

# LITHOLOGY STRIP LOG

## WellSight Systems

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

Well Name: #3 Hardy  
Location: C SE NE Section 23-T28S-R18W, Kiowa Co., KS.  
Licence Number: 15-097-21700-0000  
Spud Date: 7/18/2011  
Surface Coordinates: 1980' FNL & 660' FEL, Section 23-T28S-R18W  
Region: Hardy Field  
Drilling Completed: 7/27/2011

Bottom Hole Same as Above  
Coordinates:  
Ground Elevation (ft): 2220' K.B. Elevation (ft): 2231'  
Logged Interval (ft): 3400' To: 4882' Total Depth (ft): 4882'  
Formation: Kinderhook at Total Depth  
Type of Drilling Fluid: Freshwater/Gel to 3307'; Chemical Gel 3307' to 4882'

Printed by MUD.LOG from WellSight Systems 1-800-447-1534 www.WellSight.com

### OPERATOR

Company: Herman L. Loeb, LLC.  
Address: P.O. Box 838  
Lawrenceville, IL. 62439-0838

### GEOLOGIST

Name: Jon D. Christensen  
Company: Consulting Petroleum Geologist  
Address: 9002 W. Silver Hollow St.  
Wichita, KS. 67205-8856

### Cores

None Taken

### DSTs

DST #1(Lansing 'A') 4244' - 4262' Test Times 15"-60"-45"-90" IFP Strong Blow BOB/15 Sec., FFP Strong Blow BOB/1 Min., No Gas to Surface, no Blowback on SI's; REC: 2500' Gas in Pipe, 185' Total Fluid: 125' SO&GCWM(4%G, 1%O, 43%W, 52%M), 60' MSW(90%W, 10%M) CI 125,000, Mud 5800; IFP 30-52#, ISIP 1251#, FFP 57-89#, FSIP 1173#, IHP 2174#, FHP 2123#, BHT 118 Deg. F.

DST #2(Miss. Chert) 4786' - 4844' Test Times 15"-60"-45"-90" IFP Strong Blow BOB/30 Sec. Gas to Surface in 12", FFP Strong Blow Gas to Surface throughout, Stabilized at 52.9 MCFGPD/45" of FFP, 4" Blowback on ISI, 2" Blowback on FSI; REC: 125' SGCM(2%G, 98%M), no water; IFP 130-84#, ISIP 693#, FFP 78-105#, FSIP 636#, IHP 2428#, FHP 2385#, BHT 121 Deg. F.

## Comments

7/18/11 MIRU Sterling Drilling Co. Rig #2, Spud at 4:30 PM.; 7/19/11 TD. 528' - Cement Surface Csg.; 7/20/11 Drilling at 1255'; 7/21/11 Drilling at 2507'; 7/22/11 Drilling at 3226'; 7/23/11 Drilling at 3760'; 7/24/11 TD. 4262' - Short trip prior to DST #1; 7/25/11 Drilling at 4378'; 7/26/11 Drilling at 4786'; 7/27/11 RTD. 4882' - CCH for LOGS, LTD 4878'; 7/28/11 RTD. 4882' - LTD. 4878' - Running 5 1/2" Production Casing.

Set new 8 5/8" (23#) Surface Casing set at 523' w/350 sx.(Basic Energy Services). PD. 8:00 AM. 7/19/11. Cement Did Circulate.

Set new 5 1/2" (15.5#) Production Casing at 4875' with 200 sx. cement(Basic Energy Services). PD. 9:15 AM. 7/28/11.

Surveys: 0.5 Deg. at 528'(Surface Casing); 0.75 Deg. at 4262'(DST #1); Deg. at 4844'(DST #1).

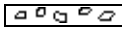
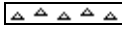
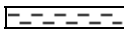





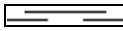
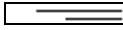
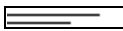


Pipe Strap at 4262'(DST #1): Strap 2.06' Short to the Board, no correction made to the Board.

After review of the Halliburton Logs, DST results and structural position, the operator elected to set new 5 1/2" (15.5#) Production Casing for completion in the Mississippian Chert.








































































LOG TOPS: Stotler 3442(-1211), Howard 3638(-1407), Heebner Shale 4054(-1823), Toronto 4072(-1841), Brown Lmst. 4220(-1989), Lansing A 4234(-2003), L/KC. 'H' 4397(-2166), Swope 4538(-2307), Base Kansas City 4626(-2395), Marmaton 4677(-2446), Pawnee 4720(-2489), Cherokee Shale 4754(-2523), Mississippi Chert 4804(-2573), Kinderhook Shale 4867(-2636), Kinderhook Sand 4872(-2641).

NOTE: This log was shifted upward by 4' to 5' for correlation purposes to correspond to the Halliburton LOG TOPS.

## ROCK TYPES

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

## ACCESSORIES

<b>MINERAL</b>  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	<b>FOSSIL</b>  Algae  Amph  Belm  Bioclst  Brach  Bryozoa  Cephal  Coral  Crin  Echin  Fish  Foram  Fossil  Gastro  Oolite	 Ostra  Pelec  Pellet  Pisolite  Plant  Strom  <b>STRINGER</b>  Anhy  Arg  Bent  Coal  Dol  Gyp  Ls  Mrst	 Sltstrg  Ssstrg  <b>TEXTURE</b>  Boundst  Chalky  Cryxln  Earthy  Finexln  Grainst  Lithogr  Microxln  Mudst  Packst  Wackest
---	--	--	--	---

**OTHER SYMBOLS**

- POROSITY**
- E Earthy
  - F Fenest
  - F Fracture
  - X Inter
  - M Moldic
  - O Organic
  - P Pinpoint

V Vuggy

- SORTING**
- W Well
  - M Moderate
  - P Poor

- ROUNDING**
- R Rounded
  - r Subrnd
  - a Subang
  - A Angular

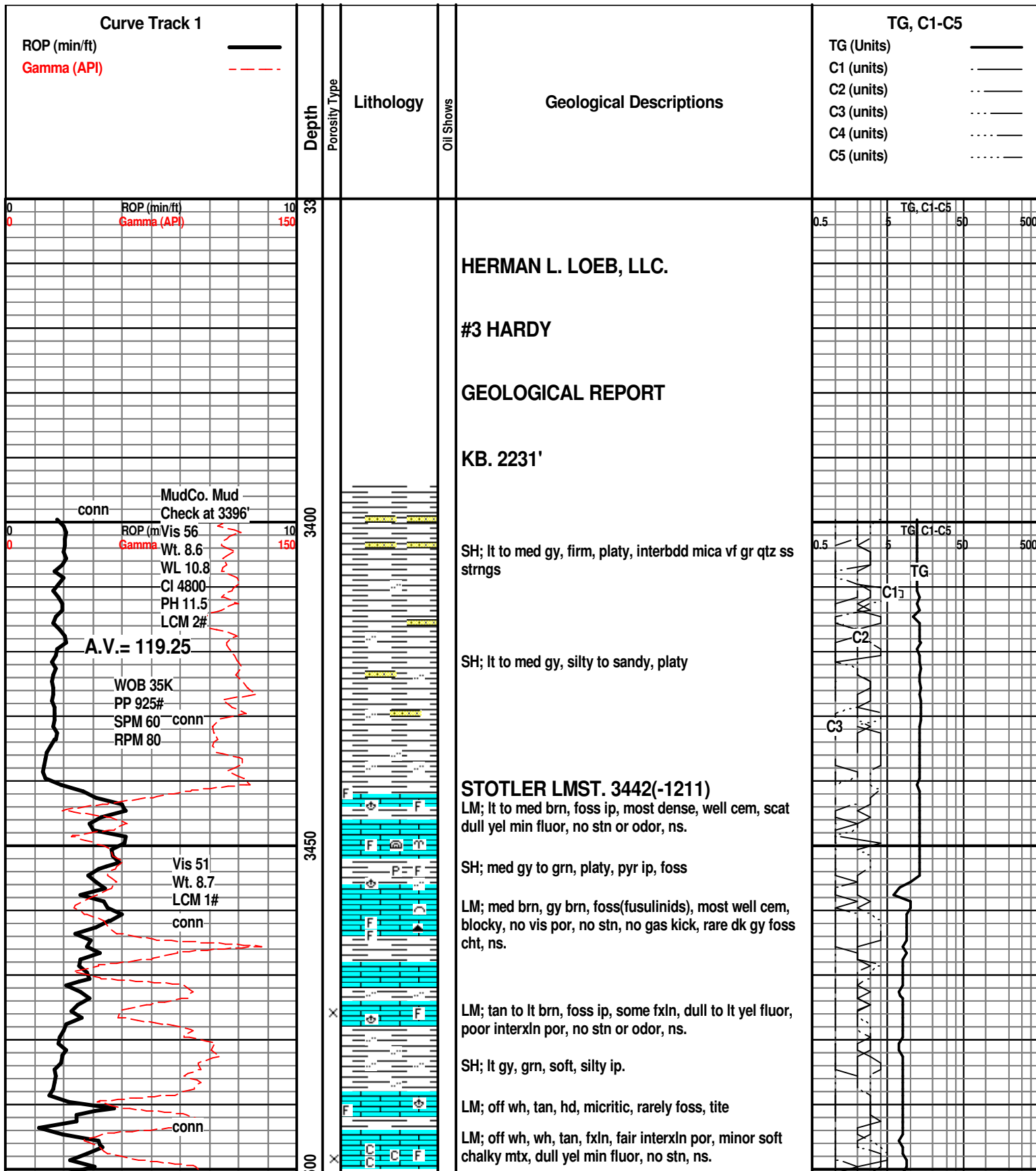
**OIL SHOW**

- Even

- Spotted
- Ques
- Dead

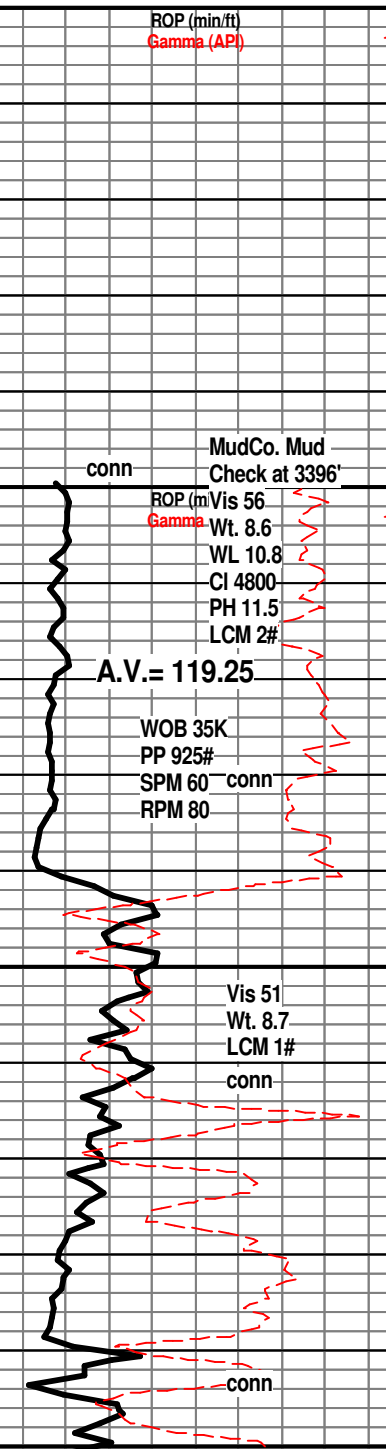
- INTERVAL**
- Core
  - Dst

- EVENT**
- Rft
  - Sidewall



ROP (min/ft) ———  
Gamma (API) - - - - -

TG (Units) ———  
C1 (units) . . . . .  
C2 (units) . . . . .  
C3 (units) . . . . .  
C4 (units) . . . . .  
C5 (units) . . . . .



HERMAN L. LOEB, LLC.

#3 HARDY

GEOLOGICAL REPORT

KB. 2231'

SH; It to med gy, firm, platy, interbdd mica vf gr qtz ss strngs

SH; It to med gy, silty to sandy, platy

STOTLER LMST. 3442(-1211)

LM; It to med brn, foss ip, most dense, well cem, scat dull yel min fluor, no stn or odor, ns.

SH; med gy to grn, platy, pyr ip, foss

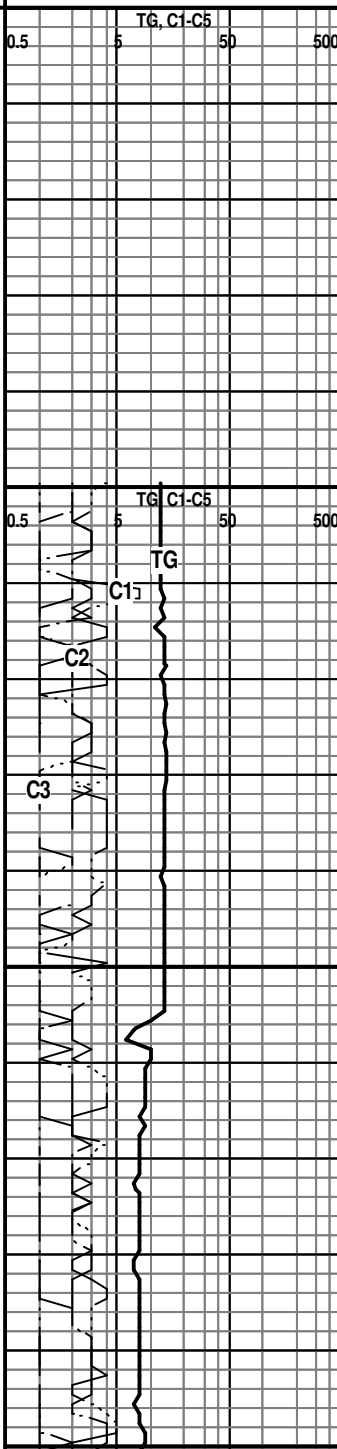
LM; med brn, gy brn, foss(fusulinids), most well cem, blocky, no vis por, no stn, no gas kick, rare dk gy foss cht, ns.

LM; tan to lt brn, foss ip, some fxln, dull to lt yel fluor, poor interxln por, no stn or odor, ns.

SH; It gy, grn, soft, silty ip.

LM; off wh, tan, hd, micritic, rarely foss, tite

LM; off wh, wh, tan, fxln, fair interxln por, minor soft chalky mtX, dull yel min fluor, no stn, ns.



MudCo. Mud  
Check at 3396'

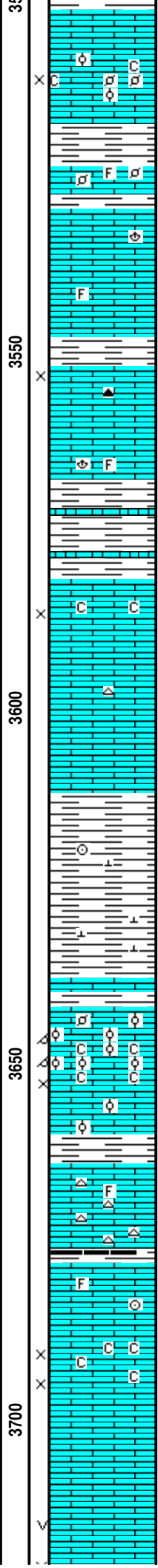
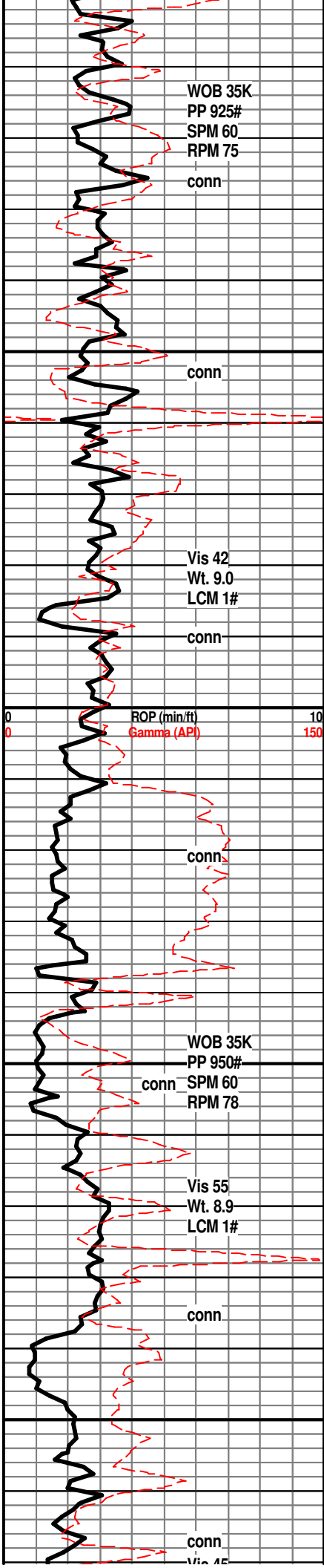
ROP (m) Vis 56  
Gamma Wt. 8.6  
WL 10.8  
CI 4800  
PH 11.5  
LCM 2#

A.V. = 119.25

WOB 35K  
PP 925#  
SPM 60 conn  
RPM 80

Vis 51  
Wt. 8.7  
LCM 1#  
conn

conn



**EMPORIA 3502(-1271)**  
LM; off wh, tan-lt brn, foss-pelletal to oolitic, poor interpart por, scat soft chalky mtx, no fluor, no gas kick, ns.

SH; grn, gy grn, fiss  
LM; tan to buff, lt brn, scat foss mat, most well cem, rare gy foss pellets, no fluor, ns.

LM; tan to lt brn, fxln to dense, rarely foss, no vis por, no stn or odor, ns.

LM; tan to lt brn, rare off wh, fxln, poor interxln por, trc dk gy cht, no fluor, no stn or odor, ns.

LM; tan to lt brn, most dense, scat foss mat - well cem, no vis por, ns.

SH; med gy, fiss to flakey, firm, interbdd hd shaly lmst.

LM; wh to off wh, fxln, soft ip, some chalky mtx, lt yel fluor, no stn or odor, no gas kick, ns.

LM; tan to off wh, buff, interbdd dk brn, most dense, some hard-sharp, trc off wh cht, no fluor, n.s

SH; med to dk gy, firm, platy, occ foss

SH; dk gy, silty ip, firm, calc, interbdd thin tite lmst strngs.

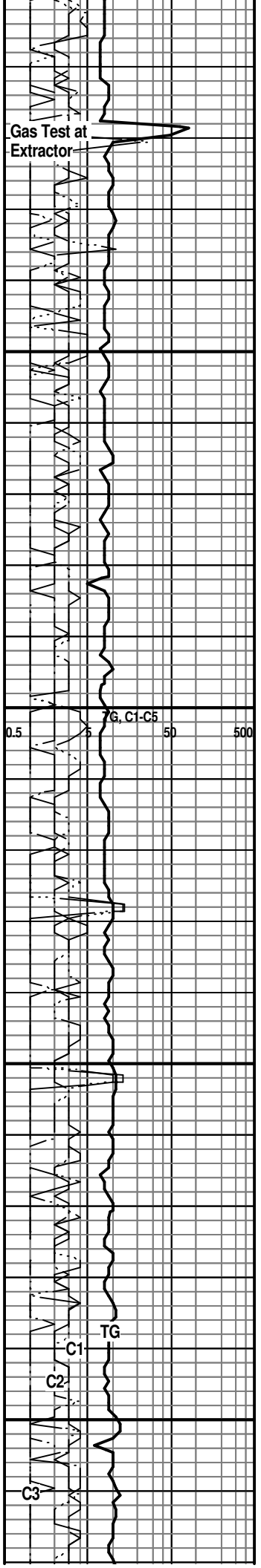
**HOWARD 3638(-1407)**  
LM; off wh, cream, foss - finely oolitic ip, interbdd med xln/gran text, fair oomoldic w/occ gd interxln por, minor soft chalky mtx, dull to lt yel min fluor, no stn or odor, no gas kick, ns.

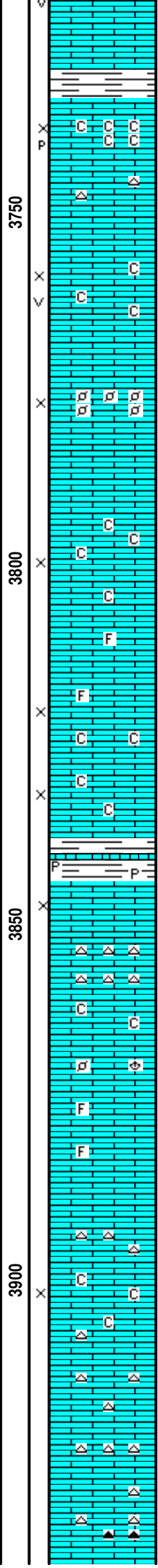
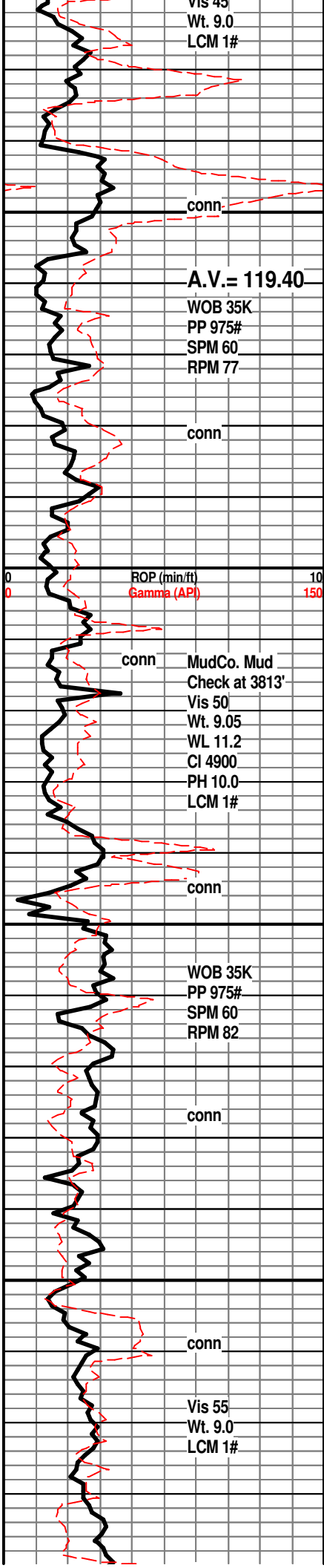
LM; lt to med brn, blocky, occ well cem foss, most dense - micritic, scat tan to off wh cht, no por, ns.

LM; tan to off wh, lt gy, fxln to micritic, foss ip, most dense, no fluor, ns.

LM; off wh, wh, f to med xln, gran text ip, gd interxln por, soft chalky mtx, dull yel min fluor only, no stn or odor, no gas kick, ns.

LM; tan to buff, lt brn, foss ip, most dense, blocky, interbdd foss lmst w/fair vug por, dull to occ lt yel fluor,





ns.

SH; med to dk gy, fiss  
**TOPEKA 3734(-1503)**  
 LM; tan to cream, off wh, gran to med xln, fair interxln and occ p-p por, chalky mtx ip, dull yel fluor, no stn or odor, no gas kick, ns.

LM; med brn, dense, occ gy/off wh cht, tite

LM; tan to off wh, med to cse xln, some gran, loosely cem, most w/gd interxln & scat vug por, occ soft chalky mtx, dull yel min fluor, no stn or odor, ns.

LM; tan to lt brn, scat cse pellets and foss frags, much spar calc cmt, fair interpart por, no fluor, no stn, no gas kick, barren, ns.

LM; tan to cream, lt brn, f to occ med xln, fair interxln por, minor soft chalky mtx, no fluor, no stn or odor, ns.

LM; tan to cream, buff, lt brn, f to med xln, occ interbdd gran to cse xln lmsst, fair to occ gd interxln por, minor chalky mtx, rare lt yel min fluor, no stn or odor, no gas kick, ns.

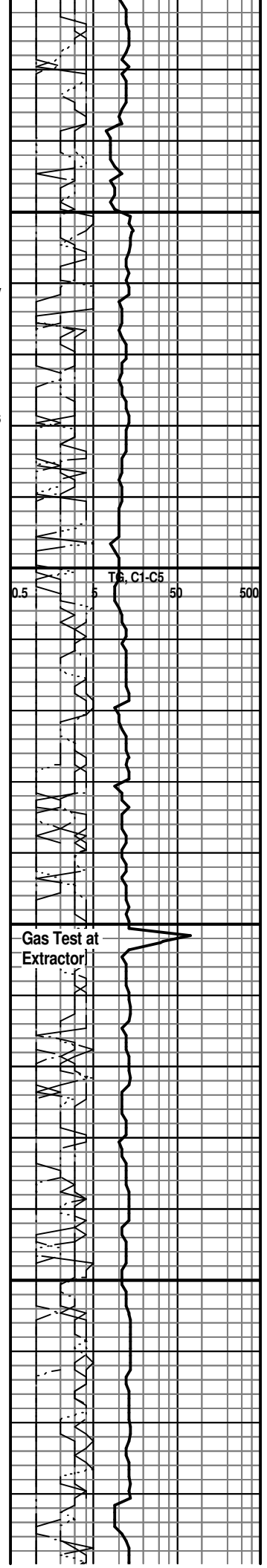
SH; med to dk gy, fiss, occ pyr  
 LM; lt brn, fxln, sandy text, gd interxln por, lt yel min fluor, no stn, ns.

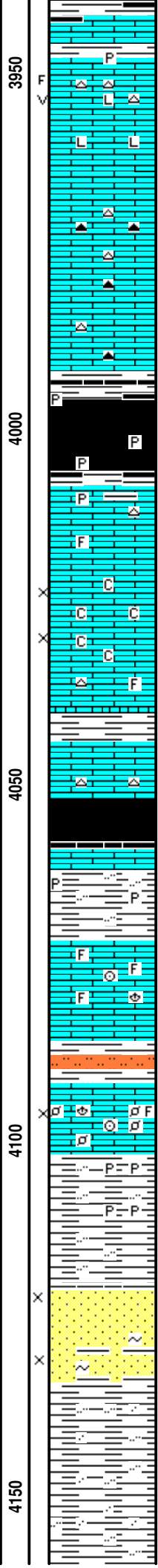
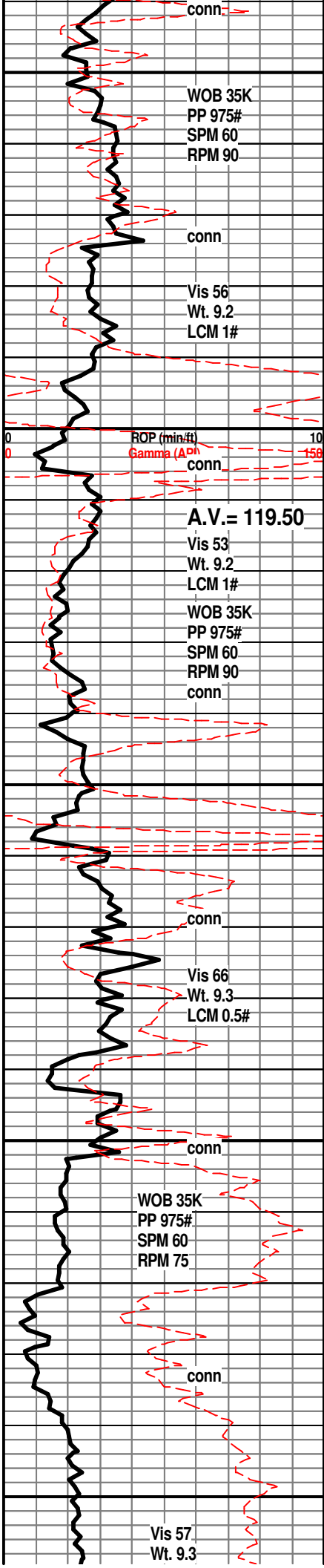
LM; lt brn, hd, blocky, interbdd banded gy cht, tite

LM; tan to lt brn, occ off wh, foss ip, most well cem, scat gy, off wh and dk gy/smoky cht, dull yel min fluor, no stn or odor, ns.

LM; wh to off wh, buff, fxln, scat poor to fair interxln por, interbdd wh to gy cht, chalky mtx ip, no fluor, no stn or odor, ns.

LM; tan to off wh, lt brn, fxln, scat cse spar calc xtals, cherty ip, no fluor, no stn or odor, ns.





SH; dk gy - blk, platy, pyr ip.

LM; lt brn, med xln - scat cse spar calc xtals, spotted lt brn oil stn, brite yel fluor, no apparent gas kick, scat vug por/fracs, fair milky cut, no odor, most looks tite

LM; tan to off wh, lt brn, fxln to micritic, most blocky, rare gy/wh cht, no fluor, no stn, ns.

LM; tan to lt brn, cream, fxln, cherty, most dense, micritic, no vis por, no fluor, ns.

SH; dk gy to blk, platy, soft to brittle, trc gas, rarely pyr

LM; tan to lt gy brn, most dense, occ pyr, some interbdd shaly lmst, rarely foss, no vis por, no fluor, ns.

LM; tan to off wh, wh, buff, fxln, chalky-soft, poor to fair interxln por, dull yel to no fluor, no stn or odor, ns.

SH; med to dk gy, firm

LM; tan to cream, buff, fxln, scat foss mat, most tite, rare gy/off wh cht, no fluor, no vis por, ns.

**HEEBNER SHALE 4054(-1823)**  
SH; blk, carb ip, soft to brittle, gassy

SH; grn, gy grn, silty ip, firm, occ pyr

**TORONTO 4072(-1841)**  
LM; off wh, lt brn, foss ip, most well cem, blocky, no vis por, no stn, scat dull yel min fluor, ns.

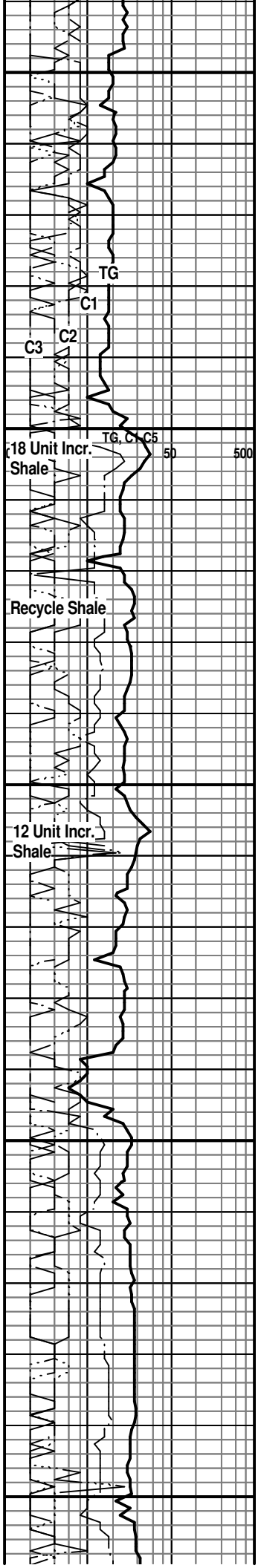
SH; lt gy, soft, silty w/interbdd sltst.

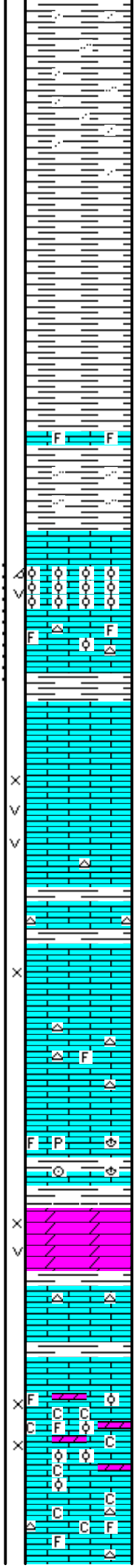
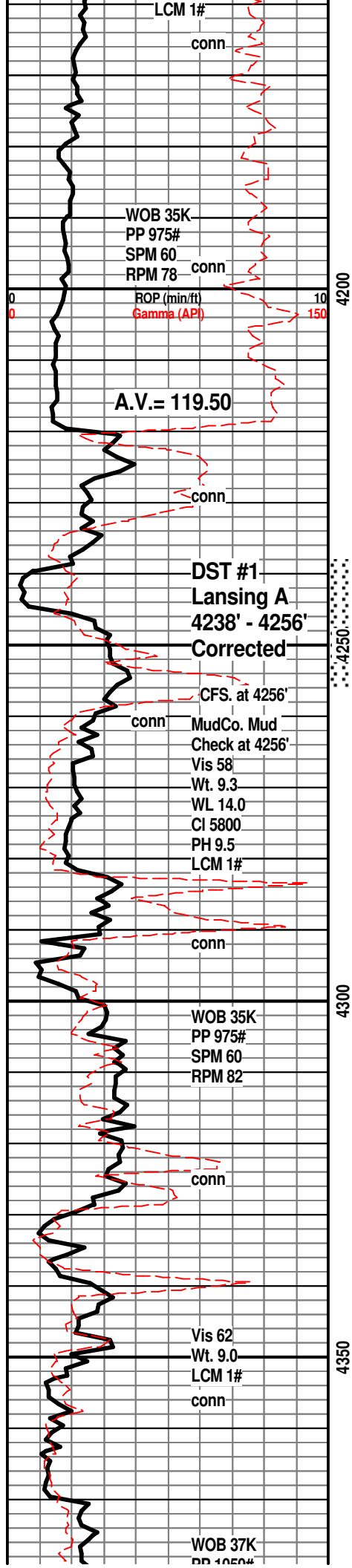
LM; tan to lt brn, v. foss ip - pelletal, poor to no interpart por, dull yel min fluor, ns.

SH; lt to med gy, silty, platy, occ pyr strngs.

SS; lt gy, rare wh, vf to f gr qtz, all clusters, fri, fair to gd intergran por, subrnd to subang gr, mica, no fluor, no stn, no gas kick, barren, , interbdd argil ss, rare glau, ns.

SH; lt to med gy, silty to sandy, firm





SH; lt to med gy, silty, occ mica, firm

SH; lt to med gy, fiss to flakey, soft

SH; med gy, smooth, sticky ip.

**BROWN LMST. 4220(-1989)**  
LM; med to occ dk brn, hd, foss ip.  
SH; med gy, firm, occ silty

**LANSING 'A' 4234(-2003)**  
LM; tan to med brn, oolitic, med to lrg molds, gd oomoldic por, scat vug por, med to brite golden yel fluor, fair/gd odor, spotted to even lt brn stn, SFO, gas bubbles vis, most w/gd cut  
LM; lt to med brn, foss ip, dense, scat tan cht  
**DST #1: Lansing 'A' 4238' - 4256' Corrected Depths to LOG**  
LM; off wh, med xln to gran text, chalky soft mtx ip, scat med yel fluor, quest. stn, faint odor  
LM; lt gy gy tan, med xln, fair interxln w/vug por, spotted oil stn, strong sulfur odor, med to occ brite yel fluor, fair cut, quest. gas bubbles, interbdd cse opaque spar calc xtals, fair to poor show

LM; med to dk brn, mottled text, cherty, tite

LM; tan to lt brn, gran to cse xln, fair interxln por, dull yel fluor, no stn or odor, ns.

LM; lt brn, tan to cream, most dense, micritic, rarely foss, scat tan cht, no vis por, no stn, ns.

LM; dk brn, occ foss, blocky, pyr ip, tite

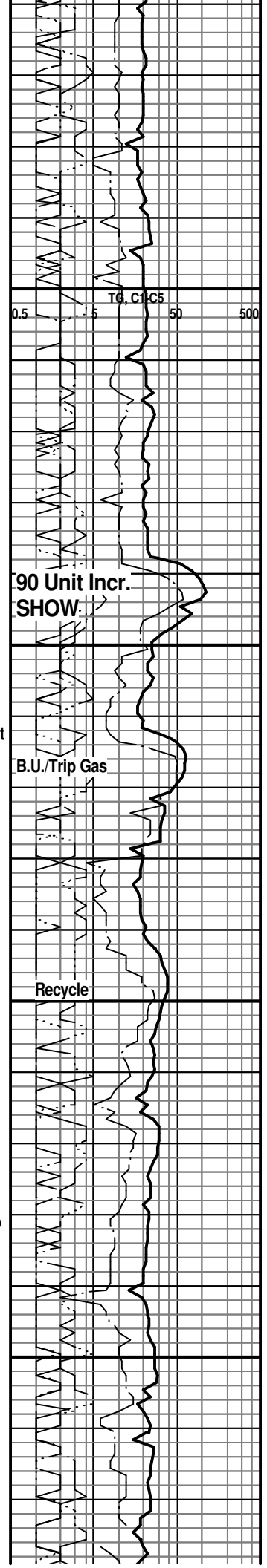
SH; med gy grn, firm, foss

DOL; off wh, wh, tan, sucrosic, partly chalky mtx, fair to gd interxln por, scat vug por, dull yel min fluor, no stn odor, ns.

LM; tan to off wh, hd, cherty ip, tite

**LANSING 'G' POROSITY 4350(-2119)**  
LM; off wh, foss - oolitic ip, much sucrosic text dolomitic lmst, scat soft chalky mtx, fair interpart/interxln por, dull to lt yel fluor, no vis stn, no gas kick, barren, ns.

LM; tan to off wh, cream, buff, fxln, scat foss mat, chalky mtx ip, dull yel min fluor, interbdd gy to tan cht,



PP 1050#  
SPM 50  
RPM 85  
conn

ROP (min/ft) 10  
Gamma (API) 150

CFS. at 4418'  
MudCo. Mud  
Check at 4418'  
Vis 60  
Wt. 9.3  
WL 11.6  
conn  
CI 6200  
PH 11.0  
LCM Trc.

WOB 37K  
conn  
PP 975#  
SPM 60  
RPM 78

A.V.= 119.60

conn  
Vis 52  
Wt. 9.2+  
LCM 1#

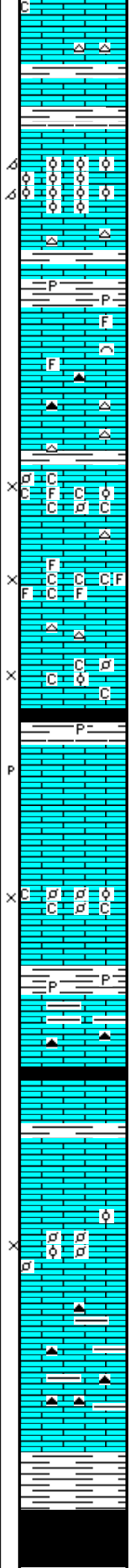
conn

conn  
WOB 36K  
PP 1000#  
SPM 60  
RPM 75

Vis 53  
wt. 9.3  
LCM 1#  
conn

A.V.=119.00

4400  
4450  
4500  
4550



no vis por, ns.

SH; med gy, fiss, interbdd gy hd lmst.

### LANS/KC. 'H' 4402(-2171)

LM; tan to lt brn, buff, oolitic, small to med size moldic por, brittle, dull yel fluor, faint sulfur odor, no stn, no gas kick, barren, ns.

LM; tan to lt brn, buff, foss ip, hd, cherty ip.

SH; grn, gy grn, fiss, occ pyr

LM; tan to off wh, foss ip, interbdd med xln, no vis por, cherty ip, no fluor, no stn, ns.

LM; med brn, micritic, occ cherty, tite

### KC 'I' ZONE 4444(-2213)

LM; off wh, tan, finely pelletal/rarely oolitic, poor interpart por, scat to patchy uneven lt brn to blk residual to dead stn, med yel fluor in chalky sections, faint odor, no gas kick, poor/no show

LM; tan to cream, off wh, med xln, scat foss mat, much soft chalky mtx, fair interxln por, dull yel min fluor, no vis stn, no odor, ns.

LM; off wh, tan, foss - med xln ip, scat fair interxln por, chalky mtx, faint sulfur odor, no vis stn, no gas kick, ns.

SH; blk, carb ip, pyr

LM; tan to cream, lt brn, foss - oolitic/pelletal ip, scat blk tar/gils., poor p-p por, dull yel fluor, no odor, no live shows, no gas kick, looks tite

LM; tan to cream, buff, foss to finely pelletal, fair interpart por, soft chalky mtx ip, no fluor, no stn or odor, ns.

SH; med to dk gy, fiss - flakey, occ pyr

LM; med to dk brn, gy brn, micritic, argil ip, hd - blocky, rare smoky cht, tite

### STARK SHALE 4538(-2307)

SH; blk, carb ip, platy

### SWOPE 4538(-2307)

LM; tan to cream, lt brn, foss - finely pelletal to oolitic, poor to fair interpart por, scat lt yel min fluor, no stn or odor, ns.

LM; lt to med brn, most dense, blocky, interbdd argil lmst, no vis por, scat dk brn to smoky cht, no fluor, ns.

LM; med to dk brn, hd, micritic, tite, interbdd dk gy cht

SH; blk, fiss, gassy ip

TG. 01-C5  
TG

C1  
C2  
C3  
C4

3 Unit Incr.

8 Unit Incr.

5 Unit Incr. Shale

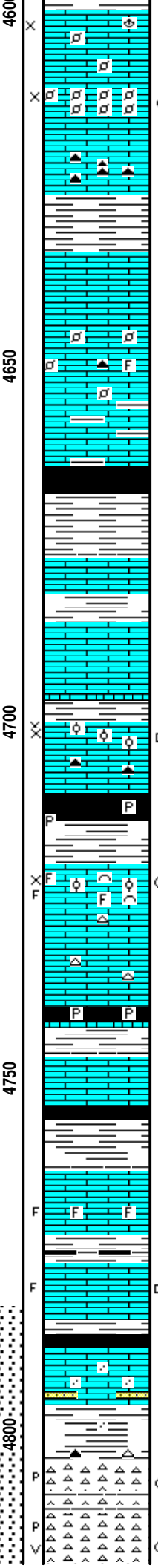
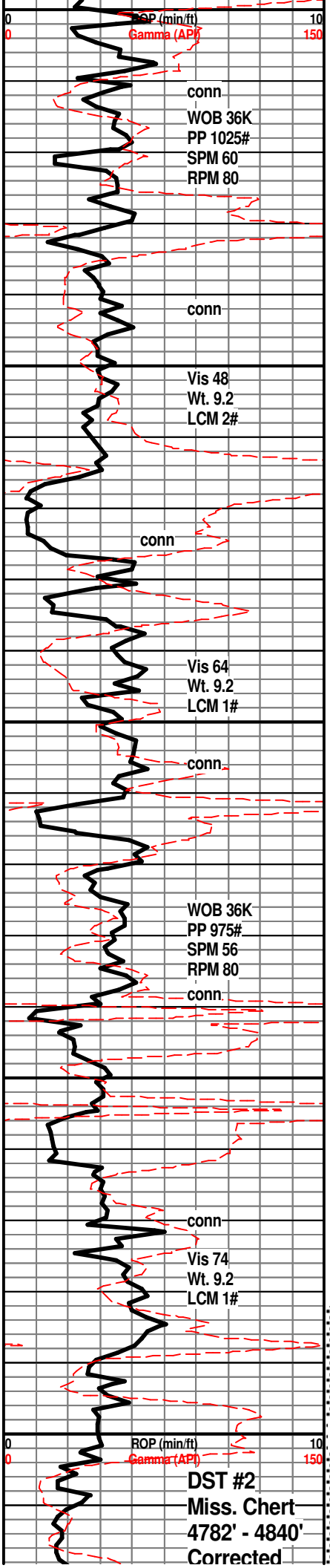
Gas Tests

Gas Tests

Gas Test - New Filament

48 Unit Incr. Shale





**HERTHA 4600(-2369)**  
 LM ; tan to lt brn, foss ip, scat poor interpart por, dull yel min fluor only, no stn or odor, no gas kick, ns.

LM; tan to cream, buff, foss - finely pelletal, poor vis interpart por, scat lt to dk brn stn, some dead oil - tar/gilsonite, med yel patchy fluor, no odor, no FO., weak to fair cut

**BASE KANSAS CITY 4626(-2395)**

SH; varic, grn, gy, brn, rust red, platy to flakey

LM; med brn, gy brn, most dense, argil ip, scat foss mat, no vis por, no stn or odor, ns.

LM; med gy to gy brn, dense, argil ip, hd - blocky, no vis por, tite, ns.

SH; med gy, grn, rare dk gy, soft, flakey

**MARMATON 4677(-2446)**

LM; tan to lt brn, pale grn tint, hd, blocky, no vis por, med yel fluor, no stn or odor, ns.

LM; tan to buff, lt brn, hd - blocky, most micritic, no vis por, lt yel fluor, no vis stn, no odor, ns.

LM; tan to lt brn, some med brn, foss ip - rarely oolitic, poor - no vis por, scat blk tar/gils, no live shows, lt yel fluor, no odor

SH; dk gy to blk, fiss, occ pyr

**PAWNEE 4720(-2489)**

LM; tan to cream, buff, foss - finely oolitic, some foss hash, trc med brn spotted oil stn, no odor, lt yel fluor, no vis gas bubbles, weak/no cut, poss fracs - edge calc xtals

LM; tan to lt brn, blocky, hd, scat tan cht, tite

SH; blk, platy, carb ip, gassy, scat pyr

LM; tan to lt brn, hd, blocky, scat foss mat, dense, no vis por, ns.

**CHEROKEE SHALE 4754(-2523)**

SH; blk, fiss, carb ip, platy, w/varic platy sh.

LM; lt to med brn, tan, foss ip, fxl w/scat cse spar calc xtals, poss fracs, dull yel fluor, no stn or odor, ns.

SH; dk gy, some blk, fiss

LM; lt to med brn, tan, most dense, micritic, poss fracs w/dk brn/blk tar/dead oil residue, dull yel fluor, no odor

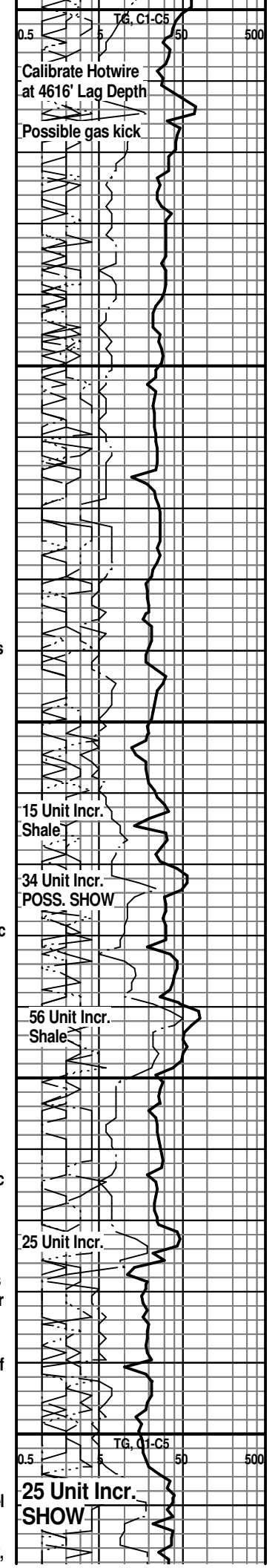
LM; lt brn, tan, hd - blocky ip, interbdd sandy lmst, trc f gr qtz ss, no vis stn, no odor

SH; varic, soft ip, trc weath multicolored cht

**MISSISSIPPI CHERT 4804(-2573)**

CHT; wh, porc, pred fresh, spotted lt brn oil stn, rare trip cht w/poor p-p por, few gas bubbles, no odor, lt yel fluor, poor/no cut

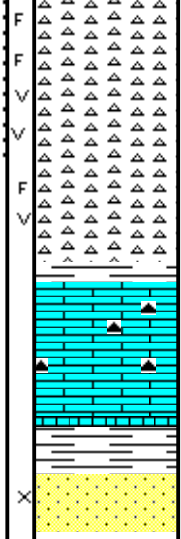
CHT; wh, off wh, fresh and trip, fri - breaks fairly easily,



Vis 61  
 Wt. 9.2  
 LCM 1#  
 conn  
 CFS. at 4840'  
 MudCo. Mud  
 Check at 4840'  
 Vis 53  
 Wt. 9.4  
 WL 10.0  
 CI 5800  
 PH 10.0  
 LCM 1#  
 conn

CFS. at 4882'  
 RTD = 4878' LOG  
 MudCo. Mud  
 Check at 4882'  
 Vis 74  
 Wt. 9.35  
 WL 10.4  
 CI 6700  
 PH 9.5  
 LCM 1#

4850  
 4900  
 4950



spotted lt/med brn oil stn, occ p-p & vug por, gas bubbles, dull/lt yel fluor, no odor  
 CHT; wh to off wh, fresh and tripolite, frags and vug por visible, some fri, other porc - hd, scat brite yel fluor, faint odor, vis. gas bubbles, Trc. FO. only when crushed, fair cut  
**DST #2: Miss. Chert 4782' - 4840'**  
**Corrected Depths to LOG**  
 CHT; wh to off wh, fresh and tripolite, sl. incr in live oil stn, incr. in brite yel fluor, frags and vug por, faint odor, spotted stn  
 SH; rust red, soft, grn & gy shales also  
 LM; med brn, some rose red/brn, blocky, dense, cherty w/amber to org fresh cht, no vis por, ns.

**KINDERHOOK SHALE 4867(-2636)**  
**KINDERHOOK SS 4872(-2641)**  
 SS; clr, lt gy, most fgr qtz, hd - qtzitic ip, poor to no por, no fluor, trc blk dead oil stn, no odor  
 BIT CRATERED AT 4882' ROTARY DEPTH

RTD. 4882' at 6:50 AM. 7/27/11  
 LTD. 4878'  
 Halliburton DIL, NEU/DEN + PE,  
 Microlog

**NOTE; This log was shifted upward by 4' to 5' for correlation purposes with the Halliburton LOGS.**

