TECTON
GEOLOGIC
Healdsburg, CA 707-431-1700

COMPANY	California Energy Co.
WELL	Newberry 23-22
FIELD	Newberry Caldera
COUNTY/STATE	Deschutes, Oregon
WELL HEAD COORDINATES	Sec 22 T21S R12E
ELEVATION	6387' GL +29' KB
SPUD DATE	10/05/95
TD DATE	12/10/95
TOTAL DEPTH	9602'
TRUE VERTICAL DEPTH	NA
BOTTOM HOLE LOCATION	NA
CONTRACTOR/RIG	Nabors/Rig 167
COMPANY REPRESENTATIVE	L.Strickland,R.Brunson

LOG INTERVAL

DATE LOGGED	10/10/95	TO	12/17/95
DEPTH LOGGED	114'	TO	9602'
MUD DRILLING	Surface	TO	9602'
AIR DRILLING	NONE	TO	
LOG SCALE	1 : 600	UNIT NO.	326

LOGGING GEOLOGISTS
Kevin Katolas, Alan Bailey
Ed Zifcheck

HOLE

36"	TO	114'
26"	TO	808'
17 1/2"	TO	4437'
12 1/4"	TO	9602'
-	TO	-

CASING

30"	AT	109'
20"	AT	795'
13 3/8"	AT	4417'
9 5/8"	AT	9577'
-	AT	-

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

▦	Basalt	▦	Obsidian	▦	Tuffaceous Sediments
▦	Vesicular Basalt	▦	Pumice	▦	Debris Flow
###	Andesite	▦	Scoria	▦	Granodiorite
▦	Dacite	▦	Ash	▦	Clay
▦	Rhyodacite	▦	Tuff		
▦	Rhyolite	▦	Hornfels		

SECONDARY MINERALS

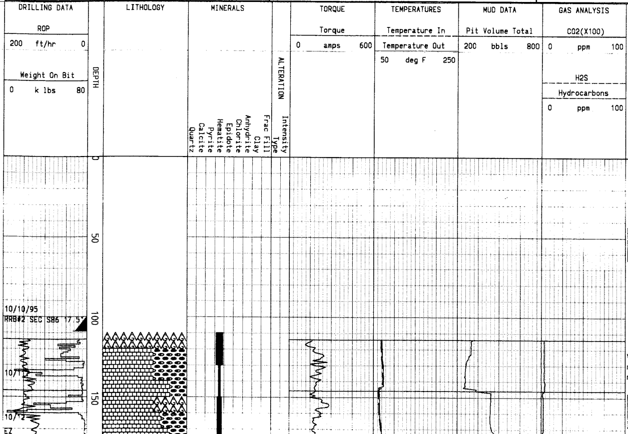
Q = Quartz
C = Calcite
P = Pyrite
H = Hematite
E = Epidote
Ch = Chlorite
A = Anhydrite
C = Clay
FF = Fracture Fill

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

ALTERATION

Si	Silicic
S	Sericitic
K	Argillic
❯	Advanced Argillic
//	Propylitic
C	Chloritic

┆	Weak
┆	Moderate
▮	Strong

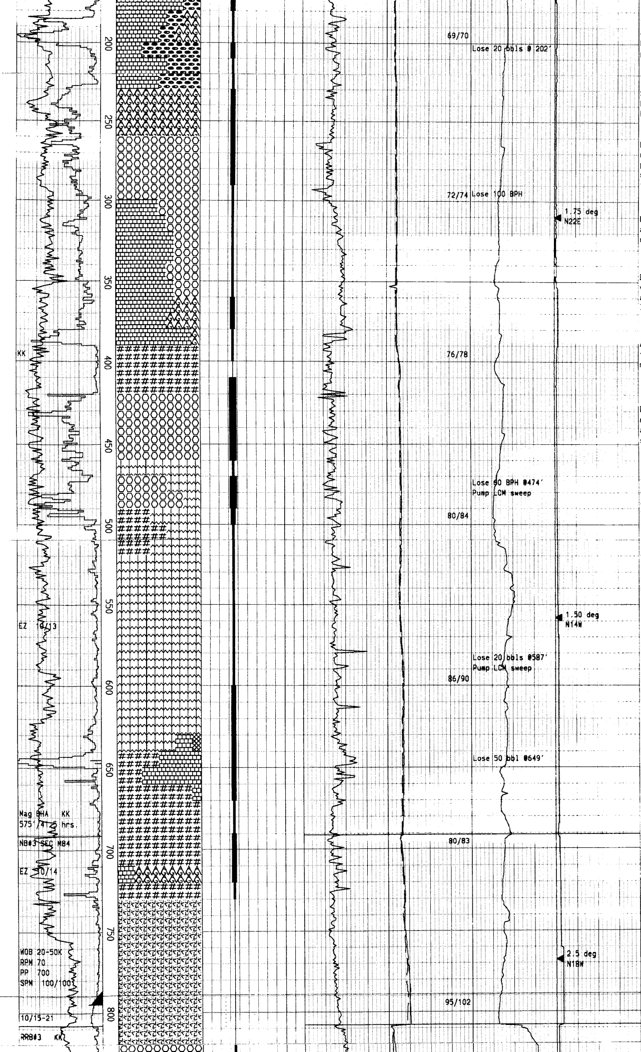


REMARKS

Drill 36' hole to 114'. Set 30' casing at 109'. Drill ahead with 17.5" bit.

Vesicular Basalt:red brn-blk,hd mnr-com ves,mnr-com feld phenos, mnr oliv phenos,loc abun hem alt.

Lose 120 BPH at 146'. Set cement plug #2, 100 LF. Drill ahead with no loss



Vesicular Basalt pred blk,mnr-loc com red brn,loc mott red brn & blk,hd,com ves,aphan grndmass,mnr plag & oliv phenos,tr-loc com hem lin ves.

Scoria:red brn,blk,com mott,hd, brit,glassy,com felds phenos,com basalt clasts,abun hem alt.

Debris Flow:dk gry,lt gry,lt brn, red brn,wht,prly srtd ang cuttings, pred basalt,mnr amt andesite & scoria,tr-mnr amt rhyodacite & tuff, tr-loc com hem alt.

Basalt:med-dk gry,hd,brit,loc mnr amt vesic,aphan grndmass,tr-mnr amt clr felds,loc tr-mnr hem lin ves.

Basalt:med-dk gry,hd,brit,tr-mnr amt vesicular,aphan grndmass,tr-mnr amt clr felds phenos,r oliv phenos, loc tr hem lin ves

Andesite:med-dk gry,hd,aphan micsuc txt,r fn gr sbhed felds phenos,tr-mnr hem stng,scat red scoria frags.

Debris Flow:multicolored,tn,gry,blk, red,uncons fn-crse gr rock frags, ang-com sbang,ves bas,andes,rhy tuff scoria,abun hem & lim stng

Tuff trnsl-lt gry,wht ip,loc mtld w/red orng,fri,micxln-fn gr,welded equigran glass frags,pumice ip,wk vis bndd, var debis flow frags,mnr-abun hem & lim stng.

Tuff lt gry-lt tan,mtld off wht & lt gry,hd-brit,aphan,micxln grndmass w/r clr felds phenos,loc relic flow bndd,scat indist hem altd phenos,var med gry andes frags

Tuff lt gry-lt tan,mottled,hd-brit, aphan,microxln grndmass,mnr-com clr felds phenos,mnr-com hem altd phenos

Welded Tuff red brn,mtld lt gry & red brn at top of unit,v hd,aphan grndmass,abun feld phenos,r oliv phenos,tr blk glassy blebs,tr bas & andes frags,com-abun hem alt.

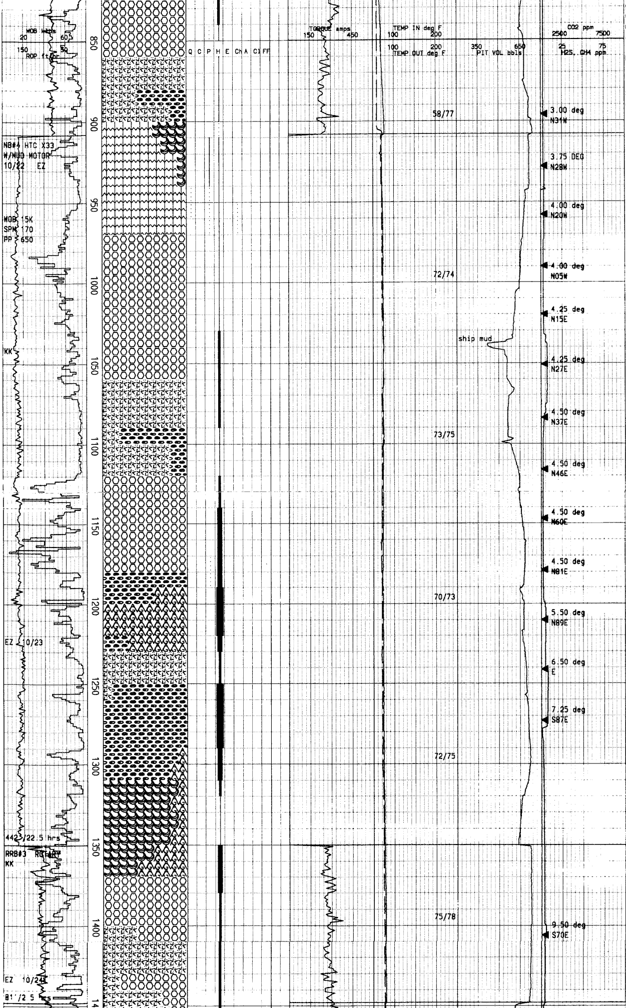
Andesite red brn-brn-med gry,v hd, aphan grndmass,mnr-loc com feld phenos,mnr-com hem alt,10% Clay at 640' sft,yel grn-med grn,botryoidal

Andesite pred lt-med brn,mnr amt red brn,v hd,aphan grndmass,tr-mnr feld phenos,mnr hem alt,Scoria at 720' red org,hd,brit

Rhyodacite: pred lt gry,mnr med gry, loc mott,loc tr amt grnish gry,v hd, aphan grndmass,tr-com anhed-euhed clr feld phenos,tr clr anhed qtz phenos,tr-mnr dism hem,loc r-tr dism pyr.

Drill to 808', open hole to 26". Set 20" casing at 795'. Drill ahead with 17.5" bit.

Debris Flow: multicolor,blk,gry-lt



gry,rd brn,uncons-fri vrfs & tuff w/susp sol lt gry cly,var vesic bas, rhy,tuff,& obsid frags,loc med grn amyg,var lt gry-wht zeol,occ vis flow bndng,incr blk bas w/20% plag phenos near base.

Rhyodacite: gry red-pale red brn,hd-brit,sharp ang ctngs,aphan grndmass w/10-20% phenos of clr felds laths & irr qtz,loc sanidine,tr hem altd mnrls,loc ves bas frags.

Tuff: pred lt gry,loc mnr amt w/sl grn cast,hd-v hd,mass,aphan silicic grndmass,occ vgy,tr qtz xls,tr lith frags,tr hem after pyr & mag,loc tr chlor alt,loc r botry qtz along microfracs.

Debris Flow: multicolor,dk gry,blk, pnk,lt gry,hd,ang frags,bas,rhy, tuff,welded tuff,tr flow bnding in rhy,tr devitrified obsidian,tr hem str along microfracs in rhy & tuff.

Debris Flow: multicolor,lt-dk gry, blk,lt brn red,rd orng,hd uncons frags of dom bas & ves bas,loc sb ang-sbrnd w/hem & lim stng lithic vrfs,var rhy & welded tuff.

Rhyodacite: gry red-med gry,lt gry, mtld ip,hd,brit ang ctngs,aphan crpxln grndmass w/10% micxln phenos of clr euh felds & irr qtz,com irr flow bndd,var hem altd mnrls & hem/lim bndd & frac fill,loc ves bas.

Debris Flow: multicolor,dom lt-dk gry,gry brn-orng brn,dom uncons ang-sbang vrfs of bas,ves bas,& rhyodac, occ vrfs susp in lt brn slty mtx w/ wk-mod hem stng,com hem/lim stng & ves lining,loc pyr lined ves.

Vesicular Basalt: dk gry-blk,hd, mass,abun ves,aphan grndmass,mnr oliv phenos,mnr feld phenos.

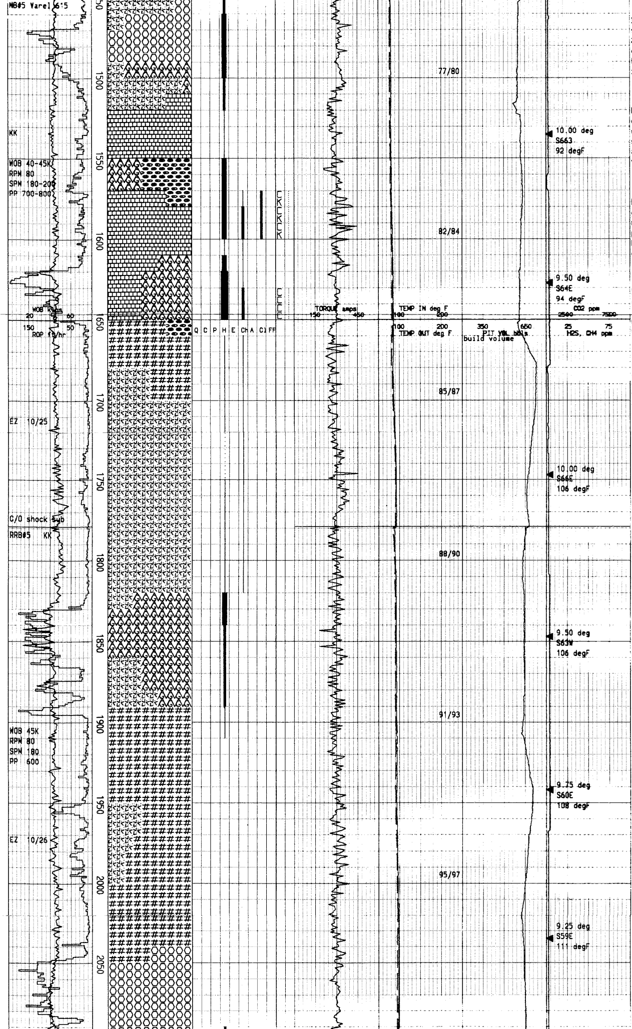
Scoria: red brn,hd,brit,glassy, com feld phenos,mnr-com basalt frags,abun hem alt.

Vesicular Basalt: dk gry-blk,brn-red brn,com mott app,hd,aphan-glsy grndmass,com scor app,loc grdtl t/ scoria,com-abun hem alt in vugs,tr clay lined vugs,tr-mnr oliv phenos, tr-mnr plag phenos.

Obsidian: dk gry,hd,brit,ang ctgs, conchoid frac,mnr-abun vugs w/clay & zeol occ in bnds,grdtl t/lt gry scoria & rhyol.

Debris Flow: multicolor,dom med gry, rd orng,blk,mtld ip,hd uncons ang-loc sbrnd ctngs,frags of scoria,ves bas,bndd rhyodac,com hem stng on ctng surf & vesic lining,var zeol amyg,lin clr felds in bndd rhyodac w/loc elong vugs.

Rhyodacite: pred lt-med gry,mnr red gry,hd,brit,ang ctngs,loc flow bndd aphan grndmass,mnr-com euhed feld phenos,mnr qtz phenos,mnr hem alt.



Debris Flow multicolor,lt-dk gry, red org,pnk,blk,ang-sbrnd ctngs, 20-30% rhyodacite,10-20% scor bas, com basalt,mnr welded tuff,mnr-com hem alt,loc tr cly filled vugs,tr zeol lined vugs & zeol amyg.

Basalt: med gry-med gry brn,hd ang ctngs,aphan crpxln-micsuc grndmass w/5% micxln phenos of dom clr felds, scat blk mafic phenos poss pyrox/ augite,var olivine,tr hem stng,loc vesic w/hem stng scoria.

Basalt: med gry-med gry grn,loc brn gry,hd-loc sl fri,aphan crpxln- micsuc grndmass w/5% fn gr clr felds phenos,scat olivine & pyrox w/loc hem stng pyrox,wk chlor mtx & loc chlor lined vesic,wk argil alt.

Scoria red-orng red,firm,aphan crpxln w/r obsid frags & loc felds inclus,occ dk gry vesic bas & ves bas lapli incl,vesic are open,abun hem stng

Andesite: med gry-med gry grn,loc lt gry,hd,aphan crpxln-micsuc grndmass w/5% phenos of micxln clr felds,scat olivine & pyrox w/occ hem stng,loc wk chlor mtx & chlor lined vesic.

Rhyodacite: pred med gry,mnr lt gry, tr med grn gry,hd,aphan crpxln- micxln grndmass,mnr clr feld phenos, tr-mnr poss oliv phenos,tr mag,r-tr hem stn & hem after mag,loc wk chlor wash mtx.

Rhyodacite: dom med gry,var brn gry w/wk grn cast,hd,dom aphan crpxln- micsuc grndmass w/5-10% micxln-fn gr phenos of clr felds,pyrox,& irr qtz, loc wk arg alt susp,wk chlor alt.

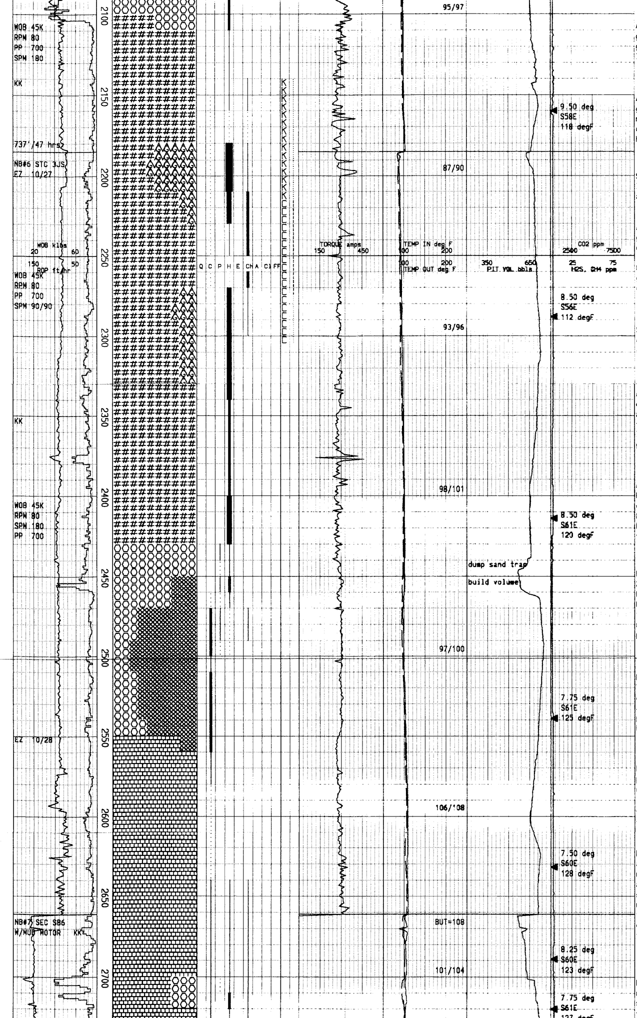
Scoria: med-dom dk gry,loc red brn, hd-frm,aphan,dom open vesic w/loc r cly lined,occ blu grn opal lined vesic,var hem stng,scat plag incl, var rhyodac.

Andesite: dom med gry-loc dk gry,hd, aphan crpxln grndmass w/5% clr micxln felds phenos,mass & dnse, fresh & unaltd,r lt gry indist lith frags.

Rhyodacite: lt-med gry,occ brn gry, hd-occ frm,aphan mic-crpxln mtx w/ 10-20% micxln-fn gr phenos,phenos dom wht-clr felds & pyrox,loc micsuc txt,wk arg alt,scat andes lithic frags in rhyodac mtx.

Andesite: pred med gry,mnr dk gry, hd,aphan crpxln grndmass,w/5% clr feld phenos,mass,fresh,unaltd.

Debris flow: multicolor,lt-med gry, dk gry,red brn,wht,lt grn,sft-hd, ang-sbrnd ctngs,contains-med gry andesite,lt gry rhyodacite,lt col ash tuff,lt col pumice,com red brn scoria & scoriac basalt/andesite near base



Andesite: lt-med gry,occ lt-med grnish gry,hd,aphan micxln-crpxln grndmass,w/fn gr clr felds phenos, loc r-tr hem alt.

Andesite: med-dk gry,loc lt gry,wk grn cast,dom hd-loc fri,aphan crpxln mtx w/10% micxln mafic phenos,wk chlor wash,wk argil alt,r calc & wk hem stng.

Scoria: red org-org,sft-hd/brittle, loc com-abun red org sol clay,com-abun hem alt.

Andesite: lt brn,med gry,med-dk grnish gry,mod hd-hd,aphan micxln-crpxln grndmass,10-20% feld phenos, loc mnr pyrx phenos,loc tr-mnr cly & qtz amyg,mod chlor alt,loc com grnish gry sft sol clay,loc r-tr calc vng.

Scoria: red org-org,sft-hd/brittle com-abun hem alt,intercal w/med gry pheno poor andesite

Andesite:dom med-dk gry,loc lt gry, occ brick red,hd & brit-occ fri, aphan crpxln grndmass,<5% fn gr clr felds phenos,occ blk mafic phenos, loc red hem bndd & hem amyg,var lt gry w/open vesic.

Andesite:dom med-loc lt gry,occ brick red,hd & brit-occ frm,aphan crpxln grndmass,<5% fn gr clr felds & occ blk mafic phenos,loc red hem bndd & hem amyg,var lt gry w/open vesic.

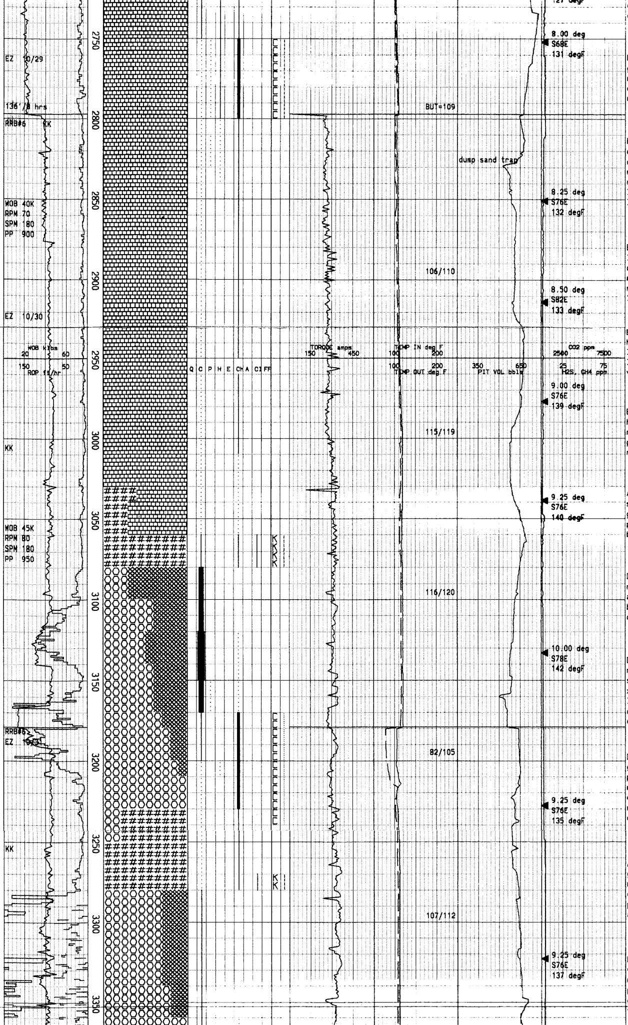
Debris Flow: multicolored vrfs w/ 20-80% lt-med gry p sol cly mtx,blk bas & vesic bas,gry andes,mnr lt gry brit tuff,ang-sbrnd fn-crse gr lith frags grdng to fn-med gr w rndd snd, r-mnr free calc xls,r-tr free euh pyr.

Debris Flow: multicolored vrfs w/ 70-80% lt-med gry p sol cly mtx,fn-crse gr w rndd-sbang vrfs of bas, andes & tuff,tr-mnr free calc,r euh pyr,cly dries brn & is v sol after heating.

Basalt: med-dk gry,hd-v hd,aphan pred crpxln grndmass,mnr micxln, mass,pred non ves,5-10% clr-wht feld phenos,mnr pyrox phenos-prob aug,mnr olivene phenos,fresh unalt app,r-tr calc vng.

Basalt: med-dk gry,hd-v hd,mass, aphan pred crpxln grndmass,mnr micxln grndmass,pred non ves,mnr amt w/ves,com'ly lined w/botry silica,5-10% clr-wht feld phenos, mnr pyrox phenos,mnr oliv phenos, fresh-sl alt app,tr hem alt,tr chlor alt,tr calc vng & calc alt feld.

Basalt: dk gry-blk,dk brn gry,loc med gry,hd-occ frm,aphan crp-micxln, scat mafic micxln phenos & olivine, var chlor lined vesic,tr-mnr free



calc, loc r pyr, tr hem stng, occ blu opal, var debris flow frags.

Basalt: dk gry, dk brn gry, loc med grn, hd, aphan crpxln-micxln grndmass micxln feld-pyrx-oliv phenos, loc com mod-strong chlor alt, tr hem stn r pyr blebs along microfrac.

Basalt: dk gry-blk, dk brn gry, hd, com dull erthy txt-grsy lstr, aphan crp-micxln, loc micxln felds laths & mafic phenos, scat dk gry chlor amyg, r free calc & hem stng on ctng surf, loc r pyr, loc blu grn opal vesic lining.

Basalt: dk gry-blk, dk brn gry, hd, loc dull erthy txt-grsy lstr, aphan crp-micxln, loc micxln felds laths & mafic phenos, scat dk gry chlor amyg, r free calc, loc blu grn opal vesic lining.

Basalt: dk gry-blk, med-dk brn gry, hd-v hd, aphan crp-micxln grndmass, loc micxln feld laths & mafic pheno loc dk grn chlor alt ctngs, r calc vng, loc r-tr blu opal vesic lining.

Basalt: dk gry-blk, med-dk brn gry, hd-v hd, aphan crp-micxln grndmass, micxln-fn gr feld phenos & mafic phenos, loc dk grn chlor alt ctngs, r calc vng.

Andesite: med-dk gry, med brn, hd, ang sharp ctngs, mass & dnse, aphan crpxln grndmass, 10% micxln-fn gr clr felds phenos, r calc & chlor, var dk gry-blk basalt frags.

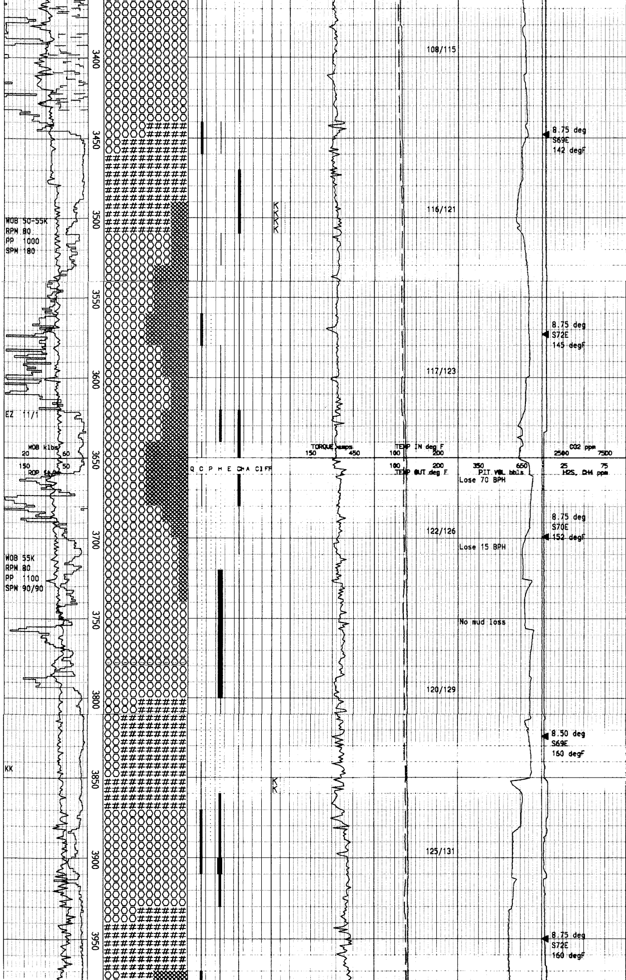
Debris Flow: multicolor, var vrfs in mod-p sol lt gry-brn cly mtx, uncons ang-sbrndd frags of blk basalt, gry-brn andes, wht xl tuff & lithic tuff, com-abun calc & free calc.

Debris Flow: multicolor, var vrfs in mod sol lt gry cly mtx, uncons ang-sbrndd-loc w rndd frags of wht tuff, xl tuff, blk basalt, gry-brn andes & lithic tuff, com-abun calc & free calc, loc r pyr & pyr vng in tuff, r chlor.

Debris Flow: pred lt grn, com wht-lt gry, sft-sl hd & brit, pred mass app, pred ash, com micxln qtz & feld xls, mnr med gry andesite/basalt frags, com chlor alt shows as chlor wash, r-tr calc, assoc w/20-30% sft sol clay at top of unit.

Andesite: lt-dom med gry, med brn gry, hd, sharp ang ctngs, aphan crp-micxln grndmass, 10% micxln-fn gr clr felds phenos w/loc dk mafic phenos, loc mod argil alt, tr chlor amyg, r free calc.

Debris Flow: wht-lt gry, multicolored vrfs, mod hd-fri, occ sft, aphan crp-micsuc grndmass, 20-40% fn-micxln phenos of clr-frstd felds, scat pale grn chlor mafics, loc lt gry-buff vitric frags, occ lithic incl, scat xl tuff & lithic tuff frags, abun wht



cly.

Debirs Flow: wht-lt gry,pale grn cast,multicolored vrfs,mod hd-fri, occ sft,aphan crp-micsuc mtx,20-40% fn-micxln phenos of clr-frstd felds, loc lt gry-tan vitric frags/opal, incr lithic frags near base.

Andesite: med gry,med brn,hd-mod hd, aphan crpxln-loc micxln,dull erthy txt,15% micxln-fn gr clr felds phenos,mnr grn chlor amyg,tr-mnr calc,loc tr hem stng,var wk arg altd mtx & phenos.

Debris Flow: multicolored,dom uncons vrfs w/lt gry cly mtx,sbang-sbrndd frags of gry-brn andes,dk gry-blk basalt,wht-lt gry tuff,var lithic tuff frags,lt-med gry argil altd andes at top.

Debris Flow: multicolored,dom uncons vrfs w/lt gry mod sol cly mtx,sbang-sbrndd frags of gry-brn andes,dk gry-blk basalt,wht-lt gry tuff,wht lithic tuff frags,sft buff lt tn ash/cly,tr free calc,tr chlor.

Debris Flow: multicolored,dom uncons vrfs w/lt gry cly mtx,sbang-sbrndd frags,pred wht-gry-lt grn tuff,var lithic tuff frags,dk-blk basalt,med gry-med brn andes,wk-mod chlor alt, r-loc mnr hem,r-tr calc vng.

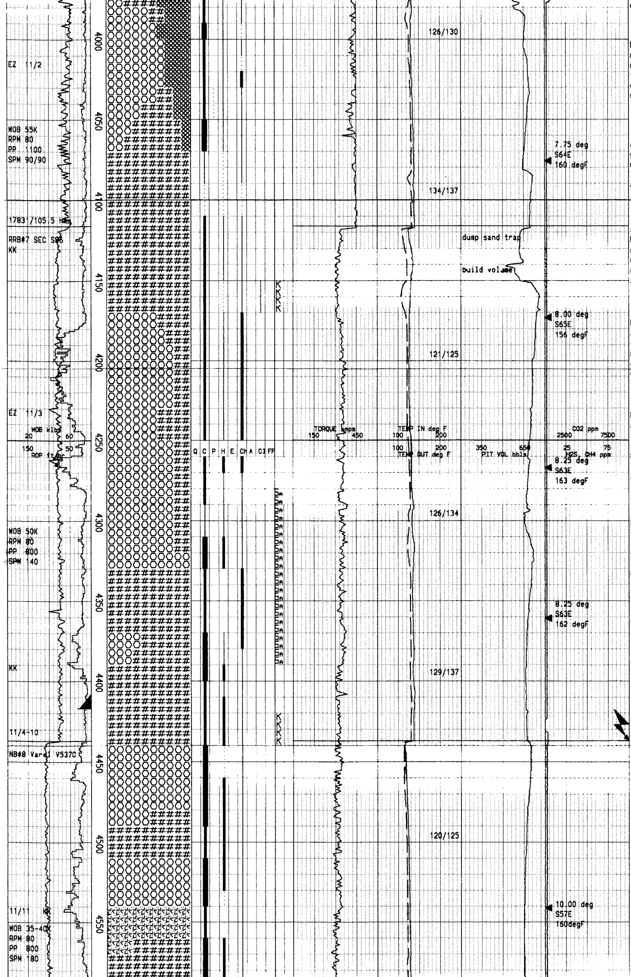
Debris Flow: multicolored,uncons vol rk frags w/lt gry cly mtx,sbang -sbrndd frags,pred wht-lt gry-lt grn tuff,var lithic tuff frags,dk gry-blk basalt,med gry-med brn andes,wk-mod chlor alt,r-tr calc vng,r-tr hem,loc r pyr.

Debris Flow: multicolored,unconsol vol rk frags w/lt gry-red org cly mtx,sbang-sbrndd frags,abun scoria f/3720',abun wht-lt gry-lt grn tuff var lithic tuff frags,breccia,andes basalt,loc com hem alt in scoria, r calc vng,tr chlor alt in tuff.

Andesite: med gry,med grnish gry, med brnish gry,hd,aphan mic-crpxln grndmass,micxln feld phenos,micxln mafic phenos,sl altd,tr chlor,r pyr r hem,r calc

Debris Flow: multicolored,med gry-brn andes,dk gry-blk basalt,lt gry rhyodac,loc red scoria,occ wht tuff & lithic tuff,loc obsid,hd-brit,dom aphan mtx w/var lapili of vrfs vis ip,loc silic/opal mtx,var sbang-sbrnd vrfs w/frags of mtx in tact, tr-mnr calc,loc mnr hem stng,tr chlor & chlor amyg.

Andesite: med-dk gry,brn gry,loc red brn,hd,dnse & mass,aphan crpxln-micsuc,5-10% micxln phenos of clr felds & felds miclites,tr



calc & hem stng,tr chlor frags.

Debris Flow: multicolored,med gry-med brn andes,dk gry-blk basalt,lt-med grnish gry rhyodacite,occ wht tuff,occ red brn breccia,mnr-com calc,tr-mnr chlor,tr hem,loc r pyr, w/10-40% sft gry clay.

Andesite: med-dk gry,grnish gry, gryish brn,mod hd-v hd,mass,aphan micxln-crpxln grndmass,pred aphyric loc mnr amt feld phenos,fresh-sl altd app,r calc,r hem,r chlor.

Andesite: dom med gry,loc lt gry, becomng lt gry,hd-occ fri,aphan crp-micxln,micsuc txt,mass & dnse,r micxln phenos of clr felds & mafic mnrls,tr chlor,mnr calc,wk-mod arg alt near base.

Debris Flow: multicolored,sft-sl hd abun lt gry-lt grnish gry xl-lithic -ash tuff w/mnr calc & chlor alt of mtx & feld frags,var frags of med gry-med red brn andesite,var frags of dk gry basalt.

Debris Flow: multicolored,sft-sl hd abun red brn scoria f/4230',abun lt gry-lt grnish gry xl-lithic-ash tuff w/mnr calc & chlor alt of mtx & feld frags,var frags of welded tuff,var frags of med gry-med brn andesite,var frags of dk gry bas.

Debris Flow: multicolored,pred hd, well indur,silicified,mnr amt sft, abun red brn & gry grn tuff breccia w/mod hem & chlor alt,com xl-lithic ash tuff,var frags of andesite & basalt.

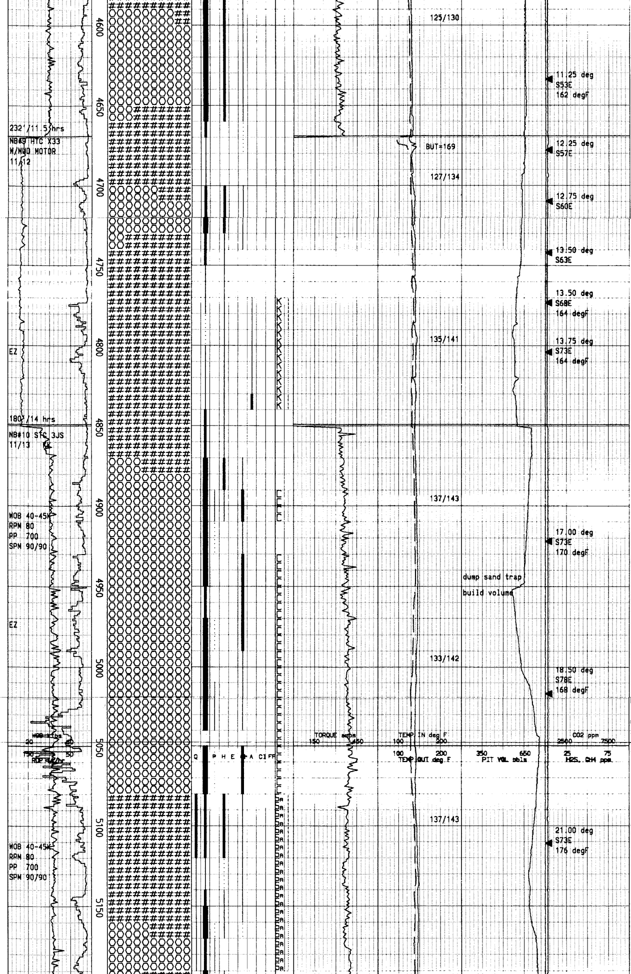
Andesite: med gry-med grn gry,hd, brit,silicic,aphan,micxln-crpxln grndmass,pheno poor,wk-mod chlortzd mtx,chlor amyds,mnr-loc com calc.

Andesite:med gry-gry brn,lt gry-lt gry grn,loc mtld lt gry & rd brn,hd-loc fri,aphan crp-micsuc mtx w/r clr felds phenos,r micxln dk phenos,occ chlor amyg,mod calc & wk argil alt, pale grn chlor ip.

Drill 17.5" hole t/4437',run logs set 13.375" csg t/4417',drill ahead w/12.25" bit.

Debris Flow: multicolored,sft-mod hd,com lt grn gry tuff,com red brn-med gry andesite w/loc chlor amygd, mnr amt tuff breccia,com calc alt tuffs,mnr hem stn andes,tr chlor alt & chlor amygd.

Andesite: med gry-gry brn,dk gry ip, hd,aphan micxln-occ crpxln,hypidio ip,aphyric-r micxln indist felds phenos,occ blk micxln mafic mnrls, com calc,mnr hem stng,tr wk chlor cast,var debris flow frags,loc rhyodac & ves bas.



Debris Flow: multicolored,dom lt gry mtx w/var vrfs,rd brn andes,blk basalt,scat wht tuff,hd,silic arg mtx w/vis fn gr-infer med gr lithic frags,com lithic tuff,com calc,mnr hem stng,tr wk chlor & poss argil altd,loc vis flow bndd.

Andesite: dk gry-blk,med gry-gry grn,hd,dense,aphan crp-occ micxln, aphyric-r micxln phenos of felds laths & pyrox,fresh & unaltd.

Debris Flow: multicolored,dom lt-med gry,rd brn,med gry grn,occ blk, hd-frm,var vrfs w/occ vis lithic tuff frags,rd brn-blk vesic basalt, gry andes & vesic andes,mnr-com calc,mnr hem stng,wk chlor cast

Andesite. lt-dk gry,dom med gry,occ rd brn,hd-frm,fri ip,aphan crp-micxln,micsuc ip,aphyric,wk-mod arg altd,r-tr calc,tr hem stng,tr free clr euh & mass anhy,scat debris flow frags.

Andesite: lt-dk gry,occ red brn, hd-frm,aphan crpxln-micxln grndmass pred aphyric,loc tr amt hem stn feld laths,wk-mod arg altd,r-tr calc,tr hem stn,loc tr clr euhed anhydrite,scat debris flow frags.

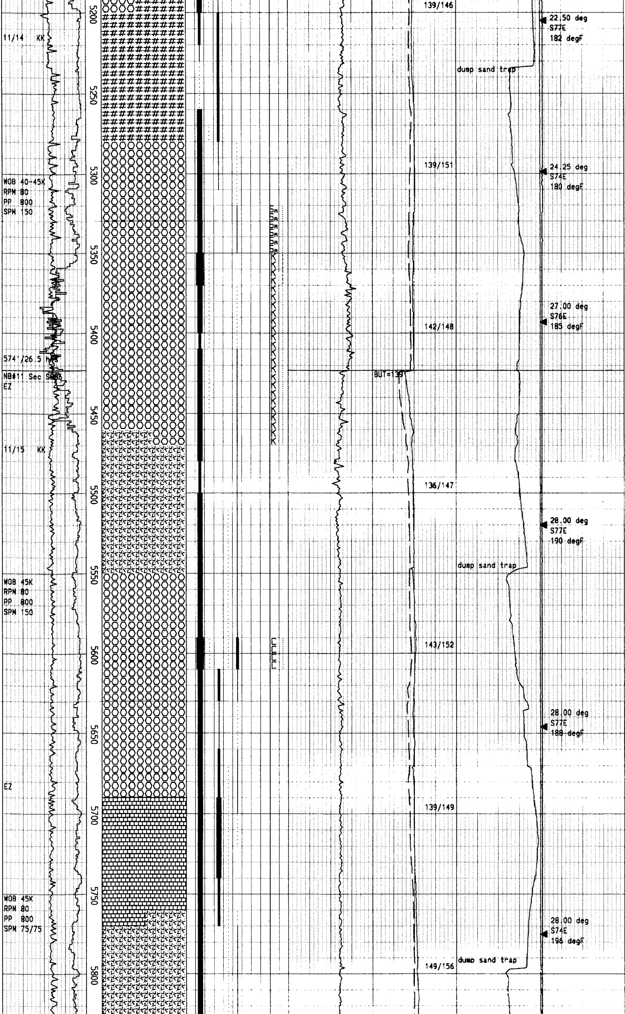
Debris Flow: multicolored,dom lt gry grn,med-dk gry,rd brn,wht,hd-occ frm,dom lt gry grn aphan mtx w/var fn-infer med gr vrfs,wk chlor mtx w/var arg alt,com silic, prob wk altd lithic tuff w/loc xl tuff,com calc,r-tr euh pyr,var unaltd andes.

Debris Flow: multicolored,lt-med gry grn,med-dk gry,red brn,wht,hd-frm,com altd tuff w/com calc & tr chlor,com sl altd andes,com silic alt,loc tr dism pyr.

Debris Flow:pred wht-lt gry grn, loc mott,sl hd-frm,brit,silicic, pred tuff w/aphan mtx,tr-mnr vol rx frags,tr-mnr feld xls,com calc, tr-mnr amt chlor wash in mtx & chlor alt feld xls,r-loc mnr euhed dism pyr,var unaltd-sl altd andes.

Andesite: red brn,med gry-med gry grn,loc mottled,mod hd-hd,aphan micxln-crpxln grnmass w/com-abun hem stn,com feld phenos w/wk-mod alt t/lt blu opal,loc mnr-com amygdules of blu grn clay & lt blu opal,mnr-com calc.

Debris Flow: wht-lt gry,sl hd,brit, silicic,pred xl-ash tuff,w/aphan mtx,com qtz xls,tr-mnr calc,gd tr sbhed dism mag,gd tr euhed dism pyr.



Andesite: gry brn-med gry,mtld rd brn & gry,hd-sl fri,aphan micxln-occ fn gr,hypidio-micgran ip,10-20% fn gr stria plag phenos,wk intstit arg alt,mnr mtld hem stng & hem altd mafics,scat mag.

Andesite: med gry-gry brn,dk gry ip,occ rd brn,hd-occ sl fri,aphan micxln-crpxln,10-20% fn gr felds phenos w/wk arg alt,r-com calc,mnr hem stng.

Debris Flow: dom lt gry,lt gry grn, med gry,rd brn,frm-hd,fri ip,dom aphan crp-micsuc mtx w/occ fn gr vrfs,loc fn gr felds phenos,prob tuff & lithic tuff w/ loc silic alt & wk chlor,loc wht opal,scat chlor amyg,com calc,loc r euh pyr.

Debris Flow: dom lt gry-lt tn gry, lt gry grn,wht ip,frm-sft,occ hd, dom aphan crpxln-micsuc ash mtx w/ occ fn gr sbang frags of andes & rhyodac,occ vis vrfs in mtx,occ free vrfs,com calc,wk chlor cast,wk arg altd w/loc silic.

Debris Flow: dom lt gry-lt gry grn, occ wht,frm-fri,occ hd,dom aphan crpxln-micsuc ash mtx w/occ fn gr sbang frags of andes,mod-tr vis vrfs in mtx,occ free vrfs,occ hazy felds phenos,scat chlor amyg,mnr-com calc, wk chlor cast,loc wk arg altd,loc silic

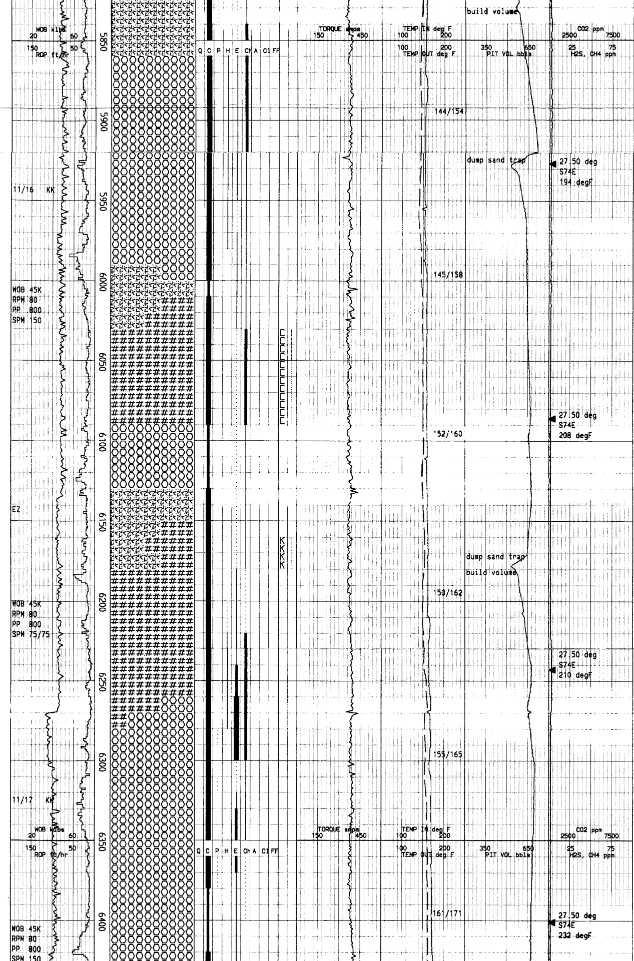
Rhyodacite: lt gry-lt gry grn,hd-fri,aphan crpxln-micsuc mtx,r fn gr wht euh felds phenos,occ irr qtz phenos,scat blk mafic mnrls,scat chlor amyg & wk chlor cast,r mag, mnr-com calc,r yell epid.

Debris Flow: multicolored,grn,gry, blk,rd brn,hd,aphan crpxln grn-gry grn mtx w/fn gr ang-sbrnd vrfs,com uncons vrf frags & vis cmtd in mtx, blk-rd brn basalt,gry andes,lt gry rhyodac,com-abun calc,tr-mnr chlor altd.

Debris Flow: multicolored,wht,lt grn gry,lt-dk gry,red brn,mod hd-hd aphan crpxln mtx w/and-sbrnd vol rx frags,blk basalt,gry & red brn andes,lt gry rhyodac,com-abun calc, loc tr-mnr hem stn,tr chlor alt,loc r-tr subhed epid.

Basalt: pred red brn,med-dk gry at base,hd,apan,micxln-crpxln mtx w/com-abun hem stn,mnr-loc com lt blu-lt blu grn opal amygdules,com calc in mtx,com calc vng,r-tr yel epid vng.

Rhyodacite: lt gry-lt gry grn,hd, fri,aphan crpxln-micxln mtx,loc wht felds phenos,occ qtz phenos,loc blk mafic mnrls,loc chlortzd mafics & chlor wash in mtx,com calc in mtx, mnr calc vng,loc tr mag,r-tr yel epid vng & dism epid.



Rhyodacite: lt gry-lt gry grn,hd, loc fri,aphan crpxln-micxln mtx,loc wht feld phenos,occ qtz phenos,loc blk mafic mnrls,loc chlortzd mafics com calc in mtx,mnr-com calc vng, r-tr yel epid vng & dism epid.

Debris Flow: multicolored,pred med gry grn,dk gry-blk,wht,red brn, com andesite & rhyodacite,mnr basalt,mod chlortzd,com-abun calc in mtx & calc vng,tr-loc mnr yel-yel grn epid vng & dism epid.

Debris Flow: multicolored,dk gry-blk basalt & vesic basalt,med gry andes,lt gry rhyodac,wht-lt gry tuff,hd,dom uncons ang-occ sbrnd vrfs,occ vis vrfs in lt gry silic cly mtx,com-abun calc,tr hem stng & chlor,r-tr yell epid.

Andesite: dk gry grn,occ dk gry,hd, aphan crp-micxln,gry grn grndmass w/10-20% dk gry grn chlor mafic & felds phenos,mtx has wk chlor cast, occ clr felds & blk mafic phenos,r wht pp insol cly altd,com calc,r-tr yell epid.

Andesite: dk gry grn-dk gry,hd, aphan crp-micxln grndmass w/10-20% dk gry grn chlor mafic & felds phenos,occ clr felds & blk mafic phenos,r wht pp insol cly altd,com calc,r-tr yell epid.

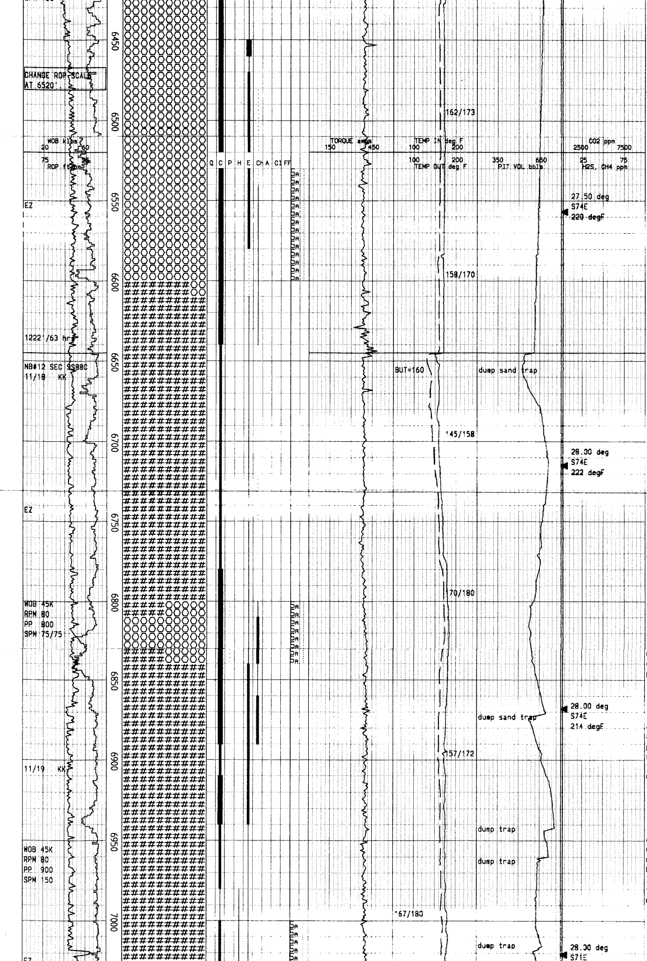
Rhyodacite: lt gry-med gry grn,hd, micxln-fn gr mtx,aphyric,com calc in mtx,mnr calc vng,mod chlortzd mafic mnrls,loc wk argillic alt,tr yel-yel grn epid vng & dism epid.

Andesite: pred med-dk gry,mnr med gry grn,tr red brn,pred hd,loc sl hd-frm,aphan crpxln-micxln mtx,pred aphyric,loc tr wht feld phenos,com calc in mtx,sl-mod chlortzd,tr-mnr yel & yel grn epid vng & dism epid, loc tr hem stn.

Debris Flow: multicolored,dom lt gry grn,med gry,wht,red brn,blk,sl hd-hd,com altd ash tuff w/chlortzd mtx,com andes loc chlortzd,com calc,mnr-com epid vng & dism epid, loc r-tr dism pyr.

Debris Flow: multicolored,lt gry-lt gry grn rhyodac,lt gry-off wht tuff, med gry andes,scat sal frags,hd-occ fri,aphan micxln-crpxln,scat uncons ang vrfs w/no vis mtx,poss bndd tuff & rhyodac,com calc,tr-mnr yel epid, tr-r chlor,loc r euh pyr.

Debris Flow: multicolored,lt gry-lt gry grn rhyodac,lt gry-wht tuff,med gry andes,hd-com fri,aphan micxln-crpxln,scat uncons ang vrfs w/r vis mtx,loc mass wht poss tuff,com calc, tr-mnr yel epid,loc gry opal frags, loc r chlor.



Debris Flow: multicolored,lt gry-lt gry grn rhyodac,lt gry-wht tuff,med gry andes,dk gry-blk basalt & occ vesic basalt,hd-occ fri,aphan mic-crpxln,uncons ang vrfs w/com vis fn gr vrfs in lt gry silic cly mtx,loc mass wht tuff,com calc,tr-mnr yel epid,wk chlor cast.

Debris Flow: multicolored,lt gry-lt gry grn sl silicified tuff,lt gry-lt gry grn rhyodac,med gry andes,dk gry-blk basalt,mod hd-hd,loc fri, wk silicic mtx,wk chlortzd mtx,com calc in mtx,tr-mnr yel-yel grn epid vng & dism epid

Andesite: med-dk gry,hd-v hd,aphan, crpxln mtx,aphyric,tr-mnr dism mag, com calc in mtx,tr yel-yel grn epid vng & dism epid,r dism chalcopyr.

Andesite: med gry,occ lt-dk gry,hd, aphan crpxln mtx w/r micxln mafic phenos,dom aphyric,dnse & mass,occ scat pp wht insol cly,mnr-com calc, tr yel grn epid & loc epid vng.

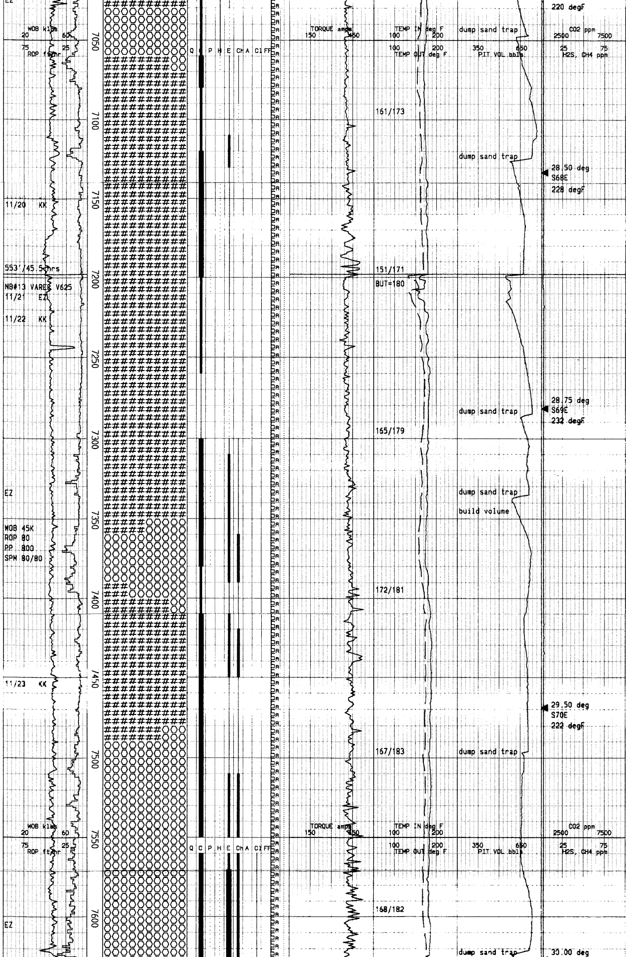
Andesite: pred med gry,occ sl grn cast,hd-v hd,mass,aphan crpxln mtx micxln feld & mafic phenos,tr dism mag,mnr calc in mtx,r-tr yel-yel grn epid vng & dism epid.

Lost 45 bbls mud drlg 6770'-6801'
No loss after 6801'.

Debris Flow: lt-med gry,lt-med gry grn,wht,mod hd,wk silicified,com lt gry grn silic tuff,com lt-med gry andes,mnr micxln rhyodac,tr amt tuff breccia,com calc mtx,tr-loc mnr yel-yel grn epid vng & dism epid,loc r dism pyr,loc r dism pyrrhotite.

Andesite: med-dk gry,occ lt gry,hd, aphan crpxln mtx w/r micxln mafic phenos,dom aphyric,dnse & mass,occ scat pp wht insol cly,mnr-com calc, tr-mnr yel grn epid & epid vng,scat mag.

Andesite: med-dk gry,occ lt gry,loc wht,hd-r fri,aphan crpxln mtx w/r micxln mafic phenos,dom aphyric,dnse & mass,occ scat pp wht insol cly, loc wht arg altd frags,mnr-com calc, tr-mnr yel grn epid & epid vng,scat mag.



Debris Flow: lt grn,lt gry grn,wht, med-dk gry,sft & fri-hd,wk silicic, com wht-lt gry-lt grn tuff w/crpxln mtx & com chlortzd micxln mafic mnrls,com silicified andes,mnr calc vng,r-tr dism hem,r-tr dism epid & epid vng.

Andesite: pred med-dk gry,mnr lt gry,hd-v hd,sl-mod silicic,mass, aphan-crpxln mtx,dom aphyric,mnr-com calc,tr-mnr yel-yel grn epid vng & dism epid,loc r dism hem,loc r dism pyr.

Andesite: dk gry-occ med gry,hd-brit,ang sbconch ctngs,aphan crpxln mtx,dom aphyric,r micxln clr-mlky occ indist felds phenos,r micxln mag,scat epid & epid vng,com calc, r hem bndd,prob wk silic altd.

Andesite: dk gry-occ blk,hd-brit, ang sbconch ctngs,aphan crpxln mtx, dom aphyric,r micxln clr-mlky occ indist felds phenos,r micxln mag, loc scat epid & epid vng,mnr calc, wk silic altd.

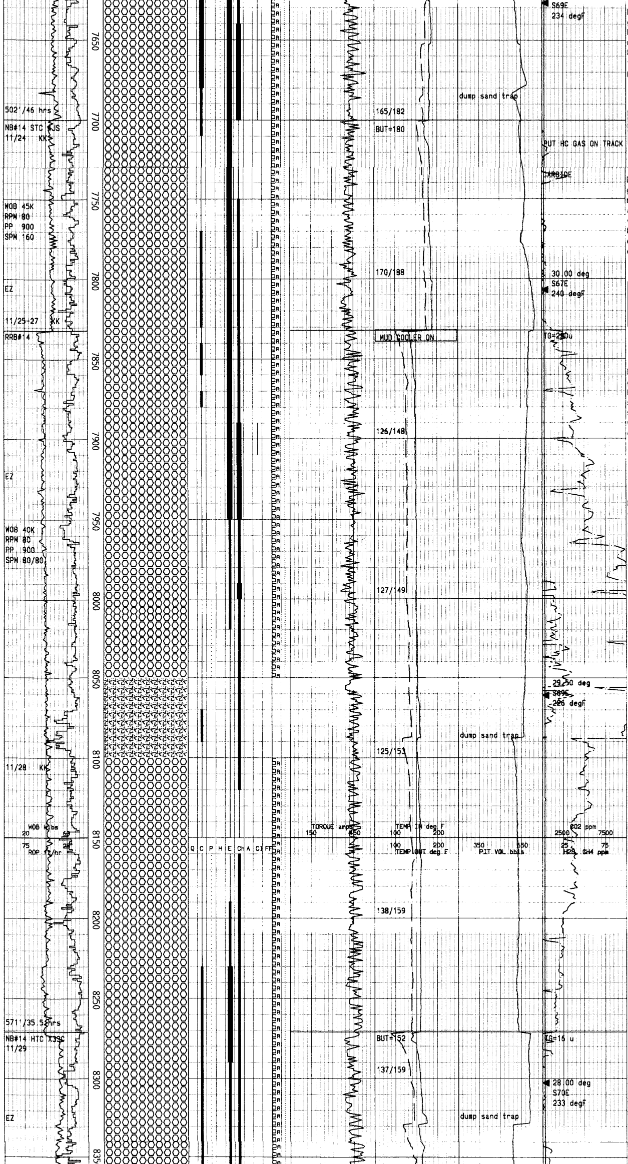
Andesite: med-dom dk gry,occ blk, loc lt gry indist bndg,hd-brit,com ang sbconch frac ctngs,aphan crpxln, dom aphyric,r micxln plag phenos,r dk grn-blk pyrox phenos,loc epid vng,mnr calc,wk silic,scat wht insol pp cly,occ mag.

Debris Flow: lt-med gry,lt gry grn, wht,sl hd & fri-hd,pred altd/rexln tuff w/aphan mtx,silicic,com calc in mtx & calc vng,tr-mnr chlor alt,tr-mnr dism epid & epid vng,loc r-tr dism pyr,mnr amt andesite.

Andesite: pred med-dk gry,mnr med gry grn,mod-v hd,loc brit,mass,aphan crpxln mtx,dom aphyric,r feld phen, tr-mnr mag,wk-mod silicic,mnr-com calc,mnr chlor,mnr-loc com dism epid & epid vng.

Debris Flow: dom lt-dk gry,occ blk-lt gry grn,hd-frm,aphan crp-occ micxln,frags of dk gry-blk andes w/ lt gry rhyodac,occ vis fn gr-micxln vrfs in lt gry silic mtx,scat uncons sbrnd andes frags,scat micxln rhyod frags,com calc,tr epid & chlor cast.

Debris Flow: multicolored,lt gry-lt gry grn,wht,med-dk gry,yel grn,rd brn,hd-occ frm,aphan crp-micxln, uncons sbang vrfs,infer silic arg/ash mtx occ vis in smpl w/fn gr vrfs,com calc & free calc xls,com-mnr yel grn epid & epid vng,mnr chlor,tr wht insol cly alt,r pyr & hem



Debris Flow: multicolored,lt-med gry,lt-med gry grn,yel grn,wht,frm-hd,loc fri,aphan mtx,mod-highly alt rexln,mod silicic,com-abun epid vng & dism epid,com calc in mtx,mnr free calc,mnr-com chlor,loc r dism pyr,loc r dism hem.

CARBIDE LAG AT 7708'
CALC: 11,287 STR
ACTUAL: 11,476 STR

Debris Flow: multicolored,lt gry-lt gry grn,wht,med-dk gry,yel grn,r brn-blk,hd-occ frm,aphan crp-micxln,uncons sbang vrfs,silic arg mtx occ vis in smpl w/fn gr vrfs,tr-mnr calc & free calc xls,com yel grn epid & epid vng,tr-mnr chlor,tr wht insol cly alt,r pyr & hem

Stuck pipe after survey,spot mineral oil & pipe lax,work stuck pipe at 7818'.Free with air bubble,drill ahead.

Debris Flow: multicolored,lt gry-lt gry grn,wht,loc med-dk gry,yel grn,hd-occ frm,aphan crp-micxln,uncons sbang vrfs,silic arg mtx occ vis in smpl w/fn gr vrfs,loc appr mod rexl rhyodac tuff,tr-mnr calc,com yel grn epid & epid vng,mnr chlor,tr wht insol cly alt,r pyr & mag

Debris Flow: multicolored,wht,lt gry-lt gry grn,yel grn,med-dk gry,hd-frm,mod altd,rexln,sl-mod silicic,mnr-com chlor,mnr-com yel-yel grn epid & epid vng,tr-mnr calc in mtx,tr calc vng,loc r dism pyr,loc r dism hem.

Debris Flow:wht,lt gry,lt gry grn,med gry,frm-hd,mod altd/rexln,pred altd tuff,mnr vrfs,silicic,mnr chlor,tr-mnr epid vng & dism epid,loc r dism pyr

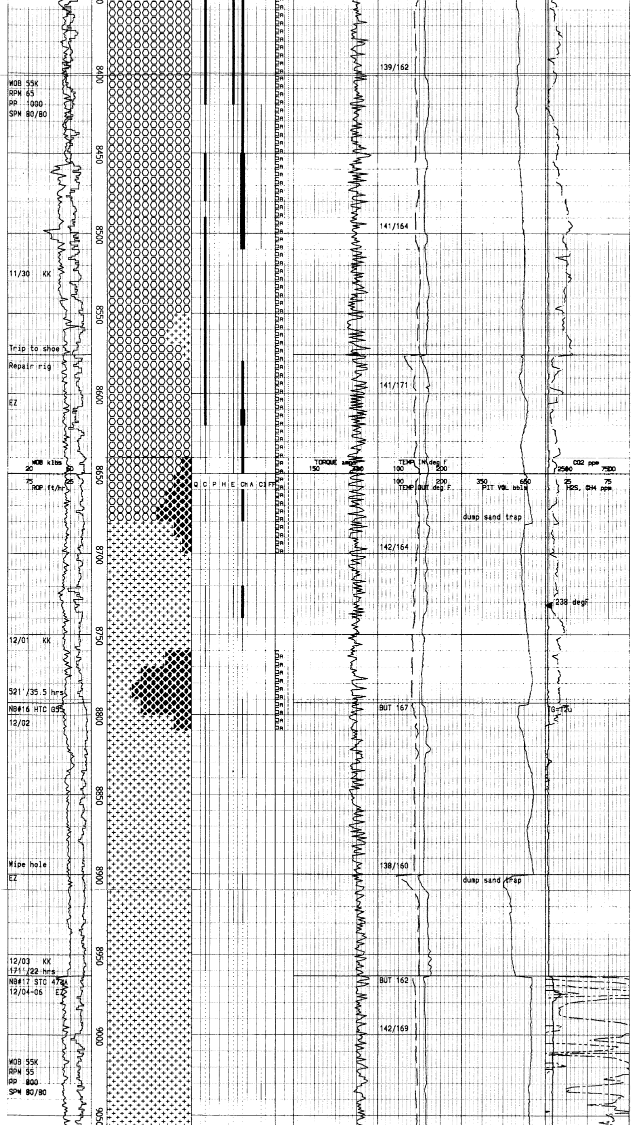
Rhyodacite: wht-lt gry,lt gry grn,hd-occ frm,aphan crp-micxln mtx,loc micsuc txt,10% micxln blk-loc grn chlor mafic phenos,loc clr micxln plag phenos,poss dike,scat andes frags,tr epid & free calc xls,mnr chlor.

Debris Flow: multicolored,lt gry-lt gry grn,wht,med gry,dk gry-blk,occ rd brn,hd-occ frm,aphan crp-micxln,uncons fn gr sbrndd-ang vrfs vis in smpl w/frags silic arg mtx,loc brec appr,loc rhyodac tuff & xl tuff mtx,vrfs incl vesic bas,andes,rhyodac,obsid,tr calc,tr-mnr epid,mnr chlor & chlor mafics,r euh pyr.

Debris Flow: multicolored,lt gry-lt gry grn,med gry-dk gry,yel grn,hd-frm,loc brit,aphan crp-micxln,loc brec appr,occ vis vrfs in silic mtx,occ uncons sbrndd vrfs,dom rhyodac & andes,tr-mnr calc,mnr-com epid & epid vng,mnr chlor & chlor mafics,r euh pyr.

Stuck drill pipe after survey at 8328'. Spot mineral oil & pipe lax,work stuck pipe,free pipe,drill ahead.

Debris Flow lt-med gry grn,lt-med



gry,yel grn,frm-hd,loc brit,aphan crpxln-micxln mtx,mod altd/rexln,com altd andes & altd tuff,mod silicic, mnr chlortzd mafics,mnr-loc com yel-yel grn epid vng & dism epid,tr calc vng,loc r dism pyr.

Debris Flow: lt-med gry grn,lt-med gry,mnr dk gry,mnr yel grn,frm-hd, loc brit,aphan crpxln-micxln mtx, mod-highly altd/rexln,com altd flow rk,mod silicic,mnr-com chlor,tr-mnr yel-yel grn dism epid & epid vng,tr -mnr free calc vng,sl-loc mod argill alt,loc r dism pyr

Debris Flow: lt gry-lt gry grn,med gry,occ dk gry,hd-com sl fri,aphan crp-micxln,com micsuc,dom rhyodac, rhyodac tuff & andes,occ vis sbang-sbrnd fn gr andes lith frags in tuff mtx,scat pp insol wht cly alt,mnr calc,tr epid & chlor,r euh pyr.

Debris Flow: lt-med gry,lt-med gry grn,occ dk gry,frm-hd,loc fri,aphan crpxln-micxln mtx,mod altd/rexln, com altd andes,rhyodac & tuff,loc mnr-com amt sl-mod altd granodiorite w/fn gr hypidio tex,chlortzd pyrox, tr free calc vng,tr yel-yel grn dism epid & epid vng,loc r v fn gr dism pyr

Hornfels: med-dk gry,brn gry,hd-v hd,mass,aphan-micxln,silicified,ang ctngs,prob meta volc,r-tr calc vng,r yel-yel grn epid vng,loc r v fn gr dism pyr.

Granodiorite: wht,lt gry,mod hd-hd, equigran,fn gr,hypidio tex,sl altd app,mnr-com pyrox,mnr-com chlortzd pyrox,com dism mag,r-tr dism yel-yel grn epid & epid vng,r-tr free calc vng.

Hornfels: med-dk gry,brn gry,hd-v hd,brit,mass dense mtx,aphan-crpxln subvit,mod silicified,loc indist micxln mafic xls,prob meta volc,tr dism mag & mag blebs,r calc vng.

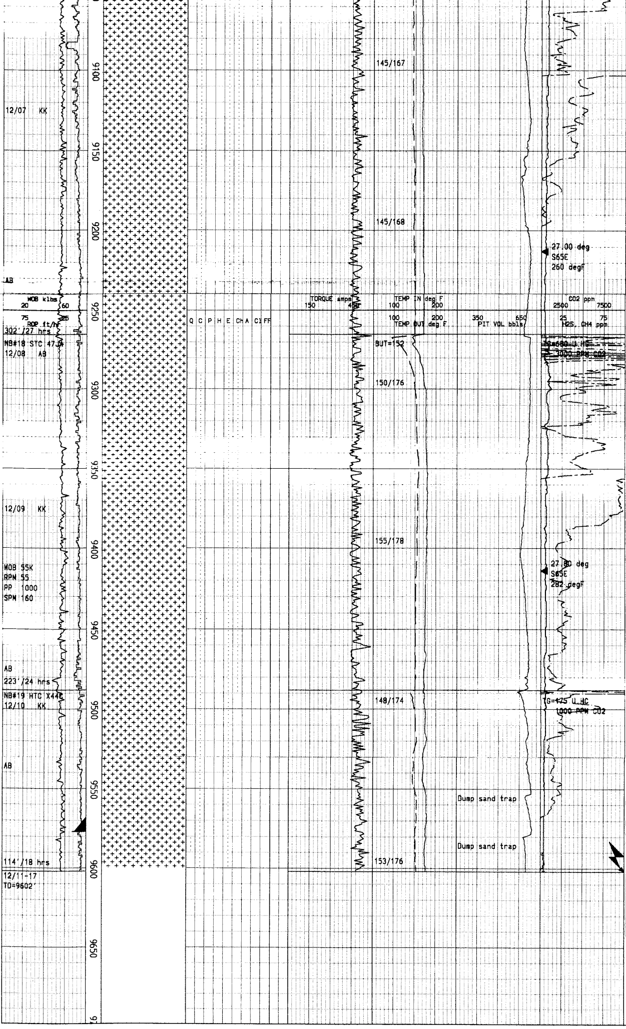
Granodiorite: wht-lt gry,wht & blk, hd-occ fri,micxln-fn gr,hypidio txt, dom fresh & unaltd,wk chlor mafics prob biot,scat disem mag,r yel grn epid xl aggs,tr calc & occ free calc xls.

Wipe hole @ 8900',stuck pipe @ 8761',spot mineral oil,free pipe,wipe 10 stands,cont drlg.

Granodiorite: wht-lt gry,hd,occ fri micxln-fn gr,hypidio tex,equigran, pred fresh app,mnr amt sl altd,wk chlor mafics,mnr amt disem mag,r yel-yel grn disem epid,r-tr free calc vng.

Stuck pipe @ 8963' while making conn,spot mineral oil,work stuck pipe,free w/air bubble. Change to spiral drill collars, drill ahead.Trip gas=650u HC & 3200ppm CO2.

Granodiorite:wht-lt gry,hd,occ fri, pred fn gr hypidio tex,loc mnr amt micxln,pred fresh app,mnr amt sl altd,wk chlor mafics,mnr amt disem



mag,r yel-yel grn disem epid,r free calc vng,loc r-tr clay alt felds.

Granodiorite: wht-lt gry,wht & blk, hd-loc fri,micxln-fn gr,hypidio txt, dom fresh & unaltd,wk chlor biot, scat disem mag,r yel grn epid, r calc,loc wht insol cly.

Granodiorite: wht-lt gry,wht & blk, trnsl & blk,hd-com fri,micxln-fn gr, hypidio txt,dom fresh & unaltd,wk chlor biot & disem biot,scat disem mag,r yel grn irreg epid,r calc,loc pp wht insol cly.

Granodiorite: wht-lt gry,wht & blk, trnsl & blk,hd-com fri,fn gr-micxln, hypidio txt,dom fresh & unaltd,wk chlor biot & micxln disem biot,scat disem mag,r yel grn epid,r calc,loc wht insol cly.

Granodiorite: wht-lt gry,wht & blk, hd-occ fri,fn gr-micxln,hypidio txt, pred fresh & unaltd,mnr amt sl altd, wk chlor biot,r disem mag,r yel-yel grn epid,r calc,loc wht insol cly.

Granodiorite: wht-lt gry,wht & blk, trnsl & blk,fri-hd,fn gr-micxln, hypidio txt,dom fresh & unaltd,loc wk chlor biot & micxln disem biot, scat disem mag,r yel grn epid,r calc,loc wht insol cly.

Granodiorite: wht-lt gry,wht & blk, trnsl & blk,hd-fri in smpl,fn gr-micxln,hypidio txt,dom fresh & unaltd,loc wk chlor biot & micxln disem biot,scat disem mag,r yel grn epid,r calc,loc wht insol cly.

Granodiorite: wht-lt gry,wht & blk, loc trnsl & blk,hd-occ fri in smpl, fn gr-occ micxln,hypidio txt,fresh & unaltd,loc micxln disem biot & mag, scat fn gr mag,r yel grn epid,r calc,decr mafic content @9520'.

Granodiorite: wht-lt gry,wht & blk, trnsl & blk,clr,hd-fri ip,dom fn gr, hypidio txt,fresh & unaltd,tr-mnr dom fresh biot,scat fn gr mag,r yel-yel grn epid,r calc.

TD:9602'. Run Schlumberger logs.
Hang 9.625" slotted liner from 4200-9577',displace hole with water & run casing profile log.
Unload hole & flow well.
Final:202 degF, 0.3 psig, 3 gpm.