

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

Well Name: #2-31 Vulgamore  
 Location: 1910' FSL, 610' FEL, SECTION 31-19S-33W, NW SE NE SE  
 License Number: API: 15-171-209311 Region: Scott County  
 Spud Date: 03/04/2013 Drilling Completed: 03/15/2013  
 Surface Coordinates: LAT 38.3572515  
 LONG -100.9998485  
 Bottom Hole Coordinates: Vertical hole  
 Ground Elevation (ft): 2991' K.B. Elevation (ft): 2996'  
 Logged Interval (ft): 3700' To: RTD Total Depth (ft): 4790'  
 Formation: Mississippian at RTD  
 Type of Drilling Fluid: Chemical  
 Printed by WellSight Log Viewer from WellSight Systems 1-800-447-1534 www.WellSight.com

**OPERATOR**

Company: Grand Mesa Operating Co.  
 Address: 1700 N. Waterfront Parkway  
 Bldg. 600  
 Wichita, KS 67206-5514

**GEOLOGIST**

Name: John Goldsmith  
 Company: John Goldsmith Wellsite Service  
 Address: 427 Roosevelt St.  
 Cheney, KS 67025  
 316-640-0236

**COMMENTS**

Contractor: Murfin Drilling Rig #24  
 Pusher: Tony Martin  
 Surface Casing: 5 joints of 8 5/8" set at 213.67'  
 Production Casing: No production casing installed, well was plugged.  
 Mud by: MudCo  
 DST's by: Diamond Testing  
 Logs by: Weatherford Wireline Services (DIL, CN-CD, ML)  
 RTD=4790'  
 LTD=4790'

**FORMATION TOPS      SAMPLE TOPS      LOG TOPS**

FORMATION	Depth	Datum	Depth	Datum
Queen Hill	3792'	-796	3794'	-798
Heebner Shale	3868'	-872	3868'	-872
Toronto	3886'	-890	3886'	-890
Lansing	3918'	-922	3918'	-922
Muncie Creek Shale	4112'	-1116	4112'	-1116
Stark Shale	4226'	-1230	4226'	-1230
Hushpuckney Shale	4279'	-1283	4279'	-1283
Marmaton	4386'	-1390	4386'	-1390
Upper Fort Scott	4464'	-1468	4468'	-1472
Little Osage Shale	4482'	-1486	4485'	-1489
Excello Shale	4500'	-1504	4500'	-1504
Morrow	4670'	-1674	4670'	-1674
Mississippian	4768'	-1772	4768'	-1772
RTD	4790'	-1794		
LTD			4790'	-1794

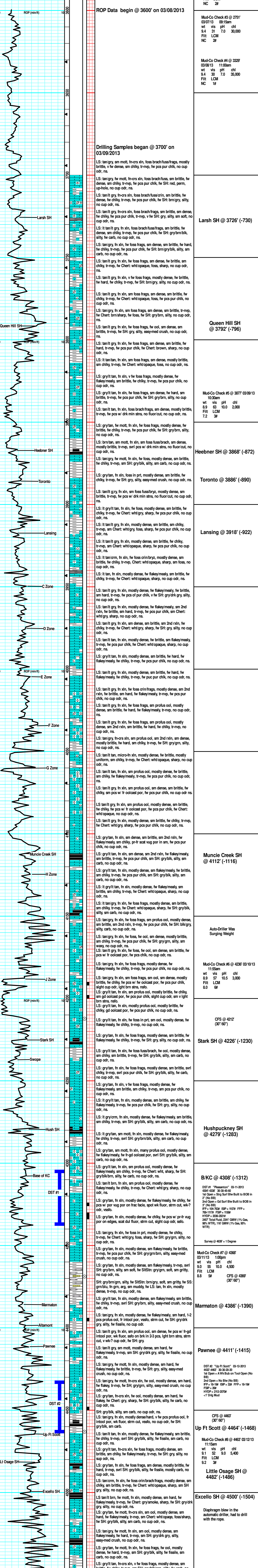
**DSTs**  
 DST #1 "Pleasanton" 03-11-2013 4304'-4338' 30-30-45-60  
 1st Open = Strg Surf Blw Built to BOB in 2" (No BB)  
 2nd Open = Gd Surf Blw Built to BOB in 3" (No BB)  
 IFP = 104-763# ISIP = 1157# FFP = 769-1117# FSIP = 1158#  
 HYDP = 2036-2021#  
 2457' Total Fluid, 2341' GMW (1% Gas, 98% WTR), 116' GMW (1% Gas, 95% WTR)  
 DST #2 "Up Ft Scott" 03-12-2013 4432'-4463' 30-30-20-20  
 1st Open = A Wk Bub on Tool Open (No BB)  
 2nd Open = No Blw (No BB)  
 IFP = 18-19# ISIP = 32# FFP = 18-19# FSIP = 26#  
 HYDP = 2112-2070#  
 <1' Drig Mud  
 DST #3 "Morrow" 03-13-2013 4638-4700' 30-45-60-75  
 1st Open = Wk Intermittent Surf Blw (No BB)  
 2nd Open = No Blw (No BB)  
 IFP = 19-22# ISIP = 167# FFP = 23-25# FSIP = 115#  
 HYDP = 2228-2204#  
 5' Mud w/ sm Gas Bub's  
 DST #4 "Morrow" 03-14-2013 4636-4720' 45-60-30-75  
 1st Open = Bt to 1" in 18min, Died back to 1/4" (No BB)  
 2nd Open = Fw Bub's on Tool Open (No BB)  
 IFP = 21-28# ISIP = 413# FFP = 29-31# FSIP = 327#  
 HYDP = 2234-2198#  
 5' Mud w/ sm Intermittent Gas Bub's

**ROCK TYPES**

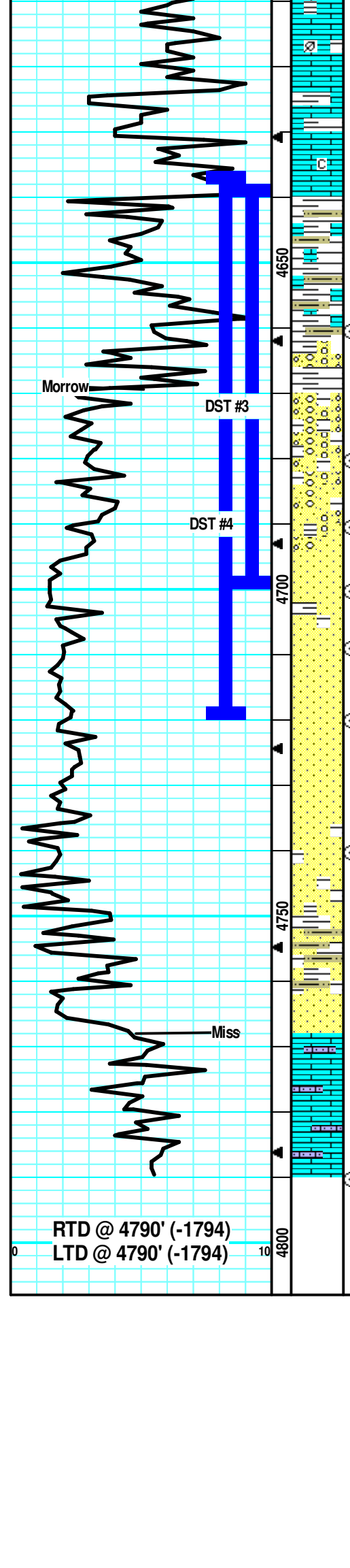
Anhy	Salt	Dol	Styly
Coal	Shcol	Dtd	Sdy dolo
Congl	Shgt	Gry sh	Sily dolo
Dol	Silt	Sandylms	Shly dolo
Lmp	Cs	Shale	Shaly ls
Gyp	Carb sh	Siltstn	

**ACCESSORIES**

Plant	Glaug	STRINGER
Strom	Hymym	Anhy
Fuss	Kaol	Arg
Oomold	Marl	Bent
MINERAL	Minxl	Coal
Anhy	Nodule	Dol
Arg	Phos	Gyp
Bent	Pyr	Ls
Bit	Salt	Mrst
Brecfrag	Sandy	Siltstrg
Calc	Silt	Ssstrg
Carb	Siltstn	Carbsh
Chldk	Sulphur	Chystn
Chilt	Tuff	Dol
Dol	Chorite	Grysh
Feldspar	Dol	Grystl
Ferrpel	Sand	Lms
	Sity	Sandylms
		Sh
		Siltstn



DST #1 "Pleasanton" 03-11-2013 4304'-4338' 30-30-45-60  
 1st Open = Strg Surf Blw Built to BOB in 2" (No BB)  
 2nd Open = Gd Surf Blw Built to BOB in 3" (No BB)  
 IFP = 104-763# ISIP = 1157# FFP = 769-1117# FSIP = 1158#  
 HYDP = 2036-2021#  
 2457' Total Fluid, 2341' GMW (1% Gas, 98% WTR), 116' GMW (1% Gas, 95% WTR)  
 Survey @ 4327 ± 1 Degree  
 Mud-Co Check #1 @ 03/04/13  
 Anhydrite 2205' (+791)  
 B/Anhydrite 2221' (+775)  
 Mud-Co Check #2 @ 1788'  
 03/06/13 11:50am  
 wt vis pH chl  
 9.1 31 8.0 23,000  
 Filtr LCM  
 NC 2#  
 Mud-Co Check #3 @ 2751'  
 03/07/13 09:15am  
 wt vis pH chl  
 9.4 31 7.0 30,000  
 Filtr LCM  
 NC 2#  
 Mud-Co Check #4 @ 3329'  
 03/08/13 11:00am  
 wt vis pH chl  
 9.4 30 7.0 35,000  
 Filtr LCM  
 NC 1#  
 Larsh SH @ 3726' (-730)  
 Queen Hill SH @ 3792' (-796)  
 Mud-Co Check #5 @ 3377 03/09/13  
 10:30am  
 wt vis pH chl  
 8.9 63 10.0 2,000  
 Filtr LCM  
 7.2 3#  
 Heebner SH @ 3868' (-872)  
 Toronto @ 3886' (-890)  
 Lansing @ 3918' (-922)  
 Mud-Co Check #6 @ 4236 03/10/13  
 11:25am  
 wt vis pH chl  
 8.9 57 10.5 3,000  
 Filtr LCM  
 8.0 6#  
 CFS @ 4212 (30'/60')  
 Stark SH @ 4226' (-1230)  
 Auto-Driller Was Surging Weight  
 Mud-Co Check #7 @ 4463' 03/12/13  
 11:15am  
 wt vis pH chl  
 9.1 52 9.0 5,400  
 Filtr LCM  
 9.2 3#  
 Little Osage SH @ 4482' (-1486)  
 Excello SH @ 4500' (-1504)  
 Diaphragm blew in the automatic driller, had to drill with the rope.  
 DST #2 "Up Ft Scott" 03-12-2013 4432'-4463' 30-30-20-20  
 1st Open = A Wk Bub on Tool Open (No BB)  
 2nd Open = No Blw (No BB)  
 IFP = 18-19# ISIP = 32# FFP = 18-19# FSIP = 26#  
 HYDP = 2112-2070#  
 <1' Drig Mud  
 CFS @ 4463' (30'/60')  
 Up Ft Scott @ 4464' (-1468)  
 Mud-Co Check #8 @ 4463' 03/12/13  
 11:15am  
 wt vis pH chl  
 9.1 52 9.0 5,400  
 Filtr LCM  
 9.2 3#  
 Little Osage SH @ 4482' (-1486)  
 Excello SH @ 4500' (-1504)  
 DST #3 "Morrow" 03-13-2013 4638-4700' 30-45-60-75  
 1st Open = Wk Intermittent Surf Blw



LS: tan/lt gry, fn xln, v fw foss frags, mostly dense, fw brittle, fw chiky, tr-nvp, fw SH: gry/drkr gry, silty, no cup odr, ns.

LS: gry/lt tan, fn xln, mostly dense, mostly brittle, brittle, sm flakey/mealy, sm chiky, tr-nvp, fw SH: gry/brn, silty, no cup odr, ns.

LS: gry/lt tan, fn xln, mostly dense, mostly brittle, brittle, sm flakey/mealy, sm chiky, tr-nvp, fw SH: gry/brn, silty, no cup odr, ns.

LS: gry/lt tan, fw molt, fn xln, fw pcs gritty/sandy like, mostly dense, sm flakey/mealy, sm brittle, tr-nvp, fw SH: gry, silty, no cup odr, ns.

LS: tan/lt gry, fn xln, mostly dense, sm flakey/mealy, sm brittle, fw pcs w/ sandy grns, tr-nvp, fw SH: gry, silty, fw fissile, no cup odr, ns.

LS: tan/lt gry, fn xln, mostly dense, mostly brittle, fw sandy/gritty, fw flakey/mealy, tr-nvp, svrl SH: gry/drkr gry, silty, sm fissile, no cup odr, ns.

SH: gry/grn, silty, sm interbedded sand grns, svrl Cong LS: fn xln, lt tan, sm chiky, sandy/gritty, brittle, tr-nvp, fw SS: lt gry/grn, fn grn, sm glauc, sm arg t/ght, fw w/ drk gll specs, no cup odr, nslo.

SS: gry/lt gry, fn grn, sm arg, mostly brittle, fw pcs w/ pr-fr intgrn por, 3-4 pcs w/ drk stns, wk fluor, slw cut, no cup odr, nsfo, svrl SH: gry/sm sandy.

SS: gry, fn grn, fw arg, mostly brittle, sm fr intgrn por, svrl pcs/try w/ drk stns, strn cut on select pcs, ssfo on break, wk-? cup odr, abund SH: gry/grn, silty.

SS: gry, fn grn, fw arg, mostly brittle, sm pr-fr intgrn por, 4-5 pcs/try w/ drk stns, fr cut when crushing, vssfo on break, no cup odr.

SS: gry/lt tan, fn grn, fw arg, sm brittle, sm pr-fr intgrn por, 4-5 pcs/try w/ gd oil sat, sil cem, svrl pcs drk stns, vssfo on break, no cup odr.

SS: gry/lt gry, fn grn, svrl arg, sm glauc, svrl brittle pcs, v fw pcs (3-4) w/ lght brn stns, nsfo on break, large influx of drk blk min stns, no cup odr, svrl SH: gry, silty, fissile.

SS: gry/drkr gry/grn, fn grn, svrl arg, sm glauc, sm brittle, fw pcs w/ pr intgrn por, 2-3 pcs w/ brn stns, no free oil on brk, sil cem, sm pcs w/ drk min stns, svrl SH: gry, silty, no cup odr.

SS: gry/lt gry, fn grn, sm arg, sil cem, sm glauc, svrl pcs w/ blk min stns, no cut/fluor, brittle, fr intgrn por in sm, svrl SH: gry/drkr gry, silty, no cup odr, ns.

SS: lt gry/wht, fn-med grn, sm arg, sil cem, fw glauc, sm fr int grn por, mostly brittle, abund SH: drk gry/grn/gry, silty, easy-med crush, no cup odr, ns.

SS: gry, fn grn, arg, sil cem, sm glauc, sm muddy like, tr-? intgrn por, svrl SH: gry/brn, silty, soft, fw SH: gry, soft, muddy fw LS: lt tan, fn xln, svrl sandy/gritty, sm chiky, mostly brittle, tr-nvp, no cup odr, ns.

LS: tan/lt gry, fn xln, sm dense, mostly sandy/gritty, sm chiky, sm brittle, tr-nvp, svrl SH: gry/drkr gry, silty, fw fissile, fw SH: gry/brn, soft, no cup odr, ns.

LS: tan/lt gry, fn xln, mostly dense, sm sandy/gritty, sm chiky, sm brittle, tr-nvp, svrl SH: gry/drkr gry, silty, fw fissile, easy-med crush, no cup odr, ns.

RTD @ 4790' (-1794)  
LTD @ 4790' (-1794)

(No psi)  
2nd Open = No Blw (No BB)  
IFP = 19-22# ISP = 167# FFP =  
25-28# F38# = 11#  
H10# = 222# 22#  
5 Mud w/ sm Gas Bub's

Mud-Co Check #9 @ 4660' 03/13/13

11:20am  
wt vis pH chl  
9.2 54 9.0 6,000  
Fill LCM  
10.0 2#

CFS @ 4660'  
(30°/60')

**Morrow @ 4670' (-1674)**

CFS @ 4680'  
(30°/60°/90')

CFS @ 4690'  
(30°/60')

CFS @ 4700'  
(30°/60')

Survey @ 4700' = 34 Degree

CFS @ 4710'  
(30°/60')

DST #1 "Morrow" 03-14-2013  
4638-4707' 45-50-30-75  
1st Open = Bit to 1" in 18min, Died  
back to 14" (No BB)  
2nd Open = Fw Bub's on Tool  
Open (No BB)  
IFP = 21-28# ISP = 413# FFP =  
25-31# F38# = 227#  
HYDP = 2234-2198#  
5 Mud w/ sm intermittent Gas  
Bub's

CFS @ 4740'  
(30°/60')

Mud-Co Check #10 @ 4720'  
03/14/13 11:40am  
wt vis pH chl  
9.6 48 9.5 5,500  
Fill LCM  
9.6 2#

**Mississippi @ 4768' (-1772)**

CFS @ 4790'  
(30°/60')

Survey @ 4790' = 1 Degree