WEST COAST
GEOLOGIC

HOLE

26"	TO	132'
17.5"	TO	380'
12.25"	TO	3500'
8.75"	TO	9145'

CASING

20"	FROM	0'	TO	132'
13.375"	FROM	0'	TO	378'
9.625"	FROM	0'	TO	3486'
5.5"	FROM	0'	TO	9105'

COMPANY	University of Utah
WELL NAME	FORGE 56-32
FIELD	Milford
COUNTY	Beaver
STATE	Utah
WELL HEAD COORDINATES	
Latitute:	38.504052
Longitude:	-112.88642
ELEVATION	5451'
RIG START DATE	2/6/2021
TD DATE	2/27/2021
TOTAL DEPTH	9145'
TRUE VERTICAL DEPTH	9138.1'
TD LOCATION	19.5'N, 106.4'E of WH Lat: 38.504008, Long: -112.88672
DRILLING CONTRACTOR	Frontier #16
COMPANY REPRESENTATIVES	V. Welch,P. Stroud

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=30.4'

LITHOLOGY

▤	Clay	▦	Diorite
▤	Silt	▨	Syenite
▨	Sand	▦	Quartz Monzonite
▨	Gravel	▨	Quartz Latite
▨	Alluvium	▨	Quartzite
▥	Basalt	▨	Gneiss
▨	Rhyolite	▨	Felsic Dike
▨	Tuff	▨	Altered Zone
▤	Granite		
▨	Granodiorite		

DRILL BREAKS	WATER ENTRIES
4774'	
6326'	
7580'	
8149'	
8220'	

LOG INTERVAL

DATE LOGGED	2/8/21	TO	2/28/21
DEPTH LOGGED	131'	TO	9145'
MUD DRILLING	131'	TO	9145'
AIR DRILLING		TO	
LOG SCALE	1:600		
UNIT NO.	C23		

LOGGING GEOLOGISTS

Patrick Broderick (pb), Andrew Schepflin(as), Brennan Williams-Mieding (bwm)

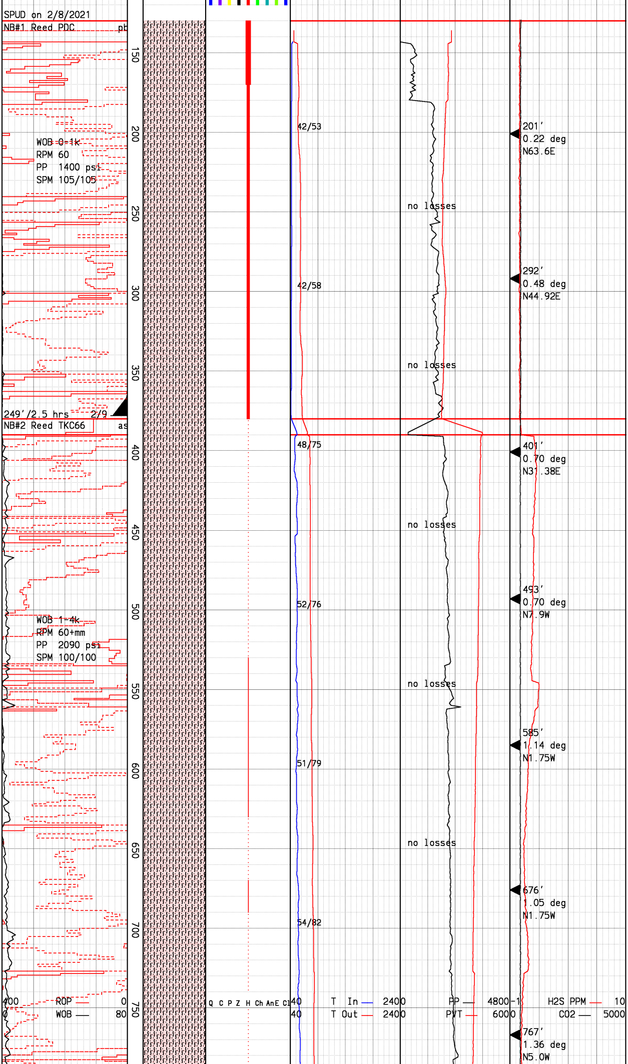
SECONDARY MINERALS

Q = Quartz
C = Calcite
P = Pyrite
Z = Zeolite
H = Hematite
Ch = Chlorite
An = Anhydrite
E = Epidote
Cl = Clay

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

FORGE UTAH 56-32 Scale 1: 600

Drilling Data	Depth (ft)	Lithology	Minerals	Temperatures	Circulation	Gas Analysis	Descriptions
ROP 400 ft/hr 0				Temperature In 40 deg F 240	Pit Total 0 bbls 600	H2S -1 ppm 10	
Weight on Bit 0 k lbs 80			Quartz Calcite Pyrite Serecite Hematite Chlorite Anhydrite Epidote Clay	Temperature Out 40 deg F 240	Pump Pressure 0 psi 4800	CO2 0 ppm 5000	
	00						20" conductor set at 132'KB



SPUD FORGE Utah 56-32 on 2/8/21. Drill ahead w/17.5" bit & mud motor assembly.

Alluvium:predom white,tan, beige,clr,orng,unconsol, predom gravel & med-v crs gr sand,predom granitic & arkosic,subang-subrndd,r-tr hem altrn of mag,tr limonite, tr-com biotite.

Alluvium:tan,beige,wht,clr, orng,unconsol,predom gravel and med-v coarse gr sand, predom granitic and arkosic, subang-subrndd,r-tr hem, tr limonite,tr-com biotite.

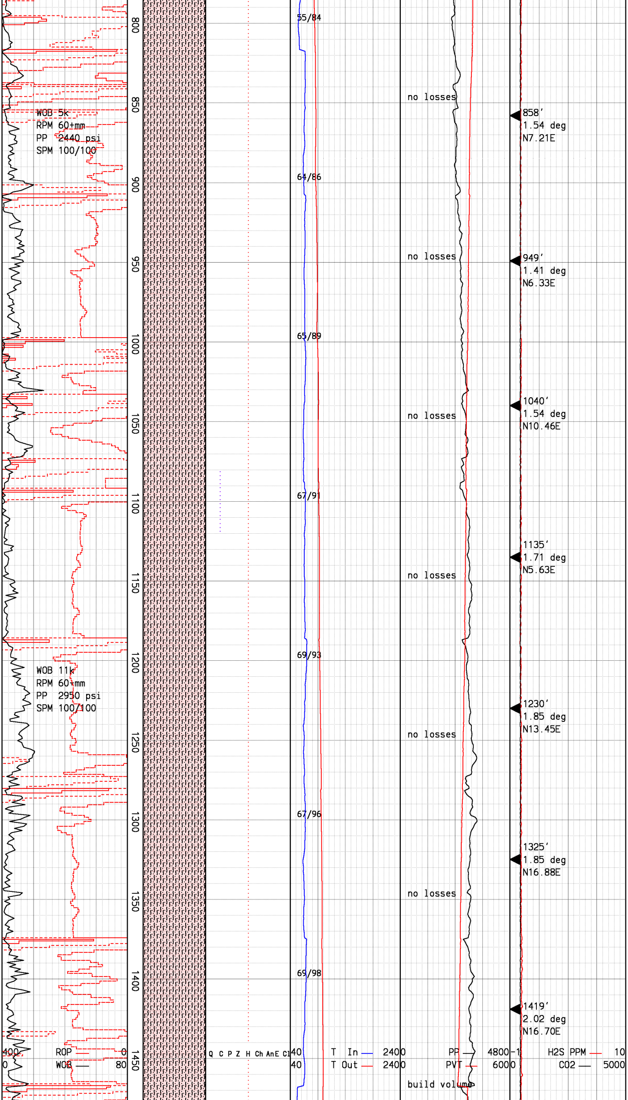
Drill 17.5" hole t/380'. Run 9 jts of 13.375",54.5# J-55 BTC casing to 378'.

Drill 10' perform FIT test. Drill ahead w/12.25" bit.

Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-5 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,r hem.

Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-10 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,tr clay,tr hem.

Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-5 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,tr clay,tr hem.



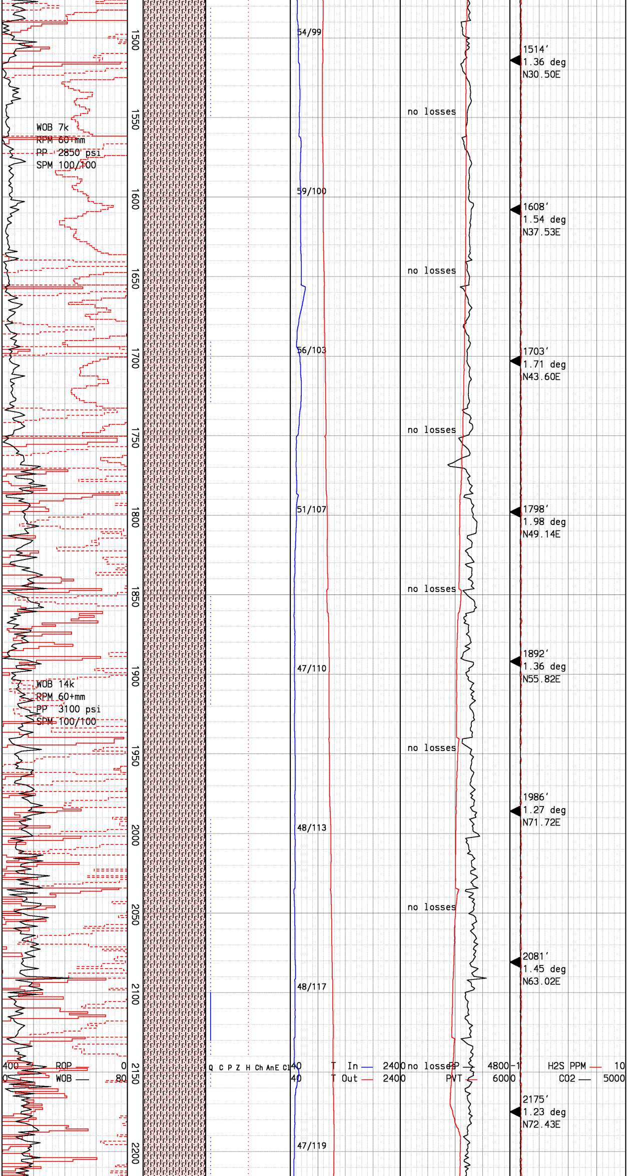
Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-5 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,tr-mnr clay,r-tr hem.

Alluvium:tan,lt gry,wht,clr, unconsol,predom gravel 2-5 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,tr-mnr clay,tr limonite,r hem.

Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-10 mm,com md-v crs gr sand, subang-subrndd predom granitic grs,com-abun md brn sft mod sol clay,r hem.

Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-10 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,com-abun md brn sft mod sol clay,r hem.

Alluvium:wht,lt gry,clr,tan unconsol,dom fn-v crs gr sand,com 2-5 mm gravel, ang-subrndd predom granitic grs,com-abun md brn sft mod sol clay,r hem.



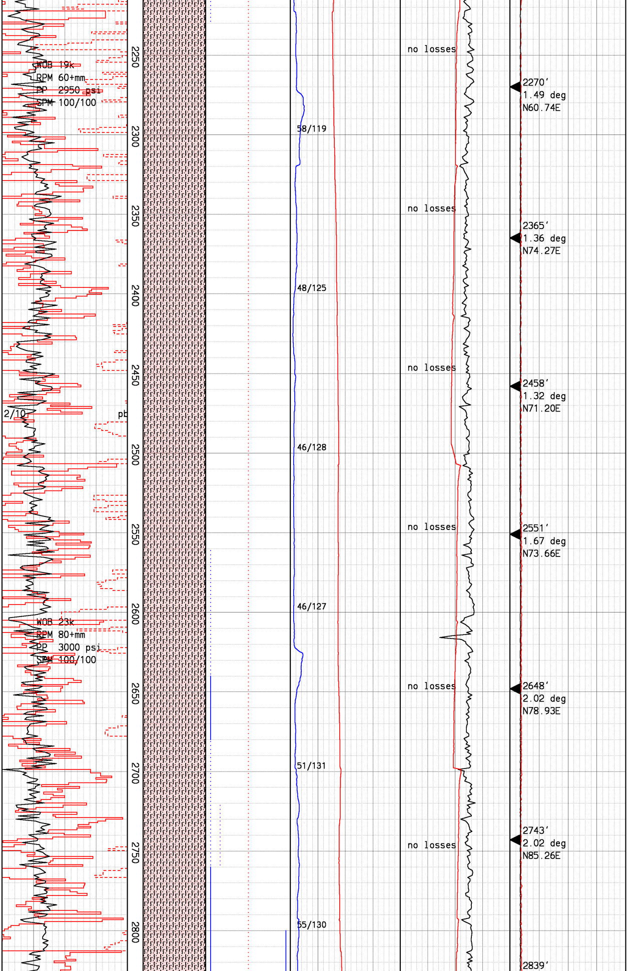
Alluvium:wht,lt gry,clr,tan unconsol,dom fn-v crs gr sand,com 2-5 mm gravel, ang-subrndd predom granitic grs,com-abun md brn sft mod sol clay,r hem.

Alluvium:wht,lt gry,clr,tan unconsol,dom fn-v crs gr sand,com 2-15 mm gravel, subang-subrndd predom granitic grs,com md brn sft mod sol clay,r hem.

Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-5 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,r hem.

Alluvium:tan,wht,clr, unconsol,predom gravel 2-10 mm,com crs-v crs gr sand, subang-subrndd predom qtz grs,r hem.

Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-5 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,r hem.

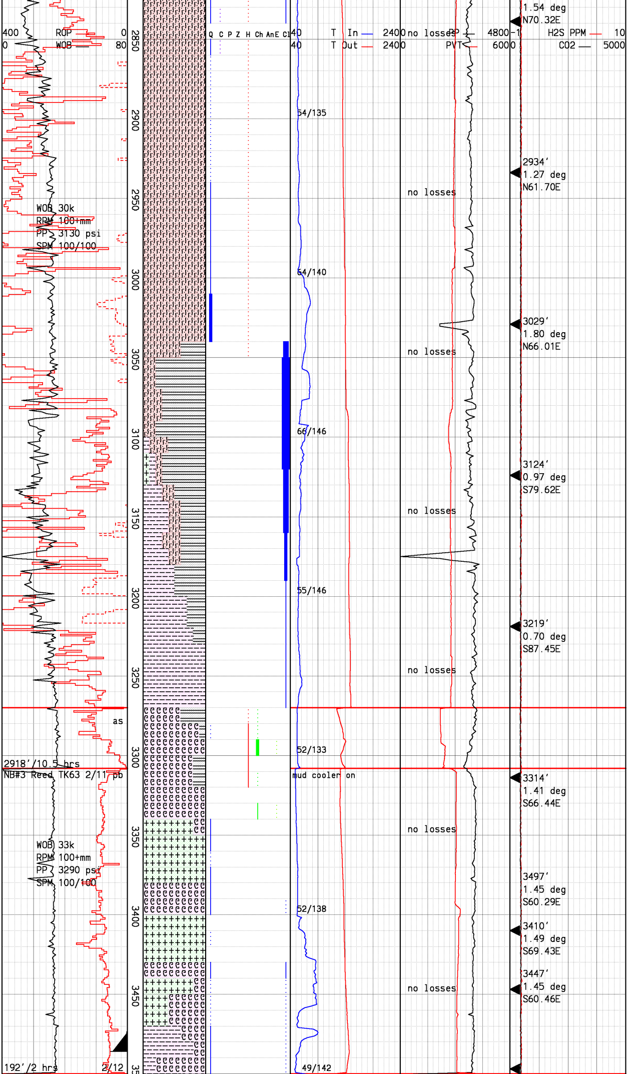


Alluvium:tan,wht,clr,lt gry unconsol,predom gravel 2-5 mm,com crs-v crs gr sand, subang-subrndd predom granitic grs,r hem.

Alluvium:wht,lt gry,gry-pink, grn-gry,beige,mod hd,fn-crs gr sand,mod wl srtd,prdom granitic origin,weathered,r Diorite frags,mnr hrnblnd, com dk brn biot,loc opal,loc r rutile,tr hem,mnr limonite, loc r calc.

Alluvium:wht,lt gry,gry-pink, grn-gry,beige,mod hd,fn-crs gr sand,mod wl srtd,prdom granitic origin,weathered,r Diorite frags,mnr hrnblnd, com dk brn biot,loc opal,tr hem,mnr limonite,loc r chlor, loc r calc,r-tr clays.

Alluvium:wht,lt gry,gry-pink, grn-gry,beige,mod hd,fn-crs gr sand,r loc gravel,mod wl srtd,prdom granitic origin, com weathered,r Diorite,mnr hrnblnd,com dk brn biot,loc opal,tr hem,mnr limonite,loc r chlor,abs-r calc.



Alluvium:wht,pink,tan,gry-grn,grn-yellow,fn-med gr sand,r loc gravel,mod wl-wl srtd,prdom granitic origin, com weathered,r Diorite,mnr hrnblnd,com dk brn biot,loc opal,tr hem,mnr limonite,loc r chlor.

Clay:lt gry,pink,wht,dk gry, v sft,sticky,massive.

Granite:wht,lt gry,mod hd-hd, fn-med gr,loc wk clay altrn, varied min composition,abun fn intrlocking qtz grns,loc com grn-blk hrnblnd,mnr dk brn-blk biot,r-tr hem,mnr limonite.

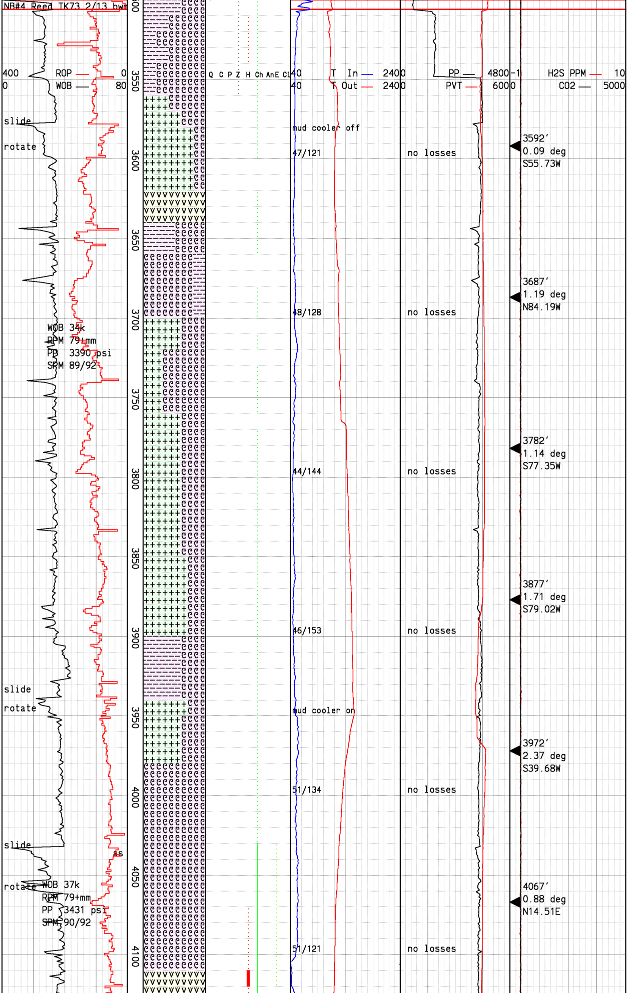
Wipe hole

POOH to inspect bit

Granodiorite:lt gry,wht,blk, mod hd-hd,fn-med gr,mod fri, phaneritic,equigranular, hypidio,com biotite,r qtz microvng,r-tr clay altrn of felds.

Diorite:blk,dk gry,hd,occ britt,equigranular,r loc fol,predom wl def gr bndrs, com blk hrnblnd,r-tr qtz vng.

Drill 12.25" hole t/3500'.
Run 83 jts of 9.625",36#
J-55 LT&C casing to 3486'.

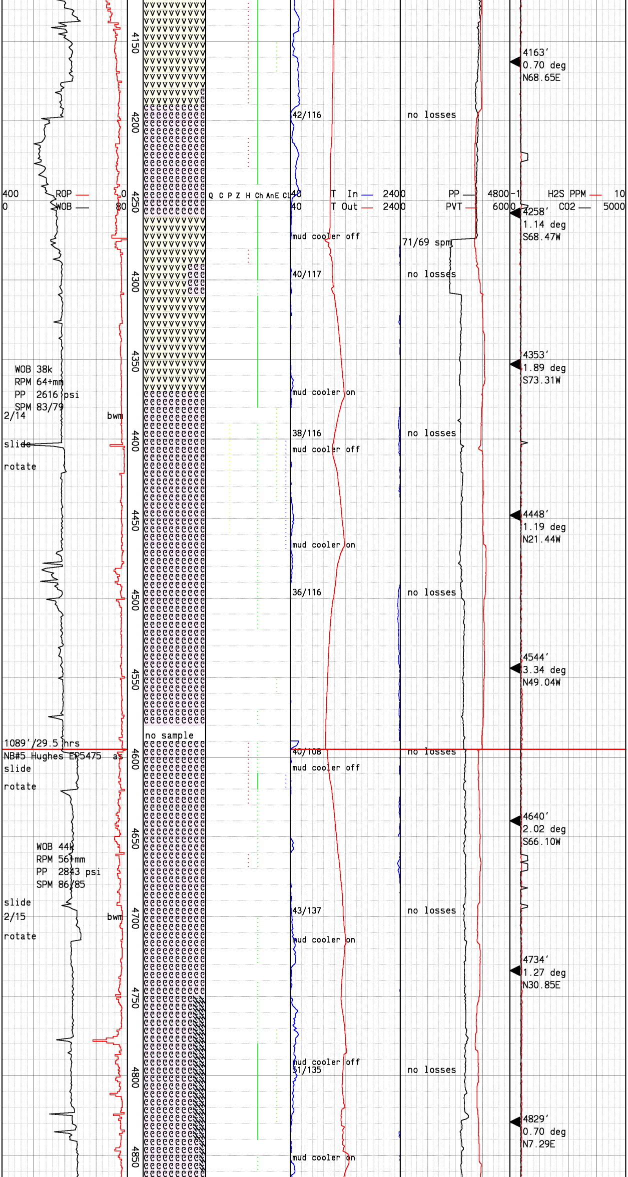


Drill 6' perform FIT test.
Drill ahead w/8.75" bit.

Felsic Dike:pinkish/gry, leucocratic,mod hd,britt sugary/crumbly txt,phenos not equigranular,indetermin xtal habit, K-felds or encrus on qtz,mostly qtz & K-felds, r amphiboles/dk minerals, although some grs within sample exhibit extrusive qualities of Dacite (larger pheno within fine matrix, smaller overall pheno size, only ~20 ft thick f/3630-3650'.

Diorite:blk,dk gry,hd,occ britt,equigranular,r loc fol,predom wl def gr bndrs, com blk hrnblnd,r-tr qtz vng, w/Granodiorite:med gry, wht,clr,blk,mod hd-hd,fn gr, equi-granular,britt,abun biotite,r-tr chlortzd grs,r lime grn epid.

Granodiorite:med gry,wht,clr, blk,mod hd-hd,fn gr,equi-granular,britt,abun biotite, r-tr chlortzd grs,r lime grn epid.



Felsic Dike:wht,clr,hd,britt,fn gr,equigranular,40% clr qtz,10% biotite,tr chlortzd grs,r-mnr hem,loc r lime grn epid,loc r pink glassy min.

Granodiorite:med gry,wht,clr,blk,mod hd-hd,fn gr,equigranular,britt,abun biotite,tr chlor wash,loc r hem,loc r pink glassy min.

Felsic Dike:wht,clr,hd,britt,fn gr,equigranular,30% clr qtz,tr chlortzd grs.

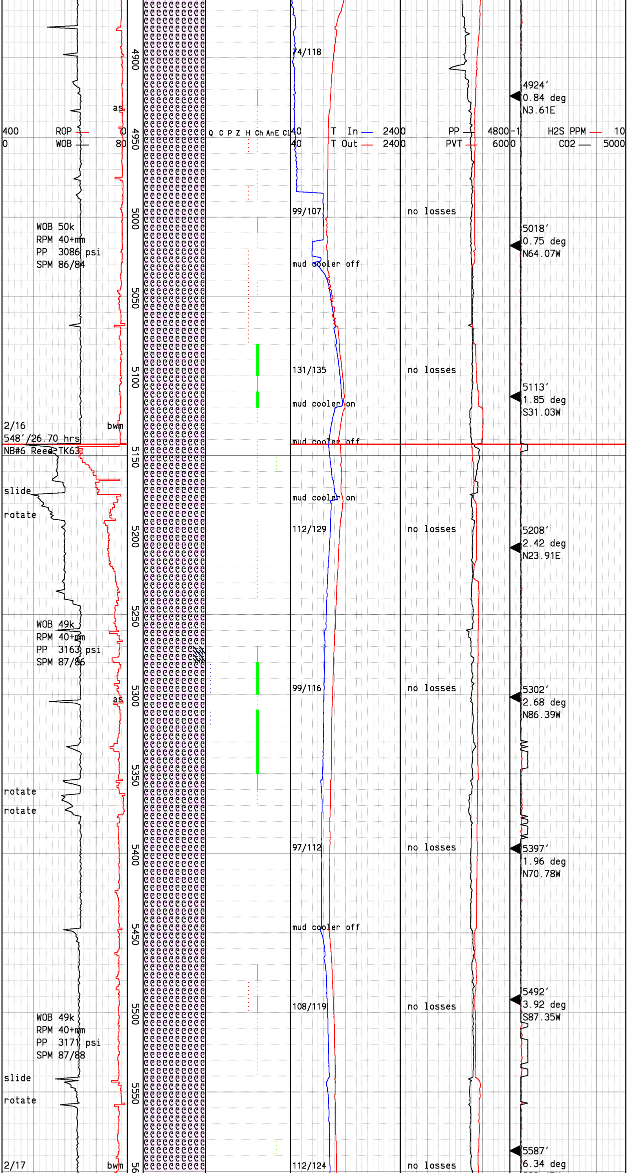
Granodiorite:med gry,wht,clr,blk,mod hd-hd,fn gr,equigranular,britt,occ gneissic txt,notable blching on plag & qtz pheno,com biotite,r-tr chlor wash,r disem pyr on amphi,r det epid,r-tr dk gry/blk,v sticky clay alteration (illite).

Granodiorite:med gry,wht,clr,blk,mod hd-v hd(K-spar britt plag v hd),subhed-anhed,trend to tonolite(10% K-spar),mnr-com biotite,r-tr chlrtzd grs,r hem,loc r magnetite,loc r gry/grn v sft clay.

Granodiorite:med gry,wht,clr,blk,mod hd-v hd,subhed-anhed,trend to tonolite(<10% K-spar),qtz com translu,mnr-com disem biotite and tabular agg r-tr chlrtzd grs,r-tr hem,loc r magnetite,r blching,incr in amphiboles/micas.

Drill Break:F/4774'-4780',ROP F/26-126'/hr,WOB F/45-33Klbs,asso w/change in lith.

Altered Zone:Metasomatism of Granodiorite,blk vitreous/pearly biotite altring to mass chlor agg,incr in freq of hematite wash on grs.



Temp in reading air.Temp reading from handheld.

Granodiorite:lt gry,wht,v hd, subhed-anhed,trend to tonolite(10-20% K-spar),mnr biotite,r-tr chlrtzd grs.

Install WCG Temp In probe.

Granodiorite:lt-md gry,wht, v hd,subhed-anhed,trend to tonolite(10-20% K-spar),tr biotite,abs-tr chlrtzd grs.

Pason Temp In relocated.

Granodiorite:md gry,dk gry, grn/gry,v hd,anhed,rexln,com biotite,tr-mnr chlrtzd grs.

Condition mud & circulate, build slug.

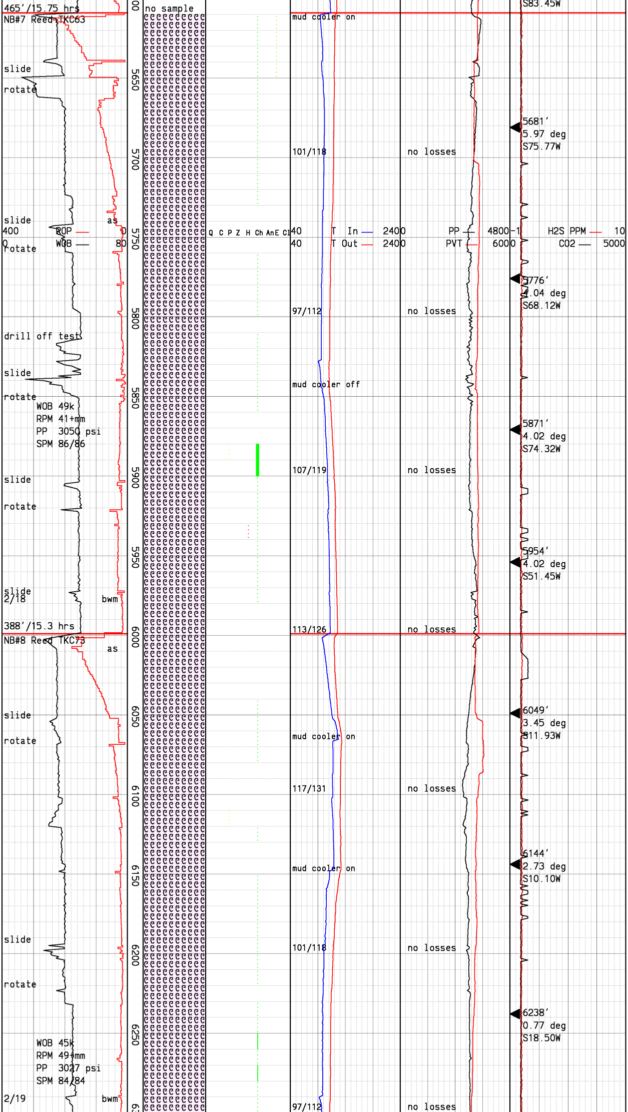
Granodiorite:md gry,dk gry, grn/gry,v hd,anhed,rexln,com biotite,tr-mnr chlrtzd grs.

Granodiorite:lt-md gry,hd-v hd,occ subhed,prim anhed, trending to tonalite,blching of plag,occ r biotite agg,abs-tr chlr,tr-mnr hem altrn.

Granodiorite:md-dk gry, grn/gry,occ wht,v hd,subhed-anhed,rexln,fuzzy gr bndrs, com hrnblnd,r qtz microvng, mnr chlrtzd grs.

Granodiorite:lt-md gry,wht, v hd,subhed-anhed,predom disagg qtz & felds,milky wht altrn of plag/k-spar,qtz com transp,tr-com biotite,abs chlrtzn F/5380' t/5480',decrs mafics (horn/tourm),tr-mnr bio.

Granodiorite:lt gry,wht,loc md-dk gry,hd-v hd,britt, subhed-anhed,tr-loc com biotite,loc euhed hrnblnd, r-tr chlrte wash,r hem,occ unalterd k-spar.



Granodiorite:lt gry,wht,loc md-dk gry,hd-v hd,britt mott agg of bio,qtz & plag, transpar subhed-anhed qtz, infreq hem wash,occ det euhed hrnblnd,com bronze/ iridescent biotite altrn.

Granodiorite:lt gry,wht,mod hd-v hd,britt,subhed-anhed, indist gr bndrs,wht feldspar altrd & britt,tr biotite,r chlrtzd grs.

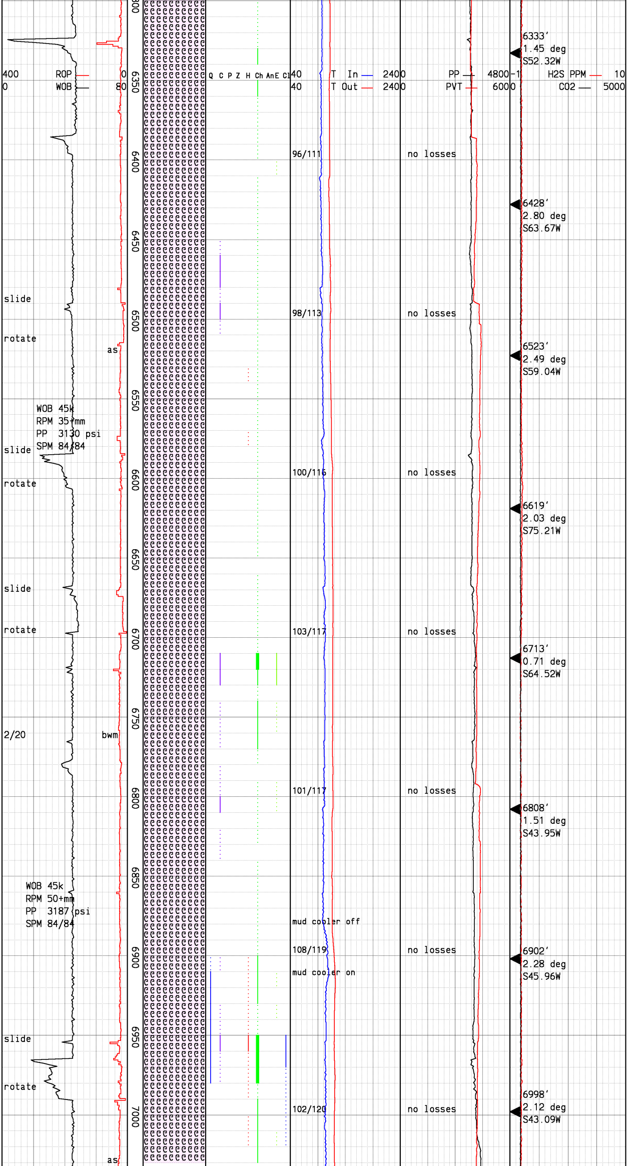
Granodiorite:lt gry,wht,loc md-dk gry,mod hd-v hd,britt, subhed-anhed,indist gr bndrs, wht feldspar altrd & britt, mnr-abun biotite,r-mnr chlrtzd grs.

Granodiorite:lt gry,wht,loc md-dk gry,mod hd-v hd,britt, subhed-anhed,indist gr bndrs, transpar qtz,wht feldspar altrd & britt,occ large (up to 3mm) subhed pink K-spar, mnr-abun biotite,r-mnr chlrtzd grs.

Granodiorite:lt gry,wht,mod hd-v hd,britt,subhed-anhed, indist gr bndrs,wht feldspar altrd & britt,com-tr biotite, loc r chlrtzd grs.

Granodiorite:lt gry,wht,mod hd-v hd,britt,subhed-anhed, indist gr bndrs,wht feldspar altrd & britt,tr biotite,r chlrtzd grs.

Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,wht feldspar altrd & britt,mnr biotite,r-tr chlrtzd grs,loc r magnetite.



Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,wht plag altrd & britt,occ subhed K-spar,mnr-com bio,mnr det elongtd euhed qtz,r-tr chlrtzd grs,loc r magnetite, com well preserved euhed det hrnblnd.

Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,wht plag altrd & britt,occ subhed K-spar,mnr-com bio w/irrides altrn,mnr disagg euhed qtz,r chlrtzd grs,occ loc r magnetite,com well preserved euhed det horn,r-tr det calc, perv hematization of amphibol

Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,wht feldspar altrd & britt,tr-mnr biotite,r chlrtzd grs,loc r hem.

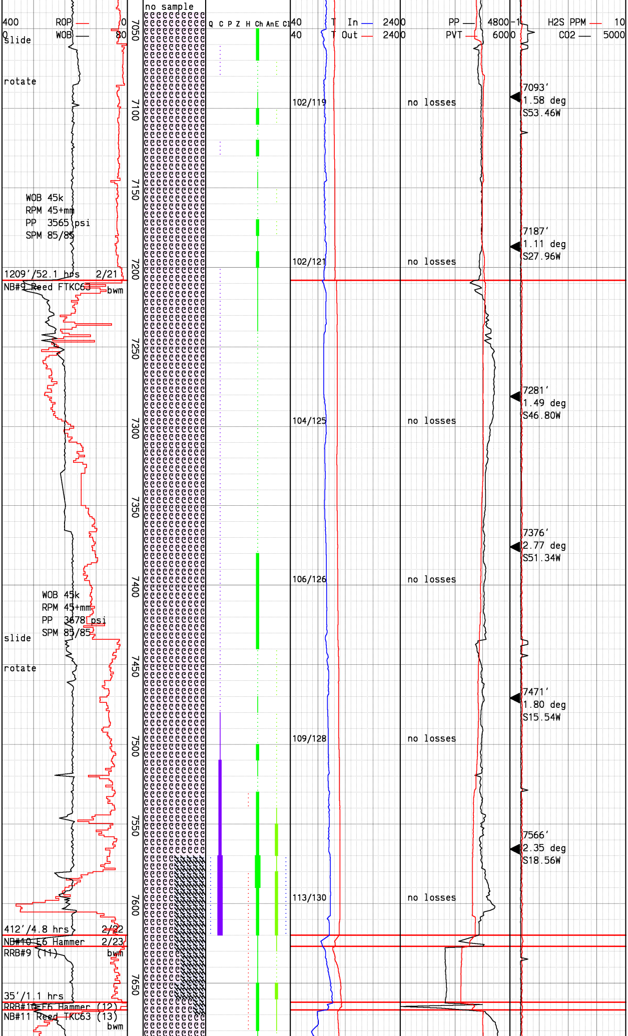
Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,wht feldspar altrd & britt,tr-mnr biotite,r chlrtzd grs.F/6720-6730',tr-mnr chlor,tr yel/grn epid,tr calc vng.

Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,wht feldspar altrd & britt,subhed peach clrd K-spar,rexln subhed qtz,tr-mnr biotite w/ occ irrides altrn,r-tr dk grn chlorite,tr yel/grn epid F/ 6720-6730' & F/6800-6810',r-tr calc.

Add 30bbls water,build mud

Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,wht feldspar altrd & britt,subhed peach clrd K-spar,rexln subhed qtz,tr-mnr biotite w/ occ irridesc altrn,r-tr dk grn chlor,occ euhed horn,occ yel epid,r-tr magnetite, cataclastic altrn britt,appr of rexln, com micro frac & qtz vng F/6890-6920'.

Granodiorite:dk gry,mod hd,v britt,indist gr bndrs,wht altrd plag,incr in hemtzn, v com bio & chlor,qtz vng w/ interstit bio,r-tr magn,tr wht clay F/6960-6990'.



Granodiorite:md gry,lt gry, wht,mod hd-v hd,indist gr bndrs,com biotite,tr hrnblnd,mnr chlrtzd grs, r calc vng,loc r epid,loc r magnetite.

Granodiorite:lt gry,occ md-dk gry,mod hd-v hd,indist gr bndrs,tr-com biotite,r-mnr chlrtzd grs,loc r calc,loc r epid,loc r magnetite.

Granodiorite:md-dk gry,mod hd-v hd,altrd,salt & pep appr,abun mafics,com clr qtz,r-tr chlrtzd grs,r calc.

Granodiorite:lt gry,wht,mod hd-v hd,indist gr bndrs,mnr biotite,r chlrtzd grs,r calc.

Granodiorite:md-dk gry,mod hd-v hd,indist gr bndrs,com biotite,mnr chlrtzd grs,r calc vng.

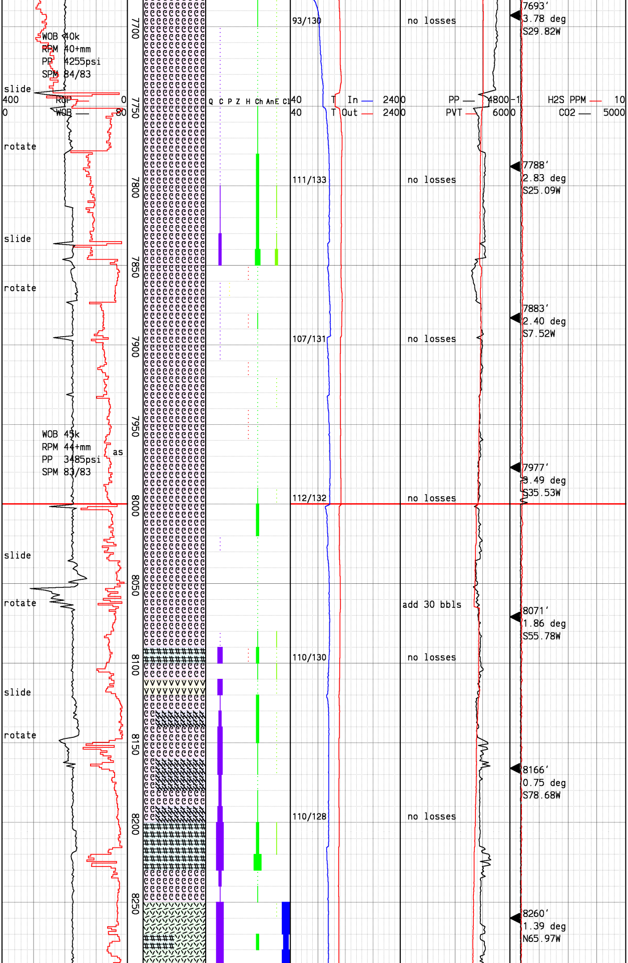
Granodiorite:lt gry,occ md-dk gry,mod hd-v hd,indist gr bndrs,com-abun biotite,r-tr chlrtzd grs,r-tr calc vng,r yel epid.

Granodiorite:lt gry,occ md-dk gry,mod hd-v hd,indist gr bndrs,com-abun biotite,mnr chlrtzd grs,mnr calc vng,r-tr yel epid.

Altered Zone:lt gry/wht,loc grn,mod hd,britt,blchd appr, com calc vng,qtz rexln & vng, mnr-com perv dk grn chlor,mnr yel-grn epid,loc red hem altrd frm hornblende/mafics, perv clay altn.

Trip to ream tight spots.

Unable to engage hammer bit



Granodiorite:lt gry,occ md-dk gry,mod hd-v hd,indist gr bndrs,com-abun biotite,r-mnr chlrtzd grs,r calc vng,r yel-grn epid.

Granodiorite:lt gry,md gry, wht,mod hd-v hd,britt,indist gr bndrs,com-abun biotite, abun clr qtz,r-tr chlrtzd grs r calc vng,loc r hem,loc pyr.

Granodiorite:lt gry,md gry, wht,mod hd-v hd,britt,indist gr bndrs,com-abun biotite, com-abun clr qtz,r chlrtzd grs,loc r yel epid,loc r hem.

POOH t/7600,Ream t/8000'.

Granodiorite:lt gry,wht,mod hd-v hd,britt,indist gr bndrs mnr-abun biotite,com-abun clr qtz,r chlrtzd grs.

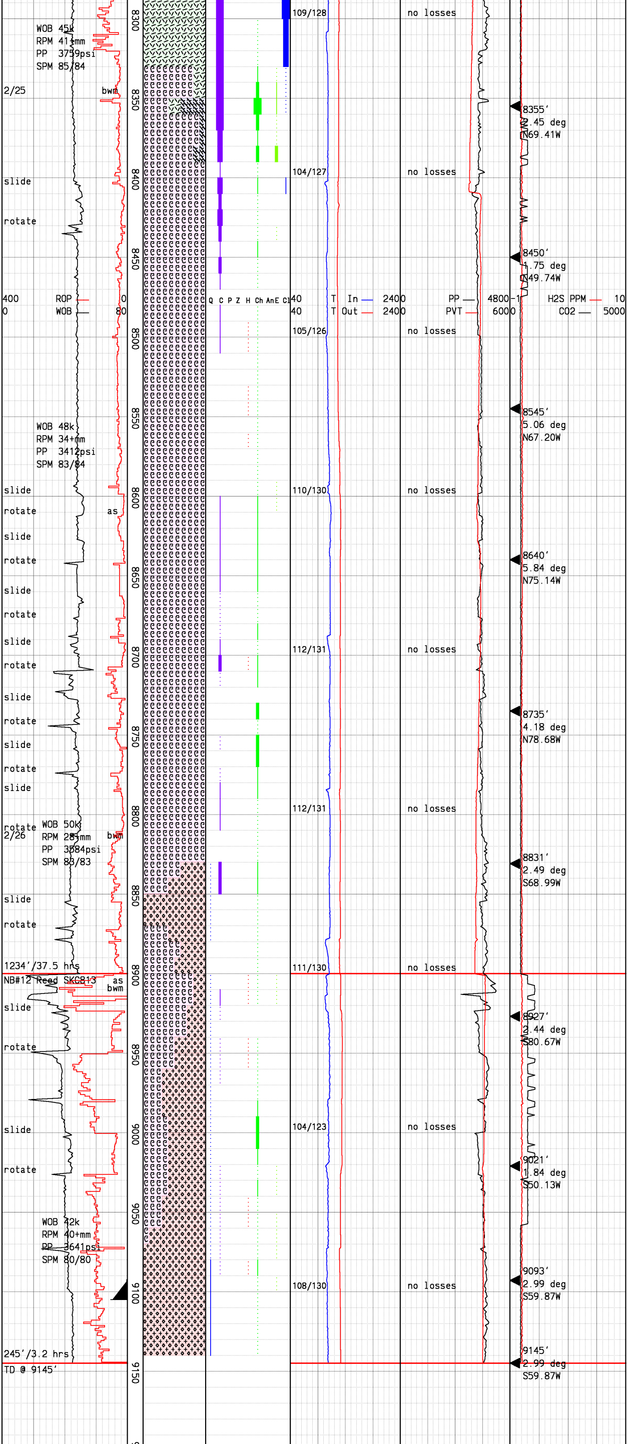
Granodiorite:med-dk gry,wht, mod hd-v hd,britt,indist gr bndrs,mnr-com calc vng,abun gold/brn-bk biotite,com-abun clr qtz,r-mnr chlrtzd grs,r transp/vitreous lt orange topaz.

Felsic Dike:wht-tan,hd,britt, fn gr,equigranular,~30% clr qtz,r chlortzd grs.

Altered Zone:lt gry/wht,loc grn,mod hd,britt,blchd appr, com calc vng,abun ~50-70% clr qtz,mnr brn-blk biotite,r-mnr perv dk grn chlor,r yel epid.

Quartz Monzonite:Wht-lt gry, loc grn/pink,md hd-hd,tr-com biotite,primarly lt pnk subhed K-spar com altrng to sticky/viscous clay,mnr-abun calc vng,~10% qtz,tr-mnr chlor wash,occ muscovite.

Syenite:Lt gry/tan,loc pink, sft-mod hd,<5% qtz,K-spar



altrn to clay,abundant calc, abundant clay altrn,tr-mnr gold biotite,r silvery muscovite,r chlorte.

Altered Zone:lt gry/wht,loc grn,mod hd,britt,blchd appr, com calc-abun vng,tr-mnr brn-blk biotite,tr-abun perv dk grn chlor,r-mnr yel-grn epid, r clay altrn.

Granodiorite:med-dk gry,wht, mod hd-v hd,britt,indist gr bndrs,euhed K-spar,tr-abun calc vng,tr-abun bk biotite w/occ irrides altrn,com-abun clr qtz,r-tr chlrtzd grs,freq euhed hornblende,occ sticky/ viscous clay altrn,occ musco, occ euhed yel epid.

Granodiorite:med-dk gry,occ lt gry/wht,mod hd-v hd,britt, mott appr,indist gr bndrs,r-abs calc,tr-com brn/gold-bk biotite,r dk grn chlorite, freq euhed hornblende occ hemitized,occ yel-grn epid.

Pason down f/8646-8663'.

Granodiorite:dk-med gry,blk, wht,mod hd-v hd,britt,indist gr bndrs,abun biotite,abun clr qtz,r-tr calc vng,r-tr chlor,loc r vitreous pink topaz.

Granodiorite:med gry,lt gry, wht,blk,mod hd-v hd,britt, r weak gneissic banding,com-abun brownish gold/blk biotite,abs-mnr calc vng,r-mnr chlor.

Gneiss:wht and lt gry-blk,v hd,qtz rxln (some migmatitic flow appar),gneissic banding, alternating bands of leucosomes & melanosomes, abun-signif brn/blk biotite,disem muscovite bands on quartz,abs calcite vng,possible granodio trending towards migmatitic biotite paragneiss.

Granodiorite:med gry,lt gry, wht,blk,mod hd-v hd,britt, mott appr,r weak gneissic banding,com-abun brownish gold/blk altrd/disem biotite, abs-tr calc vng,r-mnr dk grn agg chlor,r hematite wash on plag & qtz,occ r yel epid.

Gneiss:wht and med gry-blk,v hd,occ britt,mod gneissic banding,alternating bands of leucosomes & melanosomes,r-tr sugary rxln agg qtz,abun ~3-5 mm blk agg biotite books,occ disem muscovite bands on qtz, abs-r det calc,yel-grn agg epid occ transp,occ r hematit wash,occ blk horn,r mag,r pnk transp/vitreous indist cleav, scattered pink topaz.

T.D. University of Utah FORGE 56-32 @ 9145'.Run 208 jts of 5 1/2" casing w/fiber optic cable.Shoe set @9105'.