Tecton Geologic

COMPANY	Calpine Corporation
WELL NAME	Sulphur Bank - 34
FIELD	The Geysers
COUNTY	Sonoma
STATE	California
WELL HEAD COORDINATES	

668' N, 2054' E of SW Corner of Sec 12, T11N, R9W
N416969.2 E1768155.2

ELEVATION	2095.8' GL
RIG - DAY RATE START DATE	7/29/2012
TD DATE	9/13/2012
TOTAL DEPTH	8258'
TRUE VERTICAL DEPTH	8160'
TD LOCATION	1070.1'N and 169.2'E of wellhead
DRILLING CONTRACTOR	NCPA Rig #1
COMPANY REPRESENTATIVES	Steve Gamble Russ Silva

LOG INTERVAL

DATE LOGGED	7/30/12	TO	9/13/12
DEPTH LOGGED	42'	TO	8258'
MUD DRILLING	42'	TO	2444'
AIR DRILLING	2444'	TO	8258'
LOG SCALE	1:600		
UNIT NO.	C32		

LOGGING GEOLOGISTS

Matt Dobbs (md), Patrick Broderick (pb), Jon Pollard (jp), Richard Dunlap(dd), Drew Fetterman (df),Charley Wahl (cw)

HOLE

26"	TO	545'
17.5"	TO	2444'
10.625"	TO	6943'
8.5"	TO	8258'

CASING

20"	FROM	Surface	TO	537'
13.375"	FROM	Surface	TO	2434'

LINER

8.625 & 7"	FROM	2237'	TO	8195'
7" tieback	FROM	Surface	TO	2278'

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

REMARKS

All depths from kelly bushing KB=29'

LITHOLOGY

Argillite	Siliceous Graywacke
Chert	Metamorphic Ultramafic
Siltstone	Weak Foliation
Greenstone	Strong Foliation
Serpentine	Marginal Alteration
Blueschist	Pervasive Alteration
Felsite	Weakly Hornfelsic
Clay	Strongly Hornfelsic
Lithic Graywacke	
Argillaceous Graywacke	

STEAM ENTRIES

	Init	Sust
3684'	9	0
3690'	3	0
3841'	5	5
5030-5045'	3	3
6106'	2	2
6514-6571'	0	0
6659'	5	5
7717'	5	0

WATER ENTRIES

none

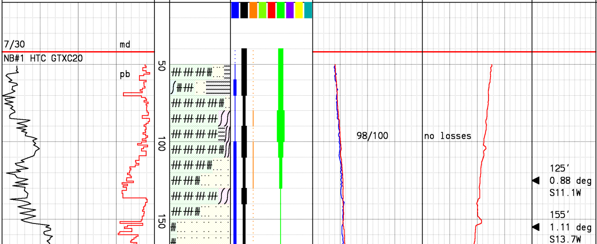
SECONDARY MINERALS

Q = Quartz
C = Calcite
P = Pyrite
E = Epidote
R = Pyrrhotite
Ch = Chlorite
X = Axinite
A = Actinolite
T = Tourmaline

Rare	<< 1%
Trace	< 1%
Minor	1% to 4%
Common	4% to 7%
Abundant	7% to 10%
	> 10%

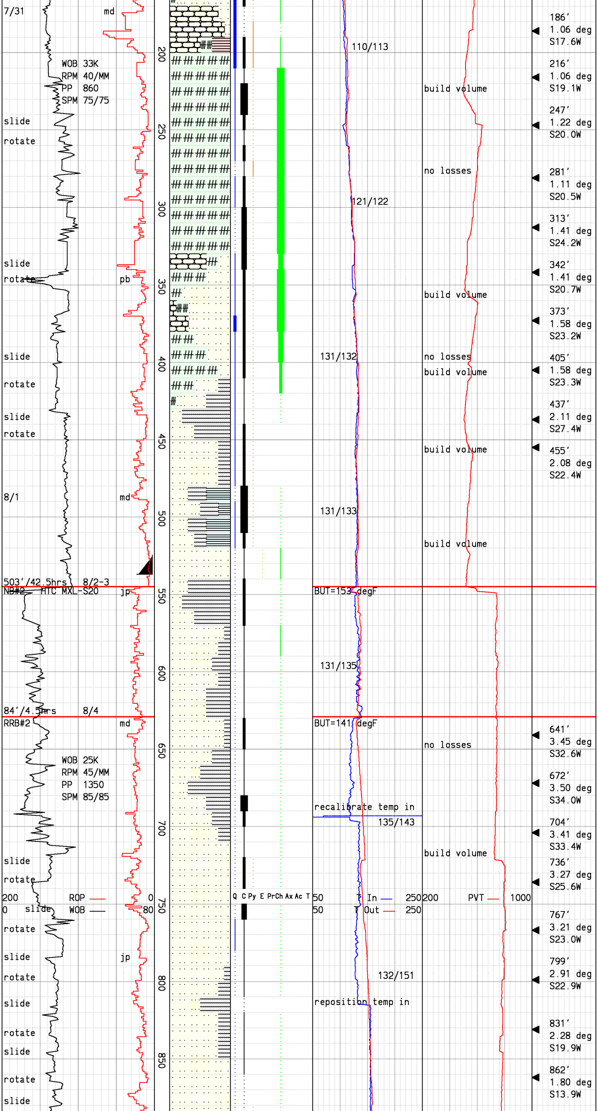
Tecton Geologic SB-34 Scale 1: 600

Drilling Data	Depth	Lithology	Minerals	Temperatures	Circulation	Surveys	Descriptions
ROP 200 ft/hr 0 Weight on Bit 0 k lbs 80			Quartz Calcite Pyrite Epidote Pyrrhotite Chlorite Axinite Actinolite Tourmaline	Temperature In Temperature Out 50 deg F 250	Pit Total 200 bbls 1000	MWD Temps 50 deg F 250	



Spud Sulphur Bank 34 on 7/30/12 Drill from 42' with 26" bit and mud motor.

Greenstone:lt-dk grn,brick red, hd-v hd,com porph text,loc mott, aphan-crs gr,r-mnr qtz vng,mnr-com clr-wht calc agg/vng,r-tr pyr,mnr-abun chlor altn intbdd w/Argillite:dk gry-blk, mod hd, com phyll shn, aphan-fn gr, intbdd w/Siliceous Graywacke: lt-med gry,mod hd-v hd,loc brit, prly srtd, predom fresh app, probably Franciscan melange.



Chert:pred lt grn,olive grn,lt gry,salmon,brick red,aph,shard app,v hd,brit,silic,tr-mnr qtz microvng,r-tr calc vng,tr-mnr disem pyr,intrbdd w/Siltstone: brick red,orng/red,firm-mod hd, mod fri,r qtz vng,r calc vng,r disem pyr.

Greenstone:lt-dk grn,dom porph txt,hd,brit,mott,abun-pred mod relic txt,abun clay altd felds, tr-abun altd t/clay,tr-com serp,r-tr qtz vng,t-abun calc vng,r-tr disem pyr,abun chlor.

Siliceous Graywacke:lt-med gry, wht,grn,mod hd-v hd,loc brit, prly srtd,prly def gr bndrs,loc mnr lithics,tr qtz vng,tr-mnr calc vng/agg,r pyr agg,mnr-com chlor altn;intrbdd w/Argillite: dk gry-blk,dk brn,mod hd-hd, friable,tr phyll shn,aphan-fn gr,tr calc vng,r mica;Clay:lt wht-med gry,r brn gry,sft, wk-mod sticky,water sol,loc relic txt of lithic wacke, calcareous.

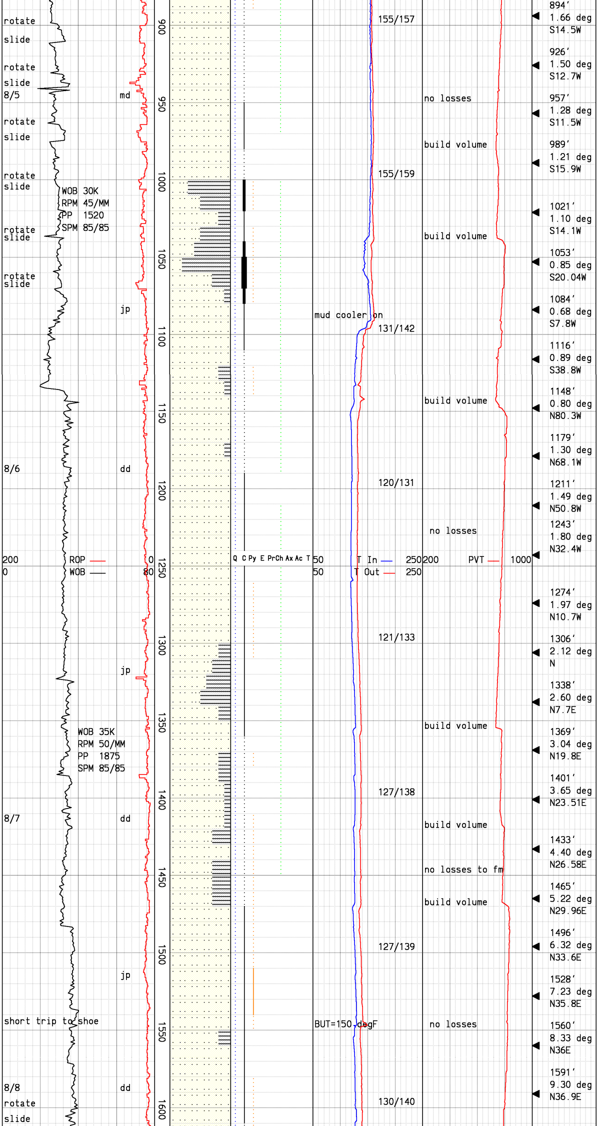
Drill 26" hole to 545'. Run 13 joints of 94#, J-55 20" butt. casing from surface to 537' and cement into place. Drill ahead with 17 1/2" bit mud motor and MWD tools.

Siliceous Graywacke:lt-med gry, wht,pale grn,sft-mod hd,loc britt,prly srtd,well def gr bndrs,loc mnr lithics,r-tr qtz, tr-mnr calc vng/agg,r-tr pyr agg,r-tr chlor altn.

POOH for directional tools. Begin directional work f/629'.

Argillite:silver,dk gry,drk brn/gry,aph,firm-mod hd,mod fri,com fiss txt,mnr weak phyll sheen,tr-mnr calc vng, intrbdd w/Siliceous Graywacke: lt gry-gry,brn/gry,v lt grn, mod hd-hd,mod crumbly-brit,v fn-fn gr,prly-mod def gr bndrs, pred prly-mod srtd,loc mnr lithics,abun clay decr w/depth, com-abun Greenstone f/690-710', r qtz vng,tr-loc abun calc vng, abs-r disem pyr,v wk chlor wash.

Siliceous Graywacke:lt gry-gry, brn/gry,v lt grn,mod hd-hd, pred brit,tr fri,fn-med gr,well def gr bndrs,pred prly-mod srtd, loc mnr lithics,r qtz vng,r-tr wht calc vng t/3mm,r-tr chlor stnd lithic frags.



Siliceous Graywacke:lt gry-gry, brn/gry,v lt grn,mod hd-v hd, pred brit,r fri,fn-med gr,well def gr bndrs,pred prly-mod srtd, loc mnr lithics,r qtz vng,r-tr wht calc vng,r agg pyr,r v wk chlor wash.

Siliceous Graywacke:lt gry-gry, lt brn/gry,v lt grn/gry,hd-v hd, pred brit,v fn-fn gr,prly-loc well def gr bndrs,prly-mod srtd, loc mnr lithics,loc wk fol,loc bronze mica,r qtz vng,r-tr calc vng,abs-r v wk chlor wash & chltzd grs,intrbdd w/Argillite: loc lt gry-pred dk gry,dk gry/ brn,mnr silver,mass-silty,firm-mod hd,mod fri-mod brit,com fiss txt,tr-mnr wk phyll sheen, tr slicks,r-com calc vng,r disem pyr.

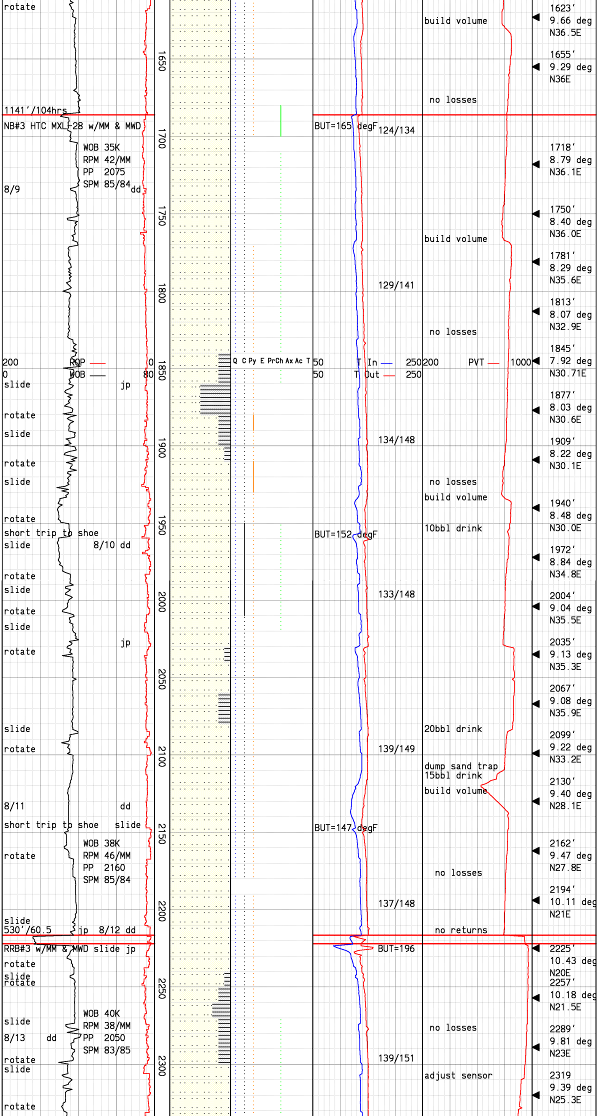
Siliceous Graywacke:lt gry-gry, brn/gry,v lt grn,mod hd-v hd, pred brit,r fri,fn-med gr,well def gr bndrs,pred prly-mod srtd, loc mnr lithics,r qtz vng,r-tr wht calc vng,r agg pyr,r v wk chlor wash,intrbdd w/Argillite: med-pred dk gry,brn,mass-silty, firm-mod hd,com fiss txt,tr wk phyll sheen,tr calc vng,r agg pyr.

Siliceous Graywacke:med gry,gry, brn/gry,loc pale grn wsh,mod hd pred brit,loc fri,fn gr,well def gr bndrs,well srtd,pred fresh app,loc mnr lithics,r qtz vng, r-tr wht disem and vn calc,r agg pyr,r wk chlor wash,r pink mica, r magn,r Arg frag.

Siliceous Graywacke:lt gry-gry, med gry,r v lt grn,mod hd-v hd, brit,mnr fri,fn-med gr,well def gr bndrs,mod srtd,loc mnr lith frags,r qtz vng,r-tr wht calc vng,r agg pyr,r v wk chlor wash, intrbdd w/Argillite:med-pred dk gry,brn,mass-silty,firm-mod hd, com fiss txt,r wk phyll sheen,tr disem and vn calc.

Tight spot f/1510-1525'

Siliceous Graywacke:lt gry-gry, med gry,r v lt grn,mod hd-v hd, brit,mnr fri,fn-med gr,pr-mod well def gr bndrs,mod srtd,loc mnr lith frags,r qtz vng,r-tr wht calc vng,r-tr agg pyr.



Siliceous Graywacke:lt gry-gry, loc wk pale grn wash,mod hd, brit,loc fri,fn gr,dom well def gr bndrs,fresh homogeneous salt and pepper app,well srtd,loc wk relic tex,loc wk lineation mafic grs,r qtz vng,r-tr disem and vn calc;becom less w/dpth, r agg pyr,poss r magnetite.

Siliceous Graywacke:lt gry-gry, ovrall wk pale grn wash,mod hd, brit,loc fri,fn gr,dom distinct gr bndrs,fresh,ovrall salt and pepper tex,well-med srtd,loc wk relic tex,loc wk fol,r qtz vng,r-tr disem & vn calc;becom less w/dpth,r disem pyr.

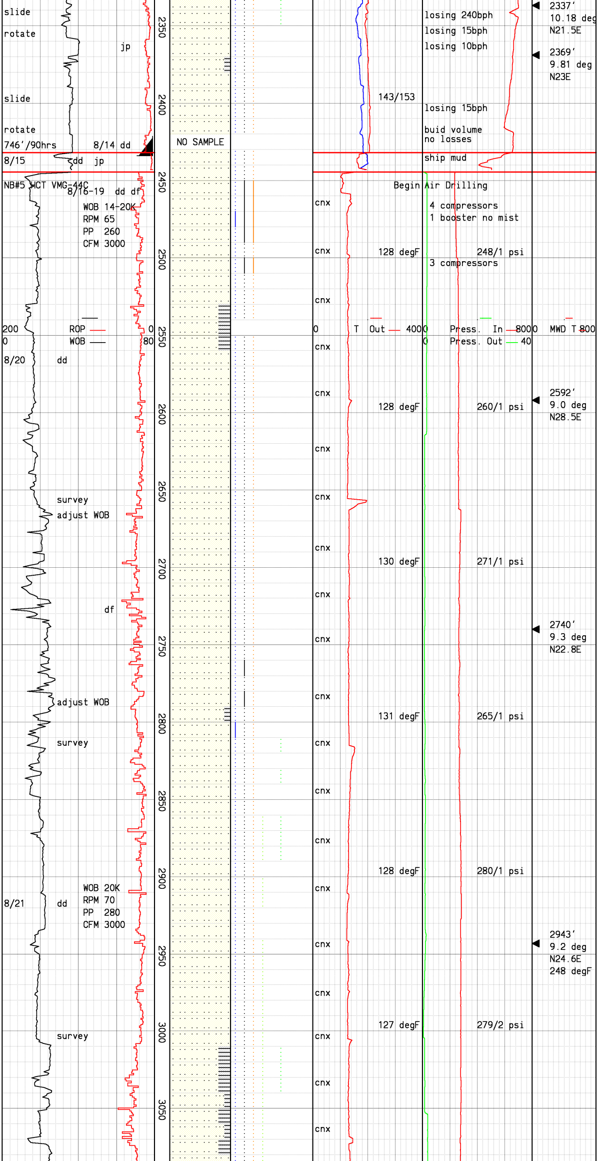
Siliceous Graywacke:lt gry-gry, med grn,r drk gry,mod hd-v hd, brit,mnr fri,fn-med gr,well def gr bndrs,loc prly def gr bndrs, mod srtd,loc mnr lith frags,r qtz vng,r wht calc vng,r agg & disem pyr,r wk chlor wash, intrbdd w/Argillite:med-pred dk gry,brn,mass-silty,firm-mod hd, com fiss txt,r wk phyll sheen,tr disem and vn calc.

Siliceous Graywacke:lt gry-gry, loc r wk pale grn wash,mod hd, brit,loc fri,fn gr,dom well def gr bndrs,fresh app,ovrall salt and pepper tex,well srtd,loc wk relic tex,loc wk fol,r qtz vng,r-tr disem & vn calc,r disem pyr,pos disem pyrrho.

Siliceous Graywacke:lt gry-gry, med gry in sample,mod hd-hd, brit,r fri,fn gr,dom well def gr bndrs,fresh app,ovrall salt and pepper tex,well srtd,loc wk relic bdg,loc wk lineation of mafics,r qtz vng,r-tr disem and vn calc,r disem pyr,r mag, loc intbbd w/thin lams of Arg as described.

Lose total rtns @ 2216'.
Pump LCM, set 150 ln ft cmt
plug #1 @ 2214'. Tag @ 2198'.
Conventional drill t/2222'.
Pick up directional tools &
drill f/2222' w/MM & MWD.

Siliceous Graywacke:lt-med gry, loc dk gry,mod hd-hd,brit,loc fri,fn-crs gr,dom fresh,dist gr bndrs,mod-prly srtd,com lith frags in mtx,r qtz vng,r calc, vn,r agg & disem pyr,r wk chlor wash,intrbdd w/Argillite:dk gry, blk,aphan-silty,firm-mod hd,loc blky com fiss txt,r tect polish,



tr disem and vn calc.

Note: Lost partial returns @ 2338'. Sent LCM sweep and healed fracture. Drill ahead.

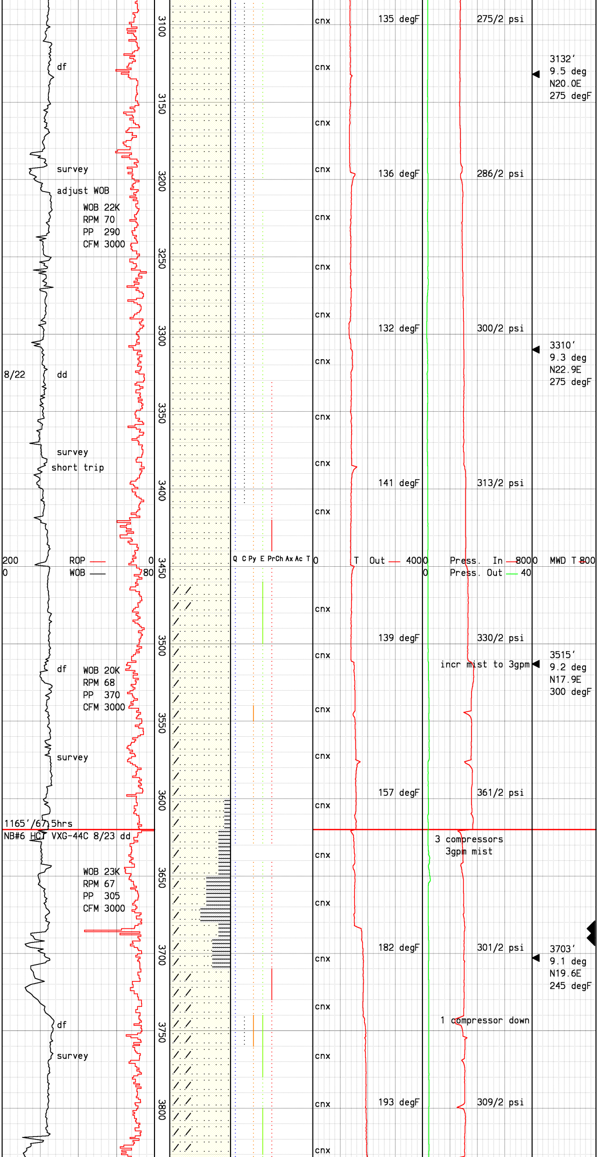
Lose total rtns @ 2432'. Pump LCM sweep,set cmt plug #2 @ 2430'. Tag @ 2252'. Conventional drill t/2444'. Run 60 jts 13 3/8",68# K-55 & L-80 casing to 2434'.Drill ahead conventional w/10.625" air drilling assy.

Siliceous Graywacke:lt-med gry, loc dk gry,mod hd-hd,brit,loc fri,fn-crs gr,dom fresh,dist gr bndrs,mod-prly srtd,com lith frags in mtx,r qtz vng,r-tr agg & vn calc,r agg & vn pyr, loc grades into Argillite:dk gry,blk,aphan-silty,firm-mod hd, loc blky com fiss txt,r tect polish,r vn calc,r vn pyr.

Siliceous Graywacke:lt gry-med gry,med gry in sample,mod hd, brit,r fri,fn gr,well def gr bndrs,fresh app,ovrall salt and pepper tex,well srtd,loc wk relic bdg,loc wk fol,r qtz vng,r disem & vn calc,r disem pyr,r mag inclsns,loc intrcltd w/thin strgrs of blk Argillite as described above.

Siliceous Graywacke:lt gry-dk gry,med gry in sample,mod hd-hd,brit,r fri,fn gr,well def gr bndrs,fresh app,ovrall salt and pepper tex,well srtd,loc wk fol,r qtz vng,r disem & vn calc,r disem pyr,1st epidote occ @ 2870',r chlor rplcmnt of grns,r magn,r Arg frags.

Siliceous Graywacke:lt gry-med gry,med gry in sample,mod hd, brit,r fri,fn gr,well def gr bndrs,fresh app,ovrall predom salt and pepper tex,well srtd, loc wk relic bddg,r wk fol,r qtz vng,r disem calc,r disem pyr,r canary yel and pistachio grn epid,r mag,loc intrbdd w/ Argillite:blk,dk gry,aphan-microxln,loc phyll shn,r blky tex,r disem pyr,sl calcareous.



Siliceous Graywacke:lt gry-dk gry,med gry in sample,mod hd, brit,r fri,fn gr,well def gr bndrs,fresh app,ovrall predom salt and pepper tex,mod-well srtd,loc lith frags in mtx r wk fol,r qtz vng,r disem calc, r agg & disem pyr,r canary yel epid.

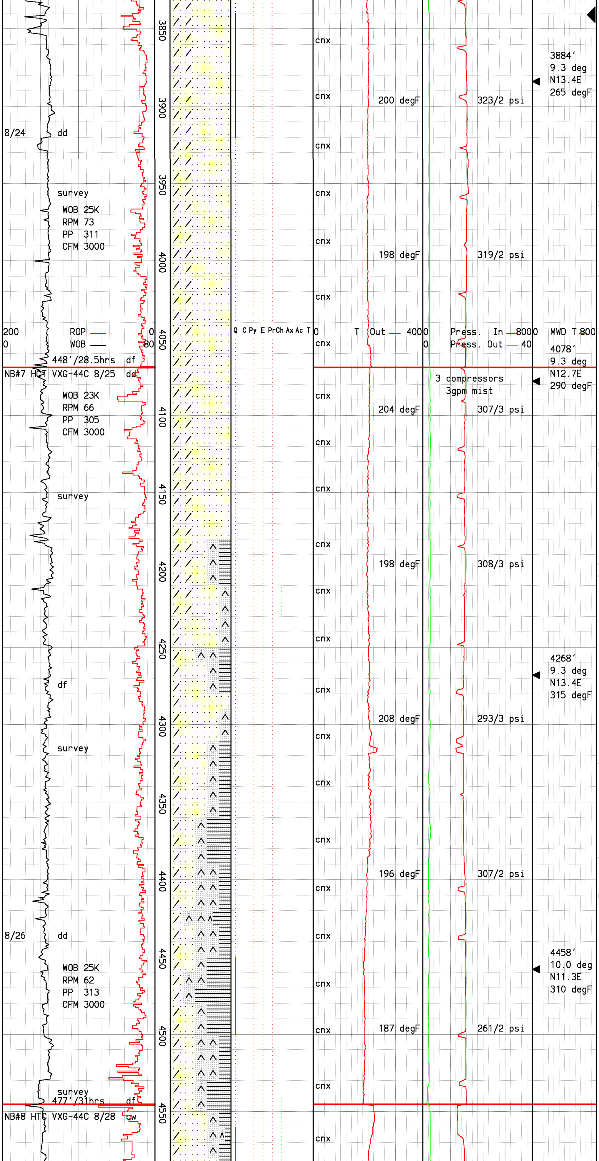
Siliceous Graywacke:lt gry-med gry,med gry in sample,mod hd, brit,r fri,fn gr,dist gr bndrs ovral fresh app,dom salt and pepper tex,well srtd,loc wk relic bddg,r wk fol,r qtz vng, r disem calc,r disem & aggpyr, r canary yel epid,r mag,r-loc tr pyrroh f/3380',loc intrbdd w/thin lams Argillite:blk,dk gry,aphan-microxln,loc silty, r tecton polish,r blky tex,r disem and agg pyr,r vn pyrrho, sl calcareous.

Siliceous Graywacke:med gry,dk gry,lt gry,med gry in sample, mod hd,loc fri,brit,fn gr,dist gr bndrs,ovrall wk-mod alt app f/3479',loc pale blchd tex,com felds grs to clay,dom salt and pepper tex,well srtd,loc wk relic bddg,r wk fol,loc com yel clr bladed epidote,r qtz vng, r disem calc,r disem & agg pyr, r mag,r pyrrh.

Steam Entry @ 3684':9psi incr.
0 sustained, 26degF sust incr.
Steam Entry @ 3690':3psi incr.
0 sustained, 7degF sust incr.

Siliceous Graywacke:med gry,dk gry,loc lt gry,med gry in samp, loc mott,mod hd,loc fri,brit,fn gr,mod-well def gr bndrs,marked incr altn f/3720':cly altn felds xls,loc blchd & devit app,well-mod srtd,loc wk relic bddg,loc com canary yel clr bladed epid, r qtz vng,r disem & agg pyr,r mag,r-tr agg pyrrh,r clr mica.

Steam Entry @ 3841':5psi sust incr, 5degF sust incr.



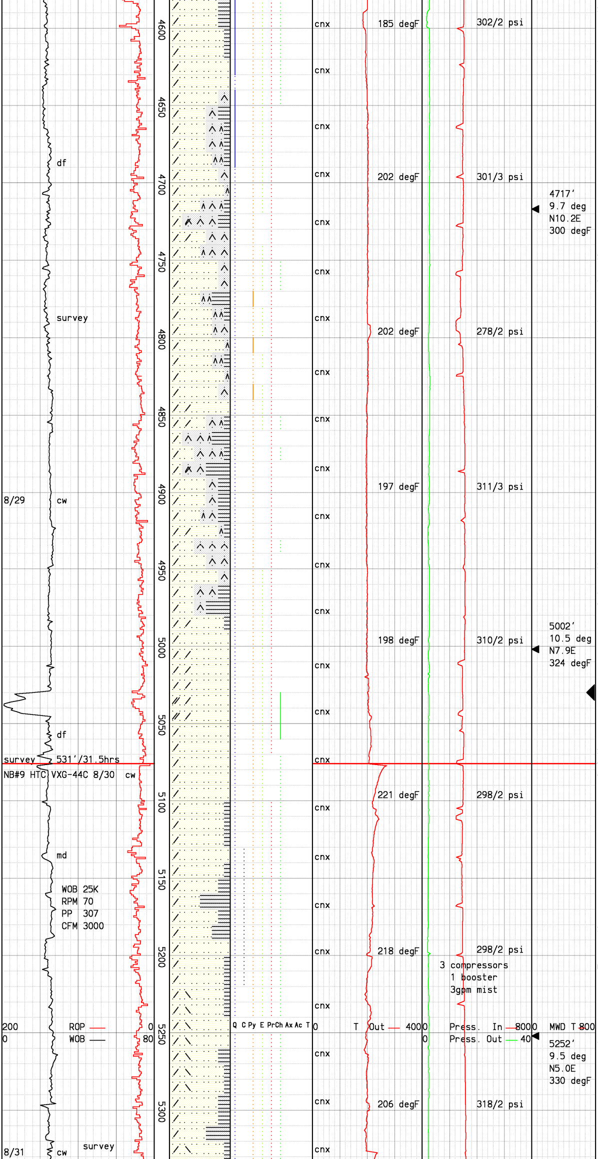
Siliceous Graywacke:med gry,lt gry,lt gry in samp,loc mott,mod hd,fri i.p.,brit,fn gr,mod-well def gr bndrs,mod altd,loc devit blchd tex,com cly altn of felds xls,well-mod srtd,loc brecc loc wk relic bddg,r-tr canary yel transp bladed epid,r qtz vng,r disem and agg pyr,r mag,r agg and vn pyrrh,r clr mica.

Siliceous Graywacke:lt gry,loc med gry,loc mott,hd-fri,brit,fn gr,well def gr bndrs,well-mod srtd,predom mod altd,loc devit app,occ blchd tex,com cly altn of felds,loc brecc loc wk relic bddg,r canary yel transp bladed epid,r qtz vng,r disem and agg pyr,r mag,r plty agg pyrrh,r Argillite frags,intrbdd w/occ Argillaceous Graywacke f/4180'.

Argillaceous Graywacke:blk,dk gry,loc med gry,mott,hd,brit, crs sndy tex,mod def gr bndrs, prly srtd,lithic in part,com transl-wht felds & qtz grs in blk fn gr mtx,loc foliated,loc str relic bddg,r pyr,r pyrrh, r mag,r agg & vn qtz,intrcltd w/Siliceous Graywacke:med gry, hd-fri,mod altd,fn gr,r yel epidote,r pyr vng,r pyrrh,r mag,r qtz vng,and Argillite: blk,dk gry,steel gry,silic,hd-sft,r fiss tex,dom blky,r qtz, r pyr vns,r agg pyrrh.

USFR = 23,800 lbs/hr
H2S = 81 ppm (air off)
NH3 = 44 ppm (air off)

While RIH with new bit,rotary clutch went out,POH to repair.



Siliceous Graywacke:lt-med gry, hd-fri,brit,fn gr,well def gr bndrs,mod srtd,loc fol,loc blchd,tr qtz,r pyr,r chlor,w/ Argillaceous Graywacke:blk,dk gry,loc med gry,hd,brit,crs sandy tex,fn gr,yel epid,r pyrrh,and Argillite:blk,v fn gr silic,sft-hd,r pyr,r pyrrh.

Siliceous Graywacke:lt-med gry, loc brwn,hd-fri,brit,fn-med gr, well-mod def gr bndrs,well srted,com mttled tex,loc fol, sl-mod clay altrn,loc blchd,loc Argillite lith frags,r-tr qtz vng,r-tr disem & vng pyr,r yel epid,r pyrrh,r chlor,grades into:Argillaceous Graywacke:blk, drk gry,loc med gry,hd,brit, sandy tex,fn-med gr,r qtz,loc r pyr,r pyrrh,intrbdd occ w/ Argillite:blk,mod hd,fri,v fn gr,silty tex,r qtz vng,r pyr.

Siliceous Graywacke:a/a,incr in epid,loc altr,occ xtln txt, Argillite:dk gry,blk,silty,vng & agg bronze/yel pyrrh.

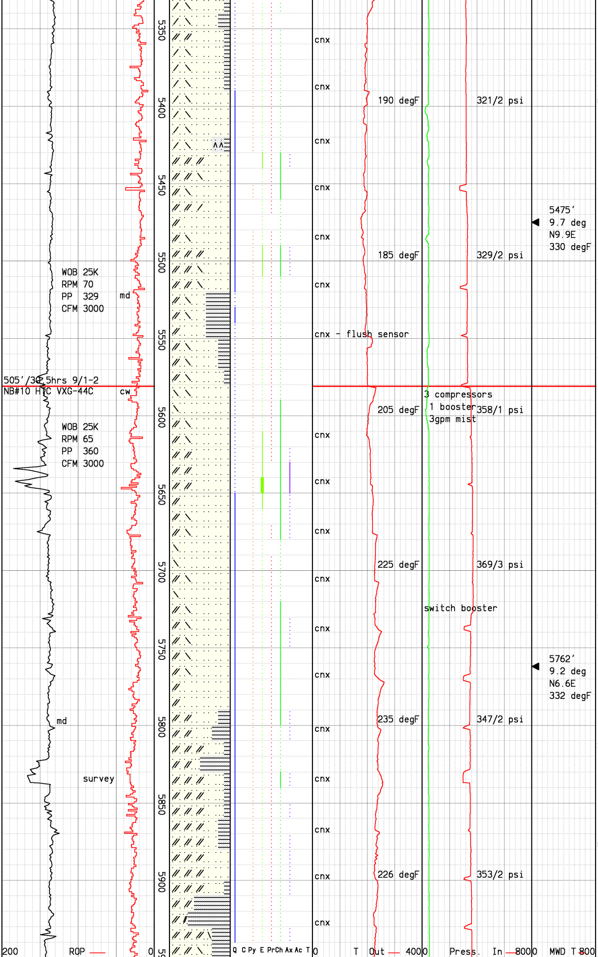
Probable steam ntry zone f/5030-5045',3 psi incr,3 sust,0 degF int,but slight incr over footage interval.

USFR = 31,100 lbs/hr
H2S = 67 ppm (air off)

Siliceous Graywacke:lt-med gry, wht,occ brn,hd,brit,fn-med gr, wkly def gr bndrs,marg altr felds,loc str altr xtln txt, blchd app,r qtz,r agg pyr,r yl epid,r vng & agg pyrrh,@5040 serpentinized? altr of <20% of the frags in hand sample or str chloritization:lt grn,sft,flaky, r open space xtals.

Flush temperature out on connections.

Siliceous Graywacke:wht-lt gry, occ brn,hd-v hd,brit,v fn-med gr,indist-wkly def gr bndrs, mnr-com sucrose txt,marg altd, pred blchd app,com wk hornfelsic txt f/5220',r qtz, loc-r calc vng,r disem pyr,r yel epid,loc-r disem pyrrh,loc-r chlor stng,intrbdd w/ Argillite:lt-dk gry,dk brn,mod hd-v hd,brit,mass,r disem pyr, loc-r disem pyrrh.



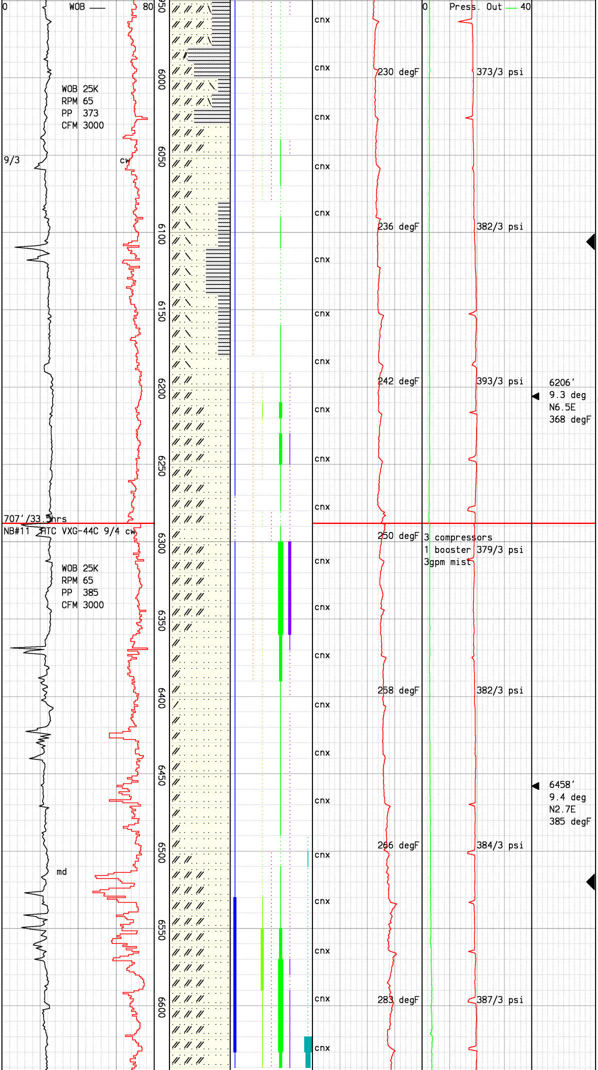
Siliceous Graywacke:wht-lt gry, med gry,brn,pastel grn,dk gry, hd-v hd,occ brit,clay altr of felds,xtln txt,wkly hrnflsic, loc blchd app including 5440': r axin,tr epid &r epid xtals, r-tr qtz vng,abs-r pyr,r pyrrh, r epid,r-tr chlor w/loc stng, Argillite:dk gry,blk,mod hd, v fn gr,aphan txt,occ silty,r qtz vng,r agg pyr.

Siliceous Graywacke:AA w/ varying degrees of bleaching (abun-pred) & hornfelsic txt (abun-pred),marg-perv altd,w/ loc Siltstone:lt gry,lt grn/ gry,firm,fri,intrbdd w/ Argillite:AA.

USFR = 40,500 lbs/hr
H2S = 67 ppm (air off)
NH3 = 240 ppm (air off)

Siliceous Graywacke:wht-lt gry, loc rootbeer brn,occ med-dk gry, hd-v hd,brit,abs-prly def gr bndrs,xtln txt,sugary app,occ clay altr felds,wkly hrnflsic, loc blchd app f/5630't/5660' including 5710',r-tr qtz,r pyr, r-tr yl-grn epid,r-tr chlor vng & stng,r lt pink axin,r magnetite throughout,@5650' incr in epid & axin w/chlor wash.

Siliceous Graywacke:wht-lt gry, lt brn-brn,v lt grn,salmon,v lt cream,v lt pink,v hd,brit, indist-r wkly def gr bndrs,v fn gr,pred sucrosic txt,str rexln, perv altd,pred blchd,com hornfelsic txt,tr mottled app, r-mnr clay altd felds,r-tr qtz microvng,r disem pyr,r yel epid,r disem pyrrh,r-tr wk chlor wash & microvng,r pink axin,intrbdd w/Argillite:lt-dk gry,brn-dk brn,mass,pred silic, pred blocky app,tr fiss txt,w/ loc Siltstone(?):lt ylw,v lt grn,soft-firm,crumbly.



Siliceous Graywacke:wht-lt gry, lt brn-brn,lt pale grn,cream, hd-v hd,brit,loc hrnflsic,altr felds,abs-prly def gr bndrs, xtln txt,tr qtz,r pyr,tr chlor including chlor wash.

Possible steam entry @6106': 2 psi incr,2 sust,0 temp incr. Drill break f/6105't/6109', ROP f/20-41 ft/hr.

Siliceous Graywacke:wht-lt gry, occ lt-dk brn,lt pale grn,hd-v hd,indist gr bndrs,sugary app, xtln txt,blchd dull app,tr qtz, r pyr,r-tr pistachio epid,tr-mnr chlor vng and stng,r-tr lt pink axin,tr magnetite.

USFR = 48,900 lbs/hr
H2S = 82 ppm (air off)
NH3 = 180 ppm (air off)

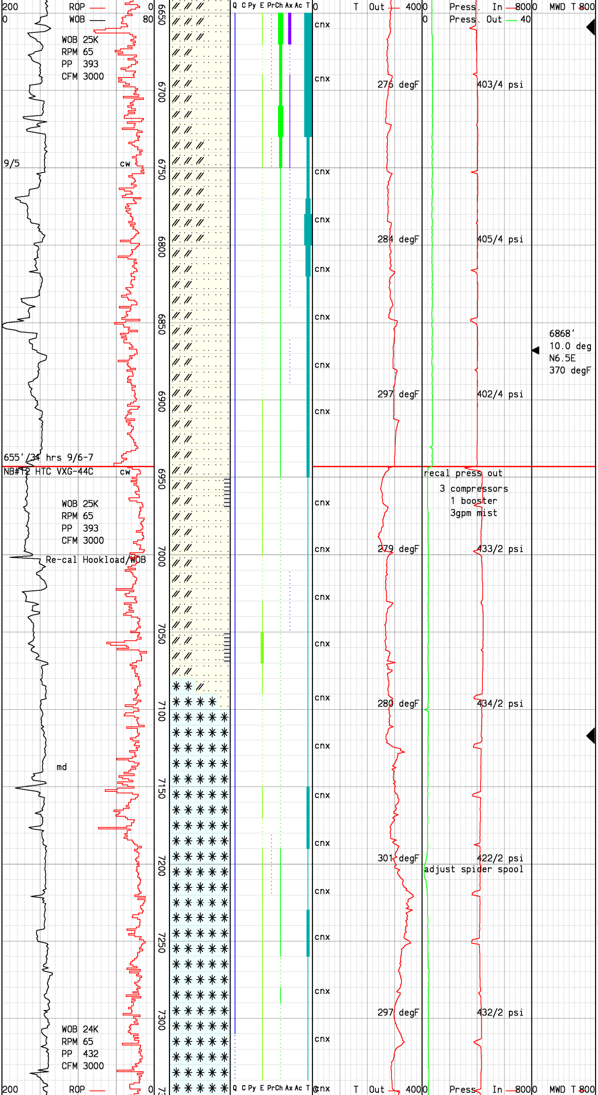
Siliceous Graywacke:wht-lt gry, predom lt grn,pink,v hd,brit,no vis gr bndrs,xtln txt,blchd sugary app,tr qtz vng,r pyr,r epid,tr-com grn chlor vng&stng, r-mnr lt pink axin vng & stng, occ axin xtals,r magnetite.

Drilling break @ 6368-6374', ROP f/28-35,WOB drop to 10k, No press or temp increase.

Drilling break @ 6419-6428', ROP f/21-58 ft/hr,no vis incr in pressure or temperature.

Probable multiple entries within fracture zone f/6514-6571'. ROP f/22-80'/hr,WOB f/25-11k, 6 degF init/stable incr, no pressure increase.

Siliceous Graywacke:wht,v lt grn,v lt pink,v hd,brit,indist gr bndrs,pred blchd,perv altd, rexln,sucrosic txt,sandy app in sample,tr mag,r-tr shiny blk amphibole(?),tr-mnr sub clr qtz,r disem pyr,mnr yel epid,r disem pyrrh,r-mnr v lt pink axin,r-abun anhed-subhed tourm, overall mineralization incr w/depth.



Possible entry at 6659'. ROP f/31-79'/hr, WOB f/26-22k, 5 psi init/stable incr. No incr in steam flow as per wet test.

Siliceous Graywacke:dom wht,occ lt gry,pale grn,v hd,brit,no gr bndrs,xtln txt,sugary app,pred blchd,r clay altr of felds,tr clr qtz,r-tr pistachio grn epid,tr chlor vng, stng & wash,r lt pink axin,mnr-abun blk tourm rods and clasts,w/poss hrnblnde,cuttings size of fine sand,no biotite in hand sample.

USFR = 89,000 lbs/hr
H2S = 50 ppm (air off)
NH3 = 150 ppm (air off)

Drill 10 5/8" hole to 6943'. Reduce down to 8 1/2" bit and drill ahead.

Siliceous Graywacke:dom wht,clr,occ lt gry,tan,pale grn,v hd,no gr bndrs,xtln txt,sugary app,tr qtz,tr-mnr pistachio epid,r-tr chlor wash,r pink axin,tr blk tourm rods and clasts,notice: loc r biotite books.

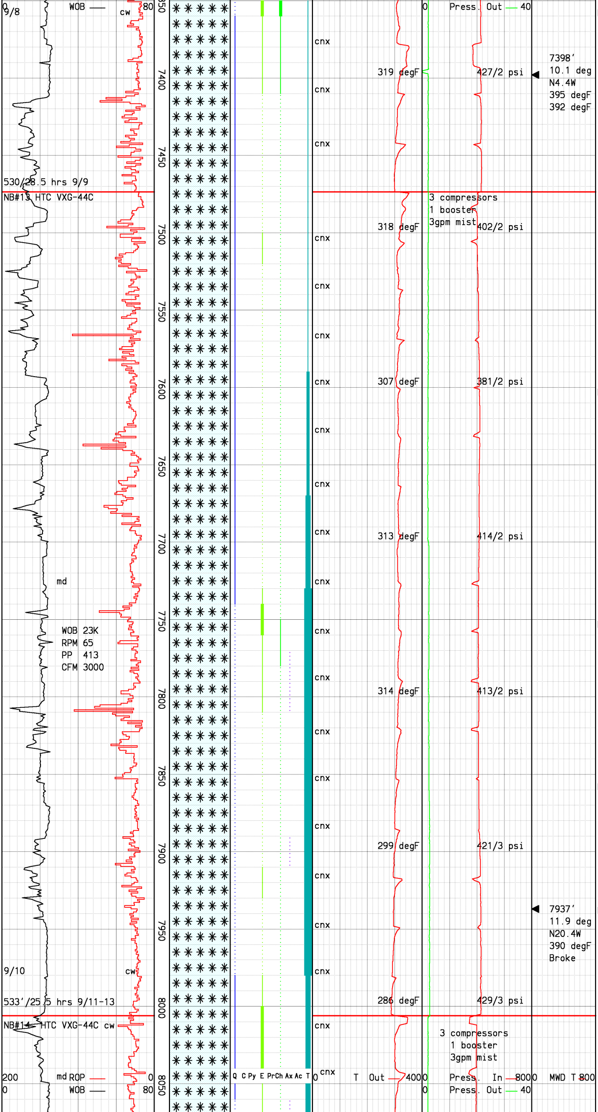
Drilling break f/7056-7061'. ROP f/17-62'/hr, WOB f/17-13k.

Siliceous Graywacke:v lt tan in sample f/7080', Probable Fesite boundary.

Possible steam entry at 7117'. 5 psi init/0 psi sustained, 4 degF init/34 degF sustained after connection. Associated with minor break at 7110'. No change in SFR per C/NC.

Fracture zone f/7140-7154'. ROP f/23-65'/hr, WOB f/22-6k.
Drilling break f/7164-719'. ROP f/34-53'/hr, WOB f/22-16k.
Drilling break f/7176-7177'. ROP f/28-73'/hr, WOB f/22-12k.

Felsite:dom wht,clr,v lt tan,pl grn,v lt yl,v hd,xtln txt,pred blchd app,loc brn bio flakes,tr qtz,tr yl epid,r disem pyrrh in v r argil frags,r-tr chlor wash,tr-mnr black/shiny tourm rods.



Felsite:wht,clr,lt tan,v hd,tr qtz,r-mnr yl/grn epid,r-tr chlor stng & flakes,tr blk tourm rods and clasts,occ tea brn boitite.

Drilling break f/7412-7418'.
ROP f/25-71 ft/hr,WOB f/25-6k.

Run two Temp thermos w/survey.

Run Second Survey @ 7403'
10.6deg,N5.5W,360degF,360degF

USFR = 91,000 lbs/hr
H2S = 46 ppm (air off)
NH3 = 180 ppm (air off)

Drilling Break f/7495-7496'.
ROP f/34-62 ft/hr,WOB f/17-7k.

Drilling break f/7513-7522'.
ROP f/27-51 ft/hr,WOB f/21-10k

Drilling break f/7565-7567'.
ROP f/24-108'/hr,WOB f/15-10k.

Drilling break f/7574-7584'.
ROP f/30-60 ft/hr,WOB f/20-9k.

Felsite:dom wht,clr,v hd,xtln text,tr qtz,r-tr yl/grn epid,r chlor bks,occ lt chlor wash,tr to mnr blk tourm rods & clasts.

Drilling break f/7632-7642'.
ROP f/44-94 ft/hr,WOB f/25-0k.

Fracture zone f/7665-7685'.
ROP f/20-66 ft/hr,WOB f/23-5k.

Drilling break f/7743-7746'.
ROP f/33-72'/hr, WOB f/24-12k.

Felsite:wht,clr,v lt tan-v lt gry in sample,v hd,brit,v fn gr-loc med gr,sand app in sample,loc brn bio flakes,loc qtz vng,t-mnr pistach grn & yel epid,r-tr chlor flakes & wash, loc pink axin,com-abun shiny blk rod & agg tourm.

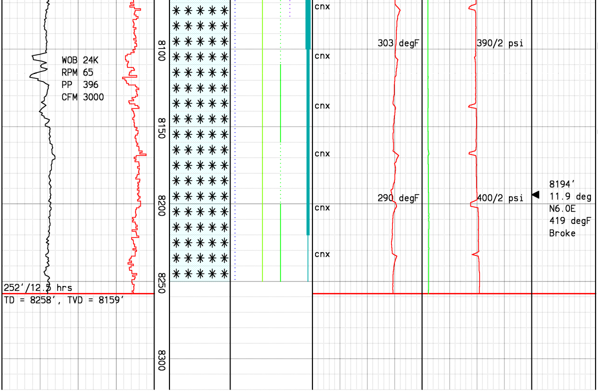
Drilling break f/7805-7810'.
ROP f/30-105'/hr, WOB f/22-4k.

Felsite:AA,becoming darker w/ depth,decr epid & chlor,tr lt brn bio flakes.

Fracture zone f/7900-7925'.
ROP f/18-51'/hr, WOB f/23-11k.

Felsite:dom wht,clr,v hd,xtln text,sm incr in pistachio grn epid,abs-r chlor flks,sm decr in blk tourm rods and clasts.

USFR = 87,000 lbs/hr
H2S = 49 ppm (air off)
NH3 = 160 ppm (air off)



Felsite:dom wht,clr,v hd,xtln text,gry-lt tan in sample,loc qtz microvng,tr yel epid,r-tr chlor flks & wk chlor wash,loc pink/translu axin,mnr-com blk tourm rods and clasts,w/com-abun slough:small pebble-sized Graywacke & Argillite.

Extremely small amount of cuttings coming over shakers.

USFR = 94,700 lbs/hr
H2S = 55 ppm
NH3 = 150 ppm

Drill 8 1/2" hole to 8258'. Run 32 joints of 7",29# L-80 & 119 joints of 8 5/8",40# C-13 slotted liner to 8195'. Run 57 joints of 7" 29#,C-13 tieback to 2249'.