HYDROCARBON WELL LOG

Colin Higgins & Associates

COMPANY: SANTOS LTD (QNTBU)

FILE: WM13

WELL: WEST MEREENIE 13

ELEVATION K.B.: 770.50 m

LOCATION: OL4

ELEVATION G.L.: 764.70 m

FIELD: MEREENIE

TOTAL DEPTH: 1222.00 m

PROVINCE: NORTHERN TERRITORY

CASING: 647.7m

COMMENCE LOGGING: 13 SEPTEMBER 1997

MUD SYSTEM: AIR DRILLING

FINISH LOGGING: 27 SEPTEMBER 1997

CONTRACTOR: MJV RIG 1

HOLE SIZE: 13 9/16" TO 653m; 9 7/8" TO 1222m

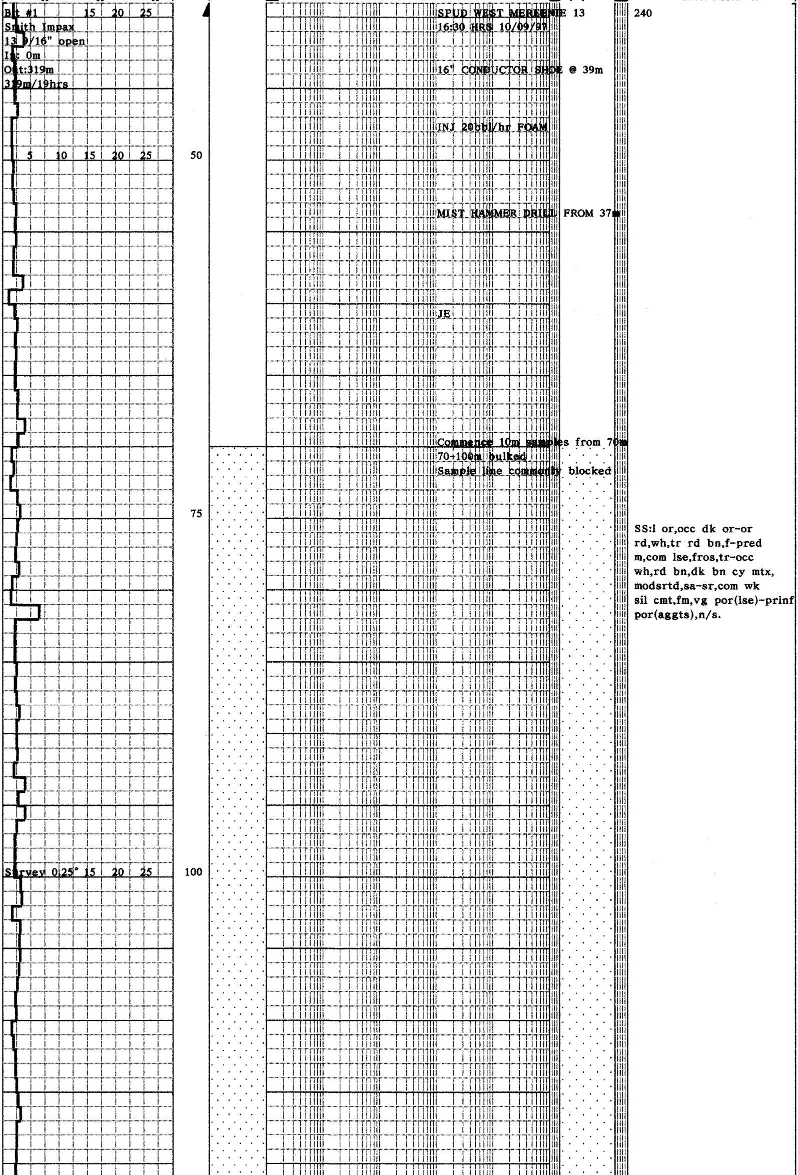
PERSONNEL: J Eleftheriou, H Hazra

REMARKS: WM13 SIDETRACKS TO WM13ST1 @ 1000m; WM13ST2 @ 1020m

INSTRUMENTATION: MP2100 DRILL DATA/HFC/SONIC PVT/GPM/ALLGAS

ALL LITHOLOGIC SYMBOLS ARE CAN-STRAT COMPATIBLE

BITS SURVEYS DRILL. FLUID DATE MISC. INFO C6,C7,C8 (ppm) PENETRATION RATE (min /m) 10 ppm 100 ppm 1000 ppm	DEPTH TOPS CORE DST CSG FAULT	LITHO %	T S E t	TOTAL GAS (units) 1 10 100 1000 OIL INDICATOR (C1/C3+C4) 0.01 0.1 1 10 CHROMATOGRAPHY (ppm x1000) 0.1 1 10 100	P O R %	10000 100 p (6) f (12) g (18) e (20000	V I S S H O W t	SAMPLE DESCRIPTION



Bit #1
Smith Impax
13 9/16" open
In: 0m
Out:319m
319m/19hrs

SPUD WEST MEREENIE 13
16:30 HRS 10/09/97

16" CONDUCTOR SHOE @ 39m

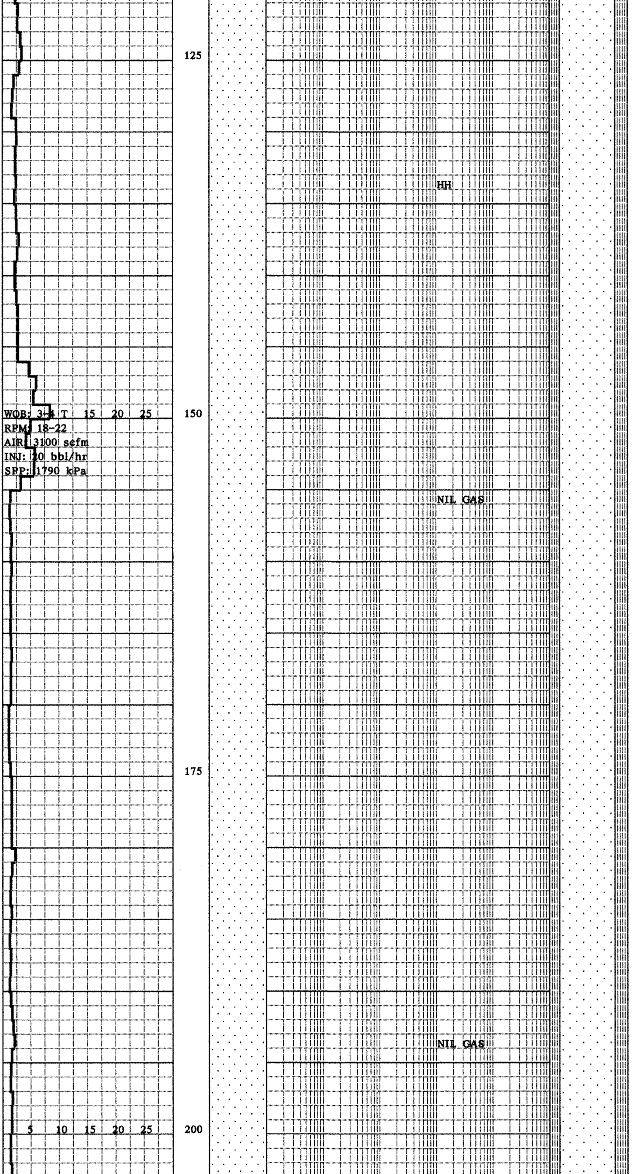
INJ 20bbl/hr FOAM

MIST HAMMER DRILL FROM 37m

JE

Commence 10m samples from 70m
70-100m bulked
Sample line commonly blocked

SS:l or,occ dk or-or
rd,wh,tr rd bn,f-pred
m,com lse,fros,tr-occ
wh,rd bn,dk bn cy mtx,
modsrtd,sa-sr,com wk
sil cmt,fm,vg por(lse)-prinf
por(aggts),n/s.



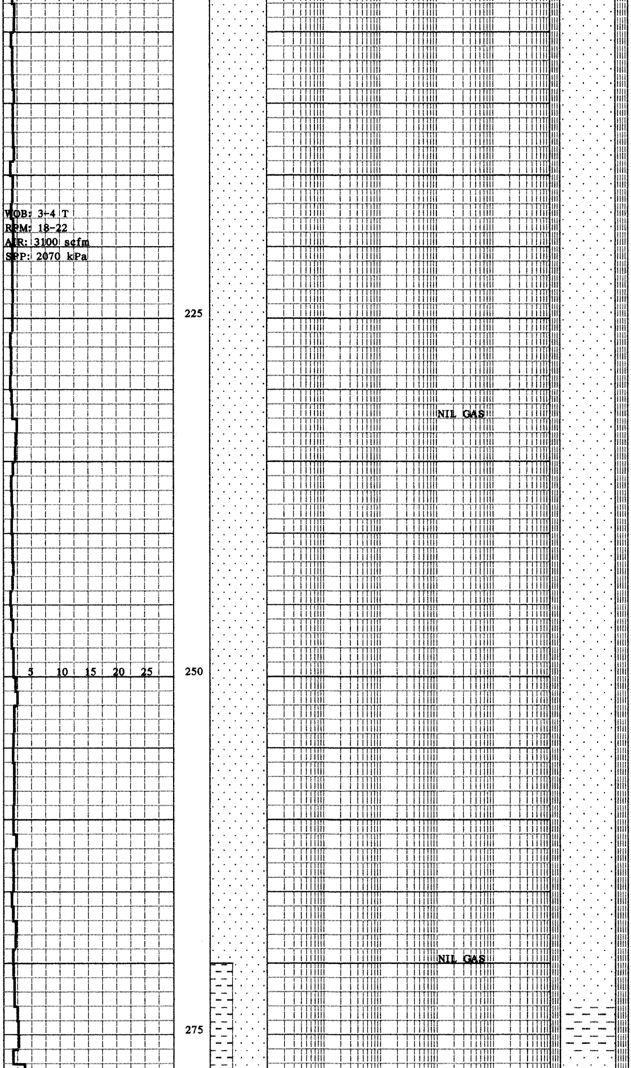
WOB: 3-4 T 15 20 25
RPM: 18-22
AIR: 3100 scfm
INJ: 20 bbl/hr
SPP: 1790 kPa

SS-lt pk-pk,occ wh, f-med gr,mod-wl srt, comaggs,occ lse wh-trnsp grns sbang-rnd,com silcmt,occ dk brn cly blks,mod hd-hd,pr-tt infpor,n/s;

SS-a/a,but pred crs hd-mod hd aggs;

SS-a/a,com v lse grns, occ aggs,pred med grns;

SS-a/a w/ f-g inf por;



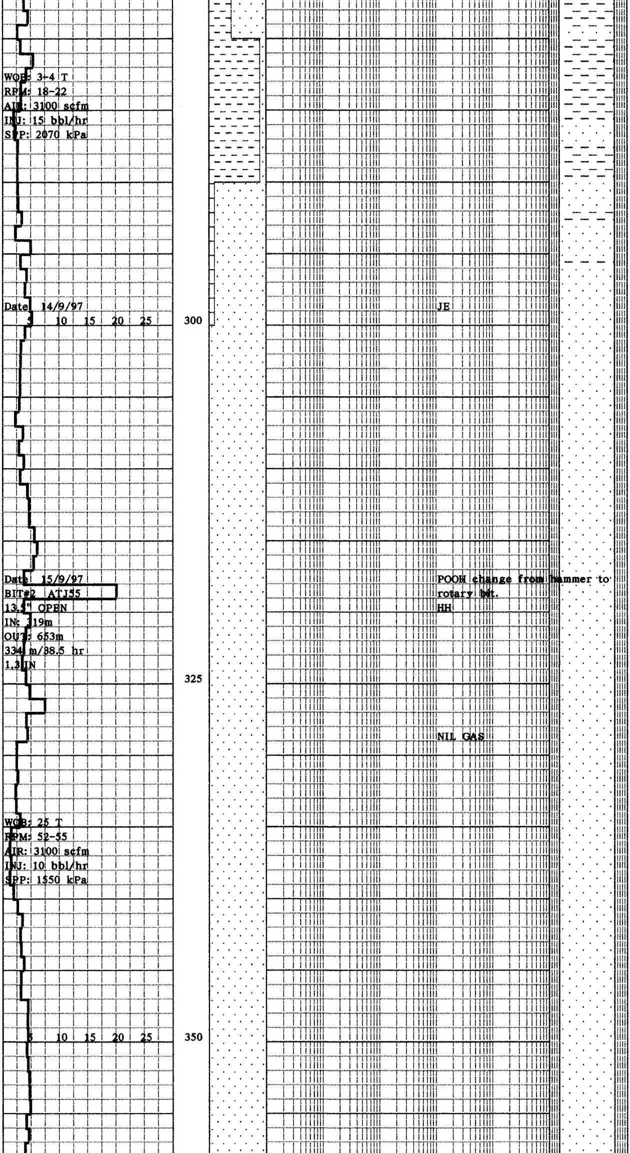
SS-clr-trnsp qtz grns, occ lt pk-lt yel brnvf-crs, pred med,p-mod srt sbang-wl rnd lsegrns, fri-hd aggs,sil cmt, p-fr inf por,n/s;

SS-a/a,pred f,wl srt;

SS-brn-orng,f-med,pred med,wl srt,rnd-sbrndlse-fri, sil cmt p-fr inf por, n/s;

SS-brn-orng rd,vf-crs, pred f,p srtsbang-sbrnd, fri-hd aggs,pyr/fe cmt,tr argmtrx,p-fr inf por,n/s;

SLT-dk brn-rd,mass, blky-sbblky,pyr/fe cmthd-mod hd;



SS-wh,occ pk,pred crs aggs,pred med gr,modsrt, sil cmt,tr-p inf por n/s;

WOB: 3-4 T
RPM: 18-22
AIR: 3100 scfm
INJ: 15 bbl/hr
SPP: 2070 kPa

Date 14/9/97

JE

SS:lt or-rdsh or,occ wh,f-m pred f,com aggts, m rd-ord rd gen assoc w f grn grd to aren SLTi/p,mod w srtd,sa-sr, fros,fm,pr-fr inf por, n/s.

Date 15/9/97
BIT#2 ATJ55
13.5" OPEN
IN: 319m
OUT: 653m
334 m/38.5 hr
1.3 IN

POOH change from hammer to rotary bit.
HH

SS-pk-orng-rd,occ off wh,crs-f,pred med,psrtang-wl rnd,pred sbrnd pyr/fe cmt,occ sil cmti/p, com v arg mtrx ip,crs aggs,hd-mod hd,tr-pinf por,n/s;

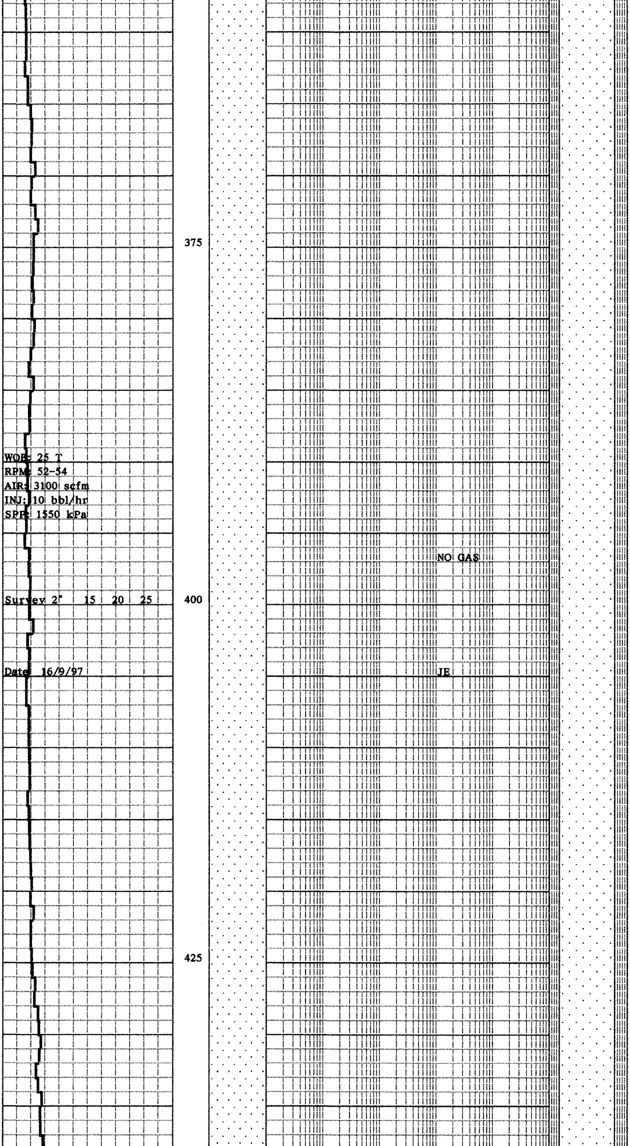
NIL GAS

SS-trnsp-trnsl clr lse qtz grns,f-med, predmed,occ crs,mod srt,sbang wl rnd,g inf porn/s;

WOB: 25 T
RPM: 52-55
AIR: 3100 scfm
INJ: 10 bbl/hr
SPP: 1550 kPa

SS-wh-off wh,trnsp qtz grns,vf-crs,pred med,psrt,ang-sbrnd, fri-mod hd aggs,com sil cmtfr-g vis por, n/s;

SS-a/a,but pred f;



WOB: 25 T
RPM: 52-54
AIR: 3100 scfm
INJ: 10 bbl/hr
SPP: 1550 kPa

Survey 2°

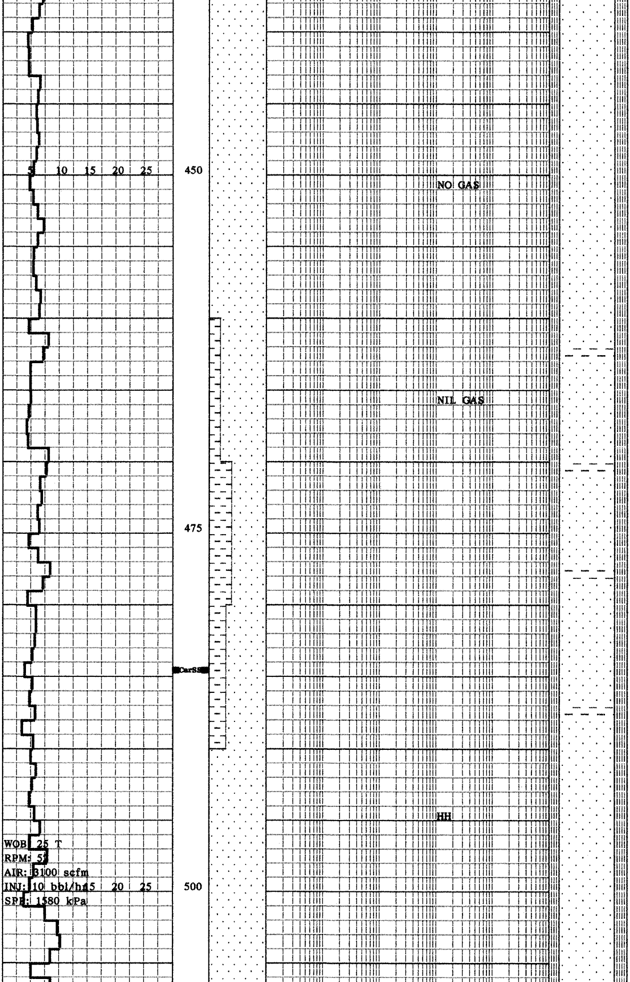
Date 16/9/97

SS-a/a,but pred med, mod hd-hd aggs;

SS-a/a,but pred f-vf, fri-mod hd aggs;

SS;

SS:wh-trnsl-buff,tr l or-or rd,f-pred m, fros,unif,sucrosic, fri-mod hd aggts,sa-rnd, mod w srtd,com wk sil cmt,occ wh-rd Fe stn cymtx,pr-fr inf por, n/s.



SS-clr,off wh,f-occ med,wl srt,sang-rnd, genwl cmt by sil,pr-tt vis por,cln,mod hd;

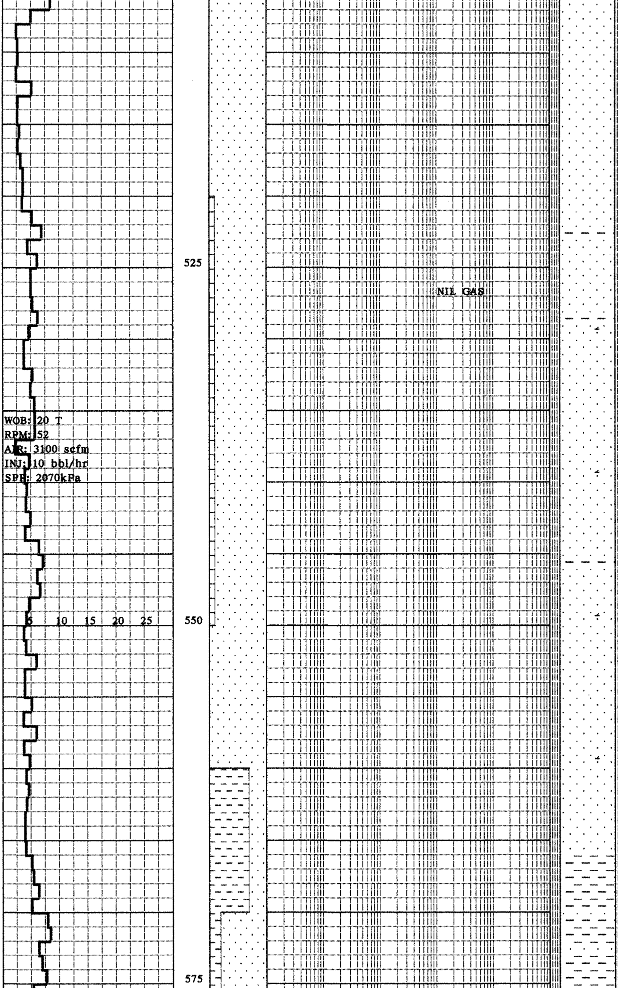
SS-a/a,but pk,pr-tt vis por,n/s;

SS-a/a,vcol,rd,purp, pk,wh,occ pl gn,clrf-pred med,fros,com suc,sbang-rnd,wl srt,comwk sil cmt,fri-mod hd; SLT-rd brn-dk rd,occgrdg to p srt vf-f SANDSTONE, sbblky-spatrymod hd-hd, com diss dk liths com mica;

SS-a/a with incr orng snd aggs & grns,tt-rr gvis por AND pk,crs & med sbrnd grns in f grncln,wl srt mtrx, strng sil cmt,no por; SLT-a/awith incr brik rd,mass,arg,mic ip, blky-angbrit-hd AND off wh,sil bndd,blky, v hd;SS-a/a with com orng-clr & trnsp,crs-f,predmed, wl rnd-sbrnd,com elg occ fros lse qtzgrns w/ g inf por; SLT-a/a w/ brick rd,massorng AND med olive gn, sil, mass,blky,hd;

SS-mainly pl pk to clr & trnsp,occ off whpred f-vf,occ crs, sbang-occ rnd,wl srtd clraggs,fri-mod hd, mod strng sil cmt,pr-tt vispor;

SS-a/a mainly v pl pk to wh & clr;



SS-clr to mainly orng,
frst-smooth,f-vf,pred
fv wl srtd,ang-rnd,
com wk sil cmt rr cly
mtrx,lse-fri aggs,
fr vis por,n/s;

SS-a/a w/ pred pl rd-brn,
fri-hd,g vis por ip;
SLT-dk brn, arg, blky-sblky,
mass,frm-sft,predgrd
to vf SANDSTONE;

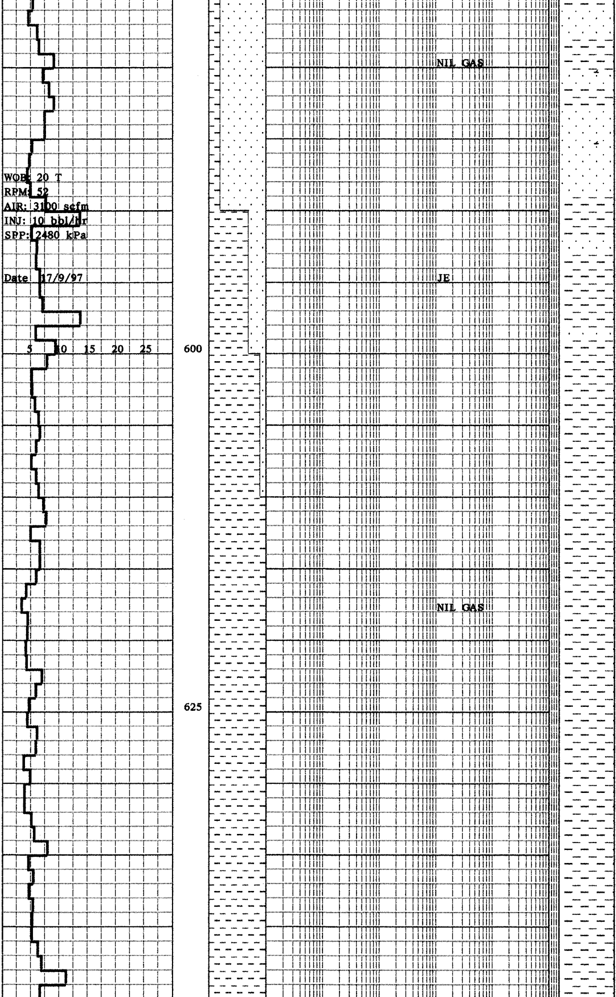
SS-a/a w/ pred med-dk
orng,lse-hd aggs;

SS-dk orng,med-mainly
f,sbrnd-pred sbang,
wlsrtd,wk-strng sil
cmt,fri & lse aggs
to modhd,fr inf por
to pr & tt vis por,
n/s;SLT-brick rd,arg,
mass,occ micmic,blky,
hd-brit

SS-a/a w/ orng to clr,
occ crs-pred f,wl srtdlse
to occ hd aggs;

SS-a/a w/ dk orng to
clr,mainly med f &
lse;SLT-dk rd-brn,orng
to mainly aren grdg
to vfSST,strng fe cmt
ip sbblky,mod fri-hd;

SS-dk-med orng,occ
clr & trnsp,occ wh
aggsmainly f & vf to
occ med sbang-sbrnd,
genwl srtd aggs, wk-strng

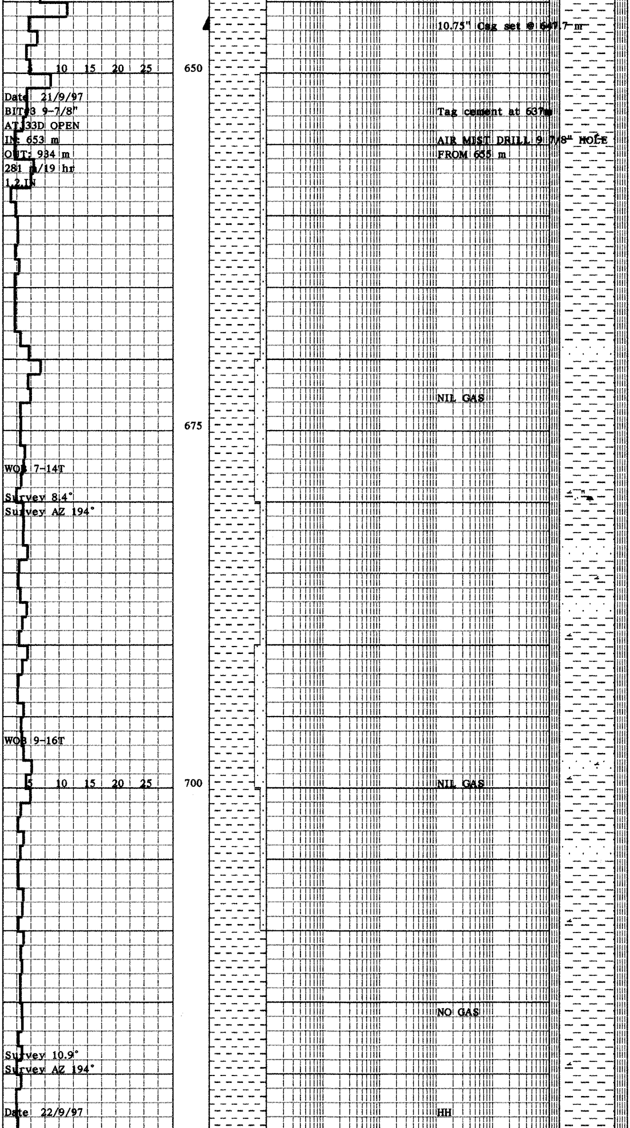


sil cmt,occ fe cmt,
fr-tt vis por n/s;
SLT-a/a but dk rd-brn,
occmica;

SS-clr,trnsp,fros ip,
med-f,sbang-v wl rndprly
srtd, wkcmt,g inf por
cln,n/s. SS:plgn-trnsp,
f,wl srtd,sbrnd, mod
strng dol cmthd,no
vis por n/s; SLT-a/a
but gen arg,massblky,
occ aren grdg to SS,
com hd,fe cmtmica ip;

SLT:rd-pl rd-or rd,
pl gn-grsh gn,fm,blky,
tr-occ bk lith spks,
tr dol,tr aren,occ
mottled.

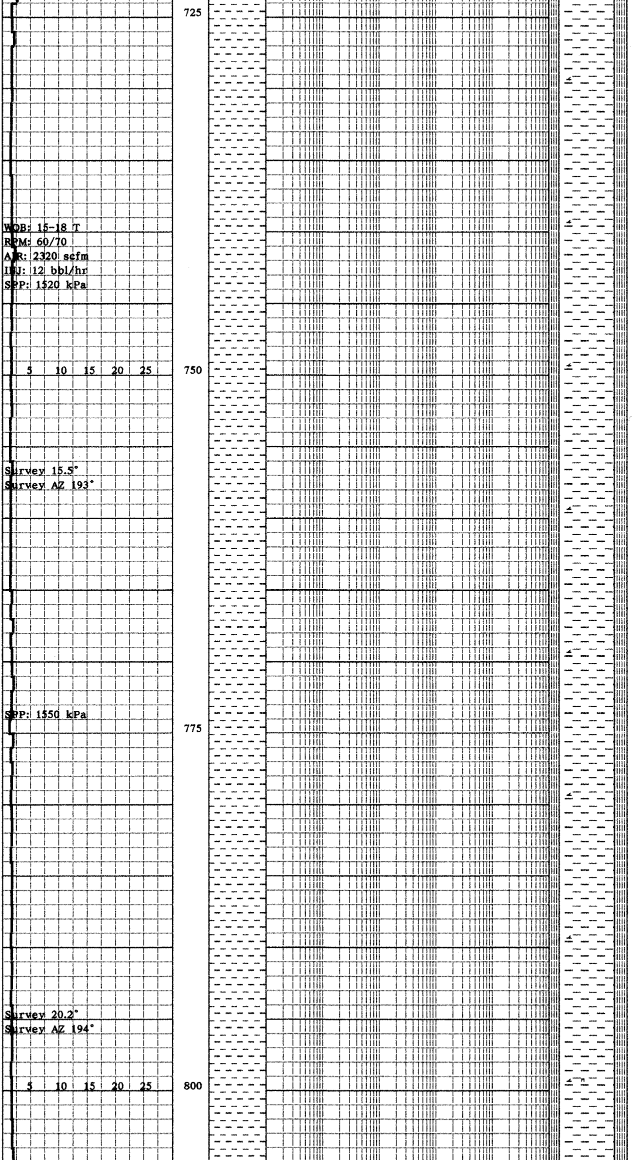
SLT:rd-dk or rd,occ
pl-grsh gn,blky-sbfiss
&bladed,brtle-hd,occ
mottled.



SLT(1):brick rd,arg,
sli dol,occ mmic,vf
SSlam,blky,hd.SLT(2):pl
trns-gn,m gy,aren,sil
i/p,dol grdto vf SS
i/p,str sil cmt i/p,
tr liths,tr feldocc
arg mtx.SLT(3):m
ppl bn,arg,v hd,mass.
SS:trns-gn,
rd,vf-occ f,cln-occ
arg mtx,blky,hd,no
vis por,n/s.SLT:
a/a

SLT:a/a,brick rd,arg,
trnsl-gn,m gy,m ppl
bn,sli dol.

SLT: a/a, becoming
com sbfis



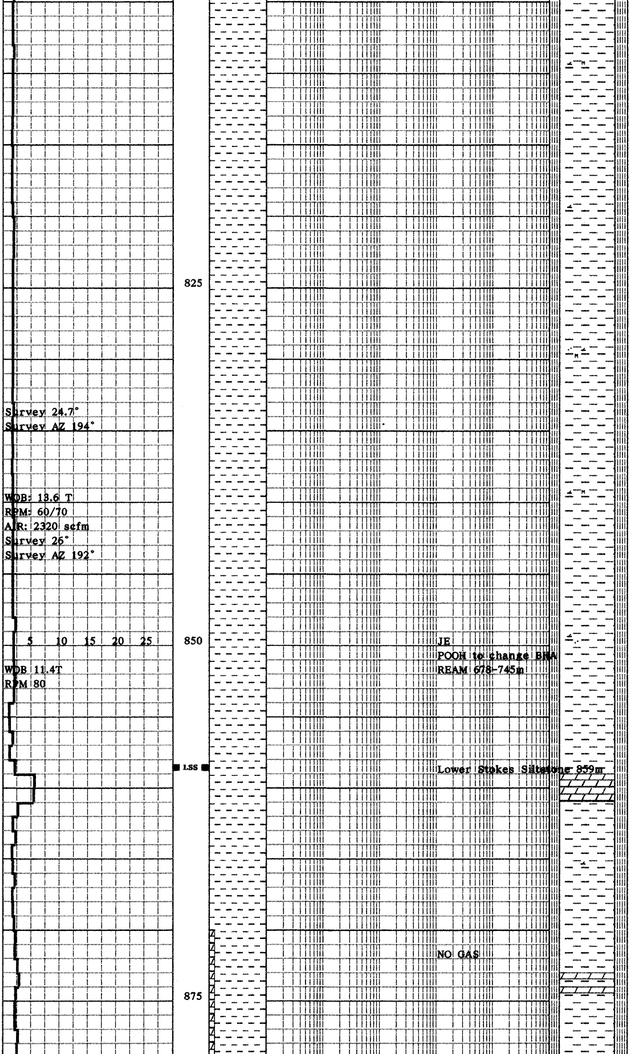
WOB: 15-18 T
RPM: 60/70
AIR: 2320 scfm
INJ: 12 bbl/hr
SPP: 1520 kPa

Survey 15.5°
Survey AZ 193°

SPP: 1550 kPa

Survey 20.2°
Survey AZ 194°

SLT: a/a,pred brick
rd to occ locally gry-gn



Survey 24.7°
Survey AZ 194°

WOB: 13.6 T
RPM: 60/70
AIR: 2320 scfm
Survey 26°
Survey AZ 192°

JE
POOH to change BHA
REAM 678-745m

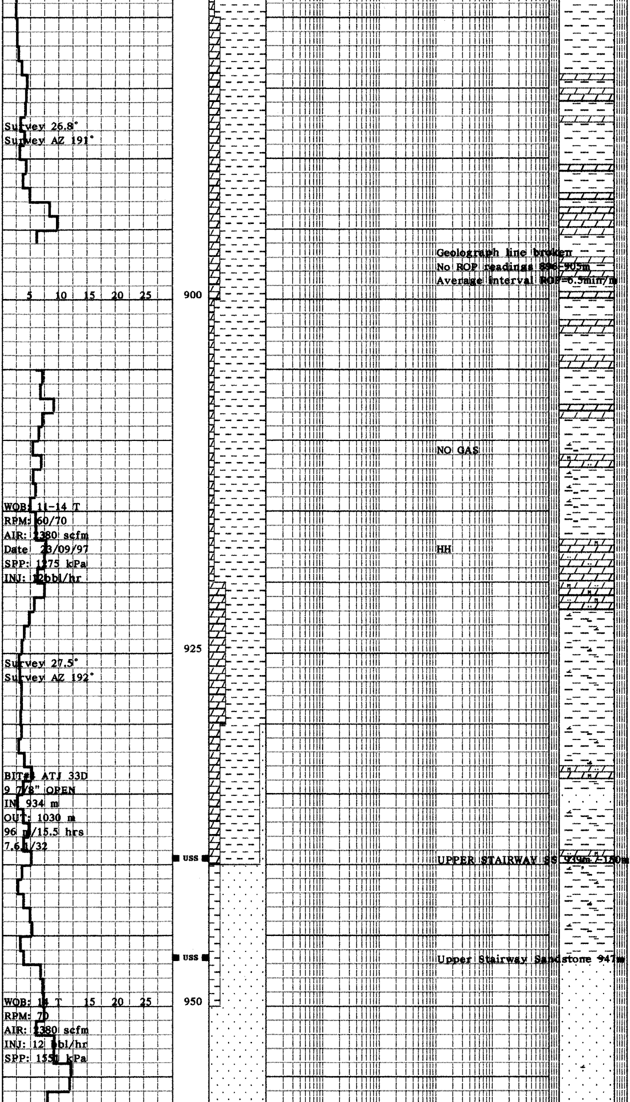
WOB 11.4T
RPM 80

Lower Stokes Siltstone 859m

SLT:rd bn-or rd,lt gy,p gn-gnsh gy,fm-hd, blkytr-ptchy dol,rr vf aren,mot,occ mmic.

NO GAS

SLT:a/a,colour change from rd to gy & gy bn.



Survey 26.8°
Survey AZ 191°

Geolograph line broken
No ROP readings 896-905m
Average interval ROP=6.5min/m

NO GAS

WOB: 11-14 T
RPM: 60/70
AIR: 2380 scfm
Date 23/09/97
SPP: 1275 kPa
INJ: 12bbl/hr

HH

Survey 27.5°
Survey AZ 192°

BIT#[illegible] ATJ 33D
9 7/8" OPEN
IN: 934 m
OUT: 1030 m
96 m/15.5 hrs
7.6 1/32

UPPER STAIRWAY SS 939m /-180mTV

Upper Stairway Sandstone 947m

WOB: 14 T
RPM: 70
AIR: 2380 scfm
INJ: 12 bbl/hr
SPP: 1550 kPa

SLT:m rd-bn,m dk ppl bn,gn,gn gy,pred arg, mass,mmic i/p,dol i/p, blky-occ sbfis,gy gnSLT grds to vf hd SS.DOL:rd, wh,milky,crsly xline-microxline, hd.

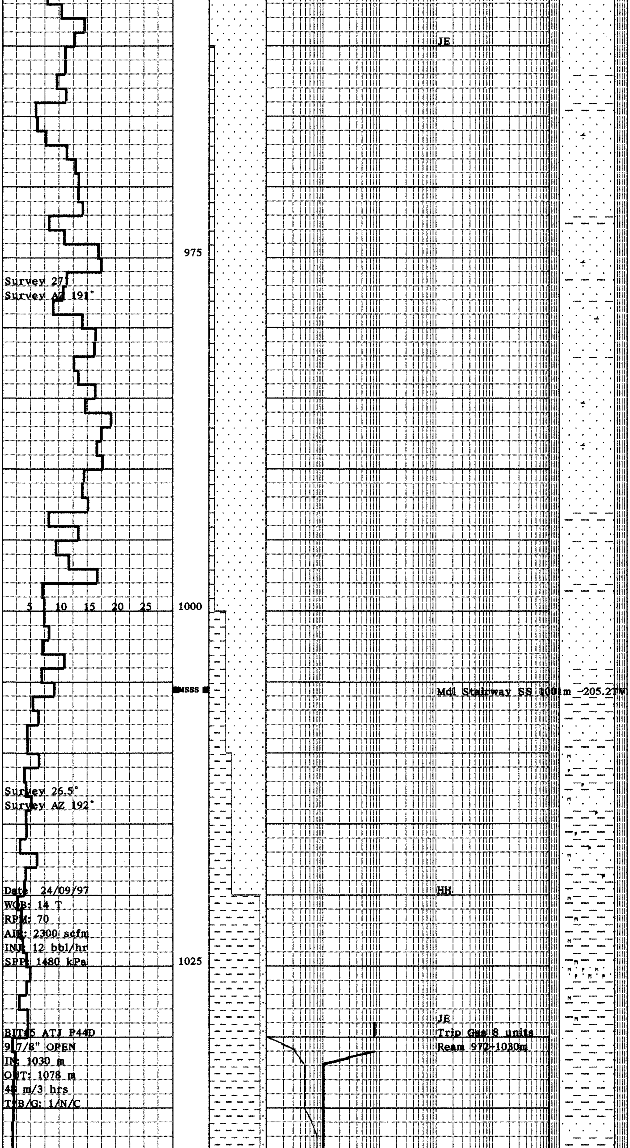
SLT:a/a,pred dol silt, minor dol sand & xlineDOL. Trace qtz SS.

SLT-pred gy,lt gn,gy gn,occ rd brnsbfiss-blky, frm-mod hd,mod-wl dol v arg,occsdy mod dol v arg; DOL-wh-off wh, lt gy gn,mmhd-v hd, xline,v slty mod mm v slty;

SLT: a/a
DOL:a/a,v mica,v slty, tr-rr sdy

SS-wh-off wh,f-med, pred f,rr crs,mod srtdang-sbrnd, strng dol cmt,hd occ dk lithip,novis/inf por, n/s

SS-clr,frstd ip,crse-f, pr srtd,sbang-v wl rndqtz gn,strng dol & sil cmt genclr-occ liths, tr pyr & slt mtrx,hd,novispor n/s;
SS: pl-med gn,off wh,lt olivebrn, trnsl aggs,f-vf,sa-wl rnd, wl srtd clnstrng-mod strng dol & sil cmt, occ sil ogrth& globular pyr,p-nil vis por,n/s;
SLT: med gn gy,lt gn, arg-aren,grd to vf SShd & dol ip;

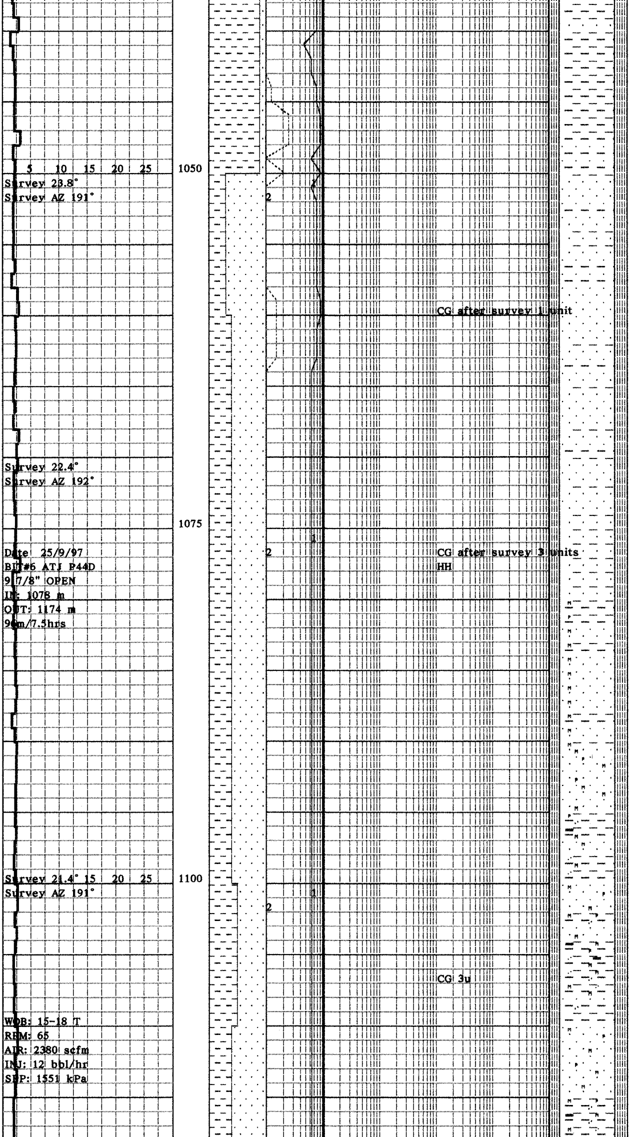


SS:mainly wh-trnsl, pred f-vf,w srtd,hd, comdol cmt,pr-nil vis por,n/s.SLT:m bn-gy,aren gds to & interbedded with SSsbfis-gen blky,hd-brtl,mmic,occ py.DOL:tr a/a.

SS:wh,clr,l gy,off wh,l bn,vf-f,mod w srtd-wsrtd,hd-v hd, suc,com wk-str dol/qtz cmt,prinf por,n/sSLT, l-d gy,fm,sbfis-blky, hd,mmic,tr py,grdsto vf SS.DOL:a/a, com dull yl-rr l yl min flu.

SS:clr,wh-off wh,lt gy,lt brn,vf-f,mod-wlsrtd, strng sil cmt,tr dol cmt,hd-v hf,tr pyrcom mica,pr inf por,n/s ; SLT-gy-dk,arengy, frm,sbfiss-sbblky,com pyr,tr micmic,grd tovf SS ip,rr dol;

SS-a/a,com mica& pyr, tr glauc.SLT-a/a com mica.



Survey 23.8°
Survey AZ 191°

SS:pred m gy,clr,off wh,l bn,vf-pred f,m-wsrtd, hd-v hd,str sil/dol cmt,suc-xline,com mica, com bk liths & SLT clasts,tr-tt vis por, n/sSLT:m-dk gy,fm-mod hd,arg,mass, occ aren grdto SS i/p,occ interbdd,occ py,occ mmic,tr hddol.

Survey 22.4°
Survey AZ 192°

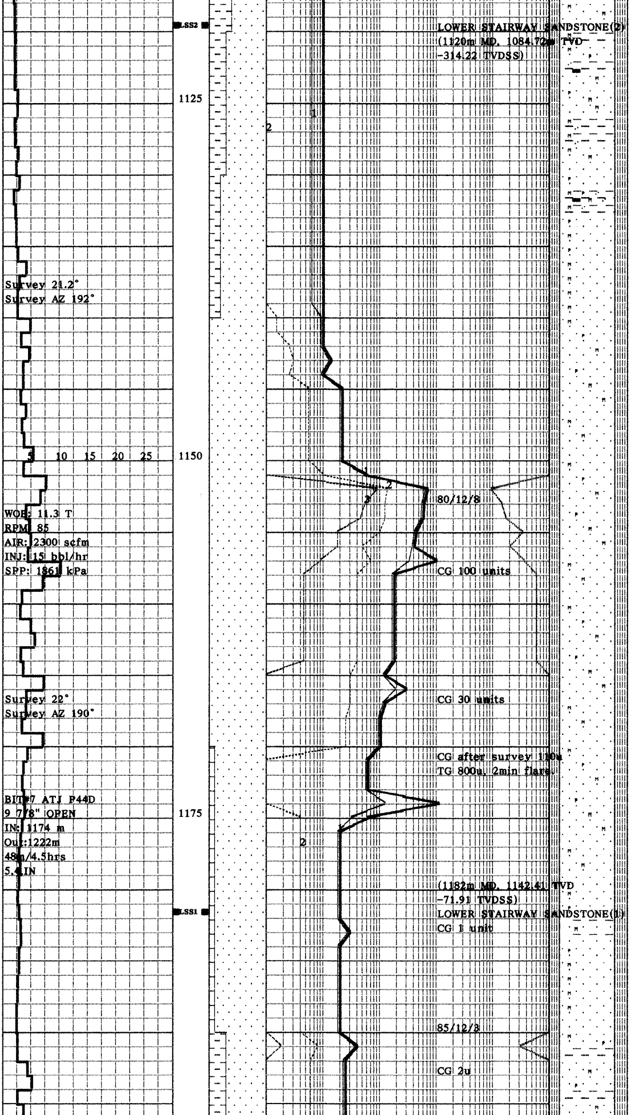
SS:a/a with com poor vis por,n/s.

Date: 25/9/97
BIT#6 ATJ P44D
9 7/8" OPEN
IN: 1078 m
OUT: 1174 m
96m/7.5hrs

Survey 21.4°
Survey AZ 191°

SS: lt gy,gy,wh,vf-f, sa-sr,hd,strng dol/silcmt, com si ogts,slty mtx, com mica,occ py,novis por; SLT:dk gy,gy,arg to v sdy,v micaocc pyr & carb,hd,sbfiss-blky

WOB: 15-18 T
RPM: 65
AIR: 2380 scfm
INJ: 12 bbl/hr
SPP: 1551 kPa



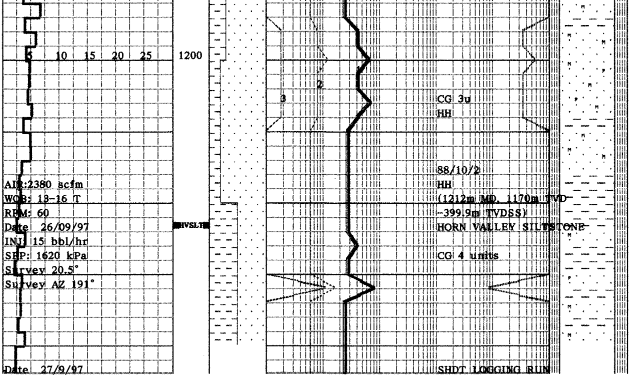
SS:clr,trns,occ milky, f-vf,occ med,rr crs, sr-wr & elongate ip, frstd to smooth grns, mod-wl srtd,wk-med strng sil cmt,cln to occsilt clasts,liths, pyr,lse-mod fri & hd aggs,fr-p inf por,no flu,tr py. SS:gold/clr, medgrns in strng pyr' cmt,hd,no porSS:wh, clr,trns,crs-vf,v p' srtd,sr-wr,frstdmed & crs grns in wh,f-vf, sr-r,qtz mtrx,clnmod hd,sil cmt,p-tt vis por,n/s

SS:cl,wh,vf-c,p srtd, fros,wr grains in f mtx,clean,mod str-v str sil cmt,pr-tt vis por,n/s

SS:a/a,fri ip to mainly wl cmt,com sogs

SS:wh-clr-trns,gy,occ dk gy,f-crs pred med &occ crs,p' srtd,sa-wr, mod hd,qtz cmt,occ wharg mtrx,com lse & fractured grns,pr-tt vispor,n/s; SLT:m-dk gy,arg-aren,blky occ massip,occ pyr,carb, hd

SS(1):a/a; SS(2):v dk-med gy,f-vf,sa-wr & occelong,wl srtd, strng sil & occ dol cmt,sltymtrx,tr liths & chlor & pyr,hd,p-nil vis porSLT:gy,arg,mass to occ SS bands,pyrveining ip,micromic,hd,blky



SS-a/a,pred clr,trns, trns-brn&gy; SS:a/a, f-vftt com mica occ pyr; SLT-a/a,gy,arg, mass;

SS:a/a,pred clr,trnsl-bn, gy,f-vf,tt.SLT:a/a, pred arg & mass.

SLT:a/a,pred arg & mass.