ROGER L. MARTIN
INDEPENDENT PETROLEUM GEOLOGIST 316-250-6970

GEOLOGIST'S REPORT
DRILLING TIME AND SAMPLE LOG

COMPANY WOOLSEY OPERATING CO., LLC
LEASE KISLING # 1
FIELD
LOCATION 1980' FNL & 990' FEL (W/2 SE NE/4)
SECTION 22 TOWNSHIP 34S RANGE 10W
COUNTY BARBER STATE KANSAS

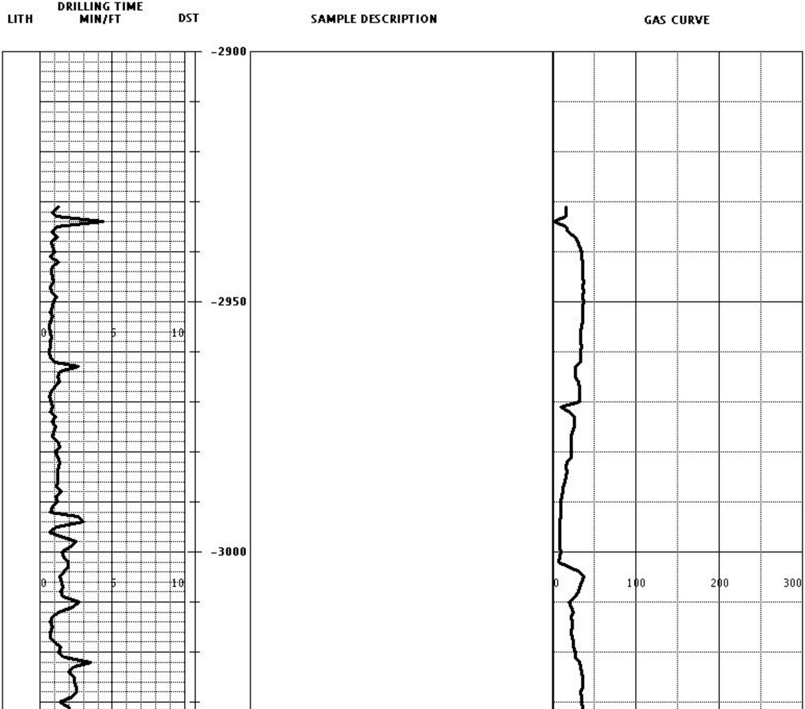
ELEVATIONS
KB 1347' GL 1338'
Measurements Are All From KB: 1347'
API 15-007-23592-00-00

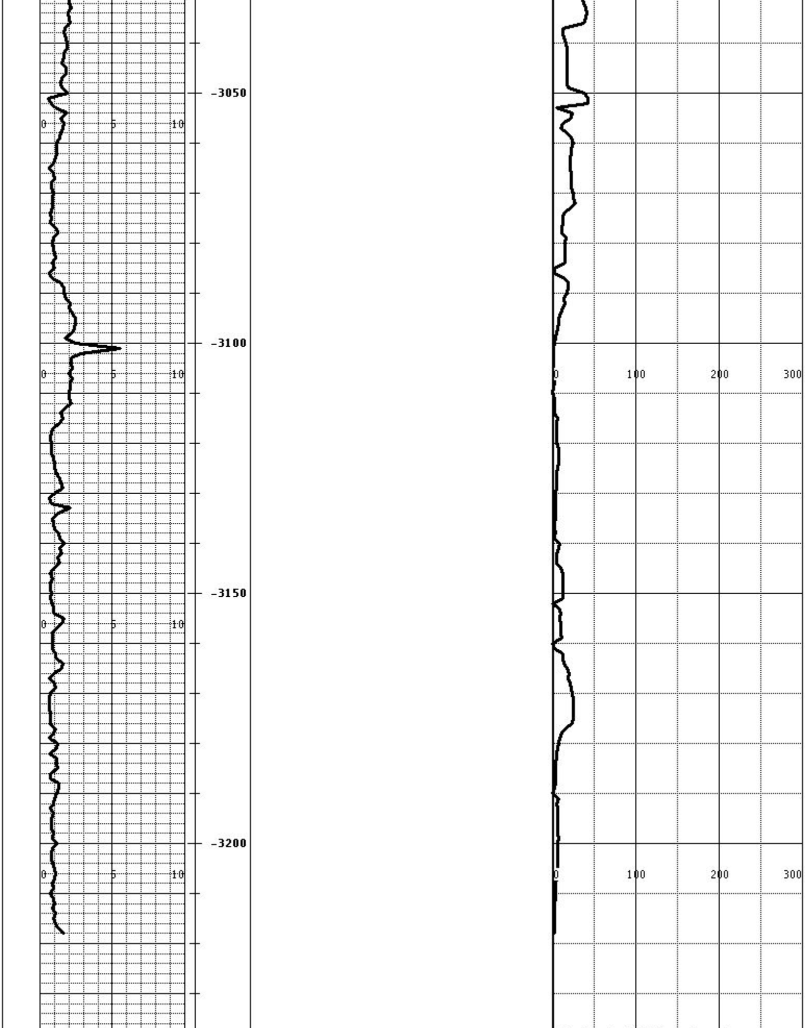
CONTRACTOR Tomcat Drilling, LLC.
SPUD COMP
RTD LTD
ELECTRICAL SURVEYS

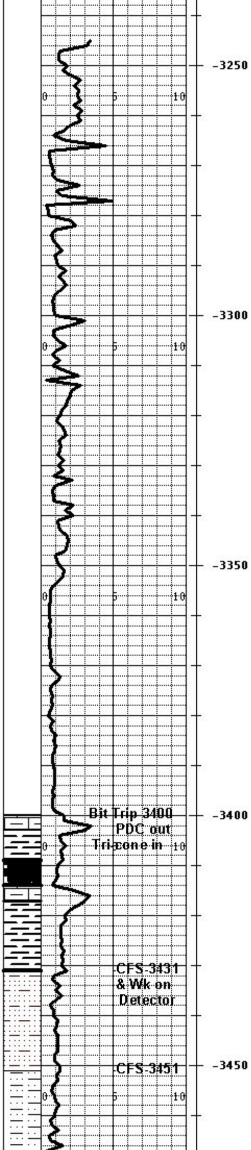
CASING
SURFACE
PRODUCTION

FORMATION TOPS	LOG	SAMPLES	CHRONOLOGY

REMARKS:







Bit Trip 3400
PDC out
Tri-cone in

CFS-3431
& Wk on
Detector

CFS-3451

LS: gy,dn Mdst.

SH: lt-dk-gy, gn-gy

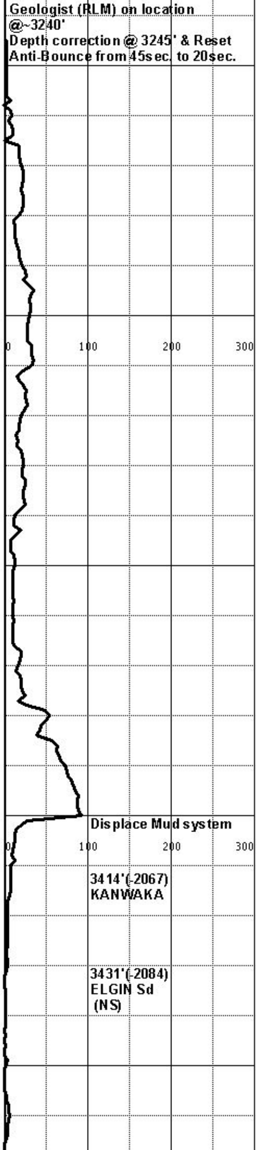
SH: bk carb- V.carb

LS: cm-gy-tn, dn Mdst, argil; Vpr-NVP.

SH: bk carb- AA; & lt-dk-gn-gy.

SS- Sd Clusters: lt-md-gy, Vfn-fn Gr'd, subRnd'd-subanglr, silty- well sort'd, pred well cmt'd, sm fribl w/ Fr-Gd Por; NS; NF; NC; NGB; Pred Silty micac SS- sm sl shly; & Sndy SILTS: lt-dk-gy, Vfn-fn Gr'd, micac, sm calc.

SS- Sd Clust: lt-md-gy-bf, Vfn-fnG'd, silty, pred well cmt'd w/ pr-Fr visbl Por; NS; NF; NC; NGB; & Sndy SILTS: AA; micac.

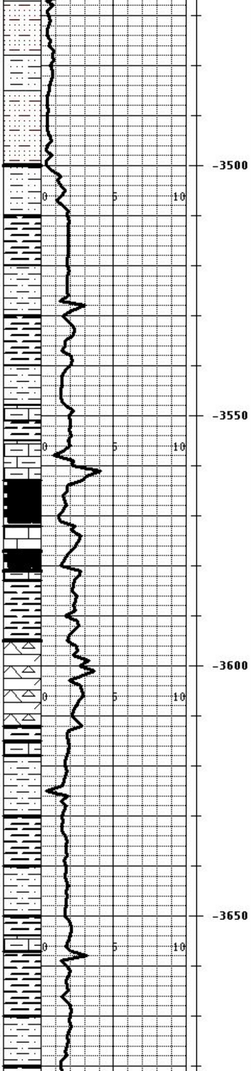


Geologist (RLM) on location
@~3240'
Depth correction @ 3245' & Reset
Anti-Bounce from 45sec. to 20sec.

Displace Mud system

3414'(-2067)
KANWAKA

3431'(-2084)
ELGIN Sd
(NS)



SS- Sd Clust: (abndt) lt-md-gy-bf, Vfn-fnGr'd, incrs fn Gr's, Rnd'd- subanglr, incrs friabl w/ Fr-Gd IGr.Por; NS; NF; NC; NGB; Sm well cmt'd- silty- sl shly, micac w/ pr visbl Por; NS; NF; NC; NGB.

SS- Sd Clust: (V.Abndt~ 80% of 3530'spl)- SS: gy-bf, Vfn-Md Gr'd, pred fn Gr'd, Rnd'd to subanglr, prt silty & micac; ~20% w/ Fr-Gd visbl IGr.Por; NS; NF; NC; NGB.

SILTS: lt-dk-gy, Sndy: Vfn-Md Gr'd, micac, sm shly; & SH: dk-lt-gy & gn-gy

(Abndt Sd Clust: AA in spls) SILTS- SH: gn-gy, sm Sndy, micac.

SH: dk-lt-gy & gn-gy, sm bk carb.

(Sd Clust: AA; NS)

Rare (Rr) LS: tn-gy-bn, dn, sl fos- Wkst- Mdst.

SH- SILTS: AA; & sm bk carb SH.

LS: gy-tn, dn & argil- Mdst.

SH: bk carb & subcarb.

LS: gy-bn, dn & argil Mdst- Wkst; Vpr-NVP; NS.

{HEEBNER} SH: bk carb.

LS: tn-gy-bn, mot, dn-fnX; Wkst-Mdst.

SH: gy-bk, subcarb- carb, & gn-gy.

Dolomc.LS (DLS)- cm-bf-tn, microxln(mx) - fnXln, pr visbl IXP; NS; & LS: cm-tn, Wkst-Pkst w/ pr Por; NS; Sl Chrty. DLS-DOLO: (Abndt) cm-bf-tn, mx-fnXln, pred pr Por, Rr Fr IXP & pin point (pp) Por; NS; NC; sm dull Mnrl.FLR- No Cut(NC); Sl Chrty.

SH: AA & LS: gy-bn, dn Mdst- Wkst; Vpr-NVP; NS. (Sm DLS-DOLO: AA; NS; NC).

SH: lt-dk-gy & gn-gy, & bk carb.

SH- SILTS: gn-gy, micac.

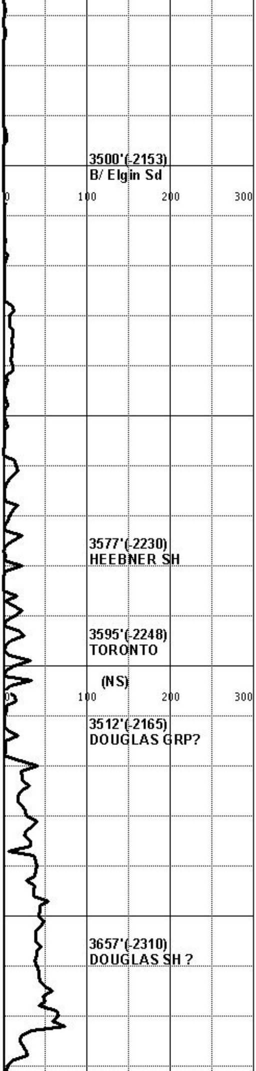
SH: gy-bk, sm carb, & gn-gy; & sm Sndy SILTS: AA.

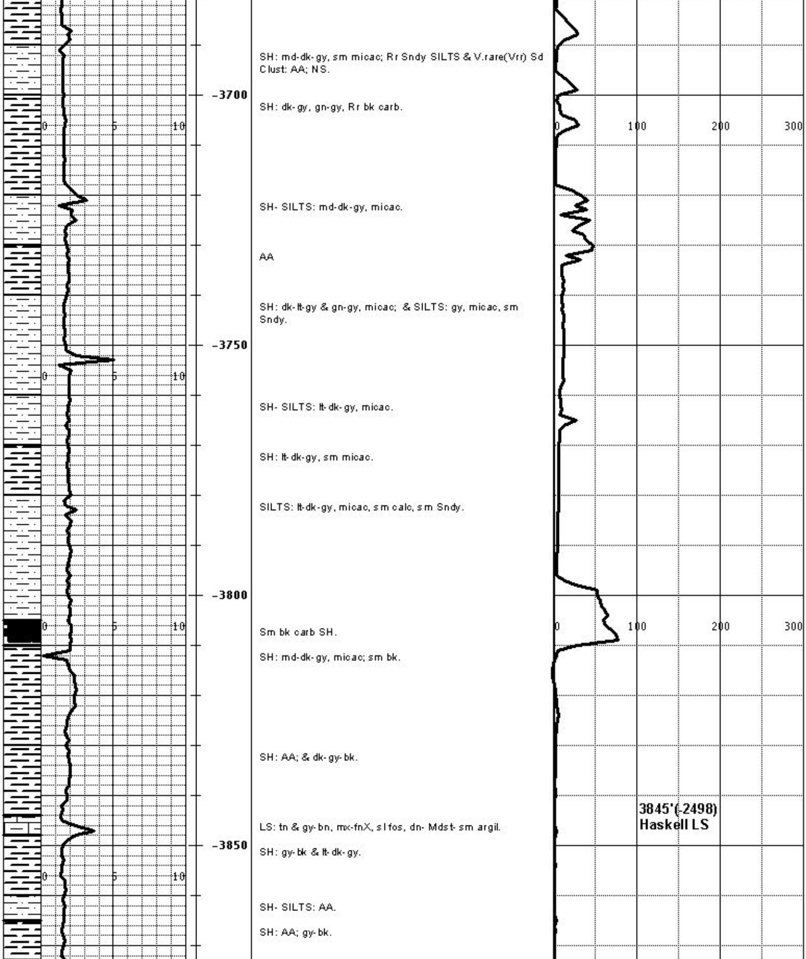
SH- SILTS: AA

LS: tn-gy-bn, mx-fnX, Mdst- sm argil.

SH: gy, micac; sm bk carb; sm SILTS: gn-gy, micac & pyrtc.

(Frly abndt Toronto DLS-Dolo & LS in spls; NS)





SH: md-dk-gy, sm micac; Rr Sndy SILTS & V.rare(Vrr) Sd Clust: AA; NS.

SH: dk-gy, gn-gy, Rr bk carb.

SH- SILTS: md-dk-gy, micac.

AA

SH: dk-lt-gy & gn-gy, micac; & SILTS: gy, micac, sm Sndy.

SH- SILTS: lt-dk-gy, micac.

SH: lt-dk-gy, sm micac.

SILTS: lt-dk-gy, micac, sm calc, sm Sndy.

Sm bk carb SH.

SH: md-dk-gy, micac; sm bk.

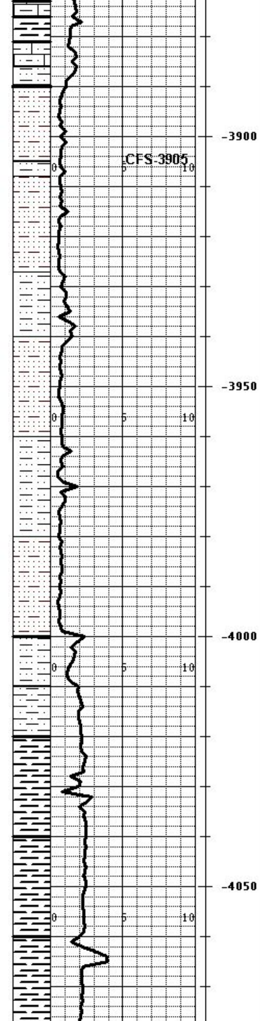
SH: AA; & dk-gy-bk.

LS: tn & gy-bn, mx-fnX, sl fos, dn- Mdst- sm argil.

SH: gy-bk & lt-dk-gy.

SH- SILTS: AA.

SH: AA; gy-bk.



LS: tn-gy-bn, dn Mdst, sl fos- sm Wkst, & mx-fnX; Vpr-NVP; NS.

SH: gy-bk, micac.

& SILTS: gy, Sndy, sm calc.

SS- Sd Clust: gy-wh, gy-bf, Vfn Gr'd, silty, micac w/ pr-Fr visbl IGr.Por; Vrr fribl Sd Clust: Vfn-fn Gr'd; well sort'd w/ Fr-Gd IGr.Por; NS; NF; NC; NGB. (Rr Sd Clust in 20min & 40min.spls @ 3905'; Abndt Sd Clust: AA in 1hr spl @ 3905') & SILTS: gy, Sndy, micac.

SS- Sd Clust: lt-gy-bf, gy-wh, pred Vfn Gr'd, well cmt'd, silty, micac w/ pr-Fr IGr.Por; NS; NF; NC; NGB; Sm Vfn-fn Gr'd, w/ Fr Por & Vrr friabl w/ Gd Por; NS; NF; NC; NGB.

SS- Sd Clust: AA; Sm V.silty Sd Clust- Sndy SILTS, micac, w/ Vpr- pr Por; NS; NF; NC; NGB.

SS- Sd Clust: AA; NS; NF; NC; NGB; & Sndy SILTS: AA.

SS- Sd Clust: lt-gy-bf, gy-wh, Vfn-fn Gr'd, subRnd'd-subanglr; pred well cmt'd, micac; Sm friabl w/ Fr-Gd IGr.Por; NS; NF; NC; NGB.

SS: AA; Abndt Vfn Gr'd Sd Clust: well cmt'd, micac, silty w/ Vpr-pr visbl Por; NS; NF; NC; NGB; & SILTS: gy & gn-gy, micac, Sndy.

SS- Abndt Sd Clust: gy-bf, Vfn-fn Gr'd, incrs fn Gr'd- well sort'd, sm Fr-Gd Por; NS; NF; NC; NGB.

SS- Sd Clust: lt-gy-bf, Vfn-Md Gr'd, abndt pred fn Gr'd-well sort'd; sm friabl w/ Fr-Gd IGr.Por; NS; NF; NC; NGB.

SILTS: gy, Sndy, micac & Abndt Silty Sd Clust: AA, Vfn-Md Gr'd, pred Vfn-fnGr'd, silty, micac, well cmt'd w/ pr-Fr visbl IGr.Por; NS; NF; NC; NGB; (~10% fribl w/ Fr-Gd Por; NS; NF; NC; NGB).

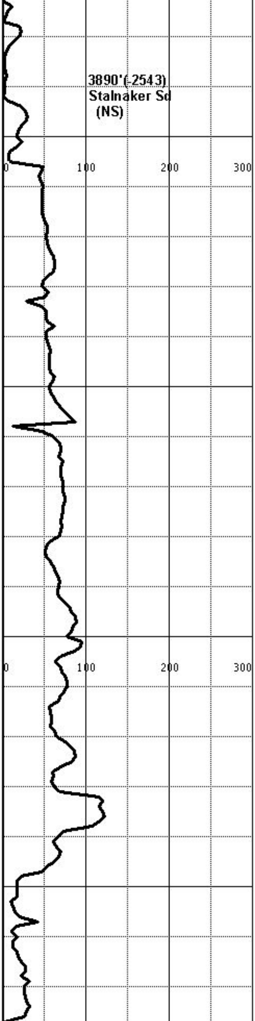
(Abndt Sd Clust: AA; NS) & SILTS: gy, micac, sndy.

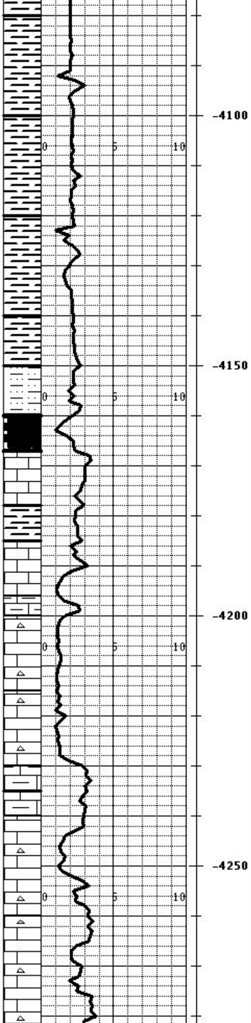
SH: gy-bk, & md-dk-gy & gn-gy.
(~40% Sd Clust:AA-NS in spls)

SH: md-dk-gy-bk, sm gn-gy, Rr mrn.
(>30% Sd Clust:AA-NS).

SH: bk carb & subcarb, & AA;
(~25% Sd Clust:AA-NS)

SH: pred gy-bk. (~10% Sd Clust)





SH: gy-bk, subcarb.

(<5% Sd Clust AA-NS)

SH: gy-bk; (<1% Sd Clust:AA-NS)

SH: pred dk-gy-bk, sm bk carb.
(Trc Sd Clust: AA-NS)

SH: AA; sm bk carb.

SH: bk subcarb-carb, & dk-gy; sm pyrtc.

SS- Sd Clust: (>10% <20% in 4180'spl)- gy-bf, gy-wh, Vfn-fn Gr'd, Rnd'd-subanglr, well cmt'd-subfribl, pred silty & micac; pr-Fr IGr.Por; NS; NF; NC; NGB.

SH: bk subcarb-carb.

LS: cm-tn-gy, mot, pred dn Mdst-Wkst; Vpr Por-NVP; NS.

SH: gy-bk, sm carb-V.carb; sm pyrtc.

LS: sm tn-gy-bn, dn Mdst;
& LS: tn-wh-gy, mot, sm Wkst-Pkst w/ pr-Fr Por: pp, fos.mold Por; NS; sm wh-chlky; NS.

LS: cm-tn-gy, sm mot, sm fos-Pkst & Wkst w/ pred pr-Fr visbl Por: pp-vug & fos.mold Por; Rr Gd visbl Por; NS; Sl Chrty: cm-gy-bf-tn, shrp, frsh.

LS: cm-bf-tn, sm fos-Pkst-Wkst, sm fos; sm Fr-Gd Por: vug-pp, & fos.mold Por; NS; NC; Chrty: cm-gy, opq, shrp-frsh.

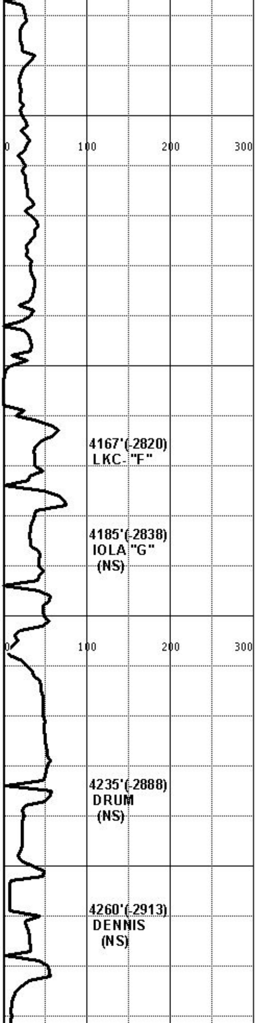
LS: tn-gy, dn Mdst-Wkst, sm argil; Vpr-NVP; NS.

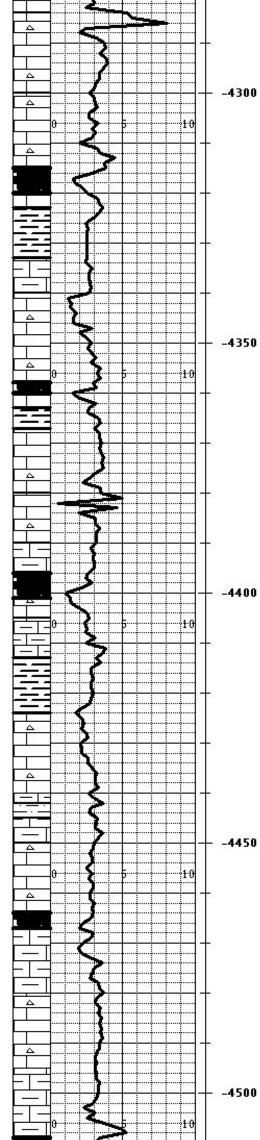
LS: tn-gy-bn, dn Mdst-Wkst, sm argil; Vpr-NVP; NS.

LS: cm-tn-gy, sm mot; sm Pkst w/ pr-Fr Por: pp-vug, IGr.Por; Vrr prt oomldc w/ Fr-Gd Por; NS; sm mx-MdX-2nd ReX; NS; Chrty: tn-gy-cm, mot, opq, fos, shrp-frsh.

LS: tn-wh, dn Mdst-Wkst, & chlky LS.

LS: cm-tn-gy, sm mot; mx-fnXln, Vrr prt MdXln-2nd ReX; & Wkst-Pkst; pr-Fr Por: pp, IGr & IXP; NS; Chrty: cm-blu-gy, opq, shrp-frsh, sm fos.





LS: tn-gy-cm, sm mot; pred Mdst- Wkst; Trc G d vug Por w/ NS; sm pr-Fr Por: pp-vug; NS; Sl Chrty.

LS: tn-gy-cm, pred dn Mdst, sm Wkst- Pkst- fos, Vpr-pr Por; NS.

LS: dk-gy-bn, dn Mdst.

{STARK} SH: bk carb- V.carb.
LS: tn-gy-bn, dn Mdst & mx-fnX; Vpr-NVP.

SH: dk-gy, gn-gy; & SILTS: gy, sndy, micac.

LS: cm-tn, dn Mdst, sm wh-chky; Vpr-NVP.

{SWOPE} LS: cm-tn-gy, mx-fnXln, & Mdst- Wkst, Vrr Pkst; Vpr-pr Por: m-IXP & pp Por; Trc SFO; <1% brt FLR; Trc Lt STN- Vpr Cut, >99% Barren; Sm wh-chky; Chrty: tn-gy, shrp.
LS: tn-gy-bn, dn Mdst- Vpr-NVP.

{HUSH.} SH: bk carb- V.carb.
LS: tn-gy, dn Mdst; & SH: gy-bk.

LS: dk-gy, argil Mdst.

LS: tn-gy-cm, mot, Mdst- Wkst; sm wh-chky; Sl Chrty; Vpr-NVP; NS.

LS: tn-gy-wh, dn Mdst, prt chlky; Vrr pr pp Por; NS.

LS: tn & lt-dk-gy, sm mot, Mdst, sm argil; Vpr-NVP.

SH: bk carb- V.carb.
LS: tn-gy-bn, pred dn Mdst- sm argil; Sl Chrty; Trc Wkst-Pkst w/ pp- l.fos.Por; Trc SFO- STN- Cut; >99%Barren; Trc shrp Chrt w/ aprnt Frac-Edg w/ FLR- Trc SFO.

LS: dk-gy, argil Mdst.

SH: AA & V.gated

LS: tn-gy-wh, pred dn Mdst; Vrr Wkst- Pkst, Trc pr pp- vug Por; Trc SFO- FLR- STN- Cut; Sl Chrty: Trc shrp Chrt w/ Edge FLR- Trc SFO; >99%Barren.

SH- SILTS: gn-gy.

LS: cm-tn, mx-fnX, sm Wkst- Pkst- sl fos; Vpr-pr pp- vug Por; Trc SFO- STN- Cut; Vrr Barren Por; >99% Barren w/ Vpr-NVP; Chrty: cm-blu-gy, shrp.

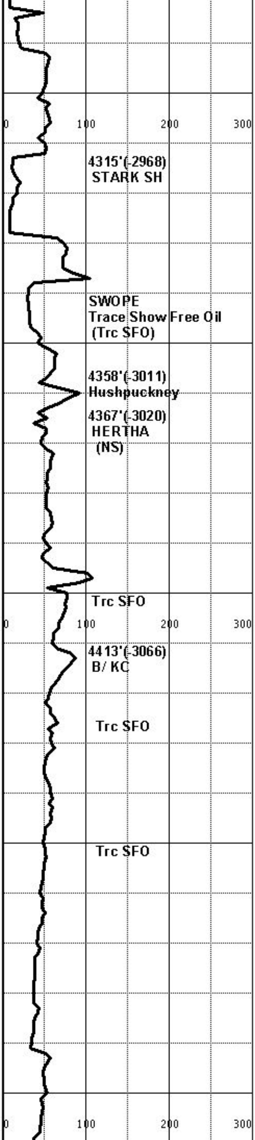
SH: bk carb. & LS: tn-gy-bn, dn & argil- Mdst w/ SH: gn-gy.

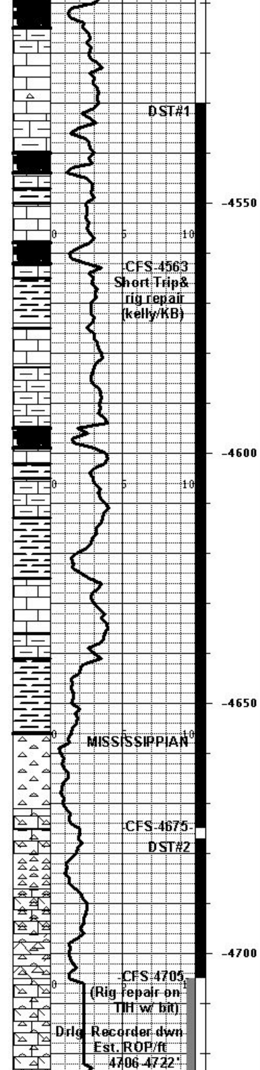
LS: tn-gy-cm, dn- fnX, Mdst, sm argil- shly; Vpr-NVP; NS.

LS: tn-gy, dn- Mdst, sm argil- shly; Sl Chrty; Vpr-NVP; NS; & SH: gn-gy.

LS: tn & dk-lt-gy, dn Mdst, sm V.argil- shly; Vpr-NVP; NS.

LS: dk-gy-bn, tn-cm, dn Mdst.





SH: bk carb & gn-gy.

{PAWNEE} LS: dk-gy-bn, dn Mdst- fnX- 2nd ReX; NS.

LS: tn-gy-wh, dn Mdst & chlky; Vrr Wkst- Pkst w/ Vpr-pr Por: pp; NS; VSl Chrty.

LS: gy-tn, dn & argil Mdst; Vpr-NVP; NS.

SH: bk carb- V.carb; & LS: gy, dn & argil Mdst.

SH: gy-bk, subcarb & gn-gy

LS: tn-gy-wh, dn Mdst & chlky, & mx-fnX; pr Por- NVP; NS.

SH: bk carb.

LS: tn, dn Mdst, sm argil; NVP; NS.

SH: dk-lt-gy & gn-gy, sm Lmy (& bk carb:AA)

LS: tn-cm, & dk-lt-gy, dn Mdst, sm argil; Vpr-NVP; NS.

& SH: V.gated, dk-lt-gy-gn, Rare(Rr) rd SH (sm bk carb)

LS: dk-lt-gy, argil Mdst; NVP; NS.

SH: gy-bk, subcarb to V.carb.
LS: tn-gy-cm, dn Mdst, sm argil; NVP; NS.
& SH: dk-lt-gn-gy.

LS: tn-gy, dn Mdst; & dk-gy, V.argil Mdst; NVP; NS.

LS: tn-gy, dk-gy, dn Mdst, sm V.argil; NVP; NS.

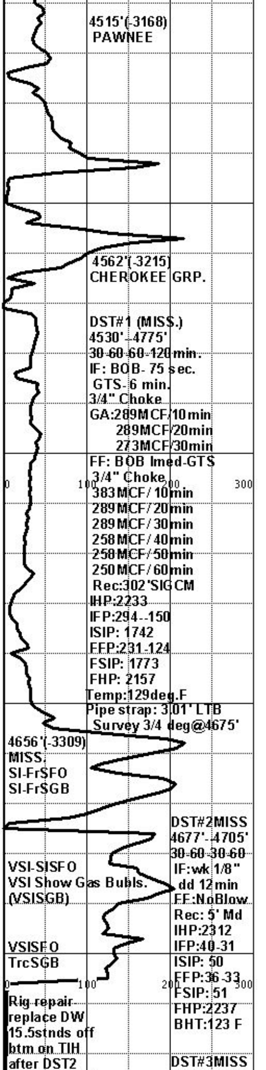
SH: V.gated; bk carb, & dk-lt-gy & gn, sm mrn- rd.

LS: tn-wh, & gy, dn Mdst w/ NVP; NS.
(Abndt V.gated SH: AA in spls)

LS: gy-tn, dn argil- shly Mdst; NVP; NS.

SH: (incrs in 4660'spl) V.gated, gy & gn, incrs mrn-rd, sm bk carb.
(4670'spl)- pred SH: AA; (sl incrs LS: AA) Vrr LS: tn-wh, Mdst & mx-fnX; Vpr-NVP.

{MISS}4675' 20min.spl-AA & >5%<10% CHRT:wh-cm-blu-gy, pred shrp, prt frsh-sl wthr'd- spt'd FLR-STN-SlSFO-GB-Vsl Cut; Vrr Wthr'd-prt Triplc w/ Fr-Gd Por- STN-FLR; Sl-FrSFO-GB. (4675'40min)-Sl incrs CHRT: AA; (1hr.spl)-Sl incrs Wthr'd- prt Triplc Chrt:AA w/ Por-STN-FLR-SFO-GB; (80min.spl)->30%<40% Chrt: wh-cm-tn-blu-gy, shrp-sl wthr'd; Vrr Wthr'd-prt Triplc- Fr-Gd Por- spt'd FLR-STN, Sl-FrSFO-GB, Vsl Odr; Vsl Cut; Vrr LS; (100min.spl)-Chrt:AA; incrs LS:cm-tn, dn Mdst & mx-VfnXln, sl dolomc; pr Por- Trc SFO-STN. (After DST#1)-4700'spl-Incrs LS-DLS:AA; (4705'20min)-CHRT: wh-cm-blu-gy, tn, pred opq, shrp- frsh- sl wthr'd; ~20% Wthr'd- Frac- Edges w/ Sl FLR-STN, VSlSFO-GB; Vrr Wthr'd- prt Triplc w/ Fr-Gd Por w/ spt'd tn-bn-bk-STN- SlSFO-GB; Rr Lmy & sl dolomc.Chrt. LS-dn Mdstn & DLS-(incrs 40min.spl)-cm-bf-tn, mx-VfnXln sm glauc, Chrty, sm silic; Vpr-pr visbl Por: m-IXP; Trc SFO- Trc STN-Cut. (4705'1hr&80min)-Incrs CHRT: lt-md-blu-gy-cm, subtransl, prt shrp- sl wthr'd, sm mot- fosspic, sm Lmy, sm Dolomc, Vrr Qtzc- drusy Qtz ReX; pred Vpr-pr visbl Por; ~5% w/ SFO-STN-FLR-Cut, TrcSGB. (After DST#2} LS: cm-tn-gy, dn Mdst; & mx-VfnXln Dolomc.LS (DLS) V.Chrty: cm-bf-lt-blu-gy, pred opq shrp-frsh- sl Wthr'd; Vrr Wthr'd/ Frac. Edges w/ STN; Trc SFO-Cut; pred Vpr Por-NVP & Barren {4720'&4730'spls). CHRT: wh-cm-lt-tn, ~70% Tripolc- granlr w/ Fr-Gd Por: IGr & vug Por w/ spt'd lt-tn STN, SlSFO & GB; VSl-Sl Cut; sm Lmy & Dolomc Triplc Chrt <{4730' & 4740'spls- Gd).



4515'(-3168)
PAWNEE

4562'(-3215)
CHEROKEE GRP.

DST#1 (MISS.)
4530'-4775'
30-60-60-120 min.
IF: BOB- 75 sec.
GTS- 6 min.
3/4" Choke
GA:289MCF/10min
289MCF/20min
273MCF/30min
FF: BOB Imed-GTS
3/4" Choke
383MCF/ 10min
289MCF/ 20min
289MCF/ 30min
258MCF/ 40min
258MCF/ 50min
250MCF/ 60min
Rec:302'SIGCM
IHP:2233
IFP:294--150
ISIP: 1742
FFP:231-124
FSIP: 1773
FHP: 2157
Temp:129deg.F
Pipe strap: 3.01' LTB
Survey 3/4 deg@4675'

4656'(-3309)
MISS.
Sl-FrSFO
Sl-FrSGB

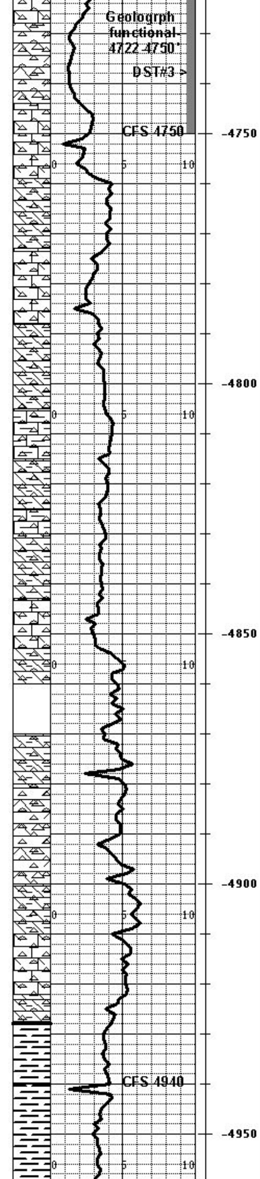
DST#2MISS
4677'-4705'
30-60-30-60
IF:wk 1/8"
dd 12min
FF:NoBlow
Rec: 5' Md
IHP:2312
IFP:40-31
ISIP: 50
FFP:36-33
FSIP: 51
FHP:2237
BHT:123 F

VSl-SlSFO
VSl Show Gas Bubls.
(VSlSGB)

VSlSFO
TrcSGB

Rig repair-
replace DW
15.5stnds off
btm on TIH
after DST2

DST#3MISS



CHRT: (~80%) wh-cm-bf-gy, w/ lt tn O.STN, pred granlr-Triplc / Wthr'd, sm chlky txtr, sm Lmy, sm Dolomc; sm Vsl Glauc; Abndt Fr Por IGr & sm Gd Por: vug Por w/ spt'd lt-tn-STN, VSl-SlSFO&GB & VSl-Sl Cut; Rare(Rr) shrp-frsh-sl Wthr'd. V.rare(Vrr) Dolo: bf-tn, microxln(mx)- fnXln w/ Fr IXP w/ subsat STN-SlSFO&GB& Cut {4750'&20min-Gd).

DLS: cm-lt-tn-gy, mx-VfnXln, sm Fr m-IXP w/ VSl spt'd STN & VSlSFO&GB&Cut; V.Chrty: wh-cm-blu-gy, shrp & semiTriplc-VSlSFO&GB&Cut {4750'40-60-80min.spls-gd) (After DST#3} DLS-LS: wh-lt-tn-gy, mx-VfnXln, sm Vfnly granlr- sm silic; pr visbl Por: m-IXP, pp, m-IGr.Por; V.Chrty: wh-cm-blu-gy-tn, pred shrp- frsh- sl wthr'd- sm dolomc, sm Lmy, pr visbl Por: IGr, pp, aprnt Frac; Trc SFO- Vlt STN- NF- Vpr Cut; pred Barren w/ pr Por-NVP.

DLS: lt-dk-gy, mx-VfnXln, prt argil & V.argil; V.Chrty: cm-blu-gy, shrp-frsh; pred Vpr-NVP w/ NS.

DLS-LS: cm-tn-gy, mx-fnXln; V.Chrty ~40% CHRT: cm-blu-gy & tn, pred opq- shrp. sm Lmy & dolomc; Vpr-pr visbl Por: m-IXP, pp, aprnt Frac's; Trc SFO- STN- NF- Vpr Cut; >99% w/ NS.

DLS-LS: lt-dk-gy-tn-cm, mx-VfnXln, sl- V.argil; V.Chrty ~30% CHRT: lt-dk-blu-gy, tn-cm, VC, pred shrp- opq- frsh, sm Lmy & dolomc; Vpr Por-NVP; NS.

LS-DLS: lt-dk-gy-tn-cm, mx-VfnXln, sl- V.argil; V.Chrty ~25% CHRT: AA, pred opq- shrp & dolomc & Lmy, Vrr Qtzic Chrt; pred Vpr Por-NVP w/ NS.

DLS-LS: AA; incrs argil DLS: lt-dk-gy-tn, mx-VfnXln, sm V.argil- sm shly- Rr bk carb SH; VChrty: AA (~20% CHRT) Vpr Por-NVP; NS.

DLS: AA; md-dk-gy, mx-VfnXln, pred argil- sm V.argil-shly w/ Rr bk carb SH; Vpr-NVP w/ NS; Chrty: lt-dk-blu-gy-tn-cm, pred shrp, sm Lmy & dolomc (>10%<20% CHRT).

LS-DLS: cm-tn-gy, mx-VfnXln, sm silic; prt argil; V.Chrty: cm-blu-gy-tn, pred opq shrp, sm frsh- sl wthr'd, sm Lmy & dolomc; pred pr Por-NVP w/ NS.

DLS-LS: md-dk-gy-tn, mx-VfnXln, argil- Vargil; Chrty: blu-gy, shrp & Lmy & dolomc (decrs Chrt); Vpr Por-NVP; NS.

No 4880' Sample!

DLS-LS: dk-lt-gy-tn, mx-VfnXln, Abndt argil- V.argil, sm silic, dn to Vpr Por; NFO; Chrty: wh-cm-blu-gy & tn, pred shrp, sm mot & fos (>10%<20% Chrt)

DLS-LS: dk-lt-gy-tn, mx-VfnXln, Abndt argil- V.argil, sm silic; Chrty >10%<20% CHRT: AA; Vpr-NVP; NS.

DLS: lt-dk-gy, tn-cm, mx-VfnXln; Vpr-pr visbl Por: m-IXP, pp Por; Trc spt'd FLR & STN- Vpr Cut; NFO; Chrty: cm-tn-blu-gy, sm dolomc w/ pp Por & Trc aprnt Frac.Edges w/ FLR- Trc STN- Vpr Cut; NFO; >99% Barren.

LS: gy-tn, & gn-gy, dn Mdst; & argil DLS: (~50%) gy, microxln(mx); Vpr-NVP w/ NS. Sl incrs SH (4920's pl} gy-bk- subcarb to bk carb.

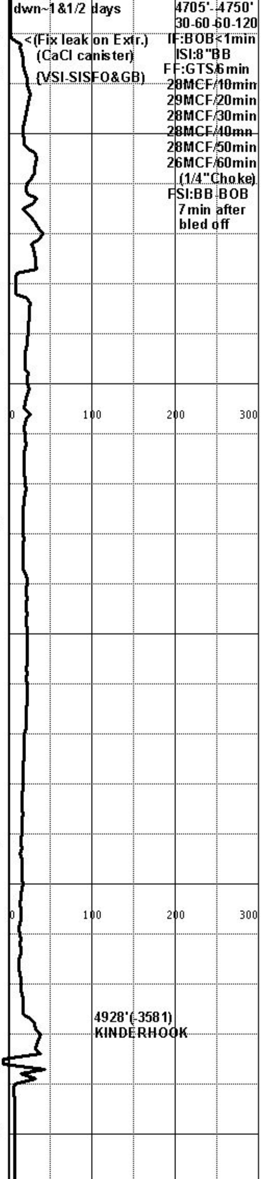
LS: cm-gy-tn, dn Mdst; & wh-cm, subchlky Wkst-Pkst-Vfnly granlr; Vpr Por-NVP; NS; (Sl incrs SH- 4930'spl).

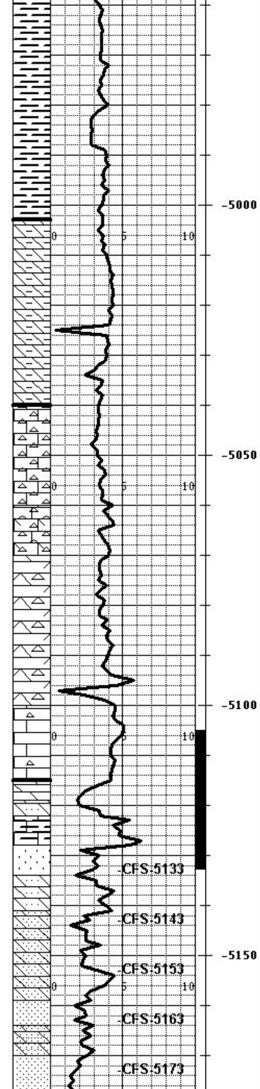
(Abndt argil- DLS & LS & Chrt: AA); Sl incrs dn Mdst: AA.

{KINDERHOOK} SH-(incrs SH in 4940' 20min.spl)- gy-bk subcarb & bk carb fiss, & gn-gy-bk- sm VC. (incrs SH:AA-20-30%/40min) (1hr & 80min.spls)- SH: dk-gy-bk, subcarb-carb & gn-gy-bk-VC; sm calc & Lmy; Vrr pyrtc.

(4960's pl)- 20-30% SH:AA.

(4970's pl)- SH: AA; pred gy-bk, sm carb (& LS:AA-pred dn Mdst & DLS:AA- sm argil & CHRT:AA-pred frsh-shrp).





(4980'spl)- 30-40% SH: gy-bk, subcarb- carb; & md-gy, gn-gy.

(4990'spl)~50% SH: gy-bk subcarb- carb, & gn-gy.

{WOODFORD}(5000'spl)- SH: incrs bk carb- sm V.carb; Sl-FrSGB on brk.

SH: bk carb & subcarb- Vdk-gy-bn-bk- dolomc- mx w/ Sl-FrSGB on brk; Vrr spt'd brt Minrl.FLR.

{MAQUOKETA} (5030'spl)- DLS-DOLO: lt-md-gy-bf, microXln(mx) sm argil; Vpr visbl Por: micro-InterXln Por-(m-IXP) NS.

DOLO-DLS: bf-lt-gy- dk-gy, mx, sm V.argil; Vpr Por- NVP; NS.

DOLO-DLS: lt-dk-gy-bf, mx, sm V.argil w/ sm dolomc.SH; Vpr Por- NVP; NS.

{VIOLA} (Trc 5050'spl)- LS: wh-cm-gy-bf, sm chky; sm mx-MdXln; Chrty: wh-cm-gy, opq; Vpr-NVP; Vrr brt FLR-Vpr Cut. (5060'spl-incrs)- LS: wh-gy, sm chky, sm sl fos-Wkst-Pkst, & sm fn-CrsXln; Vpr-pr visbl Por: IXP & aprnt Frac.Por; Vrr brt FLR & Trc SFO & Vpr Cut; Chrty: cm-blu-gy & transl- Qtzic- Vrr aprnt Frac.Edg's w/ FLR & Trc SFO, Vpr Cut.

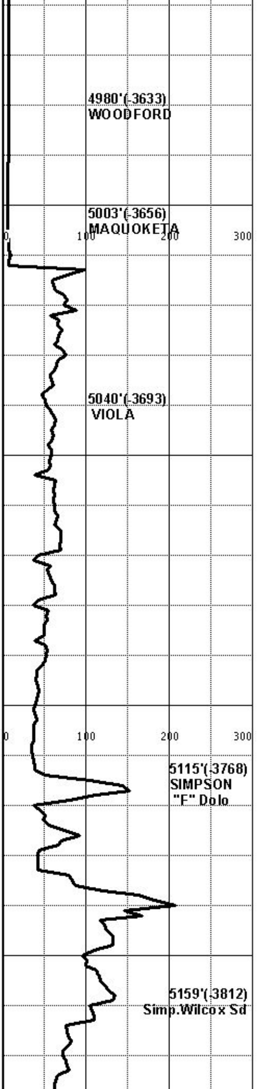
LS: cm-gy-bf, mx-VfnXln; sm dolomc; sm granlr- Pkst; V.Chrty: gy-tn, blu-gy-cm, pred opq- shrp- frsh; Vrr Vpr visbl Por & aprnt Frac.Edg's w/ brt FLR & Trc SFO- Vpr Cut.

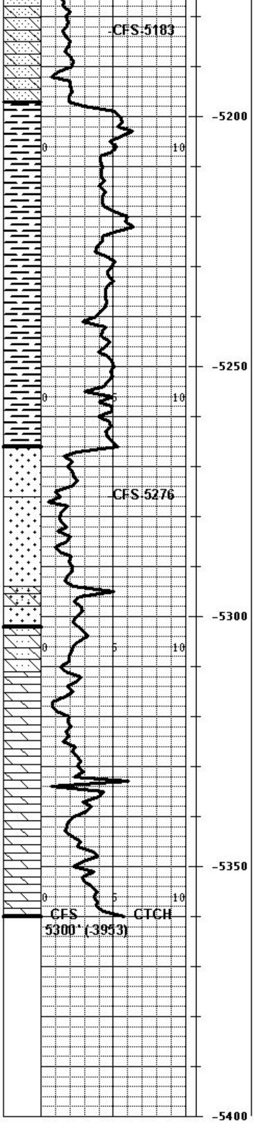
DLS-DOLO: cm-bf-gy-tn, mx-Vfnxln, sm Vfnly granlr; Vrr fnXln; Chrty: cm-tn-blu-gy, opq, shrp- frsh; Vpr-pr visbl Por: m-IXP, & sm aprnt Frac.Edges w/ FLR, Trc SFO- Vpr Cut; & LS: cm-gy-tn, dn Mdst.

DLS-DOLO: cm-bf-gy, mx-VfnXln, sm granlr- Vfnly Sndy-Silty; Vpr visbl Por: m-IXP & m-IGr.Por; Trc SFO; Chrty: dk-lt-gy-tn & blu-gy-cm, opq; V.rare (Vrr) m-Frac's & aprnt Frac.Edges w/ brt FLR- (pred on Chrt) Trc SFO, Vpr Cut; Vrr Pyrtc Chrt.

LS: cm-tn-gy, dn Mdst, & mx- dn; Vrr m-Frac's & Edges w/ brt FLR & Trc SFO & Vpr Cut; sm gy-bn dn & argil.

{SIMP."F"Dolo} (Vrr in 5130'spl & 5133'circ.spls)- DOLO: tn-dk-gy-bn, mot & STN'd, fnXln-MdXln, w/ Trc Crs-VCrsX's- 2nd ReX; pr-Fr visbl Por: IXP w/ subsat- sat STN & brt FLR, Sl-Fr SFO, & Fr-Gd SGB; Fr Milky Cut; Sl Odor- Fr Odor on brk. Trc Sndy Dolo: fn-MdXln, Vfn-MdGr'd- well Rnd'd; pr-Fr IGr.Por w/ subsat.STN & FLR, Sl-FrSFO-GB- Fr Cut- Fr Odr on brk. SH: gy-bk- subcarb & dk-gn & Turq-gn; & LS: wh-gy-tn, Vfn-MdXln, sm dolomc, sm Sndy; Vpr-pr Por; Trc FLR-SFO-Cut; Vrr Sd Clust: gy, fnGr'd, Rnd'd,silty- sm shly- tite w/ NS. (After DST#4)-SH: Turq-gn, waxy, & dk-gy-bk; Rr Sd Clust: gy-wh, pred fnGr'd; Vrr fn-MdGr'd, well cmt'd-subfribl; sl dolomc; Vpr-pr Por-NS-NC; SndyDolo: gy, fnGr'd, mx-fnXln; pr IXP&IGr.Por; NS-NC {5143'spls). (5153'spls} SS-(5-10% SdClust)-gy-wh-trnsl, fn-MdGr'd, pred fnGr'd, well Rnd'd-subanlr, well cmt'd- Vpr-pr Por; Trc fribl- sl dolomc w/ Fr-Gd Por;NS;NC; & SndyDolo: gy, fnGr'd, mx-fnXln; pr Por; NS; NC. (5163'spls}SS-(~10% Clust)-gy-wh-trnsl, Vfn-MdGr'd, well Rnd'd-subanglr, pred fnGr'd, well cmt'd- sl dolomc- pr-Fr Por, Vrr fribl w/Gd Por; NS; NC; Sm V.dolomc-argil- Vpr-pr Por;NS; sm F.SdGr's. (5373'spls}SS-(~20% Clust)-gy-wh-trnsl, Vfn-MdGr'd, Trc CrsGr's, well Rnd'd-subanglr, mod-Hi Sphr, pred well cmt'd; Rr fribl- Fr-Gd Por; NS; NF; NC; Sm V.dolomc- sm argil- Vpr-pr visbl Por- sm dead(dd)Stn-NFO-Vpr ResidCt. (5183'spls}SS-SdClust: wh-gy-bf-tn, mot, Vfn-MdGr'd, incrs fn-MdGr'd, Vrr prt CrsGr'd, pred dolomc- well cmt'd-





prt argil, Vpr-Fr Por; sm tn-bn-bk asphltc ddStn w/ NFO; Vpr ResidCt; sm sl pyrtc; abndt Free Sd Gr's; sm Sndy Dolo:AA. (5200-5210'spls}SS:AA & Sd Clust: gy-tn-wh, mot, Vfn-MdGr'd, dolomc- V.dolomc & argil, Vpr-Fr Por; sm spt'd ddStn w/ NoFLR(NF) Trc SFO- hvy- bn-bk oil w/ NF; Vpr Cut- ResidCt; No Odr; Sm Frly 'clean' Barren Sd Clust: AA; & Sndy Dolo: gy-tn, Vfn-fnXln, Vfn-MdGr'd, Vpr-pr visbl Por- sm dd.Stn & Resid.Cut.

{McLish SH} SH: gy-bk & dk-gn, Rr Turq-gn.

SH: gy-bk, & dk gn, Rr rd (~10% Sd Clusters:AA)

SH: AA; incrs gn-gy; (Sd Clust:AA, Vfn-MdGr'd; sm dolomc- argil- pr Por- sm dd.Stn; Vrr cln- fribl-NFO).

SH: AA; incrs gy & dk-gn-gy & bk; (<10% Sd Clust:AA, pred V.dolomc- argil- Vpr-pr Por- sm dd.Stn- Vpr Resid.Cut).

SH: AA; incrs gn & dk-gn-gy; (Rr Sd Clust:AA) & Sd Clust: gy, Vfn-MdGr'd, V.well cmt'd, argil- shly; Vpr Por- NVP; NS.

SH: AA; sl incrs Turq-gn & dk-gn, sm waxy.

{McLish- Bsl- Sd} (5276'circ.spls} SS- Sd Clust: gy-wh, Vfn-MdGr'd w/ Trc Crs Gr's, well Rnd'd- subanglr, Low- Hi Sphr, frost'd- clr Gr'd, well to pr sort'd, pred well cmt'd; Rr fribl w/ Fr-Gd Por; NS; NF; NC; Frly Abndt Free Sd Gr's.

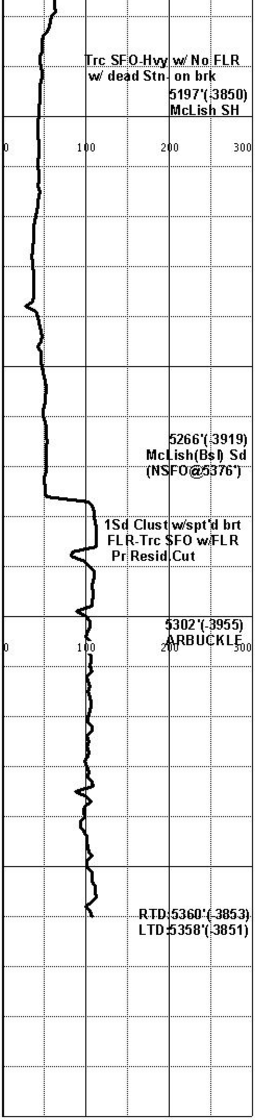
SS: V.Abndt Free Sd.Gr's: fn-CrsGr'd, clr- frost'd, Rr VCrs, V.well Rnd'd- subanglr, Hi to Low Sphr; Rr Sd Clust: gy-bf-wh-trnsl, fn-Crs Gr'd-AA, pred well cmt'd, pr sort'd, sm shly & pyrtc. Vrr fribl w/ Fr-Gd Por; >99% Barren; 1 Cluster w/ spt'd FLR & Trc SFO- micro-spts on brk, Rare pr Resid.Cut -(5300'&5310'spls).
(5320'spl)- SS- incrs Sd Clusters:AA, fn-Crs, well to pr sort'd, sm fribl w/ Fr-Gd Por- Barren; Sm well cmt'd- Rr dolomc.

{ARBUCKLE} (<5% 5320'spl) DOLO: bf-tn-gy, pred micoXln-(mx)- dn, sm prt fn-MdXln, Trc Sndy: fn-CrsGrs- V.well Rnd'd; Trc shly; Trc Fr-Gd Por: vug, pp, IXP; sm dull Minrl.Flr- NC; NS.

DOLO: (incrs 5330'&5340'spls)- cm-tn-gy, mx-fnXln, Rr prt MdXln, sm pr-Fr IXP, Rr Fr-Gd vug & moldc Por; NS; sm dn- NVP; sm dull Minrl.Flr; No Cut-(NC).

DOLO: tn-gy, mx-fnXln, Rr prt Md-CrsXln, sm Fr Por: vug & IXP, Rr prt moldc- AA, pred pr visbl Por- NVP; NS; sm dull Minrl.Flr, NC.

DOLO: cm-tn-bn & gy, sm mot, mx-fnXln, Rr prt MdXln, Trc CrsX's; ~50% dn to pr Por; ~50% w/ Fr vug & IXP, Trc Gd Por; NS; sm dull Minrl.Flr; NC.

DOLO: tn-gy-bn, mx-fnxln, Rr prt MdXln, Trc Crs-VCrsX's; Vrr Fr-Gd Por: AA; pred dn- pr Por; NS; NC.