GEOLOGIST'S REPORT

OPERATOR **MURFIN DRILLING COMP. INC.**

LEASE **BETTY #1-2**

LOCATION **660' FSL 600' FWL**

SEC. **2** TWSP **1S** RGE **37W**

COUNTY **CHEYENNE** STATE **KANSAS**

FIELD **WILDCAT**

CONTRACTOR MURFIN DRILLING CO. INC RIG NO. #20

COMMENCED MARCH 20, 2014 COMPLETED APRIL 1.2014

MUD DISPLACED 3400 MUD TYPE CHEMICAL

DRILLING TIME KEPT FROM 3470 TO 4700

SAMPLES SAVED FROM 3470 TO 4700

SAMPLES EXAMINED FROM 3470 TO 4700

GEOLOGICAL SUPERVISION FROM 3510 TO 4700

GEOLOGIST ON WELL STEPHEN J MILLER

FORMATION NAME	LOG TOP	LOG DATUM	SAMPLE TOP	SAMPLE DATUM
ANHYDRITE	3112	+51	3116	+47
B/ ANHYDRITE	3140	+23	3146	+17
NEVA	3566	-403	3583	-420
TOPEKA	3899	-736	3902	-739
LANSING	4118	-955	4119	-956
STARK SHALE	4332	-1169	4337	-1174
B/ KANSAS CITY	4389	-1226	4394	-1231
PAWNEE LIME	4512	-1349	4513	-1350
CHEROKEE SHALE	4602	-1439	4605	-1442
Total Depth	4697	-1534	4700	-1537

ELEVATIONS

KB **3163'**

GL **3152'**

ALL MEASUREMENTS FROM K.B.

CASING RECORD

Conductor

Surface 8 5/8"@ 223'

Production 5 1/2"@4677'

ELECTRICAL SURVEYS:

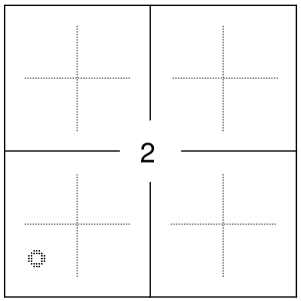
PIONEER LOGGING

DUAL INDUCTION

COMP NEU-DEN

SONIC LOG

MICRO LOG



REMARKS

API 15-023-21382

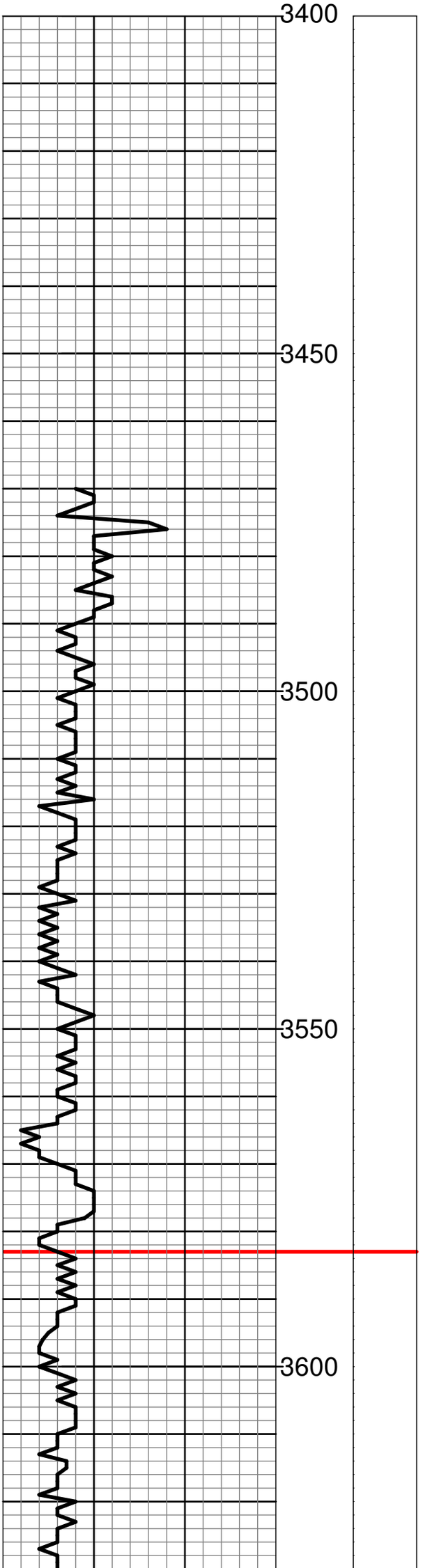
Drilling Fluids: MORGAN MUD

Drill Stem Testing: TRILOBITE TESTERS

Gas Trailer: NONE

Reserve Pit Chlorides: 700 PPM

DRILL TIME (MIN/FT)	DEPTH	LITHOLOGY	SHOWS	SAMPLE DESCRIPTIONS	REMARKS



Shale red brn sandy soft

Sandstone tan vf grain fria p vis por NS

Shale grn gray purple sli sandy waxy

Shale red sandy soft

Sandstone red vf grain silty

Shale red soft sandy

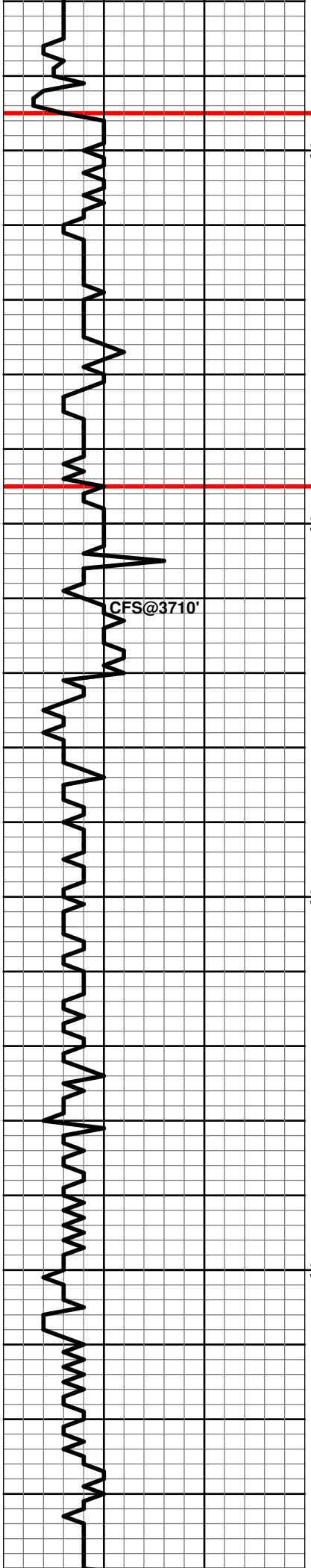
Sandstone tan vf grain fria p vis por NS

Limestone crm f-xln fos sucrosic f fos-cast por NS

NEVA LIME
3583-420

Shale red sandy soft

Sandstone red vf grain shaly



Sandstone tan vf grain no vis por

Shale red sandy soft

Limestone gray brn f-xln sli fos dense

RED EAGLE
3645-482

Sandstone brn vf-f grainsilty no vis por

Shale red gray grn maroon sandy waxy sli pyritic

Limestone dk gray f-xln fos dense

FORAKER LIME
3695-532

Limestone lt gray f-xln fos ool sli sandy p int-fos por chalky NS

Limestone tan f--xln fos chalky scat fos-cast por NS

Sandstone dk gray vf grain silty sli mica carb no vis por NS

Shale brn red silty sandy soft

Limestone crm f-xln sli fos dense

Shale red brn sandy soft

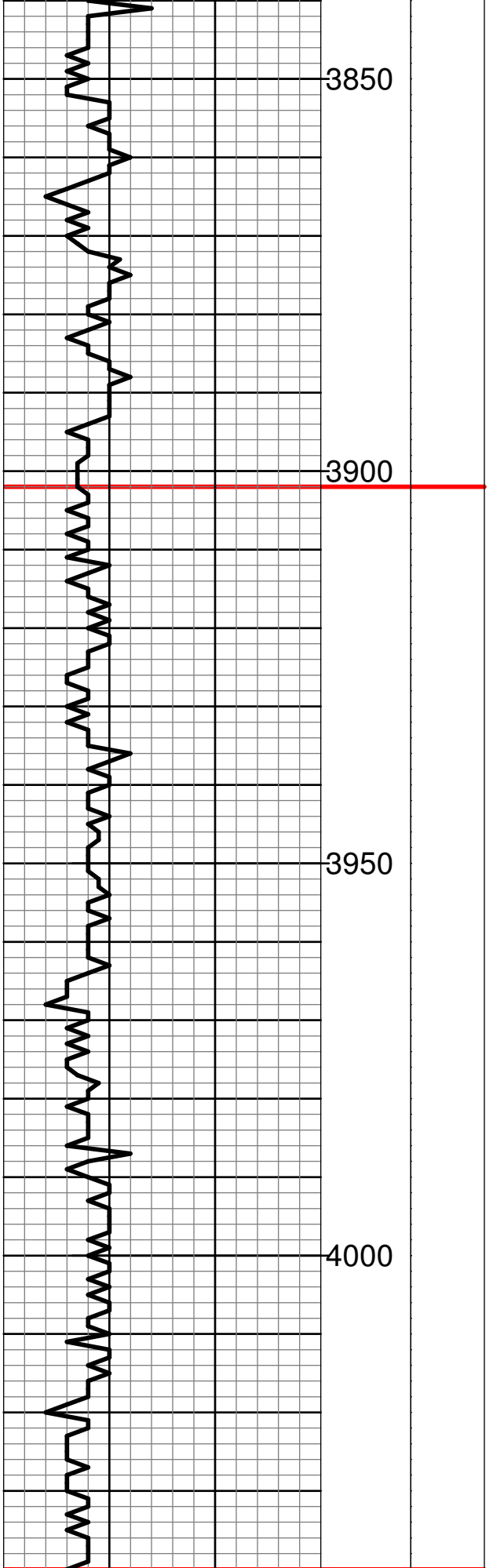
Limestone tan f-xln fos dense

Shale red brn sandy soft

Sandstone red vf grain silty

Limestone tan f-xln fos no vis por NS

Shale red grn maroon sandy



Limestone tan f-xln fos chalky dense

Limestone lt gray f-xln fos ool p int-ool por rare SFO (flaky)scat dk asphaltic stain no odor

Shale brn red sandy soft

Limestone tan f-xln fos dense

Shale red gray sandy soft

Limestone lt gray f-xln sli fos dense

Shale grn gray pyritic

Limestone tan f-xln sli fos dense

Sandstone red vf grain shaly tite

Limestone crm f-xln sli fos dhalky

Shale red brn soft sandy

Limestone gray f-xln ool fos p int ool por rare SFO scat asphaltic stain

Shale red sandy

Limestone crm f-xln sli fos sli chalky

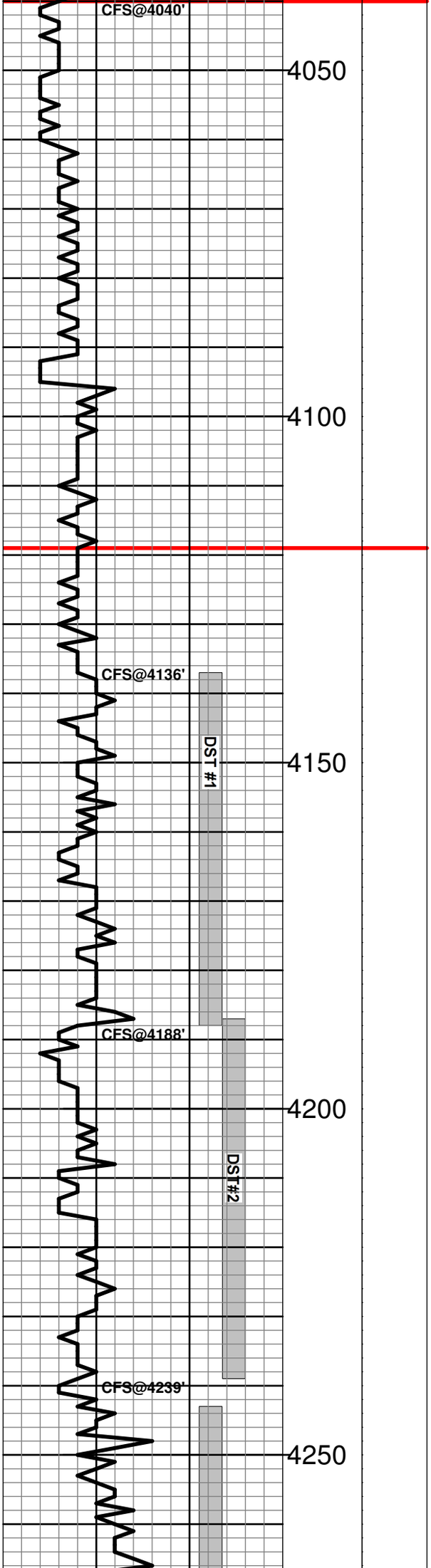
Shale purple sandy

Shale lt brn sandy

Shale gray brn red sandy soft

Shale red brn sandy soft

TOPEKA LIME
3902-739



Limestone crm lt gray md-xln sli fos sli chalky sucrosic p int-xln por NS

Limestone tan crm f-xln sli fos sli chalky dense

Limestone gray f-xln dense

Shale brn grn silty

Limestone dk gray f-xln sli mottled dense

Sandstone lt gray f grain limy no vis por NSFO asphaltic stain

Shale brn red grn gray silty sandy soft

OREAD LIME
4040-877

Limestone crm tan f-xln sli fos chalky dense

Shale brn grn gray sli sandy sli pyritic

Shale brn red sandy soft

Limestone lt gray f-xln fos sli ool f inter-ool por f-gd fos-cast por SSFO no odor spotted brn stain

Shale brn grn gray sandy

Shale brn red gray grn silty sli sandy

Shale brn red sandy soft

Limestone crm f-xln fos sli ool sli chalky f fos-cast por GSFO(waxy) no odor spotted dk brn stain

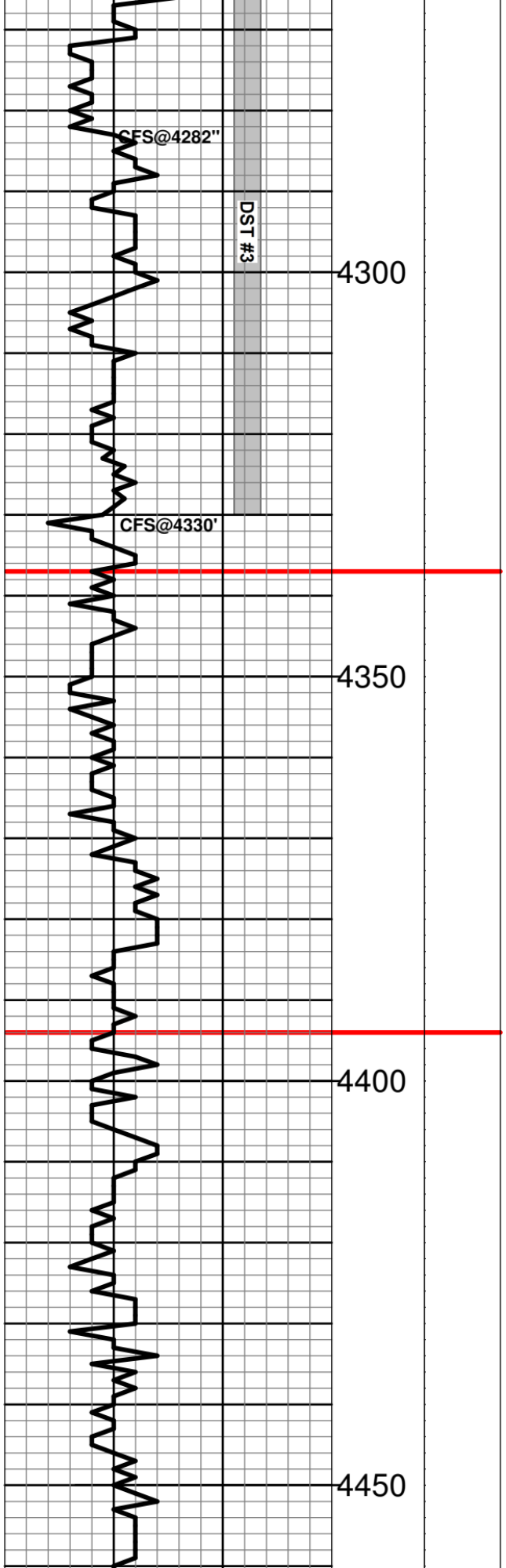
Shale brn silty sandy

Shale gray brn grn silty

LANSING LIME
4119-956

DST #1 4137-4188
30-60-90-90
Weak blow @4'
Weak blow@2'
REC
6' OIL
63' OCWM 20%OIL
63'HOCM 45%OIL
63'OCM 10% OIL
FP 15-49# 63-106#
SIP 1183-1127#

DST #2 4187-4239
30-60-60-90
Weak blow@3'
Weak blow@2'
REC
53' OCM 10% OIL
189' OCWM 5%OIL 35%SW
(42,000PPM)
FP 15-71# 77-118#
SIP 1305-1299#



Limestone lt gray crm f-xln fos sli chalky dense

DST #3 4243-4330
30-60-30-60
Weak blow 1/4'
No blow
REC
2' MUD
FP 15-17# 18-41#
SIP 689-610#

Shale brn gray lt gray silty

Shale brn silty sandy

Limestone lt gray f-xln sli fos ool p int-ool por SSFO(waxy) no odor spotted dark brn stain

Shale gray grn brn silty

STARK SHALE
4337-1174

Shale gray brn sandy

Sandstone brn vf grain silty no vis por

Shale brn silty sandy soft

Limestone lt gray crm sli ool sli chalky scat int-ool por NS

Shale brn grn silty

Limestone crm f-xln fos sli chalky dense

B/ KANSAS CITY
4394-1231

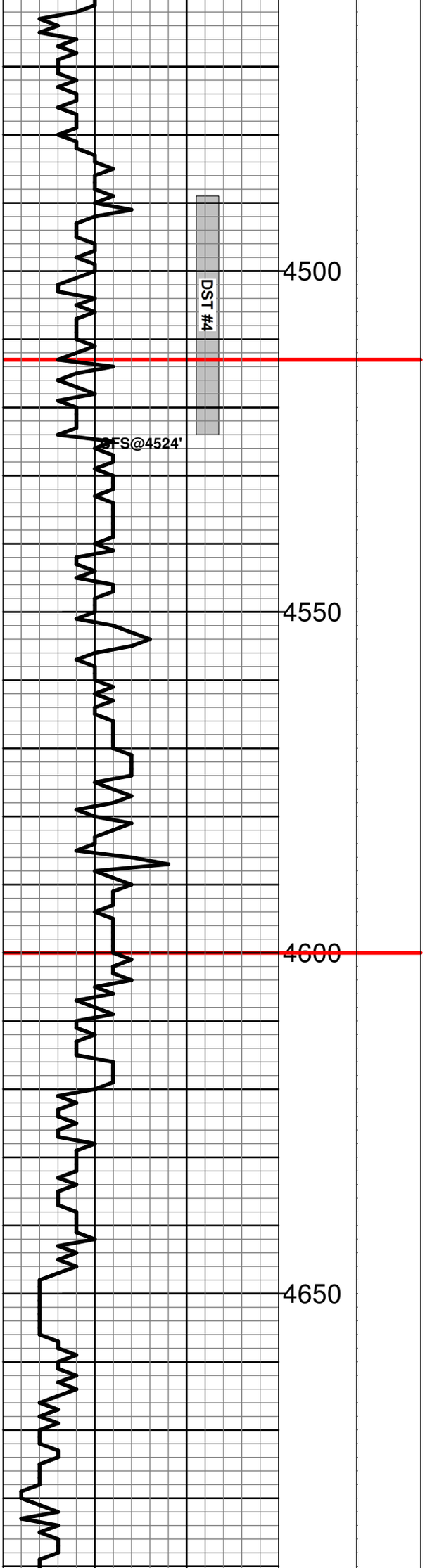
Shale brn grn silty

Limestone crm tan f-xln sli fos dense

Shale brn grn purple sli sandy

Limestone tan f-xln sli fos sli ool sli chalky

Shale brn grn sandy



Shale brn red sandy soft

Limestone crm tan f-xln sli fos sli chalky

Shale gray brn sandy

Limestone crm f-xln sli fos ool p int-ool por SSFO(gassy) no odor spotted lt brn stain

Limestone lt gray f-xln sli fos dense

Shale gray brn sandy

Limestone crm tan f-xln fos chalky no vis por

Limestone lt gray f-xln sli fos dense

Shale black carb

Shale brn gray sli sandy

Limestone lt gray f-xln grainy dense

Shale black carb

Shale brn gray sli sandy

Limestone tan crm f-xln fos sli ool sli chalky no vis por

Limestone lt gray f-xln fos sli chalky dense

Shale brn grn maroon sli sandy

Limestone lt gray f-xln sli fos dense

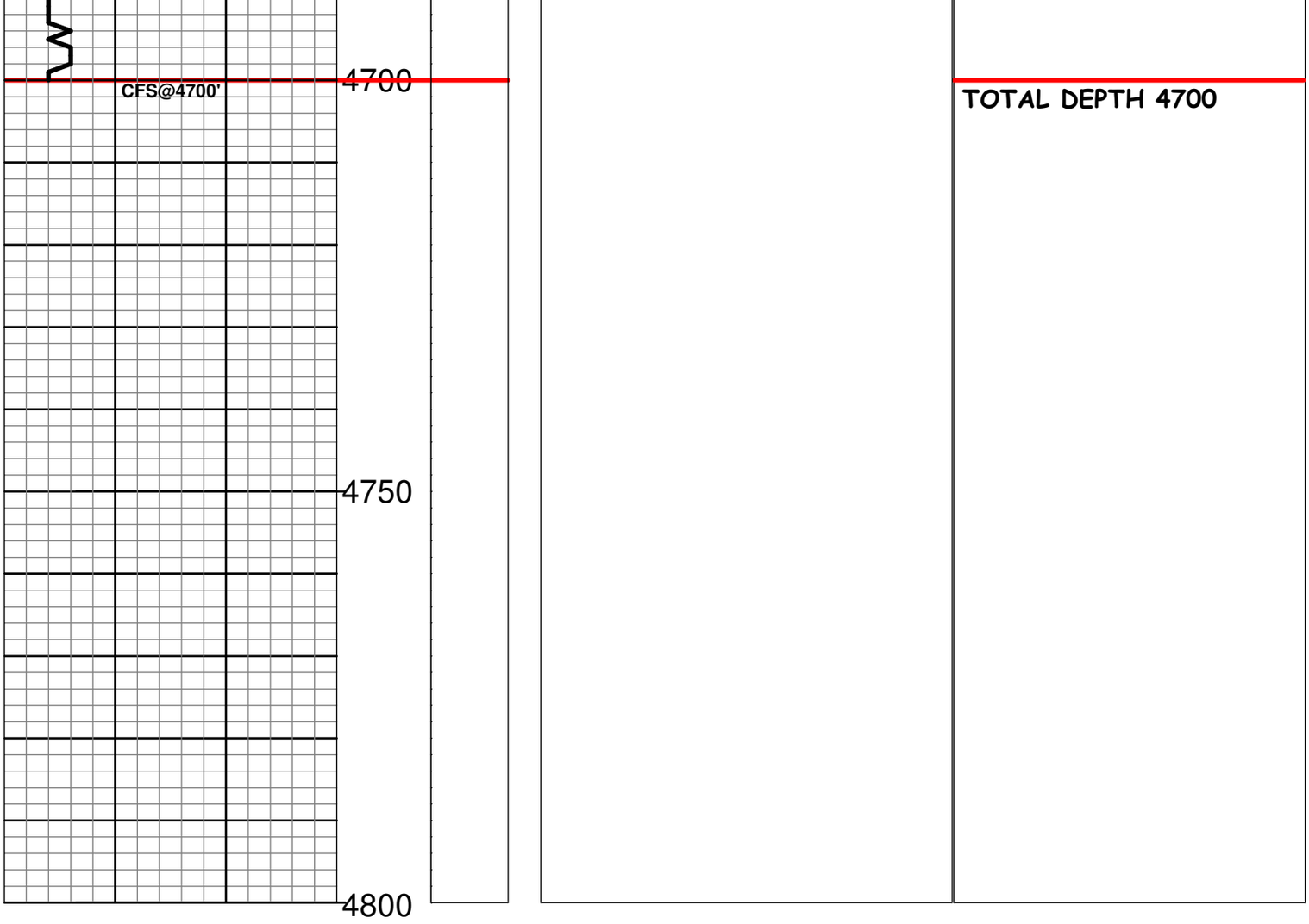
Sandstone white purple md-v lg grain sub ang sli limy NS w/ v lg ind grains(milky qutz)

Shale gray grn maroon purple sandy

DST #4 4489-4524
30-60-30-60
SURF BLOW
SURF BLOW 23"
REC
3' OSM
FP 13-14# 13-14#
SIP 33-21#

PAWNEE LIME
4513-1350

CHEROKEE SHALE
4605-1442



Operator: MURFIN DRILLING COMP. INC.

Lease: BETTY #1-2

Location: 660' FSL 600' FWL **SEC.** 30 **TWSP** 1S **RGE** 38W

County: CHEYENNE **State:** KANSAS