

LITHOLOGY STRIP LOG

WellSight Systems

Scale 1:240 (5"=100') Imperial

Well Name: Randel #2-20
Location: 1660' FSL & 1660' FWL, Sec. 20-T27S-R18W, Kiowa Co., KS.
Licence Number: 15-097-21787-00-00
Spud Date: 3/8/2014
Surface Coordinates: 1660' FSL & 1660' FWL, Sec. 20-T27S-R18W
Region: Einsel North
Drilling Completed: 3/16/2014

Bottom Hole Coordinates: Same as above
Ground Elevation (ft): 2207' K.B. Elevation (ft): 2220'
Logged Interval (ft): 3900' To: 4900' Total Depth (ft): 4900'
Formation: Kinderhook at Total Depth
Type of Drilling Fluid: Freshwater/Gel to 3293'; Chemical Gel 3293' to 4900'

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OPERATOR

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GEOLOGIST

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Cores

None Taken

DSTs

DST #1(Lansing 'A' zone) 4205' - 4221'(Corrected Depths to Log) Test Times 15"-45"-45"-90" IFP Strong Blow BOB/9 Min., FFP Fair to Strong Blow BOB/22 Min., no Blowback on SI's; REC: 450' Gas in Pipe, 30' OCM(2%O, 98%M), no Water; IFP 17-22#, ISIP 924#, FFP 17-31#, FSIP 1011# and Building; IHP 2125#, FHP 2070#, BHT 115 Deg. F.

DST #2(Kansas City 'I') 4407' - 4425' Test Times 15"-45"-45"-90" IFP Strong Blow BOB/ 90 Sec., FFP Strong Blow Gas To Surface in 19 Min., Volume Not Available (Burns Bright Orange Flame), 6" Blowback on FSI; REC: 65' CGO(40 Deg. API), 230' GW&MCO(55%G, 25%O, 12%W, 8%M), 60' OCSW(3%O, 97%W) CI 48,000, Mud 5000; IFP 35-65#, ISIP 1381#, FFP 64-132#, FSIP 1374#, IHP 2202#, FHP 2181#, BHT 119 Deg. F.

DST #3(Kansas City 'I' + 'J' zones) 4436' - 4466' Test Times 15"-45"-45"-90" IFP Strong Blow BOB/2 Min., FFP Strong Blow BOB/4 Min, no Gas to Surface, BOB Blowback on FSI; REC: 930' Gas in Pipe, 150' GOCMW(30%G, 18%O, 27%W, 25%M), 840' GSW(6%G, 94%W) CI 113,000, Mud 9000; IFP 71-234#, ISIP 1371#, FFP 253-503#, FSIP 1367#, IHP 2188#, FHP 2131#, BHT 126 Deg. F.

DST #4(Miss. Chert) 4738' - 4800' Test Times 15"-45"-45"-90" IFP Strong Blow Gas to Surface in 5 Min., FFP Gas to Surface throughout Stabilized Gas Gauge of 456 MCFGPD(15# on 0.75" choke); REC: 45' GCM(10%G, 90%M), no oil or water; IFP 93-110#, ISIP 1509#, FFP 72-75#, FSIP 1504#, IHP 2381#, FHP 2333#, BHT 123 Deg. F.

Comments

3/8/14 MIRU Sterling Drilling Rig #5 Spud at 6:30 PM; 3/9/14 TD. 608' - CTCH for setting Surface Casing; 3/10/14 Drilling at 1230'; 3/11/14 Drilling at 2750'; 3/12/14 Drilling at 4170'; 3/13/14 Drilling at 4390'; 3/14/14 TD. 4466' - TOH for DST #3; 3/15/14 Drilling at 4700'; 3/16/14 RTD. 4900' - CFS(Reached TD. at 6:30 AM.), LTD. 4900'; 3/17/14 RTD. 4900'/LTD. 4900' - LDDP to Set 5 1/2" Production Casing.

Set new 8 5/8"(23#) Surface Casing at 603' with 350 sacks of cement(Basic Energy Services). Cement did Circulate. PD. at 11:15 AM. on 3/9/14.

Set new 5 1/2"(15.5#) Production Casing at 4888' with 200 sacks of "Loeb Blend" cement(Basic Energy Services). PD. at 3:00 PM. on 3/17/14.

Surveys: 0.75 Deg. at 608'(Surface Casing); 0.25 Deg. at 4223'(DST #1); Deg. at 4425'(DST #2); 1.50 Deg. at 4800'(DST #4); 1.50 Deg. at 4900'(RTD).

Pipe Strap at 4223'(DST #1): Strap 0.01' Long to the Board, no correction made to the Board.

NOTE: Drilled with PDC Bit from under Surface Casing to 4223'. Drilled with "Button Bit" from 4223' - 4800'. Drilled from 4800' to Total Depth of 4900' with PDC Bit.

After review of the Halliburton logs, DST data and positive indications of commercially recoverable amounts of hydrocarbons, the operator elected to set new 5 1/2" Production Casing for completion in the Mississippi Chert and Kansas City 'I' zones.

LOG TOPS: Chase 2450(-230), Stotler Lmst. 3397(-1177), Queen Hill Shale 3907(-1687), Heebner Shale 4042(-1822), Toronto 4057(-1837), Brown Lmst. 4197(-1977), Lansing 'A' 4203(-1983), Lansing/KC 'H' 4362(-2142), K.C. 'I' 4412(-2192), K.C. 'J' 4452(-2232), Stark Shale 4498(-2278), Hertha 4556(-2336), Base Kansas City 4584(-2364), Pleasanton 4600(-2380), Marmaton 4627(-2407), Pawnee 4674(-2454), Cherokee Shale 4713(-2483), Reworked Miss. 4760(-2540), Miss. Chert 4772(-2552), Kinderhook Shale 4818(-2598), Kinderhook Sand 4847(-2627).

NOTE: Portions of this log were shifted 1' to 2' for correlation purposes with the Halliburton Logs.

ROCK TYPES

- Anhy
- Bent
- Brec
- Cht

- Clyst
- Coal
- Congl
- Dol

- Gyp
- Igne
- Lmst
- Meta

- Mrlst
- Salt
- Shale
- Shcol

- Shgy
- Sltst
- Ss
- Till

ACCESSORIES

MINERAL

- Anhy
- Arggrn
- Arg
- Bent
- Bit
- Brecfrag
- Calc
- Carb
- Chtdk
- Chtlt
- Dol
- Feldspar
- Ferrpel
- Ferr
- Glau

- Gyp
- Hvymin
- Kaol
- Marl
- Minxl
- Nodule
- Phos
- Pyr
- Salt
- Sandy
- Silt
- Sil
- Sulphur
- Tuff

FOSSIL

- Algae
- Amph
- Belm
- Bioclst
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram
- Fossil
- Gastro
- Oolite

- Ostra
- Pelec
- Pellet
- Pisolite
- Plant
- Strom

STRINGER

- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst

- Sltstrg
- Ssstrg

TEXTURE

- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackst

OTHER SYMBOLS

POROSITY

- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint

- Vuggy

SORTING

- Well
- Moderate
- Poor

ROUNDING

- Rounded
- Subrnd
- Subang
- Angular

- Spotted
- Ques
- Dead

INTERVAL

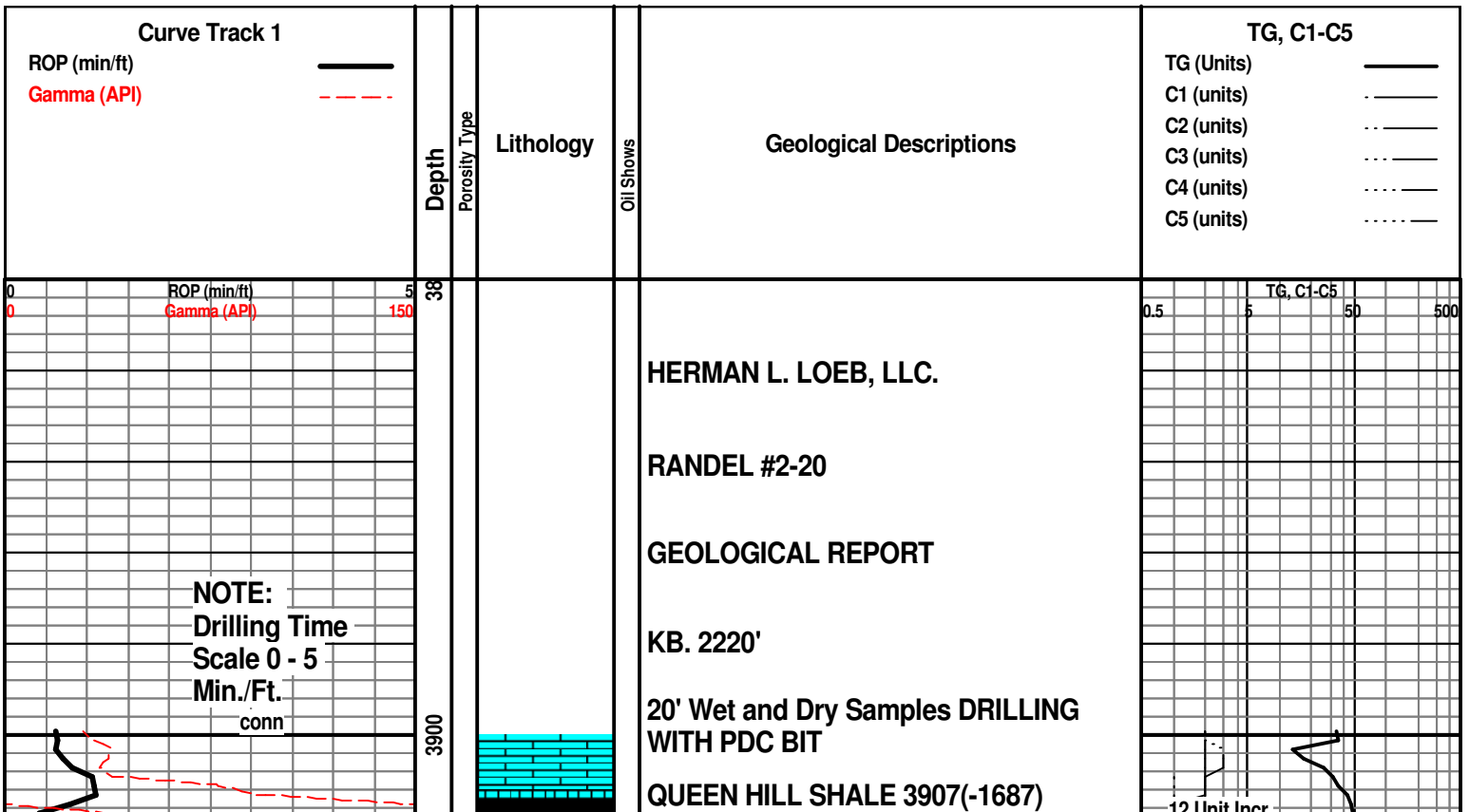
- Core
- Dst

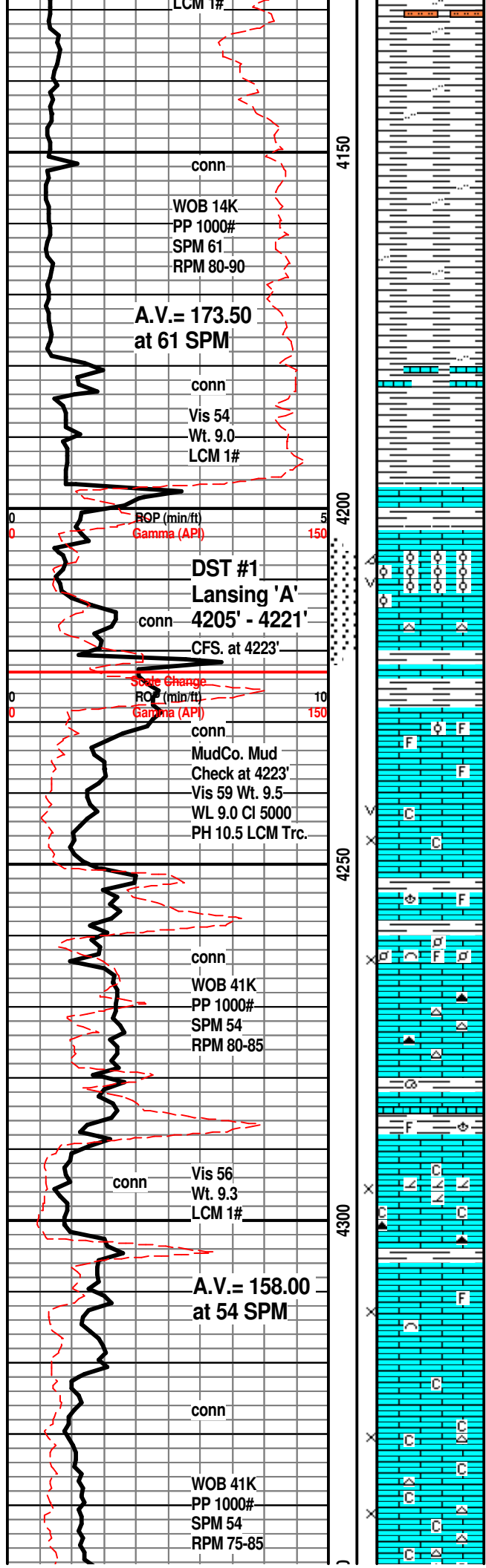
EVENT

- Rft
- Sidewall

OIL SHOW

- Even





SH; lt to med gy, smooth, platy, occ silty

SH; med gy, silty ip, platy, interbdd thin brn lmst strngs

BROWN LMST. 4197(-1977)

LANSING 'A' 4203(-1983)

LM; tan to lt brn, oolitic, med to occ lrg molds, gd oomoldic w/scat vug por, gas bubbles, spotted lt brn oil stn, med/brite yel fluor, fair to gd cut in some, fair to good odor

LM; tan to buff, fxln to dense, off wh cht, tite

DST #1: Lansing 'A' 4205' - 4221'

**Corrected Depths to Log
LANSING 'B' 4228(-2008)**

LM; tan to lt brn, foss ip, well cem, no vis por, no vis stn, ns.

10' Wet and Dry Samples at 4230'

LM; off wh, lt gy, fxln w/fair interxln and vug por, some rextalized, minor chalky mtx, dull yel fluor, no vis stn, no gas kick, ns.

LM; med to dk brn, hd, blocky, foss ip, tite

LM; tan to lt brn, buff, foss at top w/fair interpart por, no vis stn, no odor, no sample shows

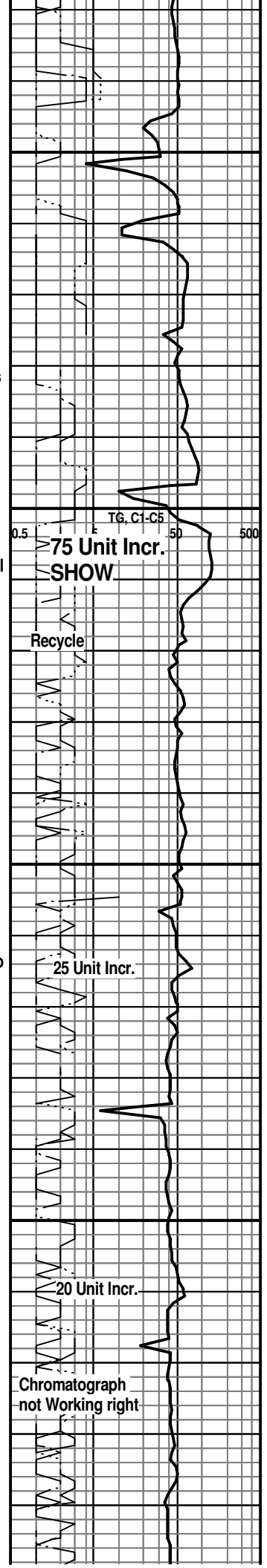
LM; lt brn, buff, hd, litho ip, tite, scat amber to lt gy cht, tite

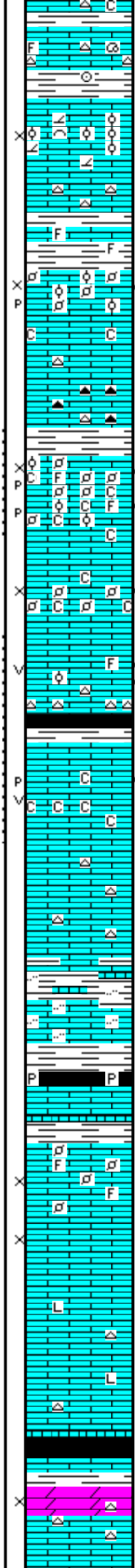
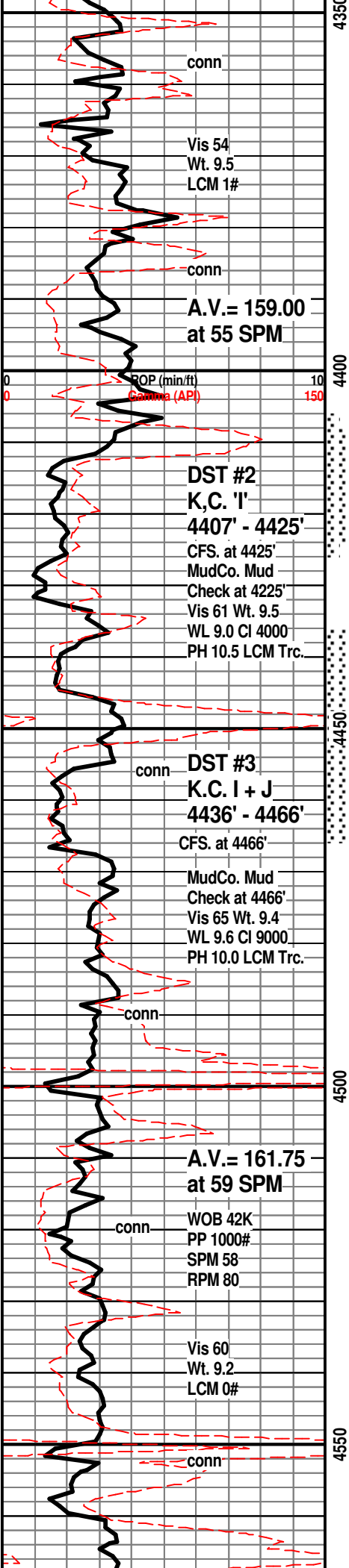
SH; dk gy grn, foss ip.

LM; tan to off wh, buff, fxln w/trc sucrosic text, partly dolomitic, fair interxln por, minor chalky mtx, occ dk brn/smoky cht, no fluor, no gas kick, ns.

LM; lt to med brn, foss ip, most dense, blocky, interbdd gran to med xln lmst w/fair interxln por, no fluor, no sample shows

LM; wh, off wh, f to med xln, chalky soft mtx, poor interxln por, dull yel min fluor, interbdd off wh to wh cht, no vis stn, no gas kick, ns.





LM; lt gy, lt brn, foss ip, dense, scat gy cht

LANSING/KC. 'H' 4362(-2142)
LM; tan to buff, foss ip w/rare ooids, sucrosic text, partly dolomitic, scat cse calc xtals, poor/no vis por, no fluor, ns.

LM; tan - lt brn, foss w/scat pellets/ooids, fair interpart w/rare p-p por, spotted lt brn oil stn in few pcs, fair odor, med yel fluor, some looks tite, fair cut, trc gas bubbles

LM; tan, lt brn, foss ip, most well cem, interbdd partly chalky soft mtx, abnt smoky to dk brn cht, no vis por, no fluor, ns.

KANSAS CITY 'I' 4412(-2192)
LM; lt brn, lt gy, highly foss - pelletal, lt brn spotted/even stn, gd to strong odor, brite yel fluor, SFO, fair p-p/interpart por, gas bubbles, chalky ip(chalk has fluor), some barren por

DST #2: K.C. 'I' zone 4407' - 4425'
LM; off wh, lt gy brn, foss - pelletal, fair to gd interpart por, minor chalky mtx, trc oil stn, poss. faint odor

LM; tan to cream, foss ip, some fairly well dev. vug por, spotted/even lt brn oil stn, med/brite yel fluor, SFO, few gas bubbles, fair odor, possible 200 Unit gas kick, gd cut, bcm cherty

KANSAS CITY 'J' 4452(-2232)
LM; tan to cream, buff, f to med xln, soft chalky mtx ip, few pcs. w/spotted lt brn stn, scat med to brite yel fluor, fair to gd odor, fair p-p and small vug por, fair cut

DST #3: K.C. 'I' + 'J' 4436' - 4466'
LM; lt brn, tan, flxn w/interbdd gy/off wh cht, no vis por, ns.

SH; med gy brn, lmy ip.

LM; med to dk brn, gritty - silty text, tite

STARK SHALE 4498(-2278)
SH; blk, platy, occ pyr

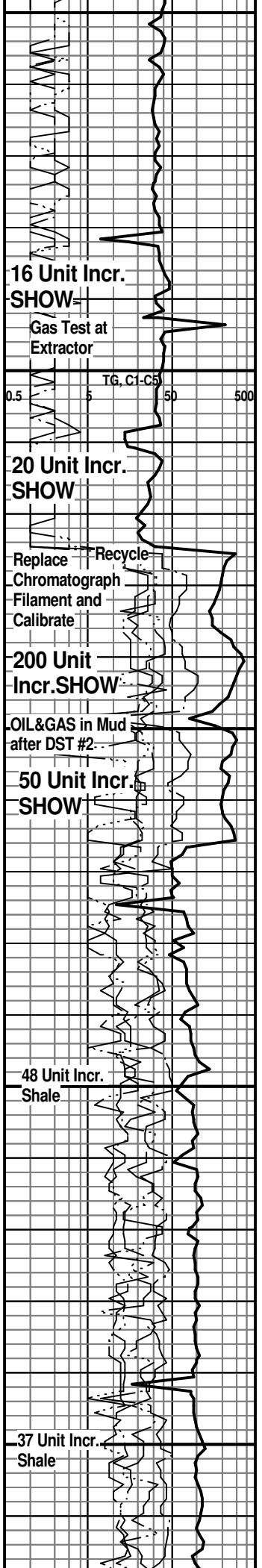
SWOPE 4508(-2288)
LM; tan to off wh, buff, foss ip w/scat foss hash, occ pellets, most well cem, trc poor interpart por, no fluor, ns.

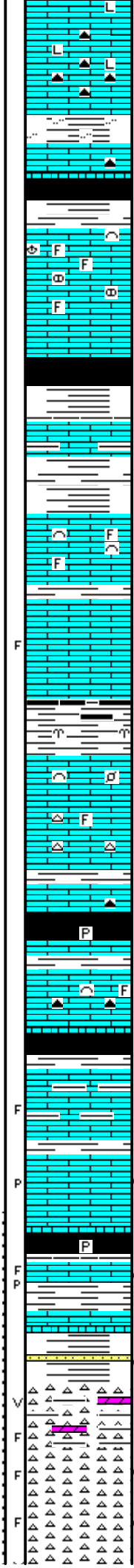
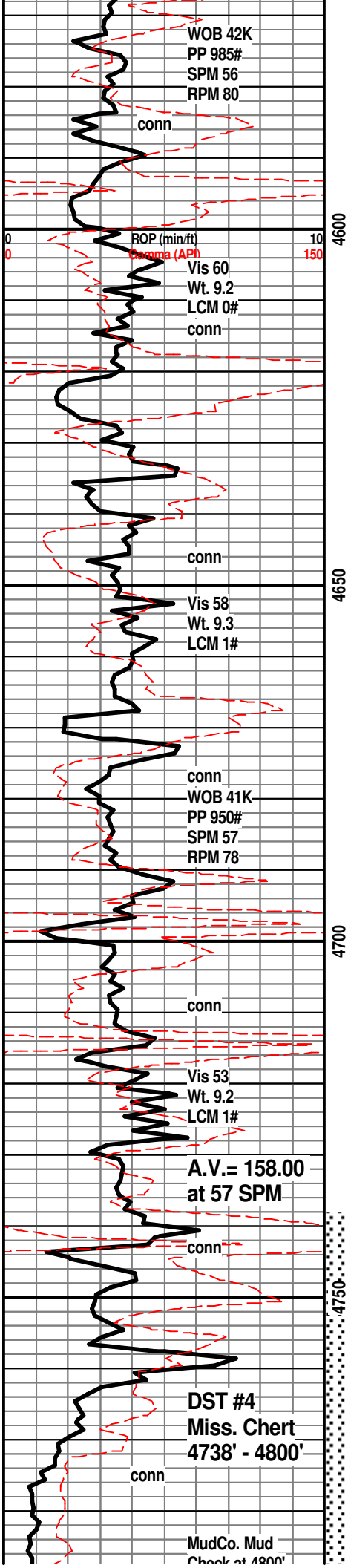
LM; tan to buff, f to med xln, scat spar calc, trc poor interxln por, lt yel min fluor, no vis stn, no odor, no gas kick

LM; lt to med brn, hd, blocky, most micritic, some litho, rare gy cht, tite

SH; blk, carb ip, platy

HERTHA 4556(-2336)
DOL; off wh, sucrosic, soft ip, fair interxln por, lt yel fluor, no stn or odor, interbdd off wh cht, ns.





LM; med to dk brn, hd, micritic, blocky, interbdd smoky/dk brn cht, some litho, tite

BASE KANSAS CITY 4584(-2364)

SH; med gy, grn, silty ip.

LM; med gy, gy brn, hd, scat blk cht

SH; varic, rust red, red brn, grn, dk gy - blk, platy

PLEASANTON 4600(-2380)

LM; tan to buff, occ off wh, foss ip, most dense - micritic, rare nodular lmst, no vis por, no fluor, ns.

SH; grn, gy grn, some blk, soft, platy

MARMATON 4627(-2407)

LM; lt gy, lt brn, rare pale grn tint, argil ip, most dense - blocky, tite

SH; grn, gy grn, med gy, trc rust red/red brn, platy

LM; tan to lt brn, some buff, fxln w/rare well cem foss mat, most dense - blocky, lt yel min fluor, no vis stn, no odor, ns.

LM; tan to lt brn, buff, fxln, few pcs w/blk tar/dead oil, trc frags, lt to med yel fluor, no live shows, no odor

SH; dk gy, blk, platy, occ foss

PAWNEE 4674(-2454)

LM; tan to lt brn, foss ip, well cem, most dense - micritic, no vis por, interbdd gy to lt brn cht, no fluor, no stn or odor, ns.

SH; blk, carb ip, trc pyr

SH; grn, gy grn, platy

LM; lt brn, foss ip, well cem, hd, no vis por, spotty lt yel min fluor, no stn or odor, ns.

CHEROKEE SHALE 4713(-2493)

SH; blk, carb ip, soft to blocky

LM; tan to lt brn, buff, some gy brn argil lmst interbdd, few pcs w/blk tar/gils, trc frags, no fluor, no odor, no live shows, most tite

LM; tan to lt brn, foss - fxln, scat foss hash, fair p-p por in some w/med brn spotted oil stn, some blk dead gils, no odor, trc gas bubbles, dull yel fluor, poor to fair cut

SH; blk, carb ip, occ pyr

LM; lt brn, foss ip, scat dk brn oil stn, poor p-p por, trc frags, lt yel fluor, no odor

LM; lt brn, fxln to micritic, blocky, hd, no vis por, no fluor, ns.

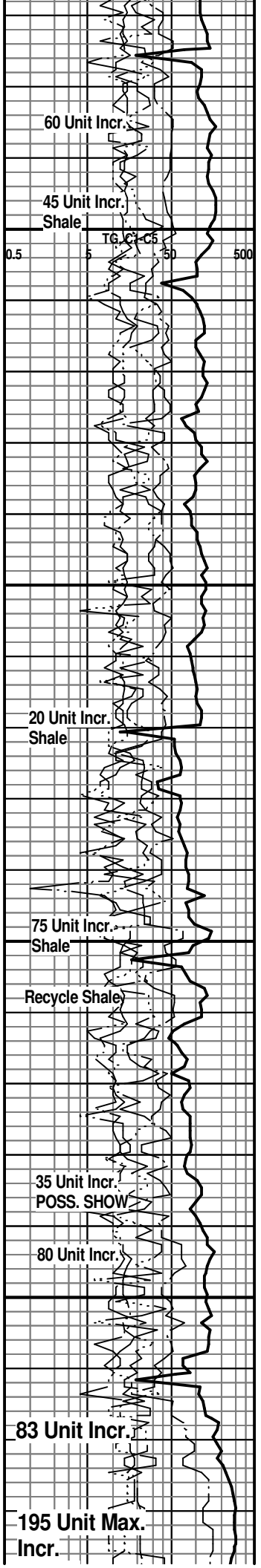
REWORKED MISS. 4760(-2540)

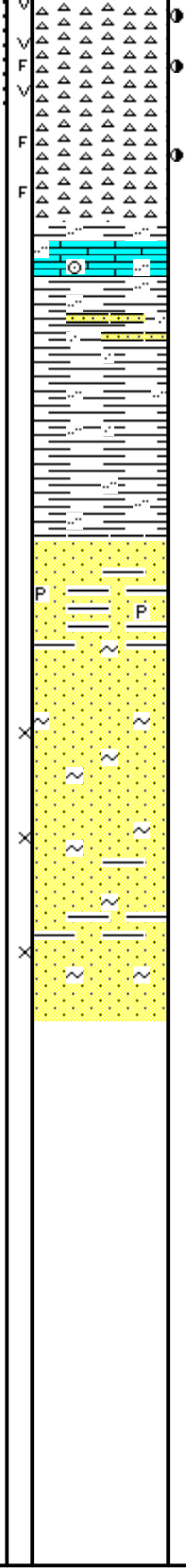
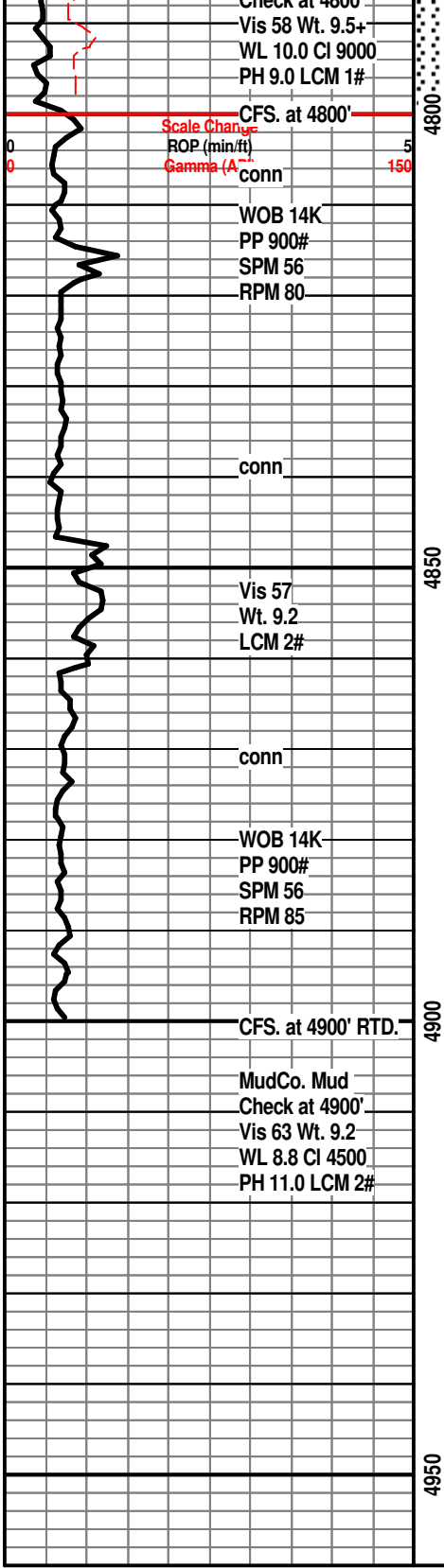
CHT; off wh, shaly w/interbdd grn shales and silty gritty reworked dolomitic cht, scat vug por in cht w/dk brn oil stn, no odor

CLEAN MISS. CHERT 4772(-2552)

CHT; wh, off wh, pred. trip cht at top, scat frags and vug por, med brn oil stn w/SFO, no odor, med yel fluor, grn shaly material w/ cht, dolo ip.

CHT; wh, most fresh, frags w/scat vug por, edge stn,





weathered edges w/live oil stn, no odor, med yel fluor, gas bubbles, tripolite w/SSFO

CHT; wh, off wh, most fresh w/weathered edges, frags w/edge stn, occ vug por, scat brite yel fluor, trc FO, v. faint gas odor

DST #4: Miss. Chert 4738' - 4800'

CHT; off wh, fresh, less stn, frags, faint gas odor

LM; lt red brn, oxidized, foss ip, occ silty

KINDERHOOK SHALE 4818(-2598)

BACK TO 20' SAMPLES

SH; med gy, gy grn, silty to occ sandy, interbdd vf gr ss strngs.

SH; med gy, gy grn, silty to occ sandy

KINDERHOOK SAND 4847(-2627)

SS; lt gy, grn, some v. hd - qtzitic ip, most tite, rare pyr

SS; wh, grn, vf to f gr qtz, clusters, some w/gd intergran por, scat grn glau/chlorite incl, no fluor, no stn or odor, ns.

SS; wh, off wh, lt gy, grn, pred f gr qtz, clusters, scat glau/chlorite, fair to gd intergran por, subrnd to subang gr, no fluor, some argil ss, ns.

RTD. 4900' at 6:30 AM. 3/16/14

LTD. 4900'

Halliburton ACRT, NEU/DEN, Microlog, Dipole Sonic, MRIL

NOTE: Portions of this log were shifted by 1' to 2' for correlation purposes with the Halliburton Logs.

