

**Ritchie Exploration, Inc.
Broeckelman 29BC No. 1
2550' FNL and 1630' FWL
90'N & 20'W of W2 E2 W2
Sec 29 T9S R30W
Sheridan County, Kansas**

Geological Report
by

Macklin M. Armstrong, P.G.
License Number 743

Scale 1:240 Imperial

| | | |
|--------------------------|--------------------------|---------------|
| Well Name: | Broeckelman 29BC No. 1 | |
| Surface Location: | Sec 29 T9S R30W | |
| Bottom Location: | 2550' FNL and 1630' FWL | |
| API: | 15-179-21379 | |
| License Number: | 4767 | |
| Spud Date: | 10/20/2014 | Time: 4:15 PM |
| Region: | Sheridan County, Kansas | |
| Drilling Completed: | 10/28/2014 | Time: 3:16 AM |
| Surface Coordinates: | | |
| Bottom Hole Coordinates: | | |
| Ground Elevation: | 2982.00ft | |
| K.B. Elevation: | 2990.00ft | |
| Logged Interval: | 3600.00ft | To: 4780.00ft |
| Total Depth: | 4780.00ft | |
| Formation: | Mississippi | |
| Drilling Fluid Type: | Chemical/Fresh Water Gel | |

OPERATOR

| | | |
|--------------------|---|-------------------|
| Company: | Ritchie Exploration, Inc. | |
| Address: | 800 East 22nd Street North, Building 700 Wichita, Kansas 67226 | |
| Contact Geologist: | Pete Fiorini | |
| Contact Phone Nbr: | 316-691-9500 | |
| Well Name: | Broeckelman 29BC No. 1 | |
| Location: | Sec 29 T9S R30W | API: 15-179-21379 |
| Pool: | Oil | Field: Wildcat |
| State: | Kansas | Country: USA |

SURFACE CO-ORDINATES

Well Type: Vertical
 Longitude: 100.696928829 Latitude: 39.242019154
 N/S Co-ord:
 E/W Co-ord:

CONTRACTOR

Contractor: Discovery Drilling
 Rig #: 1
 Rig Type: mud rotary
 Spud Date: 10/20/2014 Time: 4:15 PM
 TD Date: 10/28/2014 Time: 3:16 AM
 Rig Release: 10/28/2014 Time: 8:15 PM

ELEVATIONS

K.B. Elevation: 2990.00ft Ground Elevation: 2982.00ft
 K.B. to Ground: 8.00ft

NOTES

| Date | Depth at 7 am | Activity |
|----------|---------------|-------------------|
| 10-20-14 | MIRT | Spud at 1:00 pm |
| 10-21-14 | 680 | Drilling |
| 10-22-14 | 2583 | Drilling |
| 10-23-14 | 3500 | Drilling |
| 10-24-14 | 4036 | CFS |
| 10-25-14 | 4108 | OB with DST No. 2 |
| 10-26-14 | 4182 | Drilling |
| 10-27-14 | 4490 | CFS |
| 10-28-14 | 4780 | TOH for Log |
| 10-29-14 | 4780 | P & A |

Surface Casing: 8 5/8" 23# at 305'
 Production Casing: None set

Deviation: 305' - 1°
 4036' - 1°
 4780' - 1 1/2°

| Bit Record: | Make | Size | Type | Depth In | Depth Out | Hours |
|-------------|--------|---------|-------|----------|-----------|-------|
| | JZ | 12 1/4" | CTZ | Surface | 305 | 2 3/4 |
| | Hughes | 7 7/8" | GX20C | 305 | 4780 | 101 |

Drill Stem Tests:

DST No. 1 3990 to 4036 Toronto
 30-45-45-60

Recovery: 200' WCM (30%W, 70%M)
 250' Water (Chl 8000 ppm)

IHP 1927 FHP 1910
 IFP 20-112 FFP 117-221
 ISIP 1202 FSIP 1185
 Temp 125°

DST No. 2 4076 to 4108 Lansing D, E Zones
 30-45-45-60

Recovery: 780' Water (Chl 52,000 ppm)
 IHP 1955 FHP 1897
 IFP 32-185 FFP 190-380
 ISIP 1242 FSIP 1224
 Temp 131°

DST No. 3 4110 to 4132 Lansing F Zone
 30-45-45-60

30-43-43-00
 Recovery: 150' Water (Chl 36,000 ppm)
 IHP 1962 FHP 1914
 IFP 17-63 FFP 48-60
 ISIP 1294 FSIP 1265
 Temp 125°

| Formation | Sample | E-Log | Datum | Well 1 | Well 2 | Well 3 |
|------------------|--------|-------|-------|--------|--------|--------|
| Anhydrite | 2570 | 2569 | +421 | +18 | -24 | +17 |
| Base/Anhydrite | 2603 | 2598 | +392 | +19 | -22 | +16 |
| Stotler | 3653 | 3660 | -670 | +1 | -20 | +10 |
| Heebner | 3999 | 4006 | -1016 | +3 | -20 | +13 |
| Toronto | 4024 | 4030 | -1040 | +3 | -22 | +16 |
| Lansing | 4039 | 4046 | -1056 | +1 | -19 | +16 |
| Muncie Creek | 4160 | 4168 | -1178 | 0 | -19 | +17 |
| Stark | 4250 | 4256 | -1266 | 0 | -20 | +8 |
| Hushpuckney | 4281 | 4288 | -1298 | 0 | -18 | +9 |
| Base/Kansas City | 4305 | 4312 | -1322 | +7 | -17 | +8 |
| Marmaton | 4335 | 4342 | -1352 | | -16 | 0 |
| Altamont | 4366 | 4373 | -1383 | | -17 | -9 |
| Pawnee | 4431 | 4438 | -1448 | | -17 | +4 |
| Myrick Station | 4471 | 4478 | -1488 | | -17 | +3 |
| Fort Scott | 4505 | 4510 | -1520 | | -15 | +8 |
| Cherokee Shale | 4536 | 4544 | -1554 | | -21 | +3 |
| Johnson Zone | 4586 | 4591 | -1601 | | -20 | +5 |
| Morrow | 4592 | 4599 | -1609 | | -21 | +4 |
| Mississippi | 4623 | 4630 | -1640 | | -14 | -2 |
| Total Depth | 4780 | 4780 | -1790 | | | |

Well 1: Calvin Noah Baalman No. 1 200'N & 75'E of NE NW SE Sec 20 T9S R30W

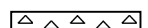







Well 2: National Associated Petroleum Company George Boger Community No. 1A C SW NW Sec 32 T9S R30W

Well 3: Empire & NCRA John Moellering No. 1 SE SE NE Sec 28 T9S R30W

Due to the results of the Drill Stem Tests and the electric log calculations, it was decided to plug this test well.

Respectfully submitted,
 Macklin M. Armstrong

ROCK TYPES

| | | | |
|--|--|--|--|
|  Cht |  shale, grn |  Carbon Sh |  Shcol |
|  Lmst fw7> |  shale, gry |  shale, red |  Ss |

ACCESSORIES

MINERAL

- ▲ Chert, dark
- ◌ Varicolored chert
- △ Chert White

FOSSIL










- F Fossils < 20%
- 🦠 Oomoldic
- 🦠 Fussilind

TEXTURE

- C Chalky

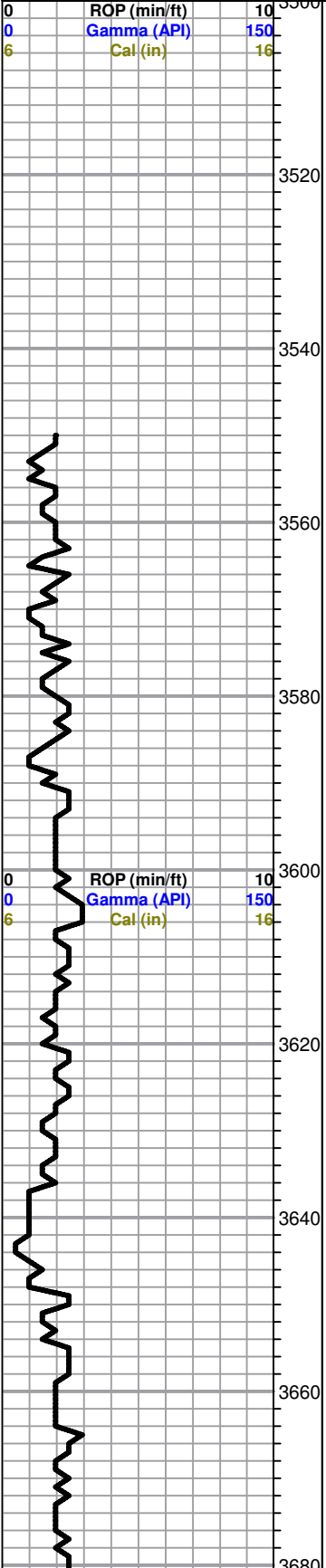
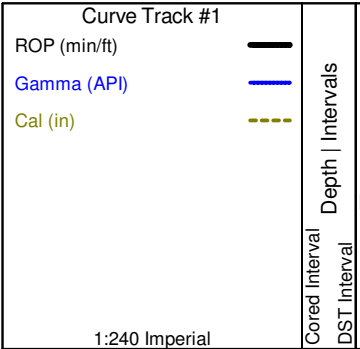
OTHER SYMBOLS

MISC

-  Daily Report
-  Digital Photo
-  Document
-  Folder
-  Link
-  Vertical Log File
-  Horizontal Log File
-  Core Log File
-  Drill Cuttings Rpt

DST

-  DST Int
-  DST alt
-  Core



Lithology

Oil Show

Geological Descriptions

Comment

Ritchie Exploration, Inc.
Broeckelman 29BC No. 1
2550' FNL and 1630' FWL
Sec 29 T9S R30W
Sheridan County, Kansas

GL 2982 KB 2990

Mud Program:
Mud Co/Service Mud, Inc.
Chemical Gel/Premix

Sample Cuttings:
KGS Well Sample Library

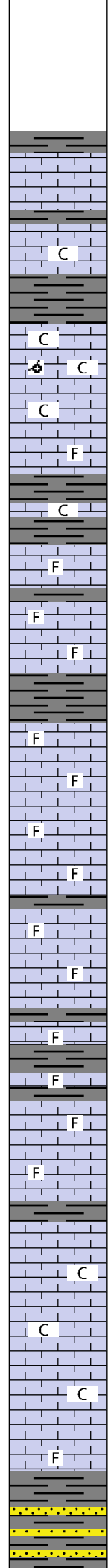
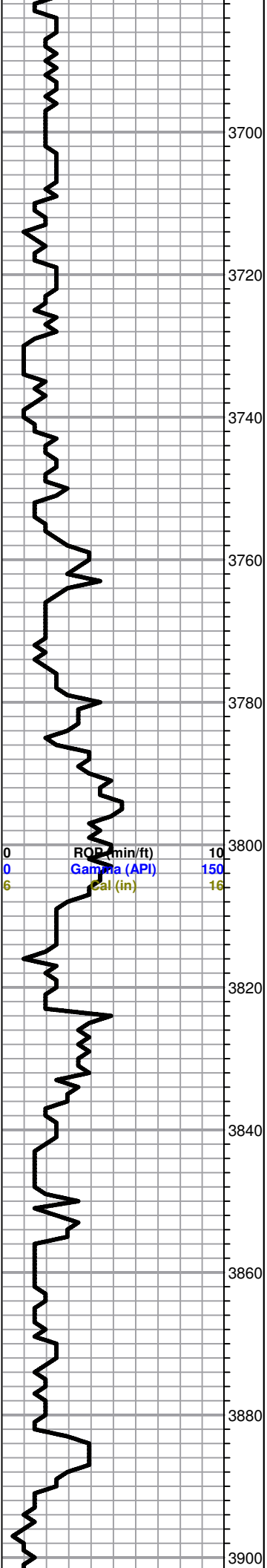
Testing: Diamond Testing

Electric Logs:
Nabors Completion &
Production Services
Company
DIL
CNL/CDL

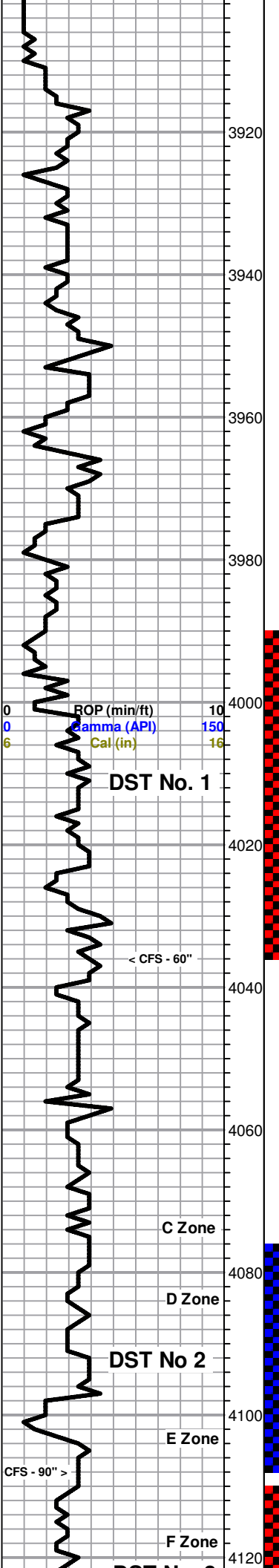
Deviation:
305' - 3/4°
4036' - 1°
4780' - 1 1/2°

----- Stotler 3653 -663 -----

All formation tops on this geological log have been correlated back to the electric log



Sh-gry/dk gry
 Ls-lt gry fxln dns no por
 Sh-gry/dk gry
 Ls-lt gry/crm fxln mhd sl clkly no por
 Sh-gry/dk gry
 Ls-lt gry/crm fxln mhd/dns sl clkly no por
 Ls-lt gry/crm f/mxln soft/mhd sl clkly fos sl oom fr inter xln por nsfo
 Ls-lt gry/crm f/mxln mhd sl clkly no por
 Ls-lt gry f/mxln mhd/dns sl fos no por
 Sh-gry/dk gry
 Ls-lt gry/crm f/mxln mhd fos sl clkly pr inter xln por nsfo
 Sh-gry/dk gry
 Ls-lt gry/crm f/mxln dns sl fos no por
 Sh-gry/dk gry
 Ls-lt gry f/mxln mhd sl fos no por
 Ls-AA
 Sh-gry/dk gry
 Ls-lt gry/gry fxln sl fos mhd no por
 Ls-lt gry fxln dns sl fos no por
 Ls-AA
 Ls-lt gry fxln mhd/dns no por
 Sh-gry/dk gry
 Ls-lt gry f/mxln mhd sl fos no por
 Ls-AA
 Sh-gry/dk gry
 Ls-lt gry f/mxln mhd/dns sl fos no por
 Sh-gry/dk gry
 Ls-lt gry f/mxln mhd/dns sl fos no por
 Sh-gry/dk gry
 Ls-lt gry f/mxln mhd sl fos no por
 Ls-lt gry f/mxln mhd sl fos pr inter xln por nsfo
 Sh-gry/dk gry
 Ls-lt gry fxln mhd/dns no por
 Ls-lt gry fxln mhd no por sm Ls-wt fxln soft clkly no por
 Ls-AA
 Ls-lt gry/crm f/mxln mhd sl clkly no por sm Ls-wt fxln soft clkly no por
 Ls-AA
 Ls-lt gry/crm f/mxln dns fos no por
 Sh-gry/dk gry
 Sh-AA sm Ss-lt gry fgrr sub ang to sub rnd sl fri



Sh-gry/dk gry sm Ss-AA

Ls-lt gry/crm fxln mhd/dns sl clky no por

3920 Sh-gry/dk gry

Ls-lt gry/crm fxln mhd/dns sl clky no por

3940 Sh-gry/dk gry

Ls-lt gry/crm fxln mhd/dns sl clky no por

Ls-lt gry/crm fxln dns sl clky no por

Sh-blk carb

Ls-lt gry/crm fxln dns sl clky no por

3960 Ls-lt gry/crm f/mxln sl clky fr inter xln por nsfo

Ls-lt gry/crm fxln dns sl clky no por

Sh-gry/dk gry

Ls-lt gry/crm f/mxln mhd sl clky sl fos fr inter xln por nsfo

3980 Ls-lt gry/crm f/mxln mhd/dns sl clky sl fos no por

Ls-AA

Ls-lt gry/crm f/mxln mhd no por

Ls-lt gry/crm/gry f/mxln dns no por

----- Heebner 3999 -1009 -----

Sh-blk carb

Ls-gry fxln dns no por

Sh-gry/dk gry

Sh-AA

Sh-AA

----- Toronto 4024 -1034 -----

Ls-crm fxln mhd gd vug/inter xln por sl gils lt brn spt stn fgsfo on brk gd cut sl odor

Ls-crm fxln dns sl clky no por

Sh-gry/dk gry

----- Lansing 4039 -1049 -----

Ls-lt gry/crm fxln dns sl clky no por sm Ls-crm fxln mhd clky sl gils no por

Ls-crm fxln dns clky no por

Sh-gry/dk gry

Ls-crm fxln dns sl clky no por

Sh-gry/dk gry/dk grn

Sh-AA

Sh-AA

D Ls-lt gry/crm fxln dns no por sm pcs with blk dead oil stn nsfo

Sh-gry/d gry

Ls-lt gry fxln mhd fr vug/pp por brn spt stn fgsfo on brk gd fluor gd cut fr odor

Ls-lt gry/crm fxln dns sl clky sl gils no por

Ls-lt gry fxln mhd gd vug por brn spt stn fgsfo on brk gd fluor gd cut fr odor

Sh-gry/dk gry

Ls-lt gry/crm fxln dns sl clky no por

Sh-gry/dk gry

Ls-lt gry/crm fxln dns sl clky no por and Ls-lt gry fxln mhd fr vug por brn spt stn fgsfo on brk gd fluor gd cut

DST No. 1
 3990 to 4036
 30-45-45-60
 1st Open: BOB in 20"
 2nd Open: BOB in 27"
 Recovery:
 200' WCM (30%W, 70%M)
 250' W (Chl 8000 ppm)
 IHP 1927 FHP 1910
 IFP 20-112 IFP 117-221
 ISIP 1202 FSIP 1185
 Temp 125°

Pulled 25 stand short trip at 4036' Then cir for test - 90"

Pipe Strap at 4036'
 Long 0.47'

Mud Data at 4036'
 11:45 am 10-24-14
 Wt 9.2 Vis 52 WL 8.8
 pH 10.5 Chl 1800 Sol 6.3%
 YP 20 LCM 1#

DST No. 2
 4076 to 4108
 30-45-45-60
 1st Open: BOB in 8"
 2nd Open: BOB in 12"
 Recovery:
 780' W (Chl 52,000 ppm)
 IHP 1955 FHP 1897
 IFP 32-185 FFP 190-380
 ISIP 1242 FSIP 1224
 Temp 131°

Mud Data at 4108'
 11:00 am 10-25-14
 Wt 9.2, Vis 62, WL 8
 pH 9 Chl 2000 Sol 6.3%
 YP 22 LCM 1#

DST No. 3

CFS - 90" >

G Zone

4140

4160

H Zone

4180

4200

I Zone

4220

J Zone

4240

4260

K Zone

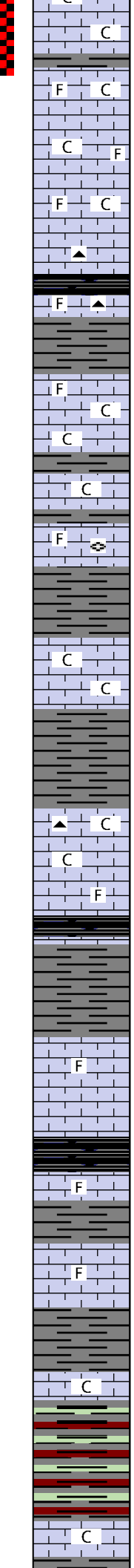
4280

L Zone

4300

4320

4340



Ls-lt gry/crm fxln mhd/dns sl clkly no por

Sh-gry/dk gry

Ls-crm f/mxln mhd/dns sl clkly sl fos no por

Ls-AA sm Ls-wt fxln soft clkly no por

Ls-lt gry/crm f/mxln mhd/dns sl clkly sl fos no por

Ls-lt gry/crm fxln mhd/dns no por sm Cht-lt tan/lt gry fsh opa

Muncie Creek 4160 -1170

Sh-blk carb

Ls-lt gry/gry f/mxln mhd/dns sl fos no por sm Cht-lt gry/lt tan fsh opa

Sh-gry/dk gry

Ls-lt gry fxln mhd/dns sl fos no por

Ls-lt gry/crm sm mott gry f/mxln mhd sl clkly no por

Ls-lt gry fxln dns no por sm Ls-wt fxln soft clkly no por

Sh-gry/dk gry

Ls-lt gry fxln dns sl clkly no por

Sh-gry/dk gry

Ls-gry f/mxln mhd/dns fos sl fuss no por

Sh-gry/dk gry

Ls-lt gry/crm fxln mhd/dns sl clkly sm pcs sl gils no por

Ls-lt gry/crm fxln mhd/dns sl clkly no por

Sh-gry/dk gry

Sh-AA

Ls-lt gry fxln mhd/dns sl clkly no por sm Cht-tan fsh opa

Ls-lt gry fxln dns sl clkly no por

Ls-gry/brn f/mxln mhd/dns sl fos no por

Stark 4250 -1260

Sh-blk carb

Sh-gry/dk gry

Sh-AA

Ls-lt gry/gry f/mxln mhd/dns sl fos no por

Ls-lt gry/gry f/mxln mhd/dns no por

Hushpuckney 4281 -1291

Sh-blk carb

Ls-lt gry/gry f/mxln dns sl fos no por

Sh-gry/dk gry

Ls-lt gry fxln dns sl fos no por

Base/Kansas City 4305 -1315

Sh-gry/dk gry

Ls-lt gry/crm fxln mhd sl clkly no por

Sh-gry/gry grn/sm red

Sh-AA

Marmaton 4335 -1345

Ls-lt gry/crm fxln dns sl clkly no por

CFS - 60" > POP (min/ft) 10
 Gamma (API) 150
 Cal (in) 16

< CFS - 60"

< CFS - 60"

DST No. 3

4110 to 4132

30-45-45-60

1st Open: Fair blow, building to 4"

2nd Open: Fair blow, building to 7"

Recovery: 150' W (Chl 36,000 ppm)

IHP 1962 FHP 1914

IFP 17-63 FFP 48-60

ISIP 1294 FSIP 1265

Temp 125°

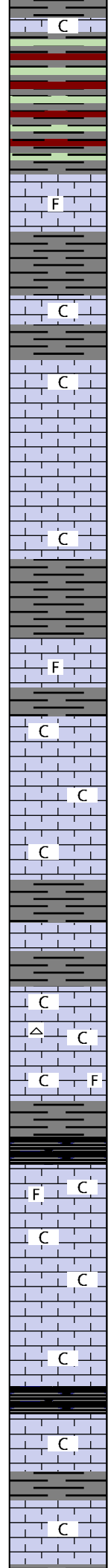
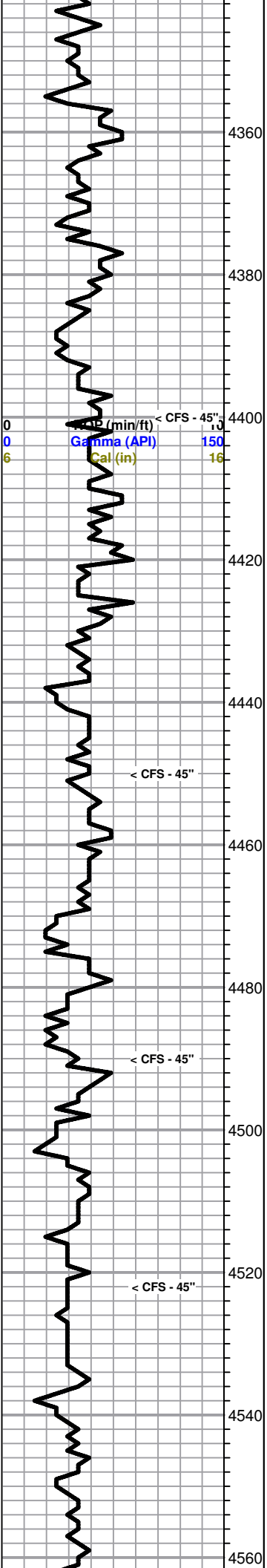
Mud Data at 4209'

9:30 am 10-26-14

Wt 9.3 Vis 52 WL 8

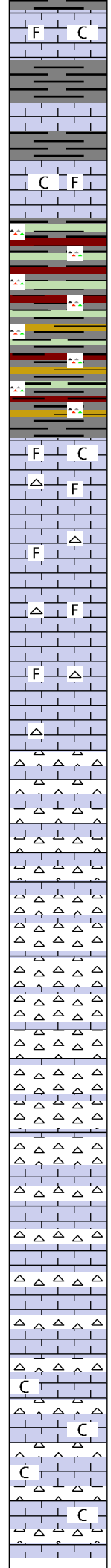
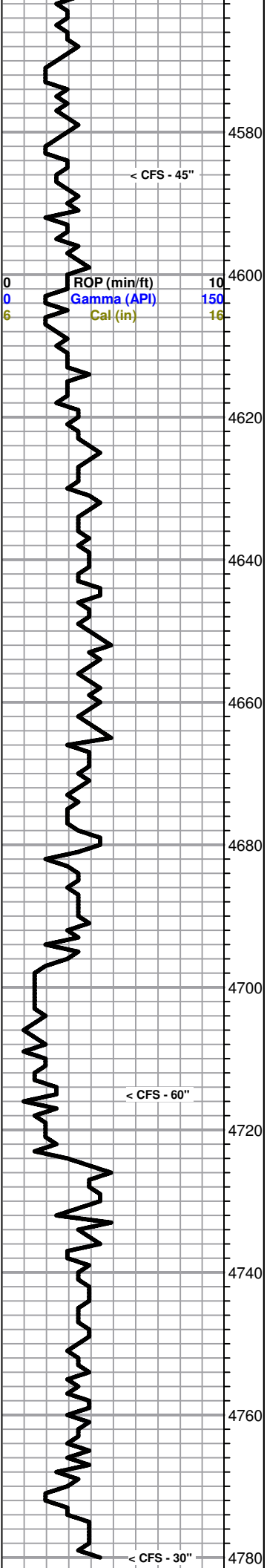
pH 9 Chl 2000 Sol 6.9%

YP 18 LCM trc



Sh-gry/dk gry
 Ls-lt gry/crm fxln dns sl clkly no por
 Sh-gry/gry grn/sm red
 Sh-AA
 Sh-AA
 -----**Altamont 4366 -1376**-----
 Ls-lt gry/crm f/mxln dns sl fos no por
 Sh-gry/dk gry
 Ls-lt gry/crm fxln mhd/dns sl clkly no por
 Sh-gry/dk gry
 Ls-lt gry/crm fxln mhd/dns sl clkly no por
 Ls-lt gry/crm/gry fxln dns no por
 Ls-AA
 Ls-lt gry/gry fxln dns no por
 Ls-lt gry/crm fxln dns sl clkly no por
 Sh-gry/dk gry
 -----**Pawnee 4431 -1441**-----
 Ls-lt gry/grm f/mxln mhd/dns sl fos no por
 Sh-gry/dk gry
 Ls-lt gry/crm fxln dns sl clkly no por
 Ls-AA
 Ls-lt gry/crm/lt gry fxln dns sl clkly no por
 Ls-AA
 Sh-gry/dk gry
 -----**Myrick Station 4471 -1481**-----
 Ls-lt gry/crm f/mxln dns no por
 Sh-gry/dk gry
 Ls-lt gry/crm f/mxln mhd/dns sl clkly no por
 Ls-crm/wt f/mxln mhd clkly sl fos no por and Cht-gry wt fsh opaq
 Ls-lt gry/crm fxln mhd sl clkly no por sm Ls-tan f/mxln mhd sl clkly
 with dk gry irregular shapped fos no por
 Sh-gry/dk gry
 Sh-blk carb
 -----**Fort Scott 4505 -1515**-----
 Ls-crm/lt gry f/mxln mhd/dns sl clkly sl fos no por sm Ls-tan f/mxln
 fos sl clkly no por
 Ls-lt gry/crm fxln mhd clkly no por
 Ls-AA
 Ls-lt gry/gry fxln dns no por
 Ls-gry/brn f/mxln dns no por
 -----**Cherokee Shale 4536 -1546**-----
 Sh-blk carb
 Ls-lt gry fxln dns no por sm Ls-crm/wt fxln soft clkly no por
 Sh-gry/dk gry
 Ls-lt gry fxln dns no por sm Ls-crm/wt fxln soft clkly no por

Mud Data at 4476'
 6:15 am 10-27-14
 Wt 9.3 Vis 62 WL 8
 pH 8.5 Chl 2000 Sol 6.9%
 YP 22 LCM 1#






Sh-gry/dk gry
 Ls-lt gry/crm f/mxln mhd/dns sl clkly sl fos no por sm Ls-tan mxln mhd clkly fos no por
 Sh-gry/dk gry
 Ls-lt gry/tan fxln dns no por
 ----- **Johnson Zone 4586 -1596** -----
 Ls-lt gry/lt tan fxln mhd no por sm Ls-wt fxln soft clkly no por and Ls-tan gry/brn mxln mhd/dns sl fos no por
 ----- **Morrow 4592 -1602** -----
 Sh-gry/gry grn/mar sm Cht-yel/tan/org & wt fsh opaqa
 Sh-AA sm Cht-yel/tan fsh opaqa
 Sh-gry/dk grn/sm mar/red/yel and Cht-yel/tan/crm fsh opaqa
 Sh-AA sm Cht-yel/tan/crm fsh opaqa
 ----- **Mississippi 4623 -1633** -----
 Ls-crm/tan cxln dns fos no por sm Ls-crm f/mxln mhd chty no por and Cht-wt/crm fsh opaqa
 Ls-crm/tan/lt gry frag to blkly dns fos no por sm Ls-wt cxln dns sl chty no por and Cht-wt fsh opaqa
 Ls-crm/lt tan cxln to frag mhd sl fos no por sm Ls-crm cxln mhd dns sl chty no por sm Ls-crm mott red brn blkly mhd no por and Cht-wt fsh opaqa fos
 Ls-lt gry/tan cxln to blkly mhd sl fos no por sm Ls-lt gry/crm cxln dns sl chty no por and Cht-wt fsh opaqa
 Ls-lt gry/crm cxln dns chty no por sm Cht-wt/gry wt fsh opaqa
 Ls-wt/crm f/mxln dns sl chty no por and Cht-wt fsh and weat
 Ls-wt/crm f/mxln mhd sl clkly no por sm Ls-wt fxln dns sl chty no por and Cht-wt/lt gry fsh opaqa and Cht-wt weat
 Cht-wt/lt gry fsh opaqa and Cht-wt weat sm Ls-tan/crm fxln mhd sl chty no por
 Cht-AA with sm Ls-tan fxln mhd sl chty no por
 Cht-wt/lt gry fsh opaqa and Cht-wt weat opaqa and Cht-lt gry fsh semi trans sm Ls-tan/crm fxln mhd sl chty no por
 Cht-wt/lt gry/sm tan fsh opaqa and Cht-wt weat sm Ls-AA
 Cht-AA sm Ls-tan/crm fxln mhd sl chty no por
 Ls-tan/lt brn fxln dns no por sm Cht-wt/lt gry fsh opaqa
 Ls-AA sm Cht-wt/lt gry fsh opaqa
 Ls-crm/lt tan fxln dns no por sm Cht-wt/lt gry fsh opaqa
 Ls-AA sm Cht-wt/lt gry fsh opaqa
 Ls-crm/lt tan fxln dns sl clkly no por sm Cht-wt/gry wt fsh opaqa
 Ls-AA sm Cht-wt/gry wt fsh opaqa
 Ls-crm/lt tan fxln dns sl clkly no por sm Cht-AA
 ----- **RTD 4780 -1790** -----

| | | | |
|---|--------------|-----|------|
| 0 | ROP (min/ft) | 10 | 4800 |
| 0 | Gamma (API) | 150 | |
| 6 | Cal (in) | 16 | |
| | | | 4820 |

Finished drilling at 3:16 am on 10-28-14. Pulled 15 stand short trip, then circulated for log 90 minutes.

Finished Logging at 12:45 pm on 10-28-14

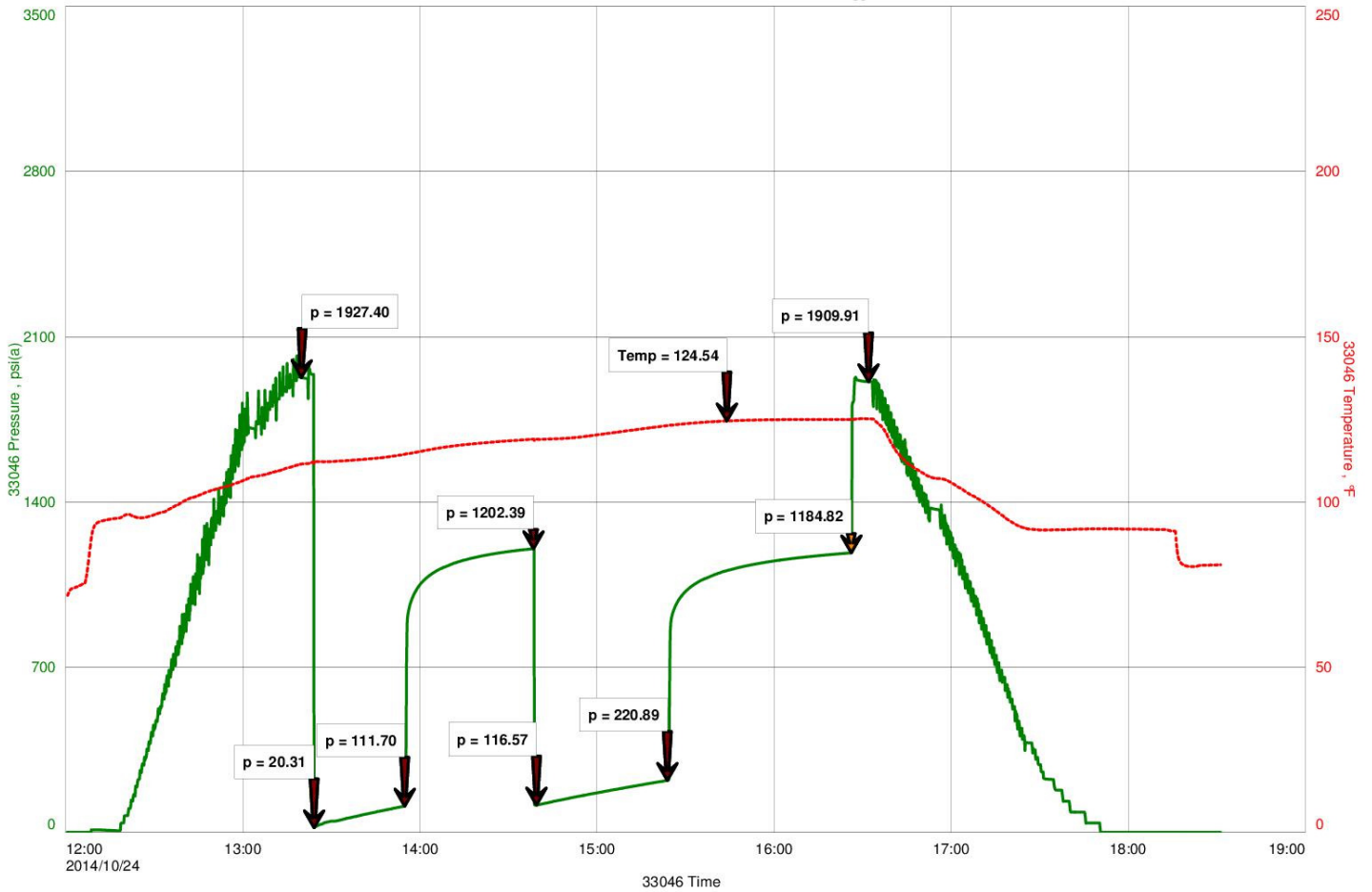
-  BROCKELMAN29BC1DST1ALL-3.jpg
-  BROCKELMAN291DST2ALL-3.jpg
-  BROCKELMANBC1DST3ALL-2.jpg

BROCKELMAN29BC1DST1ALL-3.jpg

RITCHIE EXPLORATION INC
 Start Test Date: 2014/10/24
 Final Test Date: 2014/10/24

BROCKELMAN 29BC #1
 Formation: TORONTO
 Job Number: J3313

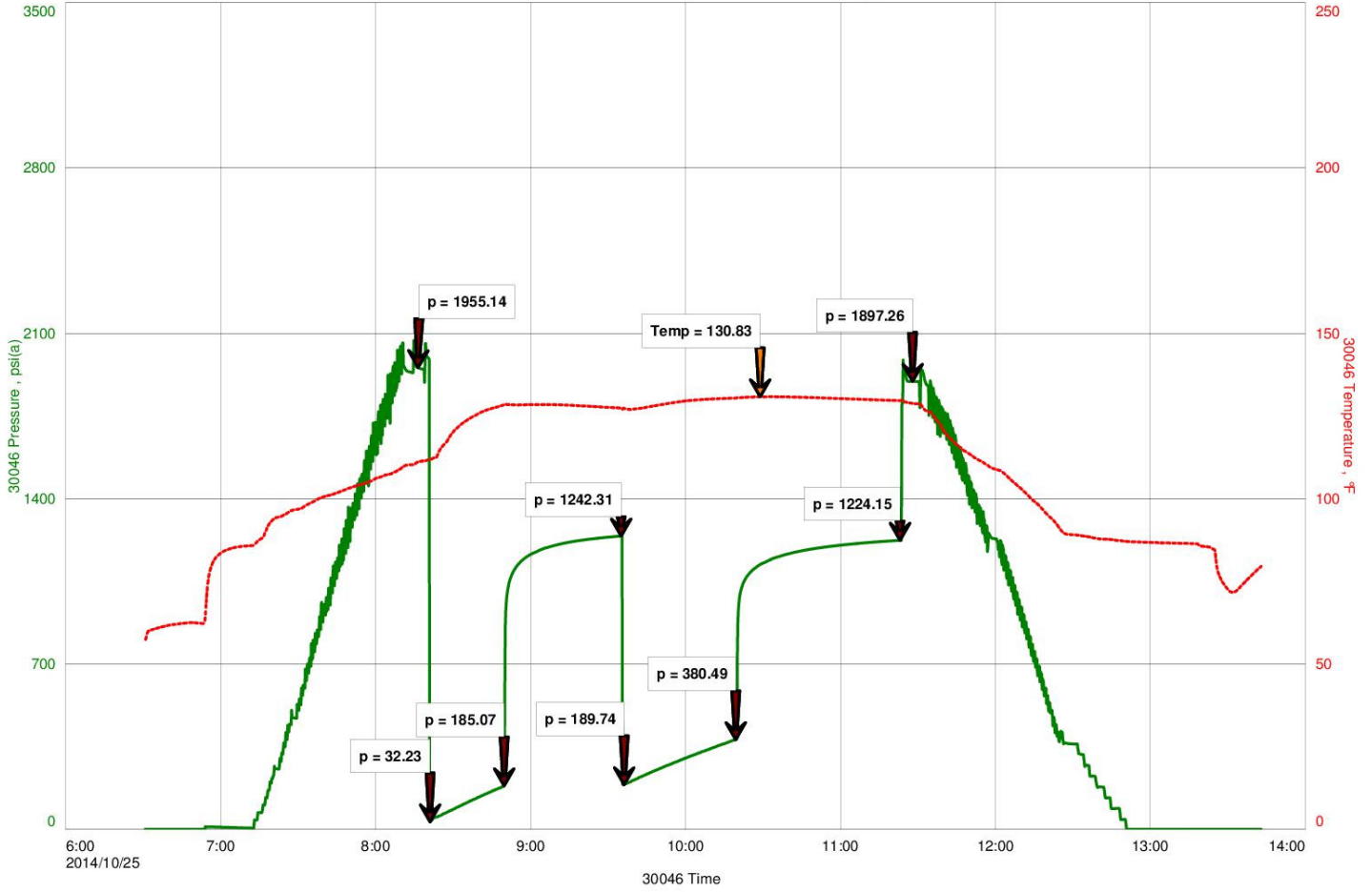
BROCKELMAN 29BC #1



RITCHIE EXPLORATION INC.
Start Test Date: 2014/10/25
Final Test Date: 2014/10/25

BROCKELMAN 29BC #1
Formation: LKC "D"
Job Number: J3314

BROCKELMAN 29BC



ROCKELMAN 29BC #1

