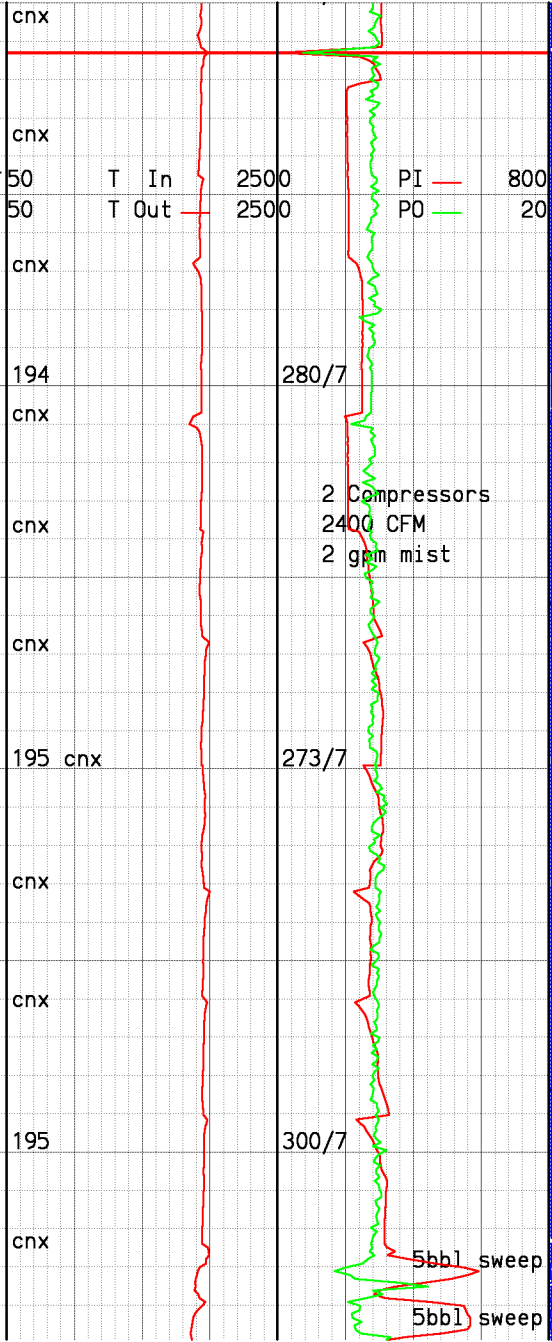
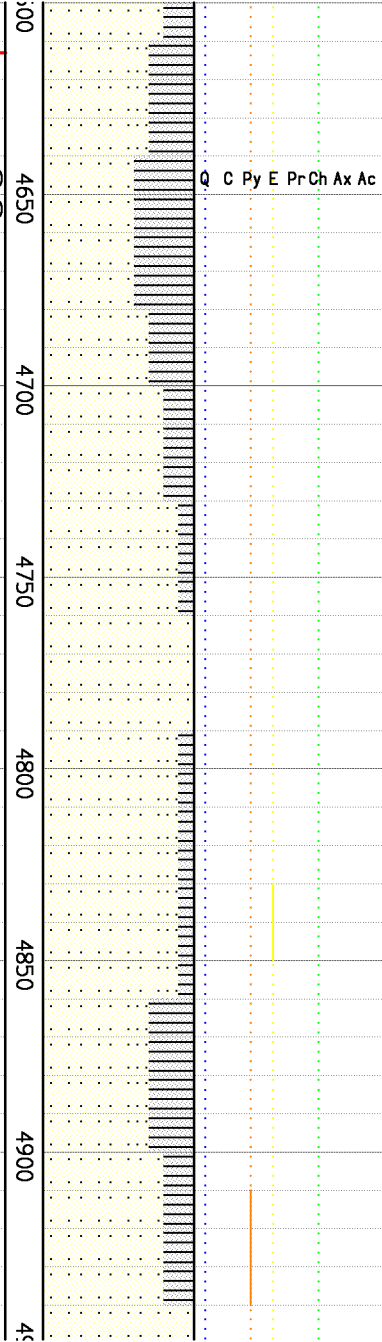
Silicic Graywacke:lt-med gry,
 occ pale green cast,occ
 blched app,v hd,v fn-med gr,
 indist gr bndrs,occ loc
 foliation,r qtz vng,r pyrite
 vng,r pale yell & pist green
 epid,r chloritized grs,intrbdd
 w/Argillite:med gry-blk,firm-
 mod hd,com foliation,dull
 luster, com silty texture,r
 milky white & clear qtz vng,r
 qtz frac fill, r-com
 Greenstone frags.

Silicic Graywacke:lt-med gry,
 occ pale green cast,occ
 bleached app,v hd,v fn-med gr,
 indist gr bndrs,pr-mod,occ loc
 foliation,r qtz vng,r pyrite
 vng,r pale yell & pist green
 epid,r chloritized grs,intrbdd
 w/Argillite:med gry-blk,firm-
 mod hd,com foliation,dull
 luster, com silty texture,r
 milky white & clear qtz vng,r
 qtz frac fill, r-com
 Greenstone frags.

9/10 694' 33.5 hrs
 NB#4 HTC G44

200 WOB
 0 WOB

WOB 45k
 RPM 60
 PSI 300



4667
 8.5 deg
 S42E

4757
 9.0 deg
 S46E

4884
 8.75 deg
 S50E

50 T In 2500 PI 800
 50 T Out 2500 PO 20

280/7

273/7

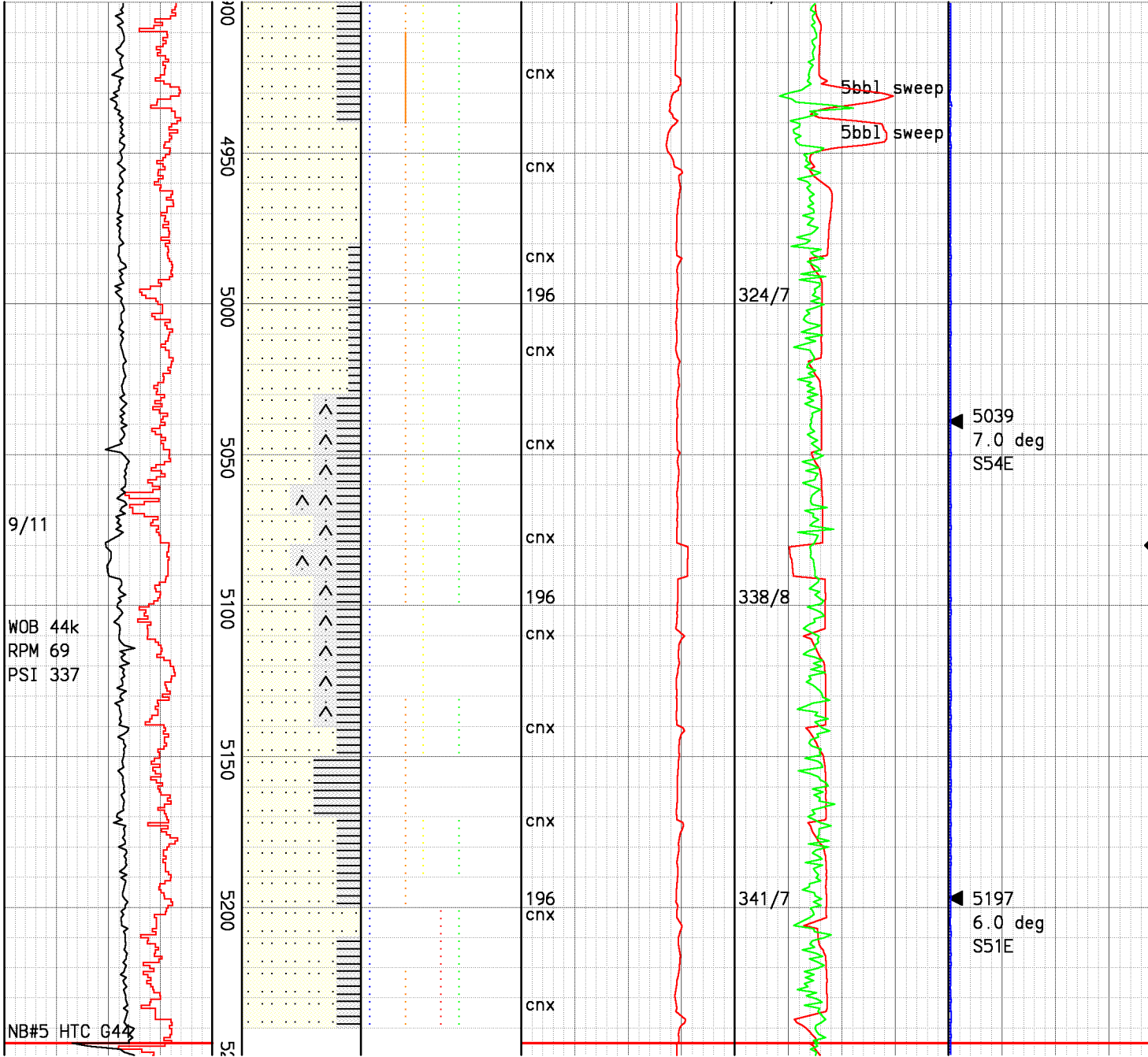
300/7

2 Compressors
 2400 CFM
 2 gpm mist

Silicic Graywacke:lt-med gry,
 occ lt green cast,occ blchd app,
 hd-v hd,fn-med gr,mod-pr srtd,
 mod-indist gr bndrs,occ fol,com
 flattened arg grs,mod rxln,r
 clr& wht qtz vng & vn frags,r
 rose qtz,r chlortzd grs,r-tr
 can yell & pist green epid,r
 pyrvng,intrbdd w/ com-30%
 Argillite:med-dk gry,frm-hd,
 mass,com silty texture,wk-mod
 phyll shn,com dull luster,loc r
 milky white qtz frac fill.

Possible Steam Entry at 4890,
 32# initial P-in increase,
 stable at 324 psi, 1 deg T-out
 increase, 0 P-out increase

Silicic Graywacke:lt-med
 gry,occ white,r loc pale green
 cast,hd-v hd,v fn-fn gr,prly-
 srtd,mod dist gr bndrs,com
 flattened arg grs,mod rxln,r cl
 sta up & wng a sta up frags

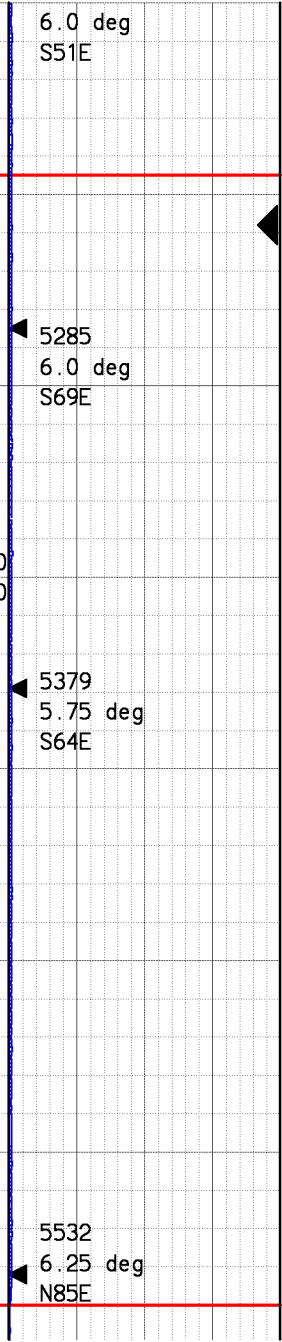
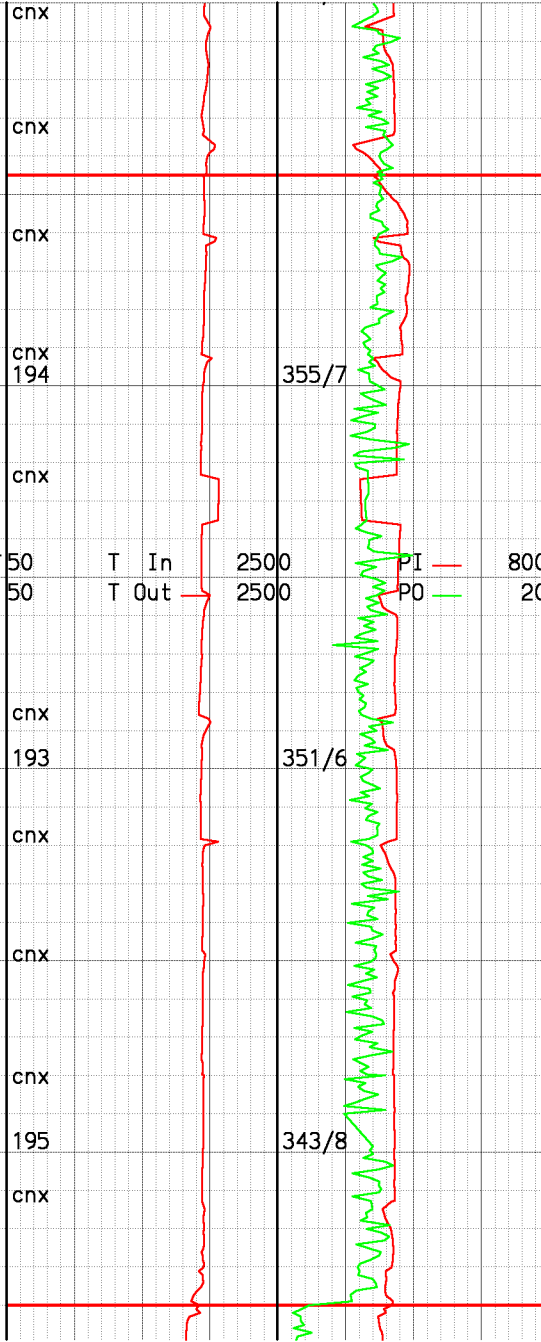
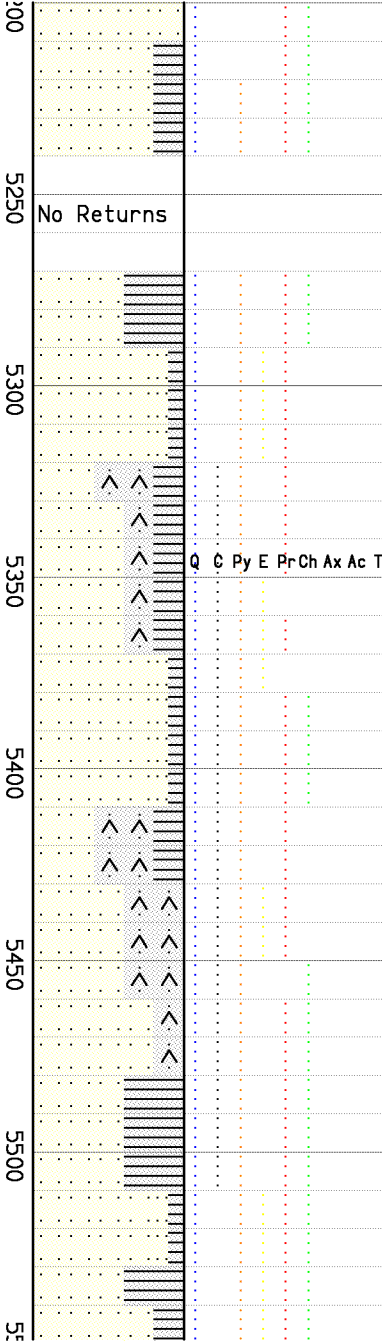
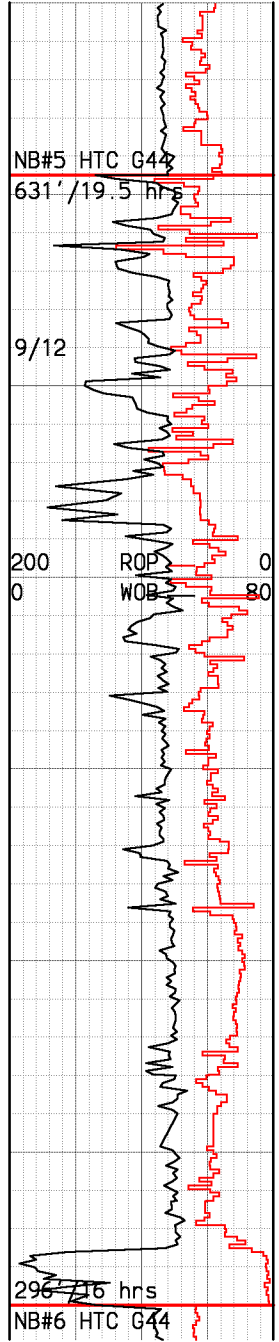


Silicic Graywacke:lt-med gry,occ white,r loc pale green cast,hd-v hd,v fn-fn gr,prly-srtd,mod dist gr bndrs,com flattened arg grs,mod rxln,r cl qtz vng & vugs,r qtz vn frags, r chlortzd grs,r pist grn epid, r-tr pyr vng,intrbdd w/ Argillite:lt-med gry,frm-hd, silty-sandy texture,mass,pred wk phyll shn,dull,loc r qtz vng, r pyr vng.

Possible Steam Entry at 5080', 14# initial P-in increase. stable at 338 psi, 0 deg T-out increase, 0 P-out increase

Silicic Graywacke:white-lt gry,com blchd app,hd-v hd,v fn-fn gr,prly-srtd,mod dist gr bndrs,com flattened arg grs,mod rxln, r cl qtz vng & vugs,r qtz vn frags, r chlortzd grs,r pist grn epid, r-tr pyr vng,intrbdd w/Argillite:lt-med gry,frm-hd, silty-sandy texture,mass,pred wk phyll shn,dull,loc r qtz vng, r pyr vng, grading to Argillaceous Graywacke:dk gry-blk, med gr,r qtz vng.

Possible Steam Entry at 5258'



Possible Steam Entry at 5258', 31# initial P-in increase, stable at 350 psi, 0 deg T-out increase, 0 P-out increase

Note: Venturi pressure test conducted from 5245-5290'. Blooie line pressure downstream of venturi spool sustained at 0 PSI, blooie line pressure upstream of venturi spool sustained at 8 PSI.

Silicic Graywacke: lt-drk gry, com blchd app, hd-v hd, fn-med gr, prly-srtd, mod dist gr bndrs, tr flattened arg grs, mod rxln, r cl qtz vng, r milky qtz vn frags, r wht calc vng & vn frags, loc r chlortzd grs, loc r pist grn epid, r pyr vng, r pyrho incl, intrbdd w/Argillite: drk gry-blk, frm, silty-sandy texture, mass, pred wk phyll shn, dull, loc r qtz vng, r pyr vng, grading to Argillaceous Graywacke: dk gry-blk, hd-v hd med gr, r qtz vng.

Note: Venturi spool removed at 5540'.

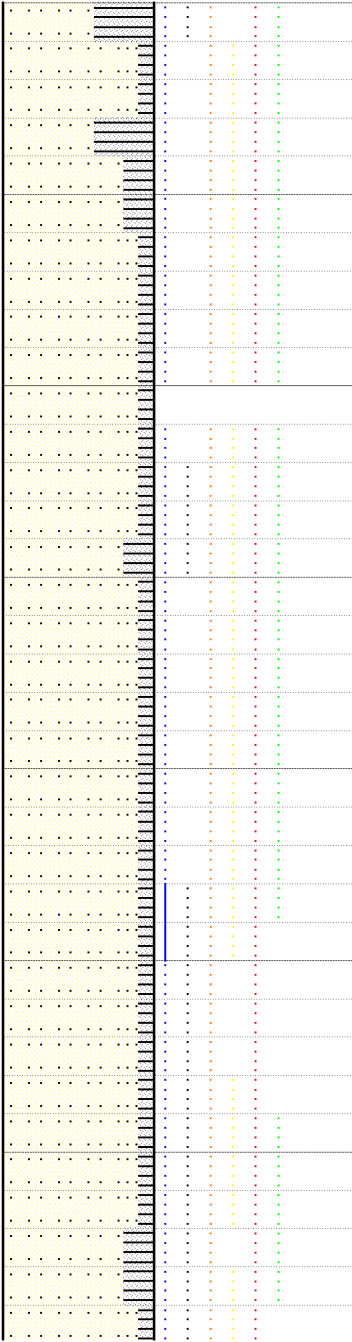
296 7/16 hrs

NB#6 HTC G44
9/13

WOB 45k
RPM 65
PSI 312

9/14

100
5550
5600
5650
5700
5750
5800
58



cnx
cnx
181
cnx
cnx
cnx
181
cnx
cnx
cnx
181
cnx

312/2
354/2
309/2

2 Compressors
2400 CFM
2 gpm mist

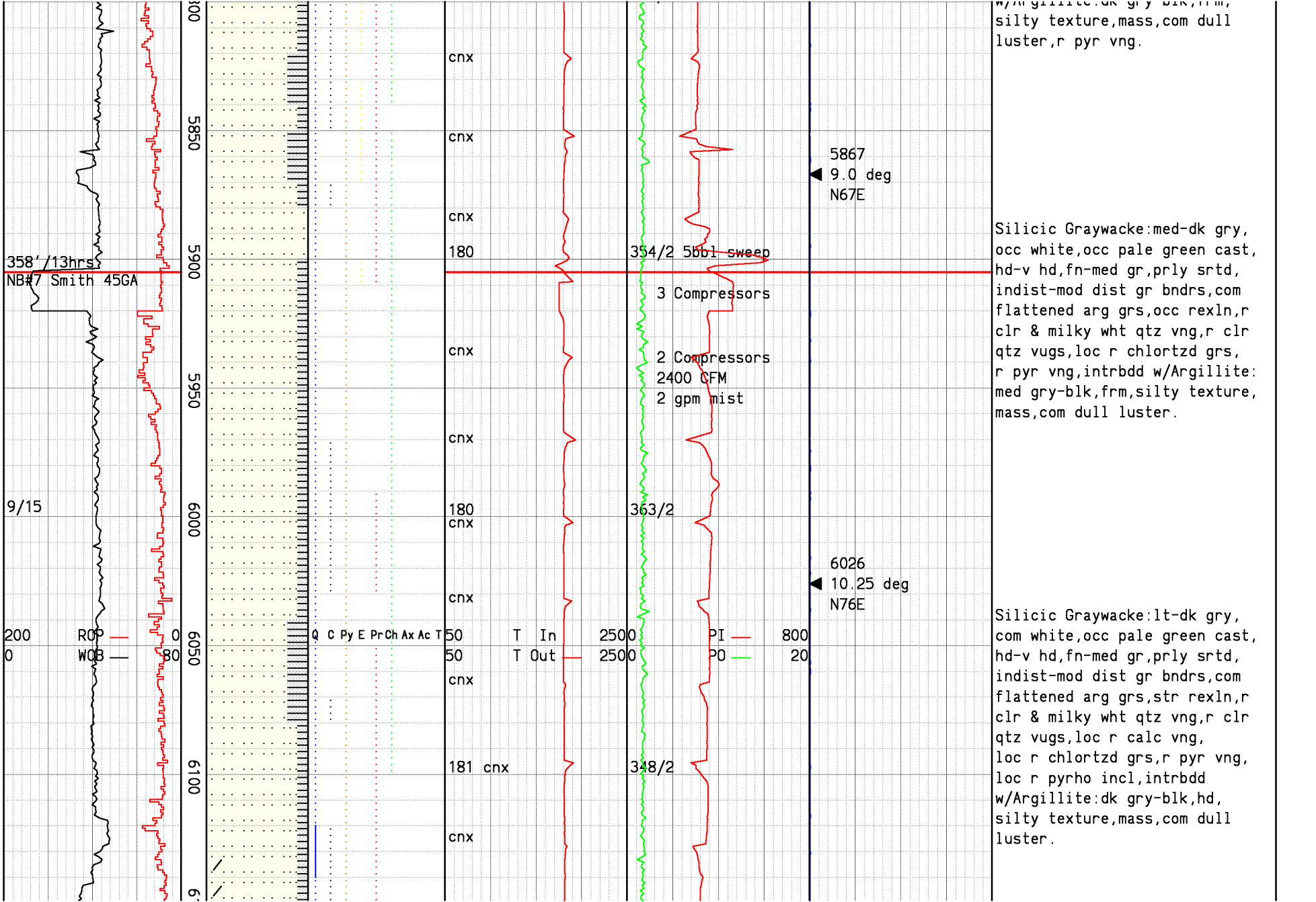
5532
6.25 deg
N85E

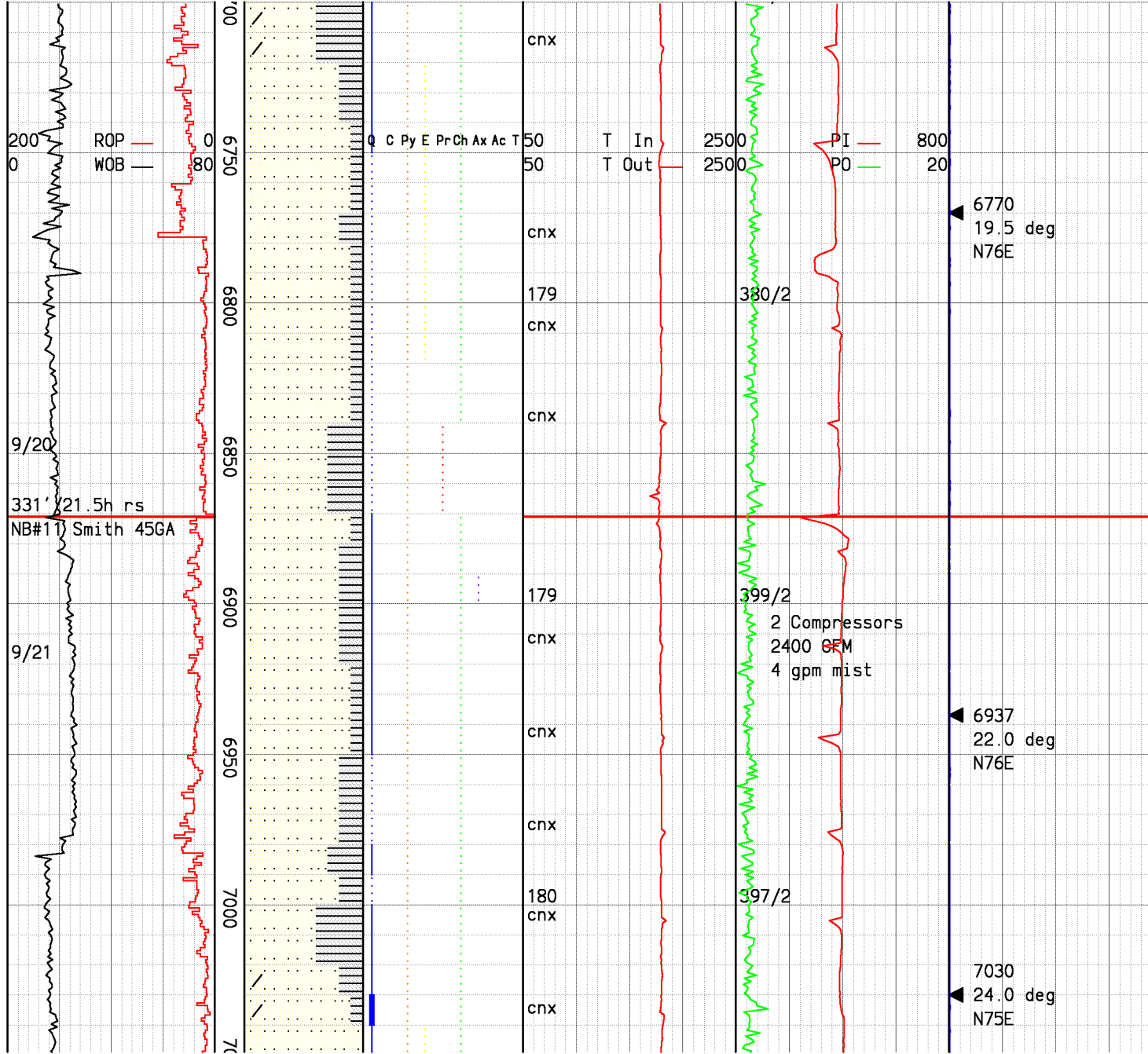
5719
7.5 deg
N86E

Note: Venturi spool removed at 5540'.

Silicic Graywacke: med-dk gry, com white, v fn-med gr, prly srted, indist gr bndrs, com flattened arg grs, mod-str rxln, v silicic, r clr & milky wht qtz vng, r clr qtz vugs, loc r wht calc vng, r chlortzd grs, r epid, occ pyr vng, occ intrbdd w/Argillite: dk gry-blk, frm, silty texture, mass, com dull luster, loc r qtz vng.

Silicic Graywacke: lt-med gry, com-abun white, fn-med gr, prly srted, indist gr bndrs, com flattened arg grs, mod-str rxln, v silicic, r clr & milky wht qtz vng, r clr qtz vugs, loc r wht calc vng, r chlortzd grs, loc r yell epid, occ pyr vng, r pyrho incl, intrbdd w/Argillite: dk gry-blk, frm, silty texture, mass, com dull luster, r pyr vng.



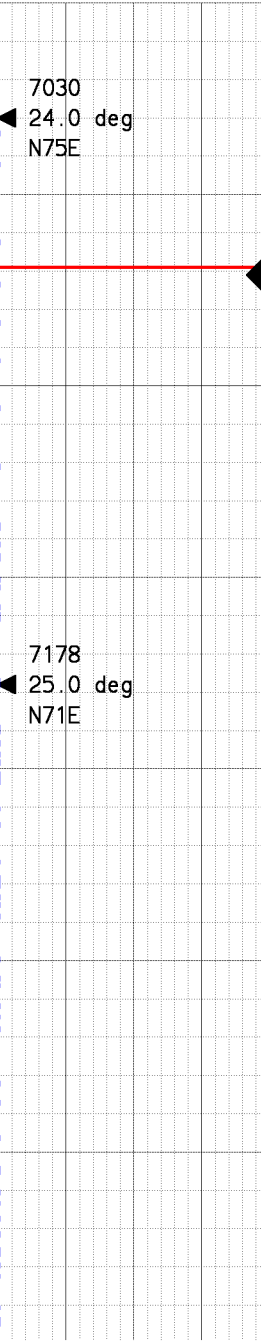
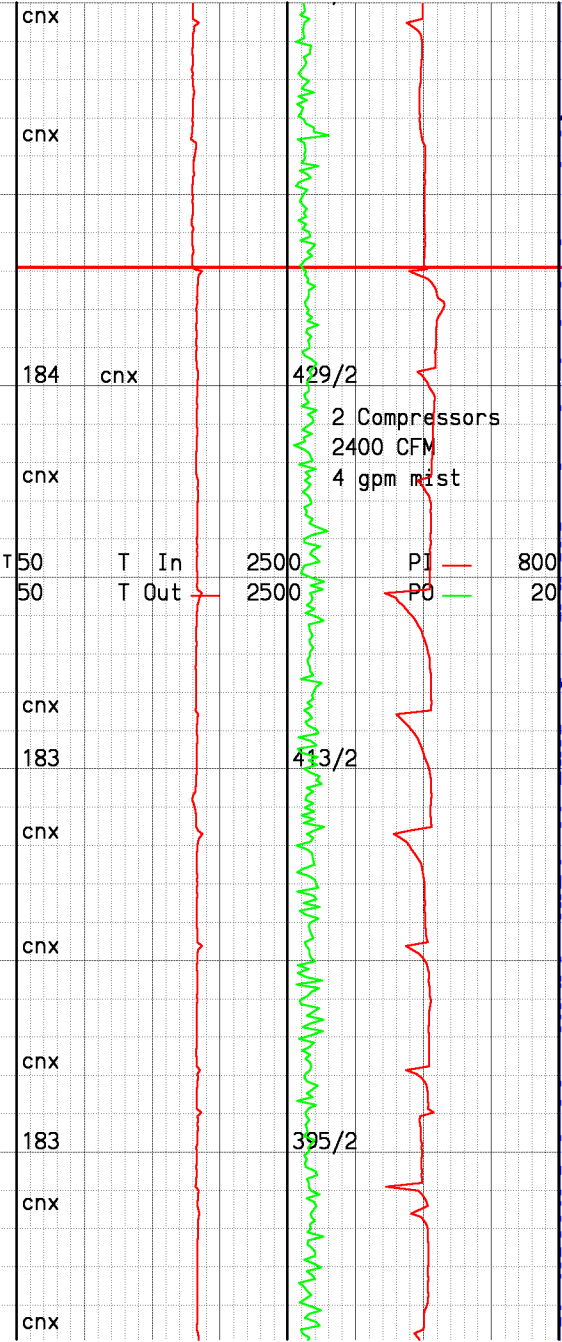
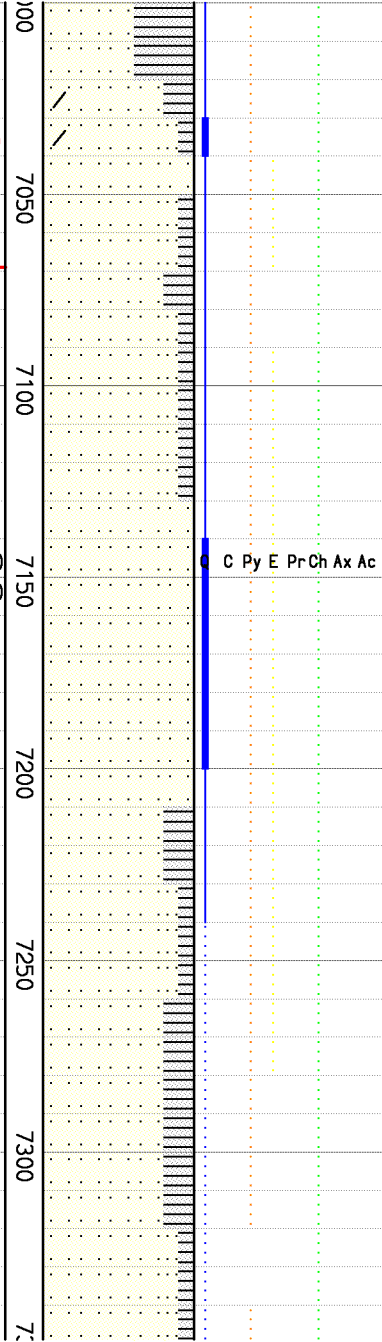
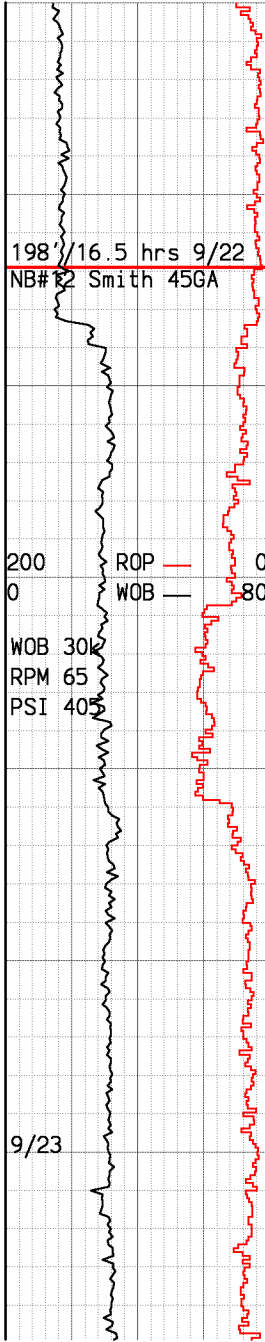


firm, mass, com dull.

Silicic Graywacke: white, lt-med gry, hd-v hd, fn-med gr, prly srt'd, r wk hornfelsic text, indist gr bndrs, mod rxln, r-tr clr qtz vng & frags, r clr qtz vugs, r chlortz grs, r disse & vn pyr, r translucent yell epid, intrbdd w/Argillite: med-dk gry, brn, firm, mass, com dull, r milky white qtz frac fill.

Silicic Graywacke: white, lt-dk gry, hd-v hd, fn-med gr, prly srt'd, indist gr bndrs, mod rxln, r-tr clr qtz vng & frags, r clr qtz vugs, r chlortz grs, r disse & vn pyr, intrbdd w/Argillite: dk gry-blk, firm, mass, com dull, r milky white qtz frac fill.

Silicic Graywacke: lt-med gry, wht, hd-v hd, occ wk hornfelsic texture, fn-med gr, prly-mod srt'd, indist gr bndrs, mod-str rxln, r-mnr clr qtz vn & vugs, r disse & vn pyr, r pale yell epid, r chlortz grs, intrbdd w/Argillite: dk gry-blk, frm-hd, mass, loc r clr qtz vng, r milky



texture, fr med gr, prly med str, indist gr bndrs, mod-str rexln, r-mnr clr qtz vn & vugs, r disse & vn pyr, r pale yell epid, r chlortzd grs, intrbdd w/ Argillite: dk gry-blk, frm-hd, mass, loc r clr qtz vng, r milky white qtz frac fill.

Possible Steam Entry @ 7071': 30# init press in incr, 15# stable, 3 deg init & stable temp out incr, 0# press out increase.

Fracture Zone f/7156-7209' w/drill breaks at 7156' and f/7175-7188'.

Silicic Graywacke: lt gry, wht, occ pale green cast, hd-v hd, occwk hornfelsic texture, fn-med gr, prly srted, indist gr bndrs, tr-mnr clr qtz vn & vugs, r disse & vn pyr, r pale yell epid, r chlortzd grs, intrbdd w/Argillite: dk gry-blk, frm-hd, mass, r white qtz frac fill.

Silicic Graywacke: lt-med gry, com blchd grns, v hd, str rexln fn gr, prly srted, indist gr bndrs r-mnr milky wht qtz vn & vugs, r disse & vn pyr, r chlortzd grs, intrbdd w/Argillite: dk gry-blk, frm-hd, mass, loc r white qtz

198 / 16.5 hrs 9/22
NB# 12 Smith 45GA

200 ROP
0 WOB
WOB 300
RPM 65
PSI 405

9/23

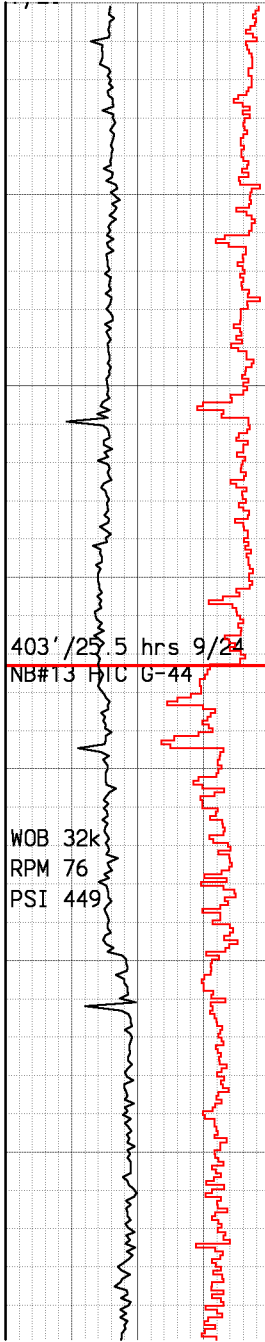
7030
24.0 deg
N75E

7178
25.0 deg
N71E

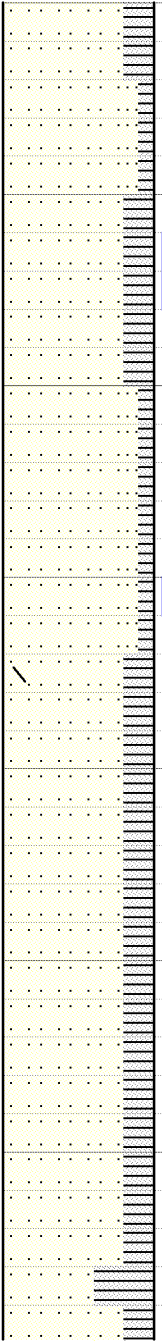
184 cnx 429/2
2 Compressors
2400 CFM
4 gpm mist
50 T In 2500 PI 800
50 T Out 2500 PO 20

cnx 183 413/2

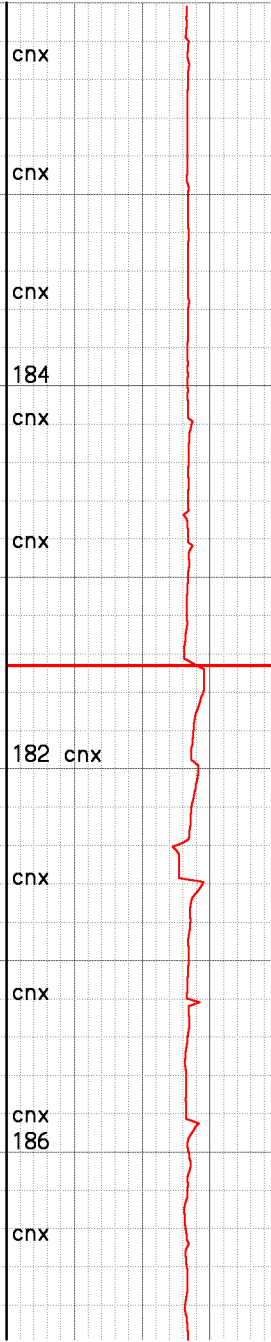
cnx 183 395/2



100
7350
7400
7450
7500
7550
7600
76



cnx
cnx
cnx
184
cnx
cnx
182 cnx
cnx
cnx
cnx
186
cnx



406/2
328/2
393/2

2 Compressors
3 Compressors
2 Compressors
2400 CFM
3 gmp mist

7371
27.0 deg
N72E
7491
26.5 deg
N72E
7645
27.0 deg

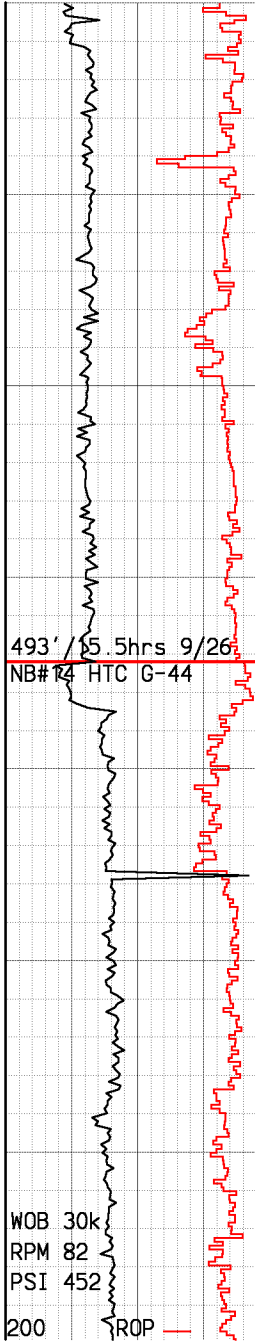
com blchd grns, v hd, str rexln
fn gr,prly srted,indist gr bndrs
r-mnr milky wht qtz vn & vugs,
r disse & vn pyr,r chlortzd
grs,intrbdd w/Argillite:dk gry-
blk,frm-hd,mass,loc r white qtz
frac fill.

Silicic Graywacke:lt gry,wht,
occ pale green cast,hd-v hd,
fn-med gr,prly srted,indist gr
bndrs,wk loc fol,tr-mnr clr qtz
vugs & frags,r disse & vn pyr,
intrbdd w/Argillite:dk gry-blk,
frm,silty.

Drill Breaks f/7405-7408' and
f/7455-7460'.

Possible Steam Entry at 7490',
30# initial P-in increase.
stable at 428 psi, 0 deg T-out
increase, 0 P-out increase

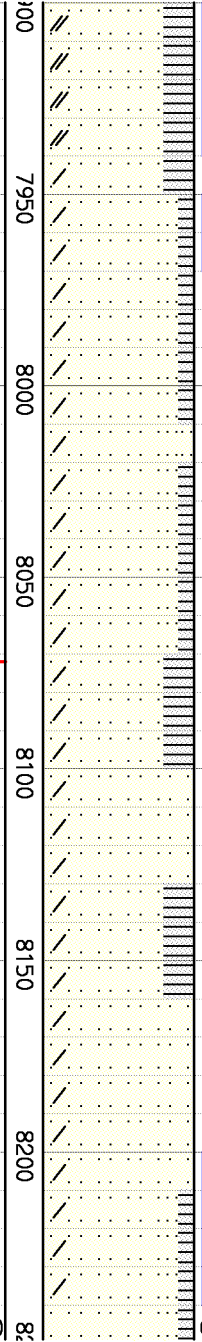
Silicic Graywacke:white-lt gry,
loc pale green cast,hd-v hd,fn-
med gr,indist gr bndrs,loc wk
fol,occ hornfelsic texture,
tr clr qtz vng,r chlortzd
grs,r disse pyr,intrbdd w/
Argillite:dk gry-blk,mod hd-hd,
brittle,silty texture,mass,loc
r qtz vng.



493' / 5.5hrs 9/26
 NB# 24 HTC G-44

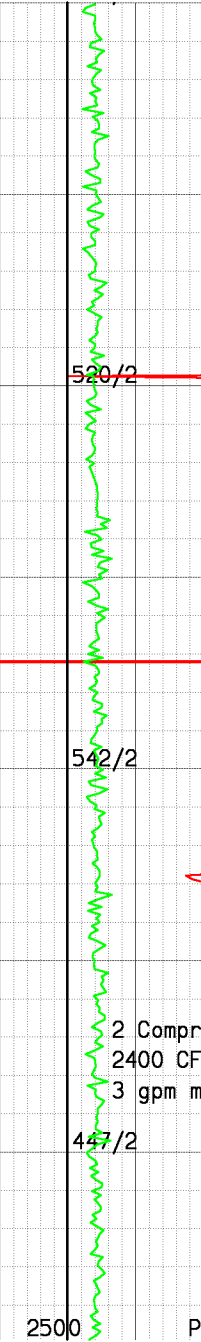
WOB 30k
 RPM 82
 PSI 452

200 ROP 0



Q C Py E Pr Ch Ax Ac T 50

cnx
 cnx
 185 cnx
 cnx
 cnx
 cnx
 186
 cnx
 cnx
 cnx
 186
 cnx



520/2
 542/2
 447/2

2 Compressors
 2400 CFM
 3 gpm mist

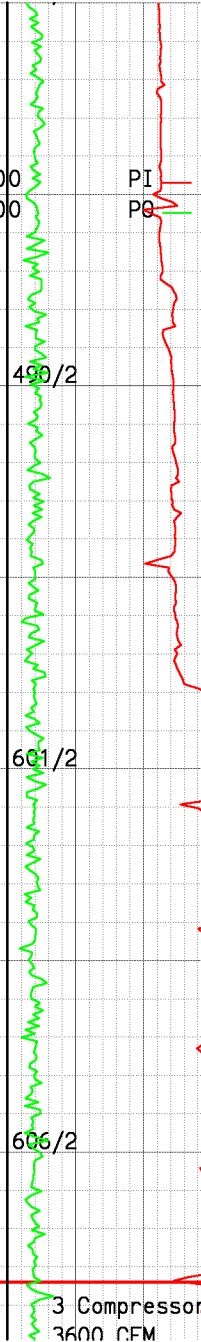
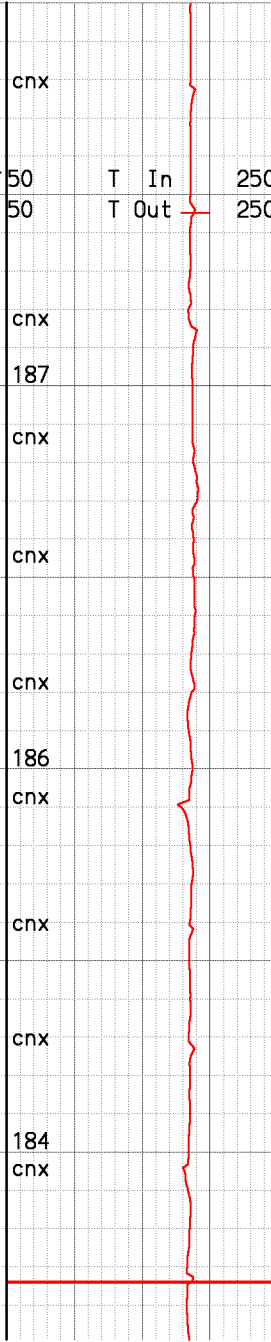
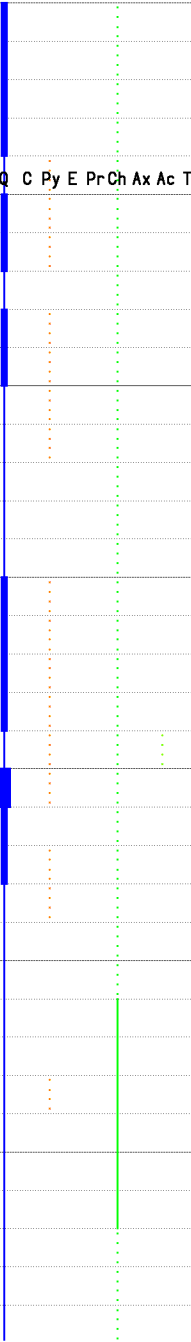
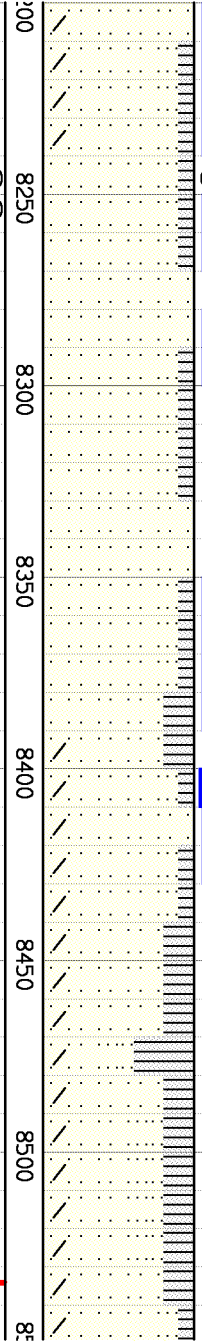
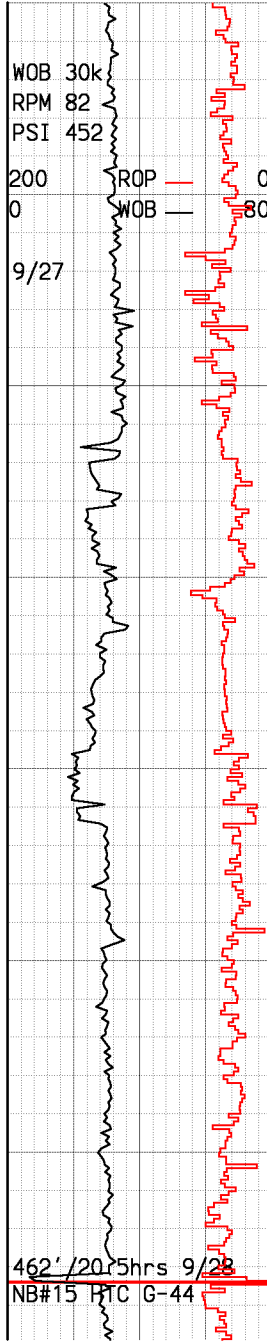
8089
 28.0 deg
 N60E
 8245
 28.0 deg

Silicic Graywacke:wht,lt-drk gry,com pale green cast,com blchd app,hd-v hd,fn-med gr, mod srted,indist-mod dist gr bndrs,mod-str rexln,tr-mnr clr & wht qtz,r chlortzd grs, r pyr vng,intrbdd w/Argillite: dk gry-blk,mod hd-hd,brittle, silty texture,mass.com dull, occ milky wht qtz vng.

Silicic Graywacke:wht,lt-drk gry,com pale green cast,occ blchd app,occ wk hornfelsic texture,hd-v hd,fn-med gr,mod -str rexln,indist-mod dist gr bndrs,tr-mnr clr & wht qtz,com chlrtzd grs,loc r pyr,intrbdd w/ Argillite:dk gry-blk,mod hd -hd,brittle,silty texture,mass, predwk-mod phyll shn,com dull, occ r qtz vng.

Possible Steam Entry at 8185', 8# init press in increase,0# stable,4 deg init temp out increase,0 deg stable.No press out increase.

Silicic Graywacke:white-lt gry,com pale green cast,com blchd app,v hd, mod altrd texture,str rexln, indist-mod bndrs,tr-mnr clr & wht qtz vng & vngs loc r wht calc vng &



Silicic Graywacke:white-lt gry,com pale green cast,com blchd app,v hd, mod altrd texture,str rexln, indist-mod bndrs,tr-mnr clr & wht qtz vng & vugs,loc r wht calc vng & vn frags r chlortzd grs,r pyr vng,intrbdd w/Argillite:dk gry-blk,frm,silty texture,mass,pred wk-mod phyll shn, com dull.

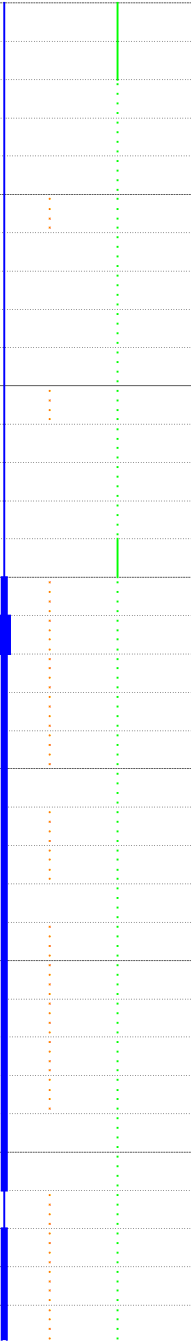
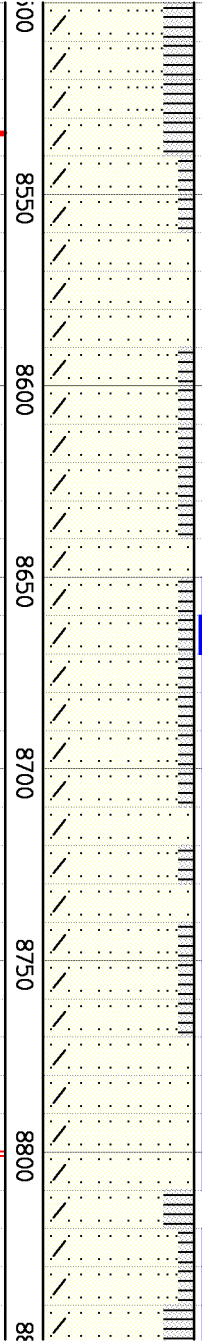
Silicic Graywacke:white-lt gry,com pale green cast,com blchd app,v hd, mod altrd texture,str rexln, indist-mod bndrs,tr-mnr clr & wht qtz vng & vugs,loc r wht calc vng & vn frags r chlortzd grs,r pyr vng,intrbdd w/Argillite:dk gry-blk,frm,silty texture,mass,pred wk-mod phyll shn, com dull.

Silicic Graywacke:white-lt gr,lt-med brn,com blchd app,hd-v hd,mod-str rexln,indist-mod dist gr bndrs,tr-mnr clr & wht qtz,com chlrtzd grs,loc r pyr, intrbdd w/Argillite:dk gry-blk, frm-mod hd,silty texture,mass, occ r qtz vng.

Silicic Graywacke:white-lt gry, occ lt-med brn,com blchd app,hd-v hd,mod altrd texture,mod-str

462' / 20 5hrs 9/28
NB#15 HIC G-44

WOB 31k
RPM 71
PSI 582



cnx

cnx

cnx

184

cnx

cnx

cnx

184

cnx

cnx

183 cnx

cnx



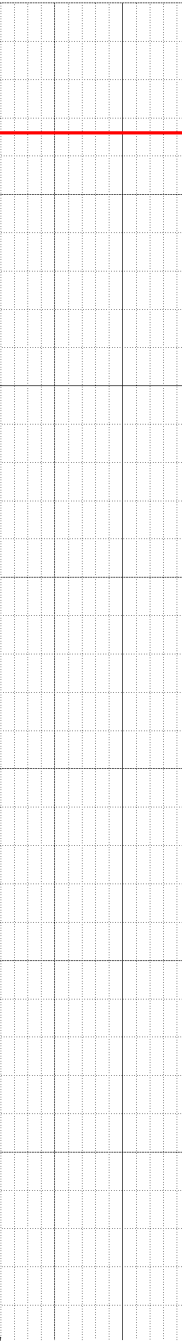
3 Compressors
3600 CFM
3 gpm mist

581/2

582/2

604/2

2 Compressors
2400 CFM
3 gpm mist

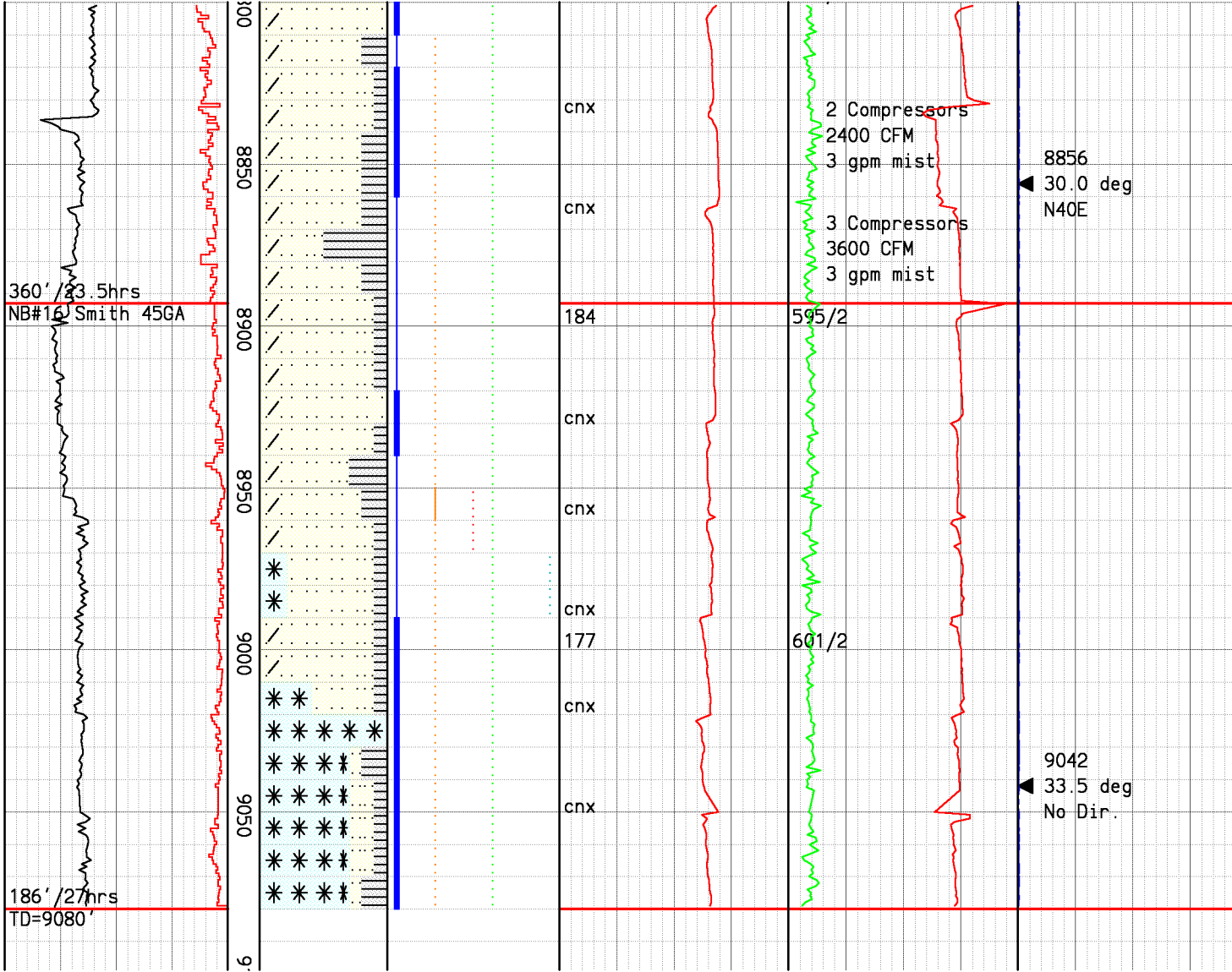


Silicic Graywacke: white-lt gry,
occ lt-med brn, com blchd app, hd-
v hd, mod altrd texture, mod-str
rexln, indist-mod dist gr bndrs,
r-tr clr & wht Qtz vng & vugs, r
chlortzd grs, r disseminated pyr.

Silicic Graywacke: wht, lt-drk
gry, lt-med brn, occ blchd app,
occ wk hornfelsic texture, hd-v
hd, fn-med gr, mod-str rexln,
indist-mod dist gr bndrs, tr-mnr
clr & wht Qtz, com chlortzd grs,
loc r pyr, intrbddd w/ Argillite:
dk gry-blk, mod hd-hd, brittle,
silty texture, mass, com dull, occ
r Qtz vng.

Silicic Graywacke: wht, lt-drk
gry, com pale green cast, hd-v hd
mod altrd texture, mod-str rexln,
indist-mod dist gr bndrs, tr-mnr
clr & wht Qtz, com chlortzd grs,
loc r disseminated pyr, intrbddd w/
Argillite: dk gry-blk, mod hd-hd
brittle, silty texture, mass, occ
r Qtz vng.

Silicic Graywacke: wht, lt-drk
gry, occ lt-med brn, com blchd
app, hd-v hd, mod altrd texture,
mod-str rexln, indist-mod dist
gr bndrs, r-tr clr & wht Qtz



Silicic Graywacke:wht,lt-drk gry,occ lt-med brn,com blchd app,hd-v hd,mod altrd texture, mod-str rexln,indist-mod dist gr bndrs,tr-mnr clr & wht qtz, com chlrtzd grs,loc r pyr, intrbdd w/Argillite:dk gry-blk, mod hd-hd,brittle,silty texture, mass,com dull,loc r qtz vng.

Silicic Graywacke:wht,lt gry, occ lt-med brn,com blchd app,v hd,str rexln,indist-mod dist gr bndrs,tr-mnr clr & wht qtz,com chlrtzd grs,loc r pyr,intrbdd w/Argillite:dk gry-blk,mod hd-hd,brittle,silty texture,mass, com dull,loc r qtz vng,intrbdd w/Felsite:wht,translucent,r pale green cast,frsh-sl altrd, microxln grndmass,brit,r disem tourm.

T.D. MLM 5 Fork @ 9080'.
Remove whipstock,drill out cement plug and cleanout original wellbore t/fish @ 4151'.