

LITHOLOGY STRIP LOG

WellSight Systems

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

Well Name: Heft #4-5
Location: 660' FNL & 1925' FEL, Sec. 5-T28S-R18W, Kiowa Co., KS.
Licence Number: 15-097-21790-00-00 Region: Einsel
Spud Date: 3/29/2014 Drilling Completed: 4/06/2014
Surface Coordinates: 660' FNL & 1925' FEL, Sec. 5-T28S-R18W

Bottom Hole Same as above
Coordinates:
Ground Elevation (ft): 2219' K.B. Elevation (ft): 2232'
Logged Interval (ft): 3900' To: 4875' Total Depth (ft): 4875'
Formation: Kinderhook Shale at Total Depth
Type of Drilling Fluid: Freshwater/Gel to 3295'; Chemical Gel 3295' to 4875'
Printed by MUD.LOG from WellSight Systems 1-800-447-1534 www.WellSight.com

OPERATOR

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GEOLOGIST

Name: Jon D. Christensen
Company: Consulting Petroleum Geologist
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Cores

None Taken

DSTs

DST #1(Lansing 'A') 4227' - 4243'(Corrected Depths to Log) Test Times 15"-45"-45"-90" IFP Strong Blow BOB/15 Sec., FFP Strong Blow BOB/1 Min., no Gas to surface, no Blowback on SI's; REC: 1178' Gas in Pipe, 60' GCMW(3%G, 72%W, 25%M) CI 55,000, Mud 6500; IFP 9-22#, ISIP 1221#, FFP 22-48#, FSIP 1202#, IHP 2122#, FHP 2068#, BHT 117 Deg. F.

DST #2(Kansas City 'I') 4425' - 4442'(Corrected Depths to Log) Test Times 15"-45"-45"-90" IFP Strong Blow BOB/5 Min., FFP Strong Blow BOB/12 Min., no GTS, 1" Blowback on FSI; REC: 496' Gas in Pipe, 120' GOCWM(Avg. 20%G, 20%O, 30%W, 30%M), 60' MSW(85%W, 15%M) CI 51,000, Mud 6000; IFP 22-40#, ISIP 1185#, FFP 47-84#, FSIP 1197#, IHP 2200#, FHP 2174#, BHT 117 Deg. F.

DST #3(Miss. Chert) 4773' - 4833'(Corrected Depths to Log) Test Times 15"-45"-40"-120" IFP Strong Blow BOB/2 Min., FFP Strong Blow BOB/Immed., no Gas to Surface, no Blowback on SI's; REC: 2360' GIP, 180' GOCM(Avg. 17%G, 6%O, 77%M), no Water; IFP 26-37#, ISIP 1032#, FFP 44-66#, FSIP 1047#, IHP 2297#, FHP 2278#, BHT 121 Deg. F.

DST #4(Miss. Chert) 4833' - 4848'(Corrected Depths to Log) Test Times 15"-45"-60"-120" IFP Strong Blow BOB/1.5 Min., 0.5" Blowback on ISI, FFP Strong Blow BOB/Immed. Gas to Surface in 12 Min. Gauged 12.9 MCFGPD(20# on a 0.125" Choke) in 60" of FFP; REC: 32' MO(85%O, 15%M, AP! 33.6 Deg.), 330' GHOCWM(Avg. 25%G, 40%O, 5%W, 30%M), 64' OCWM(20%O, 15%W, 65%M), CI 21,000, Mud 7000; IFP 30-58#. ISIP 1058#, FFP 26-129#, FSIP 1054#, IHP 2331#, FHP 2288#, BHT 125 Deg. F.

Comments

3/29/14 MIRU Sterling Drilling Rig #5 Spud at 4:45 PM; 3/30/14 TD. 279' - WOC(Conductor Casing); 3/31/14 TD. 626' - Drilling Cement; 4/1/14 Drilling at 2430'; 4/2/14 Drilling at 4000'; 4/3/14 Drilling at 4300'; 4/4/14 Drilling at 4455'; 4/5/14 TD. 4838' - CFS for DST #3; 4/6/14 TD. 4853' - DST #4; 4/7/14 RTD. 4875', LTD. 4872' - TIH to LDDP for setting Production Casing.

Set new 13 3/8"(54.5#) Conductor Casing at 275' with 280 sacks of cement(Basic Energy Services). Cement did Circulate - no Losses. PD. 3:15 AM. on 3/30/14.

Set new 8 5/8"(23#) Surface Casing at 622' with 350 sacks of cement(Basic Energy Services). Cement did Circulate - no Losses. PD. at 9:00 PM. on 3/30/14.

Set new 5 1/2"(15.5#) Production Casing at 4866' with 200 sacks cement(Basic Energy Services). PD. on 4/7/14.

Surveys: 0.75 Deg. at 279'(Conductor Casing); 1.0 Deg. at 626'(Surface Casing); 0.75 Deg. at 4247'(DST #1); 1.25 Deg. at 4447'(DST #2); 0.75 Deg. at 4838'(DST #3); 2.0 Deg. at 4875' RTD.

Pipe Strap at 4247'(DST #1): Strap 0.76' Short to the Board, no correction made to the Board.

After review of the Halliburton Logs, DST data and indications of commercial amount of hydrocarbons, the operator elected to set new 5 1/2" Production Casing for completion in the Mississippi Chert.

NOTE: Prior to abandonment of the Heft #4-5, the following zones should be perforated, acidized and tested: Cherokee Limestone from 4782' - 4786', Marmaton(Altamont) from 4681' - 4685', and Kansas City 'H' zone from 4416' - 4422'. Significant shows/gas kicks were observed in these zones, although no DST's were taken over them.

LOG TOPS: Chase 2454(-222), Stotler Lmst. 3418(-1186), Howard 3627(-1395), Heebner Shale 4058(-1826), Toronto 4073(-1841), Brown Lmst. 4214(-1982), Lansing 'A' 4224(-1992), Kansas City 'I' 4434(-2202), Stark Shale 4523(-2291), Hertha 4582(-2350), BKC 4616(-2384), Marmaton 4667(-2435), Altamont 4679(-2447), Cherokee Shale 4748(-2516), Cherokee Lime 4781(-2549), Reworked Miss. 4798(-2566), Clean Miss. Chert 4810(-2478), Kinderhook Shale 4864(-2632).

NOTE: This log was shifted upward by 4' to 5' for correlation purposes with the Halliburton Logs.

ROCK TYPES

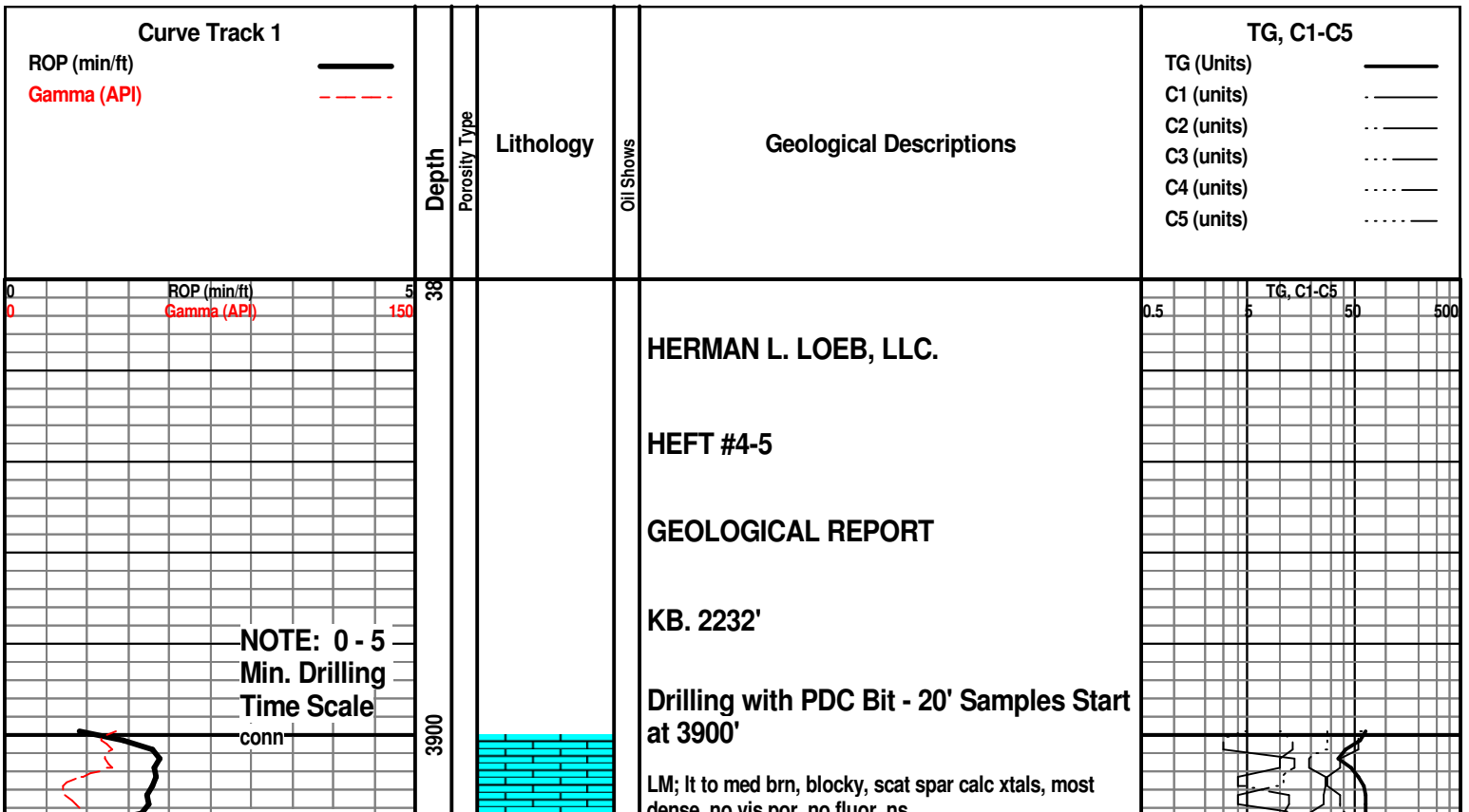
Anhy	Clyst	Gyp	Mrlst	Shgy
Bent	Coal	Igne	Salt	Sltst
Brec	Congl	Lmst	Shale	Ss
Cht	Dol	Meta	Shcol	Till

ACCESSORIES

MINERAL	Gyp	FOSSIL	Ostra	Sltstrg
Anhy	Hvymin	Algae	Pelec	Ssstrg
Arggrn	Kaol	Amph	Pellet	TEXTURE
Arg	Marl	Belm	Pisolite	Boundst
Bent	Minxl	Bioclst	Plant	Chalky
Bit	Nodule	Brach	Strom	Cryxln
Brecfrag	Phos	Bryozoa	STRINGER	Earthy
Calc	Pyr	Cephal	Anhy	Finexln
Carb	Salt	Coral	Arg	Grainst
Chtdk	Sandy	Crin	Bent	Lithogr
Chtlt	Silt	Echin	Coal	Microxln
Dol	Sil	Fish	Dol	Mudst
Feldspar	Sulphur	Foram	Gyp	Packst
Ferrpel	Tuff	Fossil	Ls	Wackst
Ferr		Gastro	Mrst	
Glau		Oolite		

OTHER SYMBOLS

POROSITY	Vuggy	ROUNDING	Spotted	EVENT
Earthy	SORTING	Rounded	Ques	Rft
Fenest	Well	Subrnd	Dead	Sidewall
Fracture	Moderate	Subang	INTERVAL	
Inter	Poor	Angular	Core	
Moldic		OIL SHOW	Dst	
Organic		Even		
Pinpoint				



WOB 15-16K
PP 1055#
SPM 67
RPM 105

conn

Vis 56
Wt. 9.1
LCM 0#

3950

conn

WOB 15-16
PP 1000#
SPM 64
RPM 85

A.V.= 172.00
at 64 SPM

conn

ROP (min) Vis 53
Gamma (A) Wt. 9.3
LCM 0#

4000

conn

WOB 16K
PP 1000#
SPM 63
RPM 83

A.V.= 172.50
at 63 SPM

conn

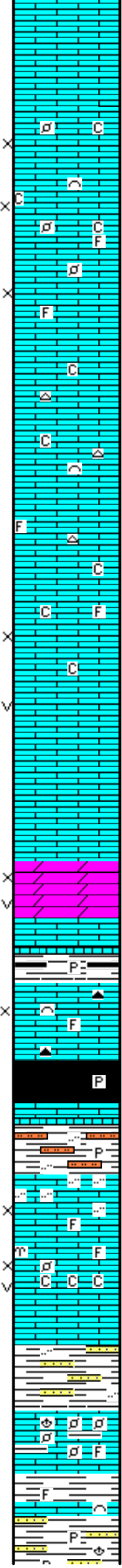
MudCo. Mud
Check at 4058'
Vis 63 Wt. 9.4
WL 8.8 CI 6500
PH 10.0 LCM 0#
conn

4050

4100

WOB 16K
PP 935#
SPM 60
RPM 88

conn



LM; tan to off wh, buff, f to med xln, fair interxln por, foss ip, minor chalky mtx, dull yel to no fluor, no stn or odor, ns.

LM; off wh, tan, buff, f to med xln w/scat foss mat, fair interpart/interxln por, dull yel fluor, occ chalky - soft, no stn or odor, ns.

LM; lt gy, off wh, tan, foss w/scat fusulinids and hash, fair interpart por, scat lt gy cht, no fluor, ns.

LM; tan to lt brn, off wh, med to cse xln, some gran w/gd interxln w/occ vug por, scat spar calc xtals, dull yel fluor, no stn or odor, occ chalky mtx, ns.

DOL; tan to lt brn, sucrosic, soft, well dev. interxln w/scat vug por, dull yel fluor, no stn or odor, no sample shows

SH; dk gy, blk, platy, occ pyr

LM; lt to med brn, blocky, interbdd foss lms w/trc poor interpart por, scat brn cht, no fluor, no stn or odor, ns.

HEEBNER SHALE 4058(-1826)

SH; blk, carb, trc gas, occ pyr

LM; med brn, hd, micritic

SH; grn, gy grn, silty w/interbdd sltst, pyr ip.

TORONTO 4074(-1842)

LM; med gy brn, gritty - silty ip, tite

LM; wh, off wh, foss w/scat vug and interpart por, med yel min fluor, no stn or odor, partly chalky mtx, ns.

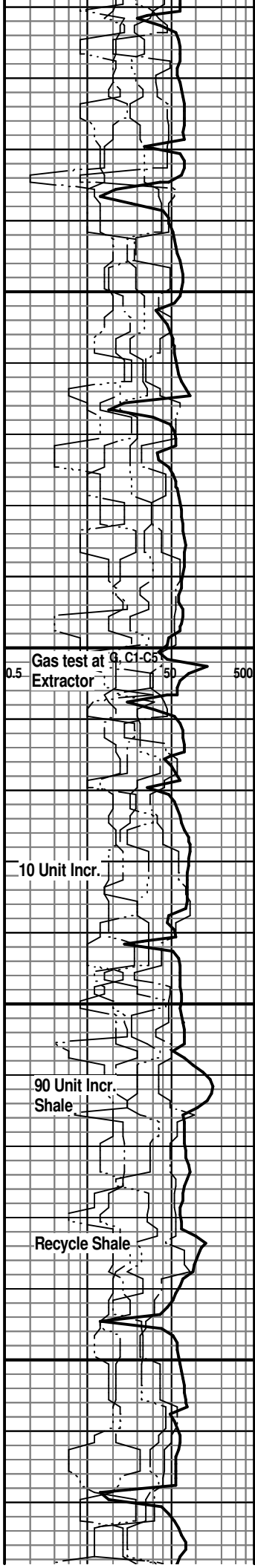
40 Stand Wiper Trip at 4092'

DOUGLAS SHALE 4096(-1864)

SH; lt gy, soft, sandy w/interbdd vf gr qtz mica ss

LM; med gy brn, abnt foss mat, pellets, argil ip, no vis por, lt yel fluor, ns.

SH; med gy, platy, foss ip, interbdd hd pyr ss strngs

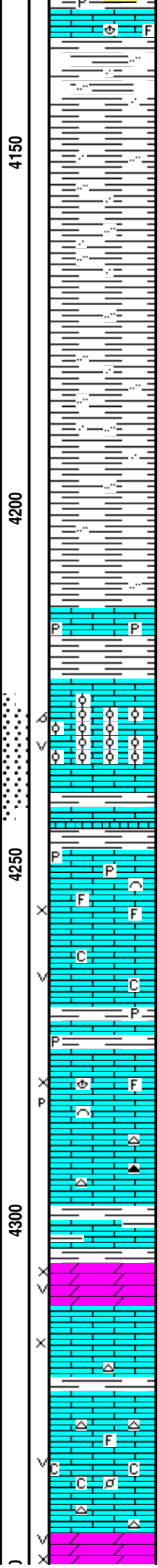
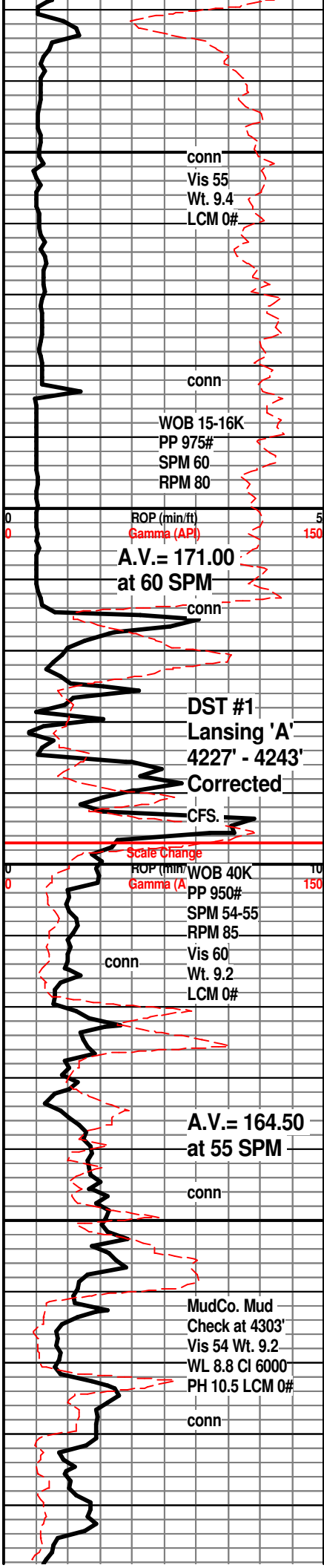


Gas test at G. C1-C5
Extractor

10 Unit Incr.

90 Unit Incr.
Shale

Recycle Shale



LM; lt to med gy brn, foss ip, dense

SH; lt gy, some red-brn varic sh, silty to sandy ip, trc.

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

SH; lt to med gy, platy

BROWN LMST. 4214(-1982)
LM; med brn, hd, pyr ip, tite

LANSING 'A' 4224(-1992)
LM; lt to med brn, oolitic, med to lrg molds, v. well dev. oomoldic por, brittle, med to brite yel fluor, sev. gas bubbles, v. faint gas odor, v. sl. spotted It oil stn, weak cut, GAS SHOW

DST #1: Lansing 'A' 4227' - 4243'
SWITCHED TO BUTTON BIT AFTER DST #1

LANSING 'B' 4248(-2016)
LM; med brn, rare off wh, foss ip, most well cem, some hd pyr lmst at top, dull to yel min fluor, trc poor interpart por, ns.

LM; lt gy, lt gy brn, fxln w/fair vug por, minor soft chalky mtx, dull to lt yel min fluor, no stn or odor, ns.

SH; med gy, gy grn, pyr ip.

LM; tan to lt brn, buff, fxln w/gd interxln and p-p por, scat foss mat, dull yel min fluor, no stn or odor, ns.

LM; lt to med brn, dense, blocky, scat gy to brn cht, no vis por, ns.

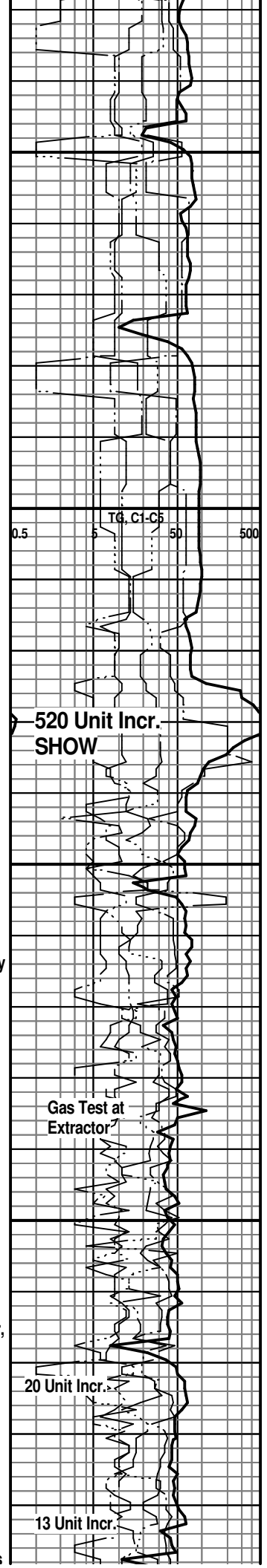
LM; med brn, gy brn, argil ip. tite

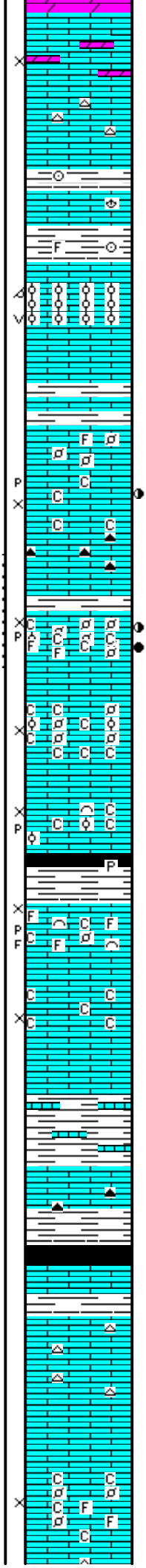
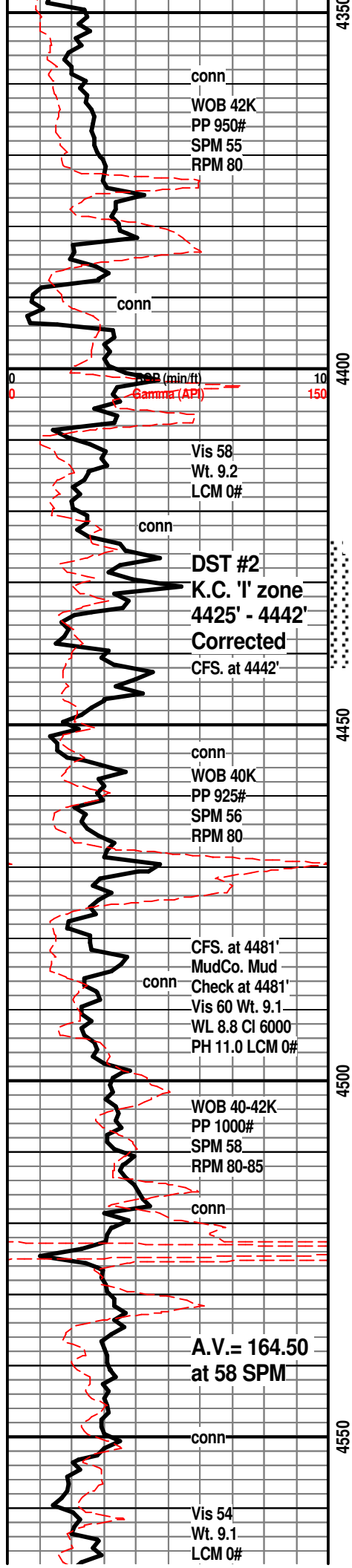
DOL; lt brn, sucrosic, fair interxln and vug por, lt yel min fluor, no vis stn, ns.

LM; tan to cream, buff, med xln to gran, fair interxln por, scat spar calc xtals, lt yel min fluor no stn or odor, ns.

LM; off wh, buff, fxln w/fair vug por, mod soft, minor chalky mtx, lt yel fluor, no vis stn, no sample shows

DOL; lt brn, tan, sucrosic, fair interxln w/occ vug por, scat cse spar calc xtals. dull vel fluor. no sample shows





LM; tan to cream, buff, fxl to sucrosic, partly dolomitic, dull yel fluor, fair interxn por, no stn or odor, bcm dense w/scat gy cht, ns.

LM; med brn, blocky, foss ip, tite

SH; med to dk gy, platy, foss ip.

LANSING/K.C. 'H' 4385(-2153)
 LM; lt brn, oolitic, small to med size molds, v. gd oomoldic w/vug por, brittle, v. dull yel fluor, no stn or odor, no sample shows, no vis gas bubbles

SH; med gy, gy grn, platy

LM; tan to cream, buff, fxl w/scat chalk and chalky mtx, fair interxn por, dull to occ lt yel fluor, faint odor, trc v. spotted lt brn stn, scat dk gy, dk brn to smoky cht

KANSAS CITY 'I' 4434(-2202)
 LM; lt brn, foss - finely pelletal, fair interpart w/some gd p-p por, spotted to occ even lt brn oil stn, trc. gassy FO, fair odor, fair to gd cut, some chalky soft mtx w/brite yel fluor

DST #2: KC 'I' zone 4425' - 4442'
 LM; off wh, buff, med xln w/scat foss pellets and ooids, soft ip w/fair to gd interxn por, very chalky, no fluor, no vis stn, no odor, barren, ns.

LM; off wh, buff, foss w/scat fair interpart and p-p por, minor soft chalky mtx, no fluor, no stn or odor, barren, ns.

SH; blk, carb ip, pyr

KANSAS CITY 'J' 4475(-2243)
 LM; off wh, buff, foss w/scat cse foss frags, fair interpart and p-p por, sev. gas bubbles, v. dull yel fluor, no vis oil stn, no odor, no cut, minor soft chalky mtx

LM; off wh, cream, buff, med xln w/fair interxn por, chalky ip, soft, no vis stn, no odor, ns.

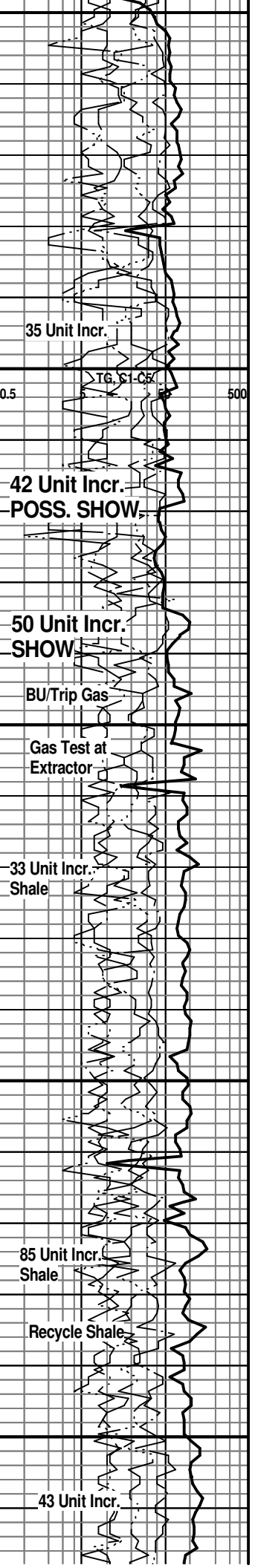
SH; med gy, gy brn, lmy w/interbdd argil lmst.

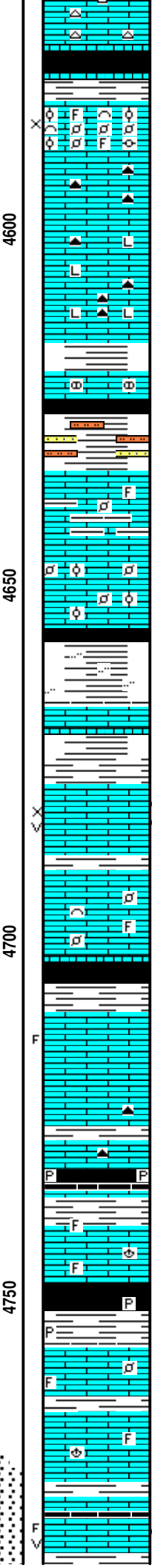
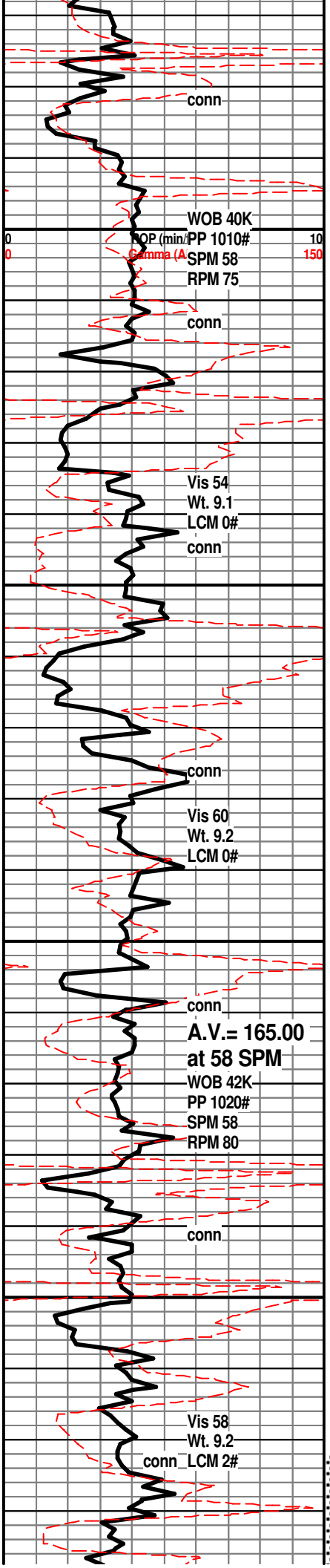
LM; dk gy, hd, micritic, scat gy-brn cht, tite

STARK SHALE 4523(-2291)
 SH; blk, carb, trc gas, blocky

SWOPE 4533(-2301)
 LM; lt gy to med brn, blocky - mictitic, scat gy cht, no vis por, no fluor, ns.

LM; off wh, buff, tan, foss w/scat pellets and hash, poor to fair interpart por, chalky mtx ip, spotty lt yel fluor, no stn or odor, no sample shows





LM; lt gy, lt brn, hd, micritic, occ cherty

SH; blk, carb ip, trc gas, blocky

HERTHA 4582(-2350)

LM; tan, lt brn, buff, highly foss, partly oolitic, gd interpart por, med yel min fluor, trc cse xln chalky lmst also, no vis stn, no odor, ns.

LM; med to dk brn, hd, cherty w/brn foss cht, dense, no vis por, some litho lmst, tite

BASE KANSAS CITY 4616(-2384)

SH; brn, some varic, gy, platy, foss ip.

LM; med gy, gy brn, hd, some nodular, tite

SH; dk gy, blk, varic ip, soft, interbdd vf gr qtz ss and sltst.

PLEASANTON 4634(-2402)

LM; lt brn, tan, occ pale grn tint, argil ip w/interbdd grn shale, scat well cem foss, lt yel min fluor, no stn, ns.

LM; off wh, tan, foss w/abnt rnd pellets/ooids, well cem, scat spar calc xtals, scat lt yel min fluor, no vis stn, no odor

SH; med to dk gy grn, blk, firm, occ silty

MARMATON 4667(-2435)

LM; lt gy brn, pale grn tint, some dk brn micrite, hd, blocky, argil ip, tite

SH; grn, gy, brn, some rust red, platy

LM; tan to buff, med to cse xln w/spotted to even dk brn live oil stn, fair interxln w/scat vug por, SSFO, faint odor, med yel fluor, fair cut, trc gas bubbles

LM; tan to lt brn, most dense - micritic, blocky, rare well cem foss mat, no vis por, no fluor, ns.

SH; blk, dk gy, platy

PAWNEE 4710(-2478)

LM; tan to lt brn, micritic, blocky, trc frags w/rare blk tar/gils, no live shows, most tite, dull yel fluor

LM; lt to med brn, blocky, rare brn cht, tite

SH; blk, carb, blocky, pyr ip.

LM; tan to lt brn, foss ip, hd, well cem, scat lt yel fluor, no stn or odor, ns.

CHEROKEE SHALE 4748(-2516)

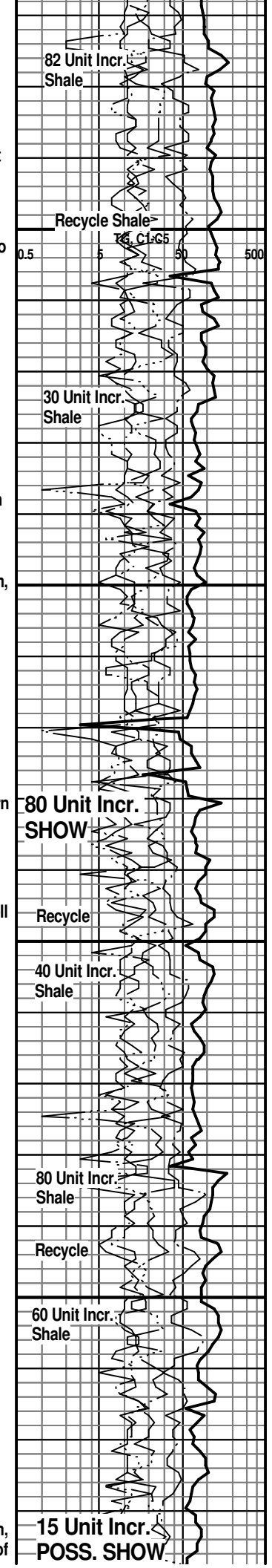
SH; blk, dk gy, carb ip, platy, rare pyr

LM; tan to buff, lt brn, most micritic, blocky, rare foss mat, no vis por, no fluor, ns.

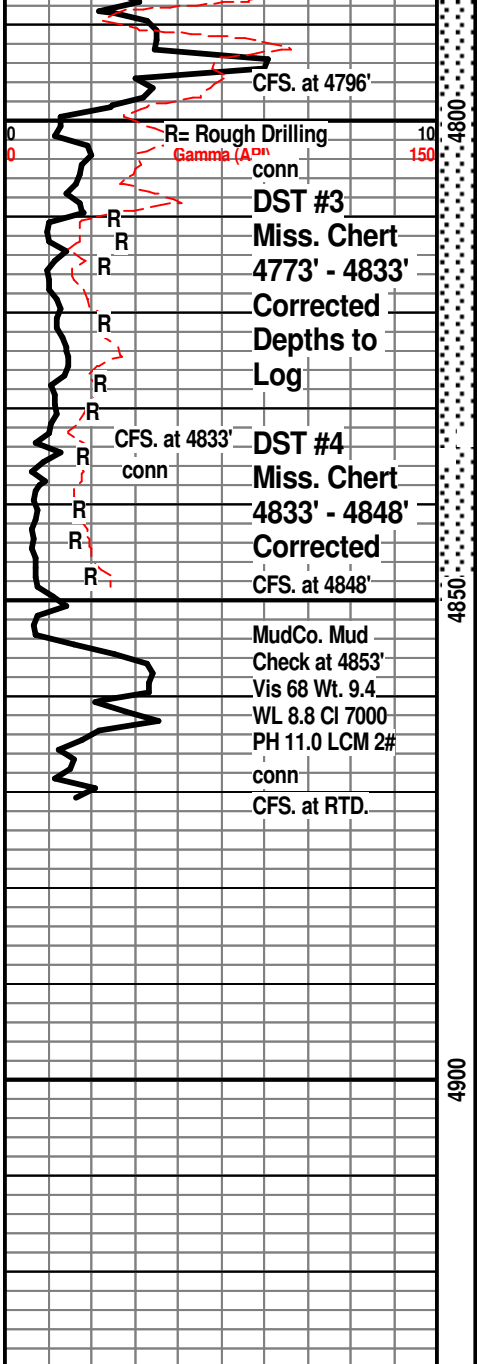
LM; tan to lt brn, buff, fxln, rarely foss, no vis por, no fluor, ns.

SH; dk gy, blk, platy, occ pyr

LM; tan, cream, fxln, occ frags w/vug por, dk brn oil stn, spar calc xtals, med yel fluor, no odor, fair cut, low % of



show in samples



CFS. at 4796'

R= Rough Drilling

Gamma (Aⁿ)

DST #3

Miss. Chert
4773' - 4833'

Corrected
Depths to
Log

CFS. at 4833'

DST #4

Miss. Chert
4833' - 4848'

Corrected
Depths to
Log

CFS. at 4848'

MudCo. Mud

Check at 4853'

Vis 68 Wt. 9.4

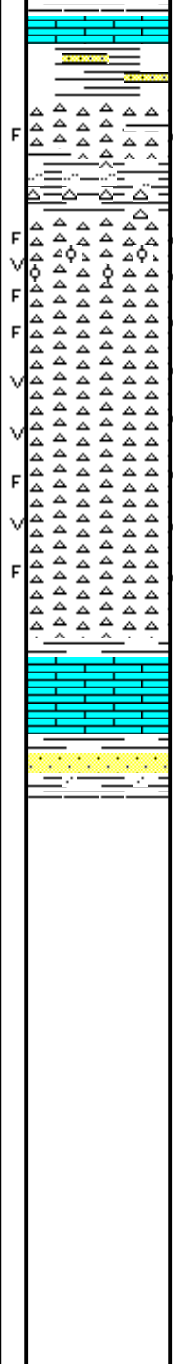
WL 8.8 Cl 7000

PH 11.0 LCM 2#

conn

CFS. at 4853'

4800
4850
4900



REWORKED MISS. 4798(-2566)

CONGL & CHT; varic, org, wh, yel, brick red, fresh, nodular cht, lt yel fluor, occ frags, faint gas odor, interbdd grn silty shale

CLEAN MISS. CHERT 4810(-2578)

CHT; wh, brn(oil stained), tripolite and fresh, some gritty text, lt/med brn spotted to occ even oil stn, fair odor, SFO, interbdd org oolitic cht w/vug por, med/brite yel fluor

CHT; wh, off wh, most fresh, frags w/occ lrg vug por, uniform brite yel fluor, fair to gd odor, SFO, few gas bubbles, spotted oil stn

DST #3: Miss. Chert 4773' - 4833'

CHT; wh, off wh, pred fresh, frags w/live oil stn, occ vug por, scat weathered edges, shows of gassy lt brn oil, gd odor, much brite yel fluor

CHT; wh, off wh, fresh, rare trip, fair/gd odor, SFO, much brite yel fluor, frags & vug por

DST #4: Miss. Chert 4833' - 4848'
Corrected Depths to Log

LM; med brn, rare red brn, micritic, tite

KINDERHOOK SHALE 4864(-2632)

SH; gy grn, grn, platy, interbdd grn vf to f grn to wh qtz ss, some fri, some tite, ns.

RTD. 4875' at 3:15 PM. on 4/6/14

LTD. 4872'

Halliburton ACRT(DIL), NEU/DEN,
Microlog, MIRL

NOTE: This log was shifted upward by 4' to 5' for correlation purposes with the Halliburton Logs.

50 Unit Incr.

140 Unit Incr.
SHOW

85 Unit Incr.

GAS/OIL IN MUD
AFTER DST #3
390 Unit Incr.