MONITOR WELL POCI 55 DRILLING, LOGGING, COMPLETION, AND TESTING SUMMARY REPORT

Submitted to:
PETROGLYPH ENERGY, INC.

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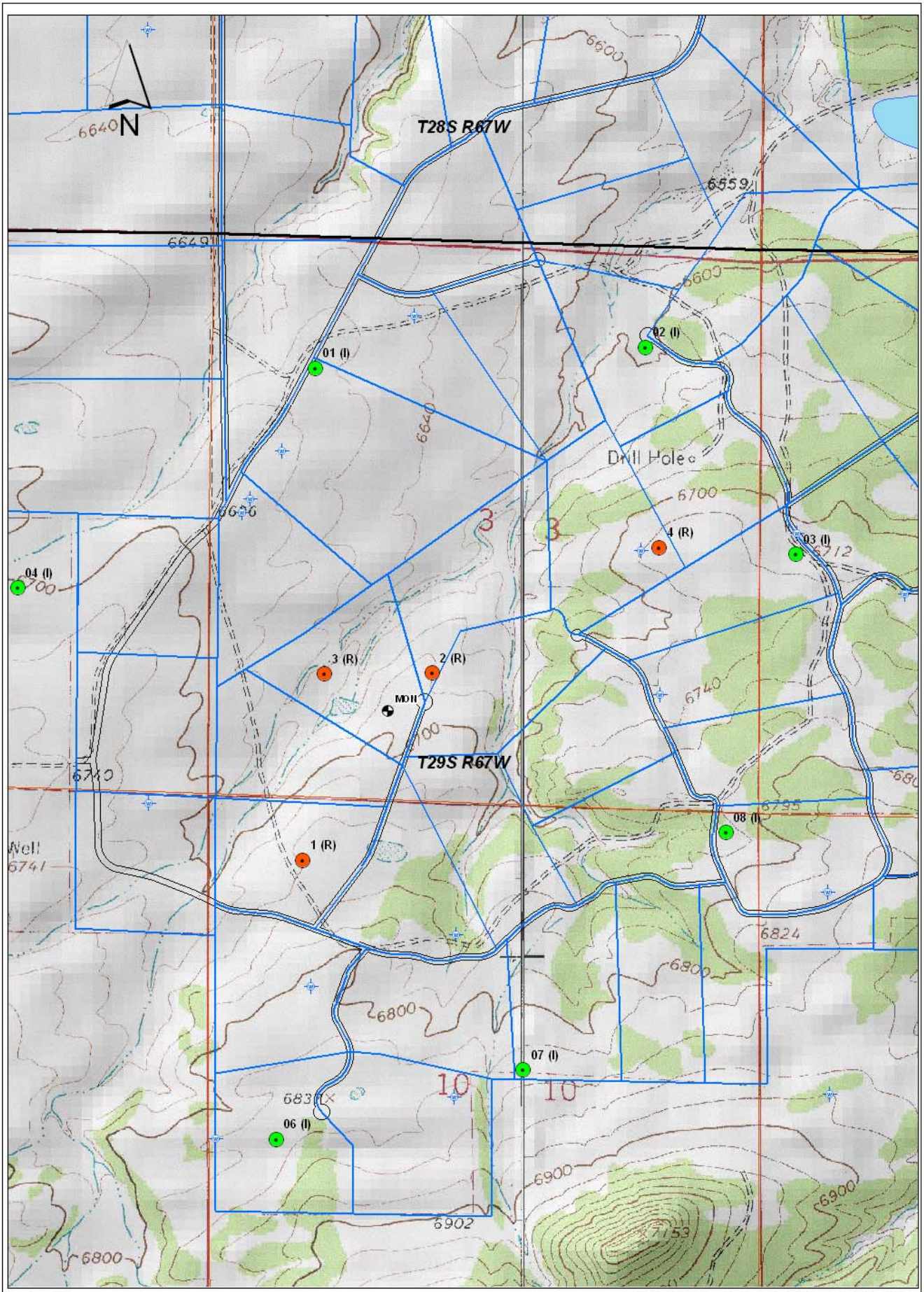
1 INTRODUCTION

The Methane Investigation, Monitoring, and Mitigation Program as set forth in the Colorado Oil and Gas Conservation Commission supplemental order number 1C-6 recognizes a three phased approach to the mitigation of fugitive methane gas within the Poison Canyon Formation in the northern portion of the Raton Basin. Phase I of the plan included the drilling, testing, and monitoring of a single monitor well. This monitor well has been drilled, logged, completed and tested under the name POCI 55. Upon completion of Phase I tasks, as listed in the COGCC order, this document will be updated to include new data and analysis of the mitigation system.

1.1 SUMMARY

Phase I of the Methane Investigation, Monitoring, and Mitigation Program plan was set in motion by Petroglyph Energy, Inc. (PEI) on February 2, 2008 with the onset of drilling the first mitigation well, monitor well POCI 55 located in the SE SW quarter of Sec 3, Township 29S Range 67W, on Lot 55 of River Ridge Ranch in Huerfano County, Colorado (Figure 1-1). The drill rig scheduled for drilling monitor well POCI 55 was on site to begin setting surface casing on February 2, 2008 and completed the well on February 16, 2008. Mud, gas, and geophysical logging were performed during and after drilling and completion of the well. The geophysical logging after completion of the well was followed with aquifer testing using inflatable packers, pressure transducers, a submersible pump, a Barton gas flow chart recorder, and a RKI model hand held gas detector. A video log was then run after the aquifer packer testing. This data will be used to design the pumping and injection wells for the mitigation system. A detailed summary of the drilling, logging, completion and testing of monitor well POCI 55 is provided.



Legend

- Injection Well
- Recovery Well
- Monitoring Well POCI 55
- Water Wells
- Roads
- Lot Lines
- Sections

0 1,000 2,000 3,000
Feet

Figure 1-1 - Petrolgyph Energy, Inc.
MONITOR WELL POCI55
AND REMEDIATION SYSTEM

NORWEST
Applied Hydrology

2 DRILLING AND INITIAL OPEN HOLE LOGGING

Layne-Western of Layne Christensen Company owned and operated the drill rig used to drill monitor well POCI 55 and began on February 2, 2008. Drilling reports from Layne Christensen Company are provided in Appendix A.

During drilling, mud and gas logging of the well was performed by Blanco Geological Services LLC of Trinidad, Colorado. The results of mud and gas logging were later used in planning the well completion and are provided in Figure 2-1.

2.1 DRILLING

Surface casing was first set prior to drilling the main bore hole for the well. A surface casing hole of 14 ¾ inches was drilled to 40 feet and 40 feet of 12 ¾ inch, 33.38 pound steel surface casing was set with type G cement placed in the annular space to surface. After setting surface casing and allowing the grout to cure the well was drilled with an 11 inch bit to 930 feet with mud/gel and air resulting in an 11 inch bore hole. Drilling was slower than anticipated and circulation was lost at 930 feet. The rig was then switched over to drilling with air to a final total depth of 1,080 feet that was reached on February 10, 2008 at 9:01 am.

2.2 MUD AND GAS LOGGING

The drilling mud and total combustible gases were logged by Blanco Geological Services LLC out of Trinidad, Colorado (Figure 2-1). The gas was monitored during drilling using a MLogger digital data acquisition and logging system Model TG Total Gas Detector made by Mudlogging Systems, Incorporated of Grand Junction, Colorado. The gas logger monitors gas generated from the hole that has been brought to the surface with the drilling mud at which point it is separated from the mud and measured with the logging device. Thus, gas from the drill hole is potentially from the entire open hole and is a relative indicator of gas from different depths.

During drilling gas was not detected in the zone at 530 feet because mud was being used as the drilling fluid and this put an effective back pressure on the zone above that of the gas pressure. This resulted in a minimal net inflow of gas into the well during drilling of the gas zone. Mud was used for this purpose as a safety precaution to prevent any potential significant pressure spike up the well towards the rig at surface. When circulation was lost at 930 feet and the drilling fluid used was only air the effective backpressure on the gas zone at 530 feet was reduced to zero and resulted in a significant show of gas that was most likely from the higher zone and not at the lost circulation zone. This causes it to appear that there is gas at 930 feet and below (when drilling with air), but the gas is estimated as emanating from the gas zone at 530 feet previously suppressed by the weight of the mud used as the drilling fluid.

The mud logging, as shown in Figure 2-1, indicates that the geology was primarily composed of alternating inter bedded layers of sandstone and shale with some siltstone and carbonates. The well was drilled through the Poison Canyon Formation.

BLANCO
Geological Services LLC

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

Well Name: POCI 55
Location: Sec3 T29S R67W
Licence Number: 05-071-275819-00
Region: Purgatoire River
Spud Date: 02/04/08
Drilling Completed: 02/10/08
Surface Coordinates: 851' FSL & 1773' FWL

Bottom Hole Coordinates:

Ground Elevation (ft): 6690'
K.B. Elevation (ft): 6690'
Logged Interval (ft): 50' To: 1079'
Total Depth (ft): 1079'
Formation:
Type of Drilling Fluid: Mud/ Gel & Air

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

OPERATOR

Company: Petroglyph Operrating Company, Inc.
Address: 555Sought Cole Rd.
Boise, ID 83709
Ph: (719) 742-5570

GEOLOGIST

Name: Leeo Carrasco
Company: BLANCO Geological Services LLC
Address: 806 Robinson Ave.
Trinidad CO 81082
(719) 846-3364

Rig

LW Rig # 14

Comments

12.75" Surface Casing set @ 40'

ROCK TYPES

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

ACCESSORIES

MINERAL: 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

FOSSIL: Algae, Amph, Belm, Bioclst, Brach, Bryozoa, Cephal, Coral, Crin, Echin, Fish, Foram, Fossil, Gastro, Oolite, Ostra, Pelec, Pellet, Pisolite, Plant, Strom

STRINGER: Anhy, Arg, Bent, Coal, Dol, Gyp, Ls, Mrst, Sltstrg, Ssstrg

TEXTURE: Boundst, Chalky, Cryxln, Earthy, Finexln, Grainst, Lithogr, Microxln, Mudst, Packst, Wackest

OTHER SYMBOLS

POROSITY TYPE: Earthy, Fenest, Fracture, Inter, Moldic, Organic, Pinpoint, Vuggy

SORTING: Well, Moderate, Poor

ROUNDING: Rounded, Subrnd, Subang, Angular

OIL SHOWS: Even, Spotted, Ques, Dead

INTERVALS: Core, Dst, Srfcsg

EVENTS: Rft, Sidewall, Srfcsg

Cv-v, Cv-c

Curve Track 1	Depth	Porosity	Lithology	Geological Descriptions	TG
ROP (min/ft)		24% 18% 12% 6%			TG (units), C1 (10000), C2 (10000), C3 (10000), C4 (10000)

Layne Wenstern Rig #414
12.75" Surface Casing Set @ 40'
ROP Scale 0 -15 (min/ft)

POCI 55
Blanco Geological Services LLC
Logging Unit Operational @ 07:00 02/03/2008

MSI Model TG Total Hydrocarbon CCD/TCD
TG Scale 0 - 100 Units

06:00 02/04/2008 Drilling New Formation from 55' w/ Water Mud
Bit # 2 Size: 11" Type: Mill-Tooth IN: 52'

50
SS: lt gy,wh, clr, firm, m-f gr, sbang sbrnd, sil cmt, p sort, n cal, abnt lse m sbang qtzxl gr.
SS: lt gy, mod sft, fri ip,f-m gr,sbrnd, sl calc intb w/ m gy, mod sft, sbblky-plty, sndy, sl calc Sh., tr coal.
SS: lt gy, mod sft, f-m gr, sbrnd-sbang, n calc w/ Sh gy, firm, sbblky-plty, sndy.
SS: lt gy, lt grn, mod sft, fri ip, f-vf gr, sbrnd, n calc, abnt lse m sbang wh pk qtz gr.
SS: m gy, fri, f-vf gr, sbrnd, sl cal mod srt., sl carb.
Gas T
100
SS: wh, pk, mod firm, m gr, sbang sbrnd, p sort, sl cal, abnt lse m sbang qtz gr.
Recal
SS: lt gy, grn, mod sft, fri ip, f-vf gr, sbrnd, sl calc, p sort, W/ Sh lt grn, sft, plty, n cal.
SS; lt gy, fri, f-vf gr, sbrnd, calc cmt, mod srt, p por, tr Sh m gy, mod sft, sbblky-plty, n calc.
SS: wh, pk, firm, m gr, sbang sbrnd, p sort, sl cal, abnt lse m sbang qtz gr.
SH, lt-m gy, sft, rthy, plty, grdg to sndysh.
150
CG
SH,m gy, sft, rthy, plty, n cal, w/ Ss lt gy, sft, f-vf gr, ncalc, mod srt, p por.
SH, lt-m gy, sft, rthy, plty, grdg to sndysh.
SS: wh, pk, mod firm, m gr, sbang sbrnd, p sort, n cal, abnt lse m sbang qtz gr.
CG
SH ,m gy, fir, blky-sbblky, n cal, w/ Ss lt gy, sft, f-vf gr, ncalc, mod srt, p por.
200
SH ,m gy, lt brn, fir, rthy, blky-sbblky, n cal, w/ Ss lt gy, sft, f-vf gr, ncalc, mod srt, p por.
CG
SS: lt gy, firm, f-vf gr, sbrnd, sil mtx, p srt, p por, n cal, w/ abnt lse wh, pk, m gr, sbang sbrnd, qtz gr.
SH ,m gy, lt brn, fir, rthy, blky-sbblky, n cal, w/ SLTST: brn, drk gy, sl brit,plty.
CG
SLTST: brn, drk gy, sl brit,plty, n calc W/Sh drk gy, rthy, firm, sbblky, plty, n calc.
250
SS: lt gy, mod sft, fri ip, f-vf gr, sbrnd, n calc, W/lt -m gy, firm, rthy, sl calc, sbblky, plty, Sh.
Gas T
SH, lt-m gy, sft, rthy, plty, sl calc, v sndy, grdg to sndysh.
CG
SS: lt gy, mod hd, m gr, sbang, p sort, mod por, abnt lse wh pk m sbang qtz gr.
SS: lt grn, sft, fri ip, f gr, sbrnd, sl calc, mod srt, mod por, W/ intb Sh lt gy, mod sft, sndy, sl calc, plty.
DTG
300
SS: lt grn, sft, fri ip, f gr, sbrnd, sl calc, mod srt, mod por, W/ Sh lt gy, mod sft, sndy, sl calc, plty, grdg to sndysh.
DTG
02/05/08 MND 313'
Possible top Poison Canyon sand @ 315'
Possible top Poison Canyon sand @315'
SS: lt gn, firm, m gr, sbang-sbrnd, mod sort, mod por,sl calc.
SH, lt-m gy, sft, rthy, plty, sl calc, v sndy, grdg to sndysh, abnt lse wh pk m sbang qtz gr.
CG
SS: lt gy,sft-mod firm, m-f gr, sbang-sbrn, mod sort, mod por, sl calc, abnt lse wh pk m sbang qtz gr.
350
SS: lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, w/ Sh m gy, firm, sbblky-plty, no calc.
SH: m gy, mod firm, sbblky-plty, no calc.
Scale Change
Gas Trip Test
SS: lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, w/ Sh m gy, firm, sbblky-plty, no calc.
Scale Change
SS: lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, glauc.
400
SH: lt gy-grn, sft, rthy, sbplty-plty, v slty, n calc.
SLTST: lt grn-grn, sft- firm, sndy, sl cal, carb incl.
CG
SH, lt gy, grn, sft, rthy, plty, sl calc, v sndy, grdg to sndysh,W/ lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc SS.
No Sample
Gas T
Ciculating & Changed Mud
450
SS: lt gy, mod sft-firm, f-vf gr, sbrnd, calc, mod srt, mod por, tr Coal.
02/06/08 MND 477'
SH, lt gy, grn, firmt, rthy,sbblky ip, plty, v sndy, w/ lt gy, brn, f-vf gr, sbrnd, mod sort. mod por, sl calc SS.
CG
SS: lt gy, lt grn, f-vf gr, sbrnd, mod srt, mod por, sl calc, carb, glauc incl.
500
SS: lt gy, lt grn, f-vf gr, sbrnd, mod srt, mod por, sl calc, carb, glauc incl, SH, lt-m gy, firm, rthy,sbblky ip, plty, v sndy.
CG
SS: lt gy, f-vf gr, sbrnd, mod srt, mod por, sl calc, carb, glauc incl. Tr lst qtzxl gr.
SS: grn, lt gy, firm, f-vf gr, sbrnd, mod srt, mod por, calc, carb, glauc incl.
SH: lt-med gy, firm, sbblky, n calc,plty, sl sndy w/lt grn, mod sft, f g, sbrnd, n calc SS.
CG
SS: lt grn, mod sft, f gr, sbang-sbrnd, shly mtx, mod srt, carb, glauc incl w/lt brn, sft- firm, shly, n cal, carb Incl SLTST.
550
SS: grn, lt gy, firm, f-vf gr, sbrnd, mod srt, mod por, calc, carb, glauc incl, w/lt brn, sft- firm, shly, n cal, carb incl SLTST.
SH: lt-med gy, firm, sbblky, n calc,plty, sl sndy w/lt grn, mod sft, f g, sbrnd, n calc SS.
CG
SH: lt-med gy, firm, sbblky, n calc,plty, sl sndy w/lt grn, mod sft, f g, sbrnd, n calc SS, abnt soluble gy cly.
SH: m gy-gy grn, firm, rthy, n calc, plty , intbd W/ lt grn, soft, f-vf sbrnd, sl calc SS.
SS: lt gy, pale grn, soft, f-vf gr, sbrnd-rnd, cly matx , w srt, mod por, sl calc.
CG
600
SS: lt gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calcw/SH: m gy-gy grn, firm, rthy, n calc, plty.
SS: lt grn, mod sft, fri ip, f-vf gr, sbrnd-rnd, cly mtx, w srt, mod por, abnt lst qtz gr. subang w/ lt brn-m gy, sbblky, plty, sndy SH.
CG
SS: lt grn, lt brn-crm, firm, f gr, sbrnd, sl calc, cly mtx ip, mod sort, p por.
SS: lt grn, lt brn-crm, wh lp, mod sft-firm, f gr, sbrnd, sl calc, cly mtx ip, mod sort, p por w/ m gy, firm, rthy, n calc ,plty, sl sndy Sh.
650
SS:lt gy, ltgrn, crm ip, mod firm, f gr, sbrnd-rnd, cly mtx ip, mod srt, p por, carb incl.
CG
SH: m gy, firm, sbblky- blky, plty, n calc, sl sndy.
02/07/08 MND 689'
SH: m gy, firm, sbblky- blky, plty, n calc, sl sndy w/SS: lt gy, brn ip, firm, f gr, sbrnd-rnd, mod srt, mod srt, sl cal , mod por, carb incl.
700
SS: lt gy, brn lp, firm, f gr, sbrnd-rnd, mod srt, mod srt, sl cal , mod por, carb incl w/ m gy, firm, sl sndy, sbblky, n calc Sh.
Lost Circulation @ 716'
SH: m gy, mod firm, sbblky, plty, n calc, sl sndy W/ lt gy. lt grn, f gr, sbrnd, sl calc, mod srt, mod por, SS.
CG
SS: lt gy, lt grn, mod sft, f-vf gr, sbang, sl calc, mod srt, mod por, carb incl, tr lt brn, sft, shly, n calc, SLTST.
SS: lt gy, lt grn, lt brn ip, mod sft, f-vf gr, sbang, sl calc, mod srt, mod por, carb incl.
750
CG
SS: lt gy, lt grn, mod sft, f-vf gr, sbang, sl calc, mod srt, p por, carb incl, w/ Sh, lt-m gy, sbblky, firm, rtthy, n calc.
02/08/08 MND 779'
POOH for New Bit
Power Down
Resume Drilling @02:15 02/08/08
Bit # 3 Size: 11" Type: Mill-Tooth IN: 779'
SH: m gy, firm, sbblky, plty, sl sndy, n calc.
COAL
800
SS: lt gy, lt grn, f-vf gr, sbrnd-sbang, cly mtx, mod srt, mod por, sl calc ip, carb incl, W/Sh, m gy, firm, sbblky, plty, sl sndy, n calc.
CG
Power Down
SH: m-drk gy, firm, rthy, blky-sbblky, sl sndy, n calc, coaly, w/ SS: lt gy, sft, f gr, sbrnd, sl calc
CG
SS: lt gy, wh, f-vf gr, mod sft, fri, sbrnd-sbang, cly mtx ip, sl calc, mod srt, mod por, abnt carb incl, Tr m-drk Sh.
850
SH: lt-m gy, firm, blky-sbblky, plty, n calc, v sndy,w/ SS: lt gy-wh, f gr, sft, sbrnd, cly mxt ip, sl calc, mod srt, mod por.
CG
Line Test
SS: lt gy, sft, f gr, sbang, p srt, p por, sl calc cmt, abnt lst wh-qtzxl gr.
SS: pred wh, lt gy, f gr, fria, mod sft, sbang, v calc cmt, mod por, p srt, abnt lst m gr, ang , wh-qtzxl gr.
900
CG
SS: pred wh, lt gy, f-vf gr, fria-mod sft, sbang, v calc cmt, mod por, p srt, abnt lst m gr, ang , wh-qtzxl gr, tr COAL.
02/09-10/08 MND 930'
POOH
Unable to recovery Circulation
Drilling w/ Air F/930'
Resume Drilling @ 12:30
Bit # 2R Size: 11" Type: Mill-Tooth IN: 930'
CARBSH: m-drk gy, firm, blky, plty, no calc.
NO Sample
Total LOST CIRCULATION @ 930'
SH: lt-m gy, brn, firm, grty, n calc, coaly ip, sl slty ip, tr pry.
950
SS; Lt grn, lt gy, firm-hd, f gr,sbrnd sbang, calc cmt, p por, mod srt, carb incl, glauc.
SH: m gy, firm, blky, plty, slty ip, no calc, W/ lt gy, firm, f gr, mod srt, mod por, calc, SS.
SS: lt, gy, wh, firm, f-m gr, sbrnd-sbang, calc cmt, p por, mod srt, abnt lst m qtzxl sbrnd gr, tr pry.
SS: lt gy, lt grn, firm, f-vf gr, sbrnd, sl calc, mor srt, mod por, carb incl.
1000
SH: lt-m, gy, firm, sbblky, plty, n calc, slty.
SS: wh, lt gy, qtzxl, sft, fri, f-vf gr, sbrnd, sl calc, mod srt, mod por, carb incl, intb w/ Sh m gy, firm, blky, plty, n calc, sl slty ip.
SS: wh, lt gy, qtzxl, sft, fri, f-vf gr, sbrnd, sl calc, mod srt, mod por, abnt lst f grqtzxl
1050
SS: lt grn, lt gy, wh ip, firm, f gr, sbang, sl cal, p por,mod srt, carb incl w/ m drk, firm, sbblky sl sndy, n calc Sh.

TD @ 1079' 09:01 02/10/08

POCI 55 Monitor

3 OPEN HOLE GEOPHYSICAL LOGGING

Initial geophysical logs were recorded by Superior Well Services of Trinidad, Colorado. The geophysical logs were collected to support mud logging and to identify major aquifer zones and aquitards, and to determine well completion intervals. All logs are provided in Appendix B. The following geophysical logs were performed immediately after drilling on February 10, 2008 within the open borehole and are provided in Figure 3-1 and Appendix B:

1. Gamma Ray (GR)
2. Spontaneous Potential (SP)
3. Deep Induction Resistivity (DIR)
4. Short Normal (SN) Induction
5. Caliper (DCAL)
6. Line Tension (LTEN) Curve
7. Density Correction Curve (RHOC)
8. Density Porosity (DPOR)
9. Neutron Porosity (NPOR)

A description of each log is presented with a summary of the interpretation.

3.1 GAMMA RAY (GR)

The gamma ray log allows for the measurement of total natural radioactivity in a formation, measured in American Petroleum Institute (API) units. Gamma rays can be measured through the casing or an open hole. Analysts use the gamma ray log to identify shale and clay since most natural radioactivity occurs in these strata. The gamma ray log also allows for correlations to be made between wells. Deflections to the right of the trend of the line (stronger signal) for the gamma ray log indicate the probable presence of shale or clay; deflections to the left of the trend line for the gamma ray log indicate the probable presence of sand.

3.2 SPONTANEOUS POTENTIAL (SP)

The SP log is the natural difference between electronic potential, in millivolts, between an electrode in the borehole and a fixed electrode on the surface. The magnitude of the deflection is dependent on the salinity contrast between drilling mud, formation water, and the clay content of the permeable bed (www.glossary.oilfield.slb.com). The SP is helpful in detecting permeable beds and estimating formation water salinity and clay content. Deflections to the right of the trend of the line (stronger signal) for the SP log indicate the probable presence of shale or clay; deflections to the left of the line for the SP log indicate the probable presence of sand.

3.3 DEEP INDUCTION RESISTIVITY (DIR) AND SHORT NORMAL (SN) INDUCTION

An induction log is created by inducing alternating current loops in the formation and measuring the resultant signal in a receiver. The field created by the current loops in the formation produces its own magnetic field, which creates a current in the receiver coil. The signal received is proportional to the conductivity of the formation. Formations with a high conductivity and resistance give the most accurate readings. A deep induction log reads deep into the formation while maintaining vertical resolution. Deep induction logs can be used to determine groundwater conductivity in the formation. A shallow induction log is based on the same principles as the deep induction log. However, a

different transmitter and receiver coil are used. The shallow induction log reads shallow into the formation.

Used in combination, the deep and shallow induction logs provide a signal that is representative of the resistivity of formation material. Formations filled with fresh water are more resistive to electrical signals than formations filled with brackish or saline water. Sand is typically more resistive than silt and clay. Consequently, deflections to the right of the trend of the line (higher resistance) on the induction logs indicate the probable presence of sand with fresh water; deflections to the left of the line on the induction logs indicate the probable presence of silt/clay or sand with brackish or saline water.

3.4 CALIPER (DCAL)

Superior includes the caliper log on the tool used to measure density and is therefore called the DCAL log. The caliper log is used to measure the diameter of the borehole in order to determine borehole stability. It can also be used to determine if the drilling mud has maintained borehole stability. Borehole diameter can affect log response so the caliper log is useful in the analysis of geophysical logs. A deflection to the right, indicting a larger borehole, may indicate that a water-bearing sand zone is causing mud separation from the borehole wall.

3.5 LINE TENSION (LTEN) CURVE

The line tension curve represents the weight being pulled on the cable as the geophysical tool is being hoisted out of the hole. This measurement determines where weight pulls are affecting the curve response log. As weight is being pulled the differential curve may increase and the other curves will turn into a straight line, indicating the response is invalid and the geophysical logs must be re-run. A deflection to the left indicates that differential tension may be affecting the logging results.

3.6 DENSITY CORRECTION CURVE (RHOC)

Superior identifies the correction curve as RHOC. The density correction curve shows how the density tool pad is making contact with the borehole. The optimal reading is zero correction, which means the pad is making solid contact with the formation. Positive correction is an indicator of mud cake between the pad and formation. This is a permeability indicator as to whether the formation has been sealed by the solids in the drilling mud. Negative correction should not occur because this indicates that the mud cake is harder than the actual formation being evaluated. A deflection to the right indicates that mud cake is between the pad and formation. Deflections to the left indicate that the mud cake is harder than the formation.

3.7 DENSITY POROSITY (DPOR)

The density porosity log allows bulk density calculations to be made as well as a basic lithology interpretation. The density porosity log can be used to correlate formations across boreholes. Deflections from the trend line to the left indicate a more porous formation, while deflections to the right could indicate a less porous zone.

3.8 NEUTRON POROSITY (NPOR)

Neutron porosity is the log of porosity based on the effect of the formation on fast neutrons emitted by a source (www.glossary.oilfield.slb.com). Hydrogen slows down and captures neutrons and affects neutron porosity. Matrix and fluid also have an effect on the neutron porosity log. The log is calibrated assuming the pores are filled with fresh water for a matrix (limestone, sandstone, or dolomite).

Formations which contain clay and gas affect neutron porosity. Formations which contain gas can be delineated using the neutron porosity log due to the low hydrogen content in gases. Deflections from the trend line to the left indicate higher porosity. Shale can appear to have a higher porosity in neutron porosity curves due to bound water.

3.9 GEOPHYSICAL LOGS EVALUATION

The GR, SP, DIR, and SN logs were analyzed below the initial fluid level, estimated at 452 to 460 feet below ground level, to total depth to identify probable sandstone intervals for the placement of slotted casing and sand pack. The typical signature included deflections to the left of trend by the GR log and deflections to the right by the DIR and SN logs. The SP log was analyzed but not considered diagnostic in this case. The sandstone signature described by the GR, DIR, and SN logs were then compared to the NPOR and DPOR logs for indications of porosity, which served to confirm the location of sandstone intervals. In addition, the NPOR and DPOR logs were used to refine the placement of slotted casing based on the indications of porosity provided by these logs. Four target intervals were chosen for slotted casing and sand pack as shown in Figure 3-1 and Table 3.1.1

TABLE 3.1.1
POCI 55 Monitor Well Aquifer Completion Intervals Summary

Depth Interval (ft below GL)		Annulus Material	Aquifer Intervals
420	628	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 4
678	797	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 3
880	981	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 2
990	1041	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 1

BLANCO
Geological Services LLC

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

Well Name: POCI 55
Location: Sec3 T29S R67W
Licence Number: 05-071-275819-00
Region: Purgatoire River
Spud Date: 02/04/08
Drilling Completed: 02/10/08
Surface Coordinates: 851' FSL & 1773' FWL

Bottom Hole Coordinates:

Ground Elevation (ft): 6690'
K.B. Elevation (ft): 6690'
Logged Interval (ft): 50' To: 1079'
Total Depth (ft): 1079'
Formation:
Type of Drilling Fluid: Mud/ Gel & Air

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

OPERATOR

Company: Petroglyph Operrating Company, Inc.
Address: 555Sought Cole Rd.
Boise, ID 83709
Ph: (719) 742-5570

GEOLOGIST

Name: Leeo Carrasco
Company: BLANCO Geological Services LLC
Address: 806 Robinson Ave.
Trinidad CO 81082
(719) 846-3364

Rig

LW Rig # 14

Comments

12.75" Surface Casing set @ 40'

ROCK TYPES

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

ACCESSORIES

MINERAL: 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

FOSSIL: Algae, Amph, Belm, Bioclst, Brach, Bryozoa, Cephal, Coral, Crin, Echin, Fish, Foram, Fossil, Gastro, Oolite, Ostra, Pelec, Pellet, Pisolite, Plant, Strom

STRINGER: Anhy, Arg, Bent, Coal, Dol, Gyp, Ls, Mrst, Sltstrg, Ssstrg

TEXTURE: Boundst, Chalky, Cryxln, Earthy, Finexln, Grainst, Lithogr, Microxln, Mudst, Packst, Wackest

OTHER SYMBOLS

POROSITY TYPE: Earthy, Fenest, Fracture, Inter, Moldic, Organic, Pinpoint, Vuggy

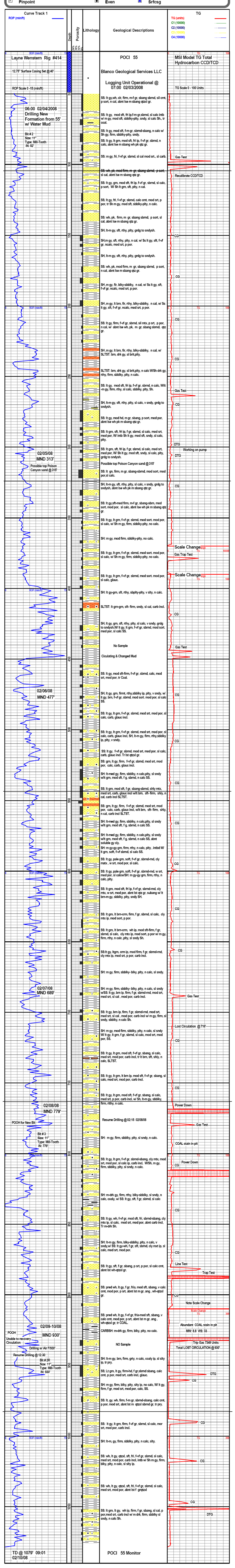
SORTING: Well, Moderate, Poor

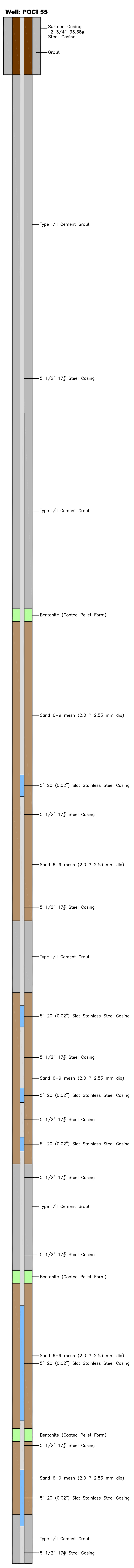
ROUNDING: Rounded, Subrnd, Subang, Angular

OIL SHOWS: Even, Spotted, Ques, Dead

INTERVALS: Core, Dst, Srfcsg

EVENTS: Cv-v, Cv-c, Rft, Sidewall, Srfcsg





SUPERIOR WELL SERVICES — SINGLE INDUCTION LOG

Company: Petroglyph Operating Company Inc.
Well: Poci 55 Monitor Well
Field: Purgatoire River
County: Huerfano
State: Colorado

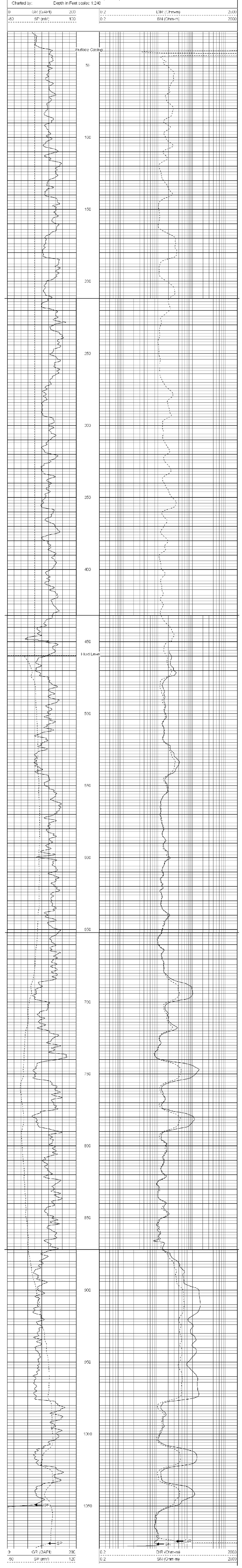
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Go 3.5 miles from west edge of Walsenburg and turn left on Cnty. rd. 346. (by blue water tank) Stay on main rd. to crossroads and go right. stay on main rd. (left@ Y) 3.4 miles to Deer Meadows Rd. Go left to location.

Main Pass

Database File: poci55.db
Dataset Pathname: pass2.2
Presentation Format: iel
Dataset Creation: Sun Feb 10 14:44:24 2008 by Calc Open-Cased 070814
Charted by: Depth in Feet scaled 1:240



SUPERIOR WELL SERVICES — COMPENSATED DENSITY NEUTRON LOG

Company: Petroglyph Operating Company Inc.
Well: Poci 55 Monitor Well
Field: Purgatoire River
County: Huerfano
State: Colorado

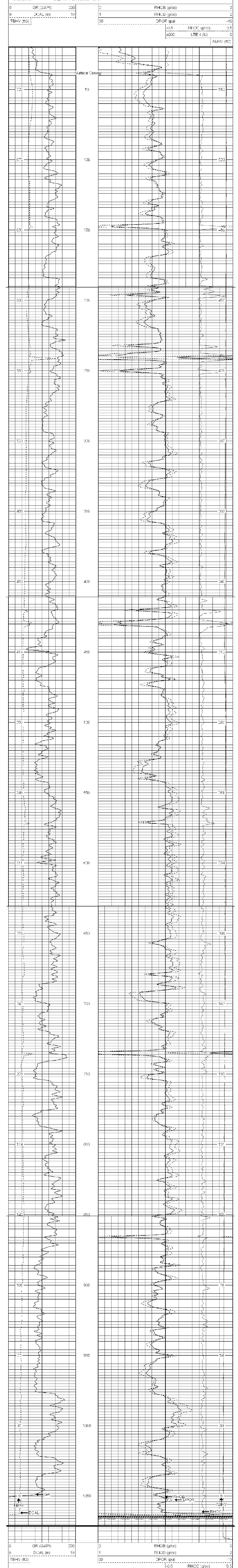
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Compensated Density Neutron Porosity Presented On Sandstone Matrix.
ABHV Calculated For 5 1/2" Casing.
Go 3.5 miles from west edge of Walsenburg and turn left on Cnty. rd. 346. (by blue water tank)
Stay on main rd. to crossroads and go right. stay on main rd. (left@ Y) 3.4 miles to
Deer Meadows Rd. Go left to location.

Main Pass

Database File: poci55.db
Dataset Pathname: pass4
Presentation Format: cd
Dataset Creation: Sun Feb 10 15:05:35 2008
Charted by: Depth in Feet scaled 1:240



Main Pass

Database File: poci55.db
Dataset Pathname: pass4
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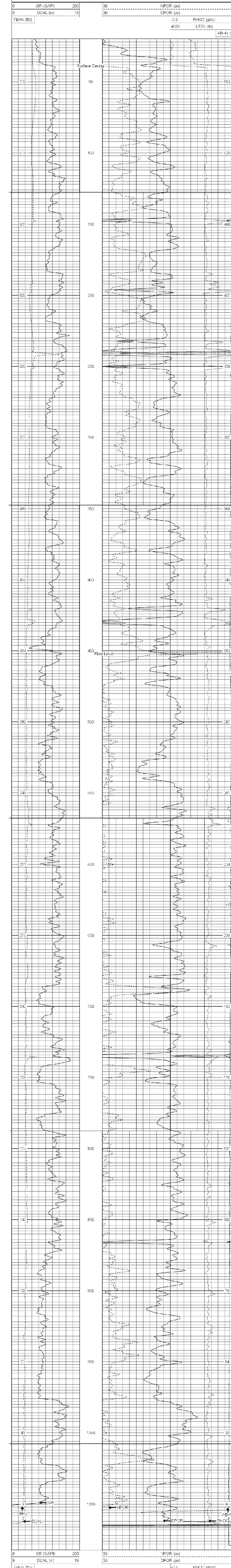
Dataset Creation: Sun Feb 10 15:05:35 2008
Charted by: Depth in Feet scaled 1:240



4 WELL COMPLETION

Well completion includes the setting of casing, both solid and slotted, and filling the annular space with proper materials to allow flow of water into the casing but separate over and underlying distinct aquifers such that there is no vertical communication through the completed annular space. The completion of monitor well POCI 55 includes, as described section 3, four aquifer intervals identified from mud and geophysical logs. The first step was to calculate a casing tally of all the available pieces of casing because they were all different lengths. These were then placed in a specified order to achieve placement of the slotted casing at the target zones.

4.1 CASING PLACEMENT

Layne-Western of Layne Christensen Company completed the well using the same drill rig used to drill the well. Completion of well POCI 55 included setting casing, slotted casing and completing the annular space with grout, bentonite, and sand to isolate targeted aquifer zones. Monitor well POCI 55 was completed using 5 ½ inch 17 pound, threaded and coupled steel casing with 6 inch outer diameter couplings. The intervals selected from mud and geophysical logs as target aquifers were screened with 6 inch outer diameter, 5 inch inner diameter, stainless steel 0.020 inch slot, threaded and coupled casing. The casing was set as shown in the casing tally provided in Tables 4.1.1 and 4.1.2 and as shown in Figure 2-1. Table 4.2.1 also provides interval summary and detailed casing information.

Table 4.1.1

POCI 55 Monitor Well Casing Tally

Individual Lengths (ft)	Depth Interval (ft below GL)		Well Casing Type
21	0	21	Solid Steel
21.07	21	42.07	Solid Steel
34.7	42.07	76.77	Solid Steel
35.11	76.77	111.88	Solid Steel
34.71	111.88	146.59	Solid Steel
34.88	146.59	181.47	Solid Steel
34.97	181.47	216.44	Solid Steel
34.4	216.44	250.84	Solid Steel
2.23	250.84	253.07	Solid Steel
36.2	253.07	289.27	Solid Steel
35.8	289.27	325.07	Solid Steel
34.2	325.07	359.27	Solid Steel
34.5	359.27	393.77	Solid Steel
34.7	393.77	428.47	Solid Steel
35.65	428.47	464.12	Solid Steel
17.65	464.12	481.77	Solid Steel
5.1	481.77	486.87	Solid Steel
5.15	486.87	492.02	Solid Steel
34.55	492.02	526.57	Solid Steel
10	526.57	536.57	Slotted Steel
5	536.57	541.57	Slotted Steel
35.24	541.57	576.81	Solid Steel
34.45	576.81	611.26	Solid Steel
35.05	611.26	646.31	Solid Steel
36.57	646.31	682.88	Solid Steel
2.05	682.88	684.93	Solid Steel
2.08	684.93	687.01	Solid Steel
4.98	687.01	691.99	Slotted Steel
9.75	691.99	701.74	Slotted Steel
21.11	701.74	722.85	Solid Steel
21.5	722.85	744.35	Solid Steel
10.01	744.35	754.36	Slotted Steel
19.1	754.36	773.46	Solid Steel
4.98	773.46	778.44	Solid Steel
9.7	778.44	788.14	Slotted Steel
36.41	788.14	824.55	Solid Steel
35.38	824.55	859.93	Solid Steel
35.71	859.93	895.64	Solid Steel
20.01	895.64	915.65	Slotted Steel
20.01	915.65	935.66	Slotted Steel
20.01	935.66	955.67	Slotted Steel
20.01	955.67	975.68	Slotted Steel
34.22	975.68	1009.9	Solid Steel
19.55	1009.9	1029.45	Slotted Steel
19.43	1029.45	1048.88	Slotted Steel
11.33	1048.88	1060.21	Solid Steel
14.6	1060.21	1074.81	Solid Steel

Solid Steel Casing is 5 1/2" ID 17 pound threaded casing.

Slotted Steel casing is 6" OD, 5" ID casing with 0.02" Stainless Steel Slots.

TABLE 4.1.2
POCI 55 Monitor Well Casing Summary Description

Depth Interval (ft below GL)		Hole Size "	Casing Type
0	40	Surface Casing	12 3/4", 33.38# Steel Casing
0	526.57	11	5 1/2" 17# Steel Casing
526.57	541.57	11	5", 0.02" Slotted Stainless Steel Casing
541.57	687.01	11	5 1/2", 17# Steel Casing
687.01	701.74	11	5", 0.02" Slotted Stainless Steel Casing
701.74	744.35	11	5 1/2", 17# Steel Casing
744.35	754.36	11	5", 0.02" Slotted Stainless Steel Casing
754.36	778.44	11	5 1/2", 17# Steel Casing
778.44	788.14	11	5", 0.02" Slotted Stainless Steel Casing
788.14	895.64	11	5 1/2", 17# Steel Casing
895.64	975.68	11	5", 0.02" Slotted Stainless Steel Casing
975.68	1009.9	11	5 1/2", 17# Steel Casing
1009.9	1048.88	11	5", 0.02" Slotted Stainless Steel Casing
1048.88	1074.81	11	5 1/2", 17# Steel Casing

4.2 ANNULAR COMPLETION

After setting casing, grout and sand were placed in the annular space between open bore hole and casing using 2 7/8 inch trimmie pipe. Grout was placed behind solid casing while sand was targeted for approximately ten feet below, within, and ten feet above the slotted casing intervals. Bentonite was used to form a seal between the top of sand and grout to prevent grout from entering the slotted casing or the sand. When applying Bentonite between sand and grout approximately nine feet of bentonite was placed by pouring from ground surface down the annular space. Smaller intervals were sealed only with bentonite and no grout was placed. A coated pellet form of bentonite was used to prevent it from bridging prior to reaching the desired depth. The bentonite pellets were allowed a minimum of two hours to activate after placed downhole. Activation of Bentonite is the active dissolving of the non-stick coating that causes the bentonite to swell in place and create a seal prior to placing grout.

After the placement of sand and of cured grout, the tops of the placements of each were tagged or measured using the trimmie pipe to assure that placement was close to the calculated target values. The field measured values are provided in Figure 2-1 and Table 4.2.1. The first placement of grout was miscalculated due to the settling of sediment scraped from the open bore hole wall as casing was set. This resulted in a higher than originally drilled total depth and the possibility of grout entering the lower most slotted casing. The bottom of the inner cased hole was tagged at 1,035 feet.

TABLE 4.2.1
POCI 55 Monitor Well Annular Space Completions

Depth Interval (ft below GL)		Annulus Material
0	40	Type I/II Cement Grout **(Surface Casing)**
0	401	Type I/II Cement Grout
411	420	Bentonite (Coated Pellet Form)
420	628	Sand 6-9 mesh (2.0 – 2.53 mm dia)
628	678	Type I/II Cement Grout
678	797	Sand 6-9 mesh (2.0 – 2.53 mm dia)
797	871	Type I/II Cement Grout
871	880	Bentonite (Coated Pellet Form)
880	981	Sand 6-9 mesh (2.0 – 2.53 mm dia)
981	990	Bentonite (Coated Pellet Form)
990	1041	Sand 6-9 mesh (2.0 – 2.53 mm dia)
1041	1074.81	Type I/II Cement Grout

4.3 WELL DEVELOPMENT

Upon completion of the well it was developed using the drill rig by running in drill tubing below the water level near the bottom of the cased hole and "blowing" on the well with compressed air to create an air-lift of the water. The air-lift causes a complete displacement of the water column within the casing followed by a continuous flow rate supported by the aquifer completions and the continuous flow of air. Air-lifting causes a surge of air resulting in agitation of sediment fines within the well and the formation. This results in a removal of those fines and a cleaning out of the well. The air-lifting for this well resulted in a continuous flow rate of approximately 35 to 45 gallons per minute after initially evacuating the casing. The air-lifting was performed by evacuating the casing, flowing the well at 35 to 45 gallons per minute for approximately fifteen minutes, and then stopping for approximately five minutes and repeating. The development continued for seven hours. However, the water air-lifted from the casing did not clear up and remained very murky and with higher than expected pH values of 9.7 standard units

4.4 TOTAL DEPTH DRILL OUT

The accidental placement of grout within the bottom of the casing, as described in section 4.2, resulted in a drill-out of the cement plug at the bottom, 1,035 feet, to a total depth of 1,072 feet. This was followed by a second attempt to develop the well using the drill rig by air-lifting for three hours as described in section 4.3.

5 CASED HOLE GEOPHYSICAL LOGGING

After completion a second suite of geophysical logs were recorded by Superior Well Services. This second set of geophysical logs was used to corroborate the placement of casing, slotted casing, sand, and grout. The following geophysical logs were performed two days after completion of the well on February 18, 2008 and are provided in Figure 5-1 and Appendix B:

1. Cement Bond (CBL)
2. Collar Locator (CCL)
2. Gamma Ray (GR)
3. Neutron Porosity (NPOR)

The GR and NPOR have already been discussed in section 3. However, cement bond and collar locator were not previously described or used and are now presented.

5.1 CEMENT BOND

A cement bond log (CBL) is used to provide an indication of the cement, grout in this case, bond between the casing and borehole wall. A straight line indicates a poor bond while a wavy thicker line indicates a good bond. This log was run to indicate the presence of grout within the slotted intervals if present and seals between the casing and bore hole wall.

5.2 COLLAR LOCATOR (CCL)

The CCL log is generated by the use of two magnets that produce a signal proportional to the thickness of iron within the casing. This provides the ability to check the casing tally and placement within the well by identifying casing collars and the slotted casing.

5.3 GEOPHYSICAL LOG EVALUATION

The CBL and CCL logs were obtained from below 400 feet to total depth. The CBL actually indicates the best "bond" where the slots are located. According to the logging engineer the tool is "seeing through" the slots in the screen and receiving back a signal from the formation and sand pack without any "pipe ring". But in the intervals that are grouted with cement, the tool is actually showing a poor bond (pure "pipe ring"). The CBL was used as a test to see if it would be useful for detecting the placement of grout behind casing in a water well. However, it was determined that the tool used is limited in this application and the results are not accurate.

As noted in the log file by Superior Well Services, the neutron porosity log was affected by gas flow at approximately 530 feet below ground level to surface and not at greater depths. This supports the origin of gas only from the upper strata.

BLANCO
Geological Services LLC

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

Well Name: POCI 55
Location: Sec3 T29S R67W
Licence Number: 05-071-275819-00 — Region: Purgatoire River
Spud Date: 02/04/08 — Drilling Completed: 02/10/08
Surface Coordinates: 851' FSL & 1773' FWL

Bottom Hole Coordinates:

Ground Elevation (ft): 6690' — K.B. Elevation (ft): 6690'
Logged Interval (ft): 50' To: 1079' — Total Depth (ft): 1079'
Formation:
Type of Drilling Fluid: Mud/ Gel & Air

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

OPERATOR

Company: Petroglyph Operrating Company, Inc.
Address: 555Sought Cole Rd.
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Ph: (719) 742-5570

GEOLOGIST

Name: Leeo Carrasco
Company: BLANCO Geological Services LLC
Address: 806 Robinson Ave.
Trinidad CO 81082
(719) 846-3364

Rig

LW Rig # 14

Comments

12.75" Surface Casing set @ 40'

ROCK TYPES

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

ACCESSORIES

MINERAL: 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

FOSSIL: Algae, Amph, Belm, Bioclst, Brach, Bryozoa, Cephal, Coral, Crin, Echin, Fish, Foram, Fossil, Gastro, Oolite, Ostra, Pelec, Pellet, Pisolite, Plant, Strom

STRINGER: Anhy, Arg, Bent, Coal, Dol, Gyp, Ls, Mrst, Sltstrg, Ssstrg

TEXTURE: Boundst, Chalky, CryxIn, Earthy, FinexIn, Grainst, Lithogr, MicroxIn, Mudst, Packst, Wackest

OTHER SYMBOLS

POROSITY TYPE: Earthy, Fenest, Fracture, Inter, Moldic, Organic, Pinpoint, Vuggy

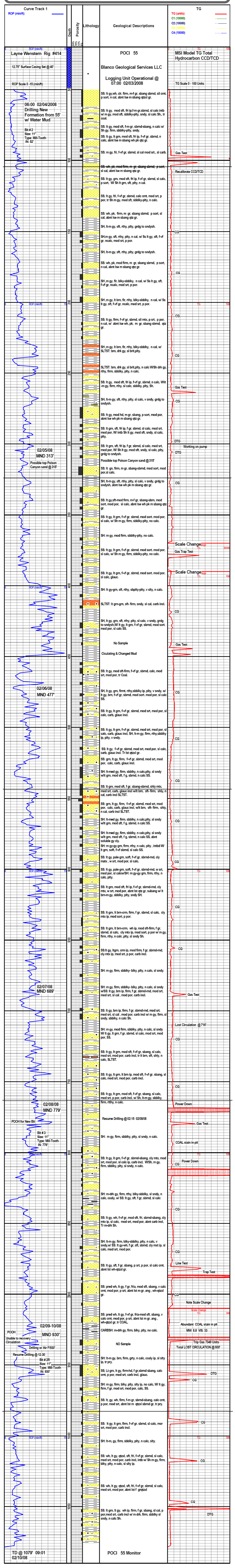
SORTING: Well, Moderate, Poor

ROUNDING: Rounded, Subrnd, Subang, Angular

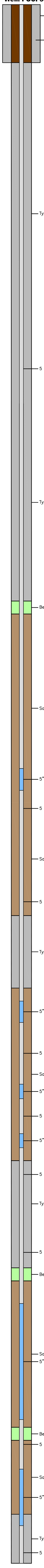
OIL SHOWS: Even, Spotted, Ques, Dead

INTERVALS: Core, Dst, Sidewall

EVENTS: Rft, Srfcsg



Well: POCI 55



SUPERIOR WELL SERVICES
Black Lick, Pa. · Mercer, Pa. · Wooster, Oh. · Cleveland, Ok. · Trinidad, Co.

SECTOR CEMENT BOND GAMMA RAY

Company Petroglyph Operating Company Inc.
Well Poci 55 Monitor Well
Field Huerfano
County Las Animas State CO
Location: API #:
Water Well Permit Number 275819
851' FSL & 1773' FWL
SEC 3 TWP 29S RGE 67W
Other Services: NEU
Permanent Datum Ground Level — Elevation 6690
Log Measured From Ground Level
Drilling Measured From Ground Level
Elevation: K.B. —— D.F. —— G.L. 6690

Date	2/18/08
Run Number	one
Depth Driller	1079'
Depth Logger	1070'
Bottom Logged Interval	1066'
Top Log Interval	450'
Open Hole Size	11"
Type Fluid	water
Density / Viscosity	///
Max. Recorded Temp.	///
Estimated Cement Top	NA
Time Well Ready	ROA
Time Logger on Bottom	12:30
Equipment Number	0703
Location	Trinidad
Recorded By	Worley
Witnessed By	Mr. Melland / Mr. Valdez

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	12.75"		00	39'
Prot. String				
Production String	5 1/2"		00	NA
Liner				

<<< Fold Here >>>

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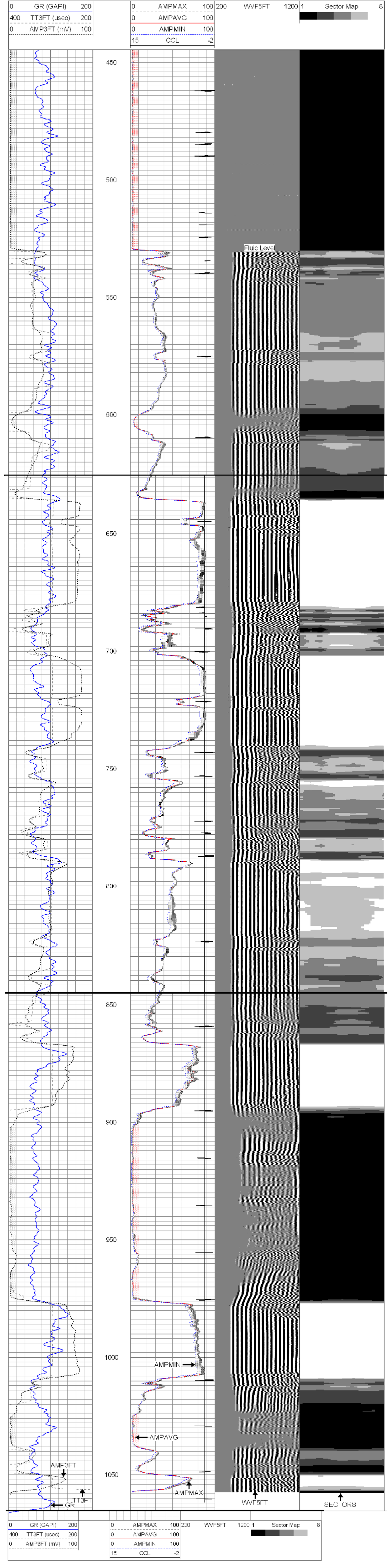
Comments

Go 3.5 miles from west edge of Walsenburg and turn left on Cnty, road 346. (by blue water tank) stay on main road to crossroads and go right. stay on main road (left @ Y) 3.4 miles to Deer Meadows Road, go left to location.

SUPERIOR WELL SERVICES

Main Pass

Database File: poci55monitorwell21808.db
Dataset Pathname: pass5
Presentation Format: sector
Dataset Creation: Mon Feb 18 12:57:54 2008 by Log Open-Cased 071220
Charted by: Depth in Feet scaled 1:240



SUPERIOR WELL SERVICES
Black Lick, Pa. · Mercer, Pa. · Wooster, Oh. · Cleveland, Ok. · Trinidad, Co.

GAMMA NEUTRON LOG

Company Petroglyph Operating Company Inc.
Well Poci 55 Monitor Well
Field Huerfano
County Las Animas State CO
Location: API #:
Water Well Permit Number 275819
851' FSL & 1773' FWL
SEC 3 TWP 29S RGE 67W
Other Services: SCBL
Permanent Datum Ground Level — Elevation 6690'
Log Measured From Ground Level
Drilling Measured From Ground Level
Elevation: K.B. —— D.F. —— G.L. 6690'

Date	2/18/08
Run Number	one
Depth Driller	1079'
Depth Logger	1070'
Bottom Logged Interval	1066'
Top Log Interval	Surf.
Open Hole Size	11"
Type Fluid	water
Density / Viscosity	///
Max. Recorded Temp.	///
Estimated Cement Top	NA
Time Well Ready	ROA
Time Logger on Bottom	12:30
Equipment Number	0703
Location	Trinidad
Recorded By	Worley
Witnessed By	Mr. Melland / Mr. Valdez

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	12.75"		00	39'
Prot. String				
Production String	5 1/2"		00	NA
Liner				

<<< Fold Here >>>

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Comments

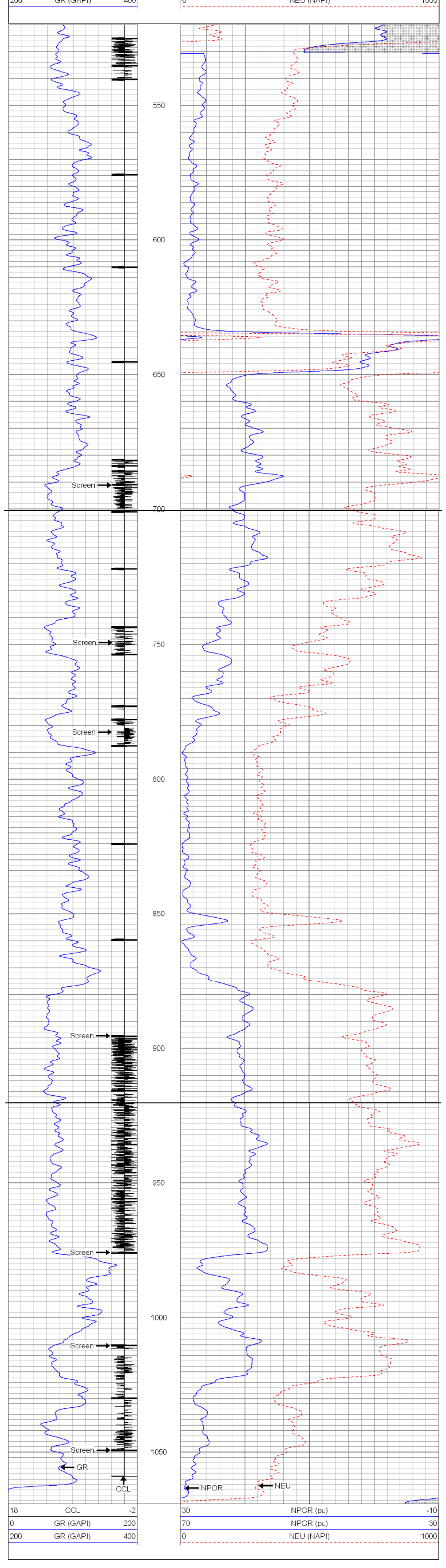
Go 3.5 miles from west edge of Walsenburg and turn left on Cnty, road 346. (by blue water tank) stay on main road to crossroads and go right. stay on main road (left @ Y) 3.4 miles to Deer Meadows Road, go left to location.

Neutron affectted by gas flow from 530' to surface.
Well flowing at time of log.

SUPERIOR WELL SERVICES

Main Pass

Database File: poci55monitorwell21808.db
Dataset Pathname: pass7.1
Presentation Format: gr-n-ccl
Dataset Creation: Mon Feb 18 15:56:11 2008 by Calc Open-Cased 071220
Charted by: Depth in Feet scaled 1:240



Calibration Report

Database File: poci55monitorwell21808.db
Dataset Pathname: pass7.1
Dataset Creation: Mon Feb 18 15:56:11 2008 by Calc Open-Cased 071220

Neutron Calibration Report

Serial Number: Titan
Tool Model: T
Performed: Thu May 08 11:16:24 2003

Calibrator Value: 1200 NAPI

Calibrator Reading: 1700 cps

Sensitivity: 1 NAPI/cps

Gamma Ray Calibration Report

Serial Number: Slimhole
Tool Model: SH

6 AQUIFER PACKER TESTING

Individual slotted casing zones within monitor well POCI 55 were tested for water and gas production. Layne Christensen was used in the testing to supply the testing rig and field labor. The Layne Christensen testing report is provided in Appendix C. The equipment configuration is shown in Figure 6-1. The equipment included using 2 7/8 inch discharge tubing, two 4.0 inch medium duty inflatable packers purchased from Baski Inc. and spaced using 1½ inch tubing, and a Grundfos 4 inch submersible pump and motor. The pump was set within a shroud so that it could be placed in between an upper and lower, straddle, packer system.

Pressure changes were monitored using pressure transducers. One vented Level Troll 700 and two non-vented Level Troll 700 pressure transducers, and one 1,000 foot vented Level Troll cable were rented from In-Situ Inc. The vented Level Troll 700 was used with the vented cable for direct read out during testing and was used to monitor the middle zone, in between the upper and lower packer, that was being actively pumped or tested. The two non-vented Level Troll 700 transducers were attached to the discharge tubing with tests logging and were not connected for surface read-out. The tests from the two non-vented transducers were downloaded after the discharge string was removed from the well. These two transducers monitored pressure changes above the upper packer and below the lower packer. The transducer monitoring above the upper packer was attached to the discharge string without any other equipment. However, the transducers monitoring the middle and lower zones were connected at their pressure monitoring point with ¼ inch nylon tubing that was passed through the discharge assembly using Swedgelok fittings such that they were water tight (Figure 6-1). The middle transducer nylon tubing was open to the middle zone just below the upper packer and the lower transducer nylon tubing was open just below the lower packer (Figure 6-1). Thus, the middle and lower transducers monitored pressure changes in between the packers and below the lower packer, respectively, but would reflect a pressure relative to the transducer placement approximately two feet above the upper packer.

The discharge tubing string was fitted at the surface to an inline paddle flow meter with digital read out of rate in gallons per minute and total accumulative flow in gallons. The discharge line then was connected to a gas water separator. The outlet of the water flow was also metered with a magnetic flow meter with digital read out of rate in gallons per minute and total accumulative flow in gallons. The vented gas from the separator was measured with a Barton chart recorder and intermittently with a handheld RKI model GX-2003 gas meter to identify the type of gas emanating from the separator vent.

Significant gas production was only found within the upper most slotted interval, completion 4, between 526.6 and 541.6 feet below ground level. The upper zone produced approximately 35 mcf/day when the lower packer was placed just below the upper most slotted interval. However there was a significant loss of gas at the wellhead that was not recorded on the Barton chart due to a leak in the wellhead pack-off system. A similar flow rate of gas, approximately 50 mcf/day, was also observed from the entire open hole with a completely sealed wellhead. Details of each test including flow rates and times of turning on and off the pump are provided in Appendix D. Images of the Barton gas flow charts monitoring gas from the gas water separator are provided in Appendix E. Individual tests from the bottom up are described below.

6.1 AQUIFER TEST 1 – COMPLETION INTERVAL 1, SLOTTED INTERVAL 1,010 TO 1,049 FEET

This first test only required the use of one packer and two pressure transducers because there was no slotted interval below this target interval; only the cased bottom of the well. The upper packer

was used and placed at 992 feet below ground surface with the pump hanging directly below the packer within the shroud. The two pressure transducers monitored pressures above and below the single packer. The tubing tally for this test is provided in Table 6.1.1. The J refers to the tubing joints that were measured prior to running in the well and pups refers to short pieces of tubing used to place the packer within a foot of the target set depth between slotted casing.

TABLE 6.1.1

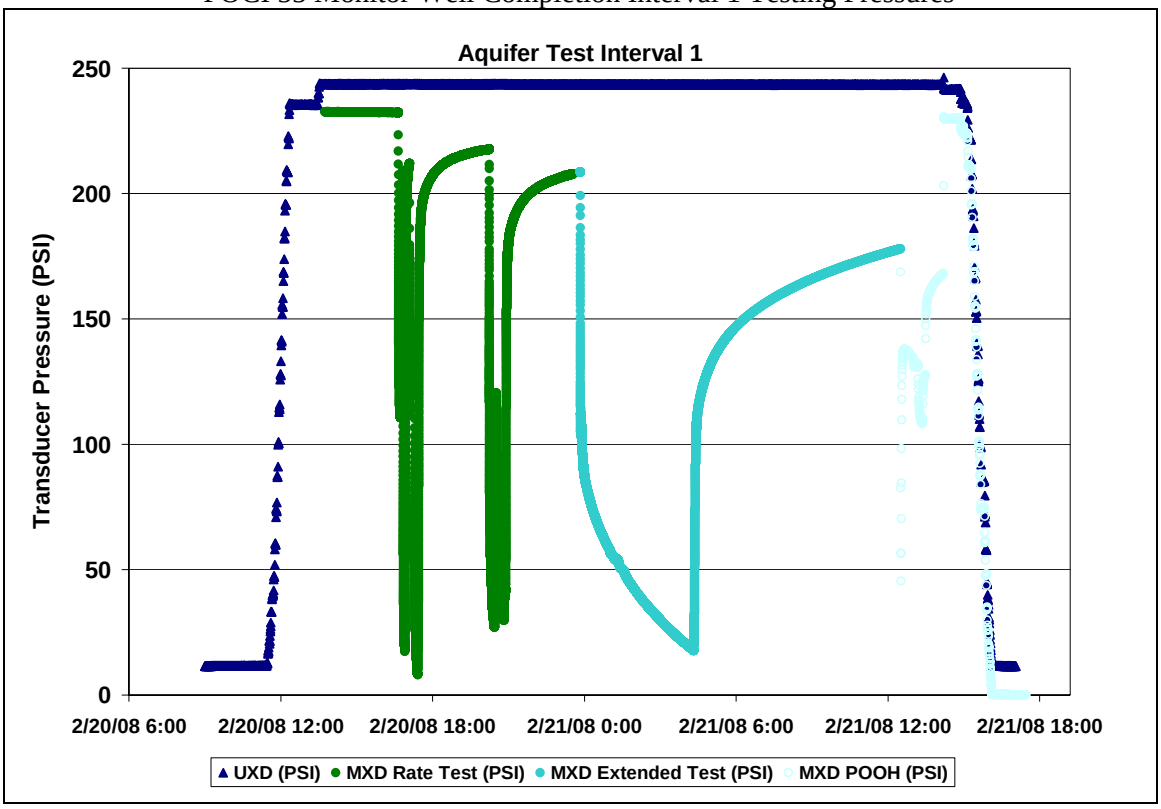
POCI 55 Monitor Well Completion Interval 1 Testing Tubing Tally

POCI 55 Test String Tubing Tally Bottom Zone 1009.9' - 1048.9'		
Open Hole DTW from Top of Casing = 530.8 ft		
Top of Pipe String Above GL (ft)	3	
*Transducers Placed at bottom of this joint @ 984 feet		
ID	**Joint Lengths (ft)**	**Packer Center Line Set Depth (ft)**
Packer CL To top of assembly	7	
J1+ Check Valve	32.22*	36.22
J2	31.48	67.7
J3	31.22	98.92
J4	31.22	130.14
J5	31.33	161.47
J6	31.27	192.74
J7	31.22	223.96
J8	31.15	255.11
J9	31.35	286.46
J10	31.05	317.51
J11	31.3	348.81
J12	31.12	379.93
J13	31.2	411.13
J14	31.35	442.48
J15	31.25	473.73
J16	31.7	505.43
J17	31.35	536.78
J18	31.1	567.88
J19	31.45	599.33
J20	31.05	630.38
J21	31.2	661.58
J22	31.15	692.73
J23	31	723.73
J24	31.16	754.89
J25	31.33	786.22
J26	31.14	817.36
J27	31.25	848.61
J28	31.25	879.86
J29	31.4	911.26
J30	31.2	942.46
J31	31.13	973.59
Pups	18.45	992.04

Pressure transducer data is shown in Figure 6.1. The dark blue triangles show the pressure transducer measuring pressure above the packer, while the circles represent measurements monitored below the packer in the testing zone. The green data circles are data collected during packer inflation and the rate testing. The light blue circles show the data collected during the extended testing and the lighter blue open circles show the data collected after testing as the testing string is pulled out of the hole (POOH) or well. The two transducers, upper (UXD) and

middle (MXD), were placed approximately eight feet above the upper packer center line on the bottom of the first joint of tubing. This places the transducers at 984 feet below ground level. The middle transducer was the vented Level Troll 700 connected to the vented cable for direct read. This target zone started with an initial pressure of 232.5 psi reading on the middle, below the upper packer, vented transducer connected to ¼ inch nylon tubing and 235.5 psi on the upper non-vented transducer. After inflation of the upper packer the pressure in the upper non-vented transducer increased to 243.7 psi and remained at that pressure during the entire time until packer deflation when it lowered to 235.5 psi. The lack of pressure response in the upper transducer during pumping indicates that there was a good seal in the annular space and that the zone was not connected to the upper water bearing zones.

FIGURE 6-1
POCI 55 Monitor Well Completion Interval 1 Testing Pressures



The upper pressure transducer water column pressure was recording 223.8 psi before inflating the packer and after subtracting off atmospheric pressure, 11.7 psi. This pressure results in 516.9 feet of water above the transducer using a conversion of 0.433 psi per foot of water. The calculated water level is 467 feet below ground level when taking into account placement of the transducer.

The first test initiated was a step rate test. This is where the pump is turned on and flow is restricted to a low flow rate. After analyzing the drawdown as water is discharged at a constant rate the pumping is increased at step increments until a sustainable rate that stresses the system. After the rate test the formation was allowed to recover to its approximate original starting pressure. The pumping of the well at a low rate, approximately 5 gallons per minute, resulted in a significant drawdown from the original 232 psi down to 17 psi before shutting down the pump.

This was only sustainable for 4.5 hours. Recovery of the zone was also slow with only approximately 80% recovery after 10 hours.

During this entire test no gas from this zone was recorded on the Barton chart recorder or on the RKI gas meter at the separator vent. However, during the entire event 100% methane gas by volume was venting from the well casing from above the packer (Table 6.1.2) at a significant rate (Appendix E).

TABLE 6.1.2
POCI 55 Monitor Well Completion Interval 1 Testing Gas Monitoring

Aquifer Test Interval 1						
Date	**Time**	**CH_4 (% Vol)**	**H_2S (ppm)**	**O_2 (% Vol)**	**CO (ppm)**	**Measurement Location**
2/21/08	0:07	100	0	0	0	Casing Above Packer
2/21/08	1:30	0	0	20.9	0	Separator Vent
2/21/08	1:30	100	0	0	0	Casing Above Packer
2/21/08	3:03	0	0	20.9	0	Separator Vent
2/21/08	3:03	100	0	0	0	Casing Above Packer
2/21/08	4:00	0	0	20.9	0	Separator Vent
2/21/08	4:00	100	0	0	0	Casing Above Packer
2/22/08	11:31	9	1.5	15	0	Separator Vent

6.2 AQUIFER TEST 2 – COMPLETION INTERVAL 2, SLOTTED INTERVAL 896 TO 976 FEET

Before running the second test, the discharge and packer assembly was pulled out of the well and the second packer was added into the testing assembly for a straddle packer configuration with the pump and shroud in between the packers. An additional pressure transducer was also added resulting in a total of three pressure transducers to monitor above the upper packer, in between packers, and below the lower packer as described at the beginning of this section. The first test only required the use of two transducers. This assembly was then run back into the well down to the second test zone. It was assembled such that for subsequent testing only tubing joints from the top were pulled out and the testing string landed for the next higher slotted zones. The packers for this second test were set at 849 and 995 feet below ground surface. The pump and packer portion of the assembly remained intact for the subsequent tests with a spacing between packers of 145 feet. The 145 feet of spacing was set such that the slotted intervals were straddled without overlap or without placing the packers on the slots. The pipe tally for this test is provided in Table 6.2.1. The abbreviations UP, LP, and CL are short for upper packer, lower packer, and center line, respectively. Center line is the center of the packer inflation material making contact with the casing wall. The capital letter J refers to the 2 7/8 inch tubing while the lower case j refers to the 1½ inch tubing separating the packers.

TABLE 6.2.1

POCI 55 Monitor Well Completion Interval 2 Testing Tubing Tally

POCI 55 Test String Tubing Tally Bottom Zone 896' - 976'			
Open Hole DTW from Top of Casing = 530.8 ft			
Top of Pipe String Above GL (ft) 4			
*Transducers Placed at bottom of this joint @ 841 feet			
ID	**Joint Lengths (ft)**	**LP CL Set Depth (ft)**	**UP CL Set Depth (ft)**
LP CL to bottom	8	-4	
LP CL to top	4.4	0.4	
j1	21.32	21.72	
j2	21.06	42.78	
j3	21.35	64.13	
j4	21.04	85.17	
j5	21.1	106.27	
j6	21	127.27	
UP CL to bottom	15.8	143.07	
UP CL To top	7	150.07	4.8
J1+ Check Valve	32.22*	182.29	37.02
J2	31.48	213.77	68.5
J3	31.22	244.99	99.72
J4	31.22	276.21	130.94
J5	31.33	307.54	162.27
J6	31.27	338.81	193.54
J7	31.22	370.03	224.76
J8	31.15	401.18	255.91
J9	31.35	432.53	287.26
J10	31.05	463.58	318.31
J11	31.3	494.88	349.61
J12	31.12	526	380.73
J13	31.2	557.2	411.93
J14	31.35	588.55	443.28
J15	31.25	619.8	474.53
J16	31.7	651.5	506.23
J17	31.35	682.85	537.58
J18	31.1	713.95	568.68
J19	31.45	745.4	600.13
J20	31.05	776.45	631.18
J21	31.2	807.65	662.38
J22	31.15	838.8	693.53
J23	31	869.8	724.53
J24	31.16	900.96	755.69
J25	31.33	932.29	787.02
J26	31.14	963.43	818.16
J27	31.25	994.68	849.41

Prior to inflating the packers the middle transducer pressure was reading 155.8 psi. After the inflation of the packers the middle transducer was recording a pressure of 155.3 psi. This indicated only a slight pressure drop after packer inflation of approximately 0.5 psi. This may indicate that the upper zone has a slightly higher pressure head and was feeding water to this zone.

Prior to packer inflation the upper and lower pressure transducers were measuring 167.3 psi and 174.2 psi, respectively. After inflation the upper and lower pressure transducers were measuring 169.9 psi and 174.2 psi, respectively. The upper transducer was able to show that the upper zones

reached an equilibrium. However, the pressure in the lower zone was influenced by pumping and an equilibrium pressure was not obtained for this zone during this test.

The pressure in this zone with packers inflated as monitored by the middle transducer was 155.3 psi. However, the use of the ¼ inch nylon tubing may result in an inaccurate but precise value. The recorded value may not be a true water pressure but the changes in value are precise. This is noted by comparing the upper transducer not connected to nylon tubing with the lower transducer connected to nylon tubing. The transducers are all placed in the same location on the testing string and therefore should ideally read the same pressure. However there are differences, after taking into account atmospheric pressure, 11.5 psi, that are seen in the data that can be accounted for by the 1/4 inch nylon tubing. Thus, potentiometric fluid level calculations should be based on the upper pressure transducer. The upper transducer pressure prior to inflating the packers can be used as a calibration for the middle and lower transducer readings after subtracting out atmospheric pressure. The relative changes in the middle and lower transducers can be used to calculate a potentiometric fluid level in those zones using the initial upper pressure transducer value. Using the upper pressure transducer the open hole potentiometric fluid level prior to packer inflation after subtracting off 11.5 psi for atmospheric pressure is 155.8 psi or 360 feet. The change in the middle transducer after packer inflations is 0.5 psi resulting in 358.6 feet of water above the transducer and a calculated potentiometric fluid level of 482 feet below ground level with the transducer placed at 841 feet below ground level.

After inflating the packers and allowing the pressure signal to stabilize, a rate test was run to determine the best flow rate before running a longer term drawdown test. During the rate test it was found that the pump could be running at its full production rate, approximately 14 gallons per minute, without dewatering.

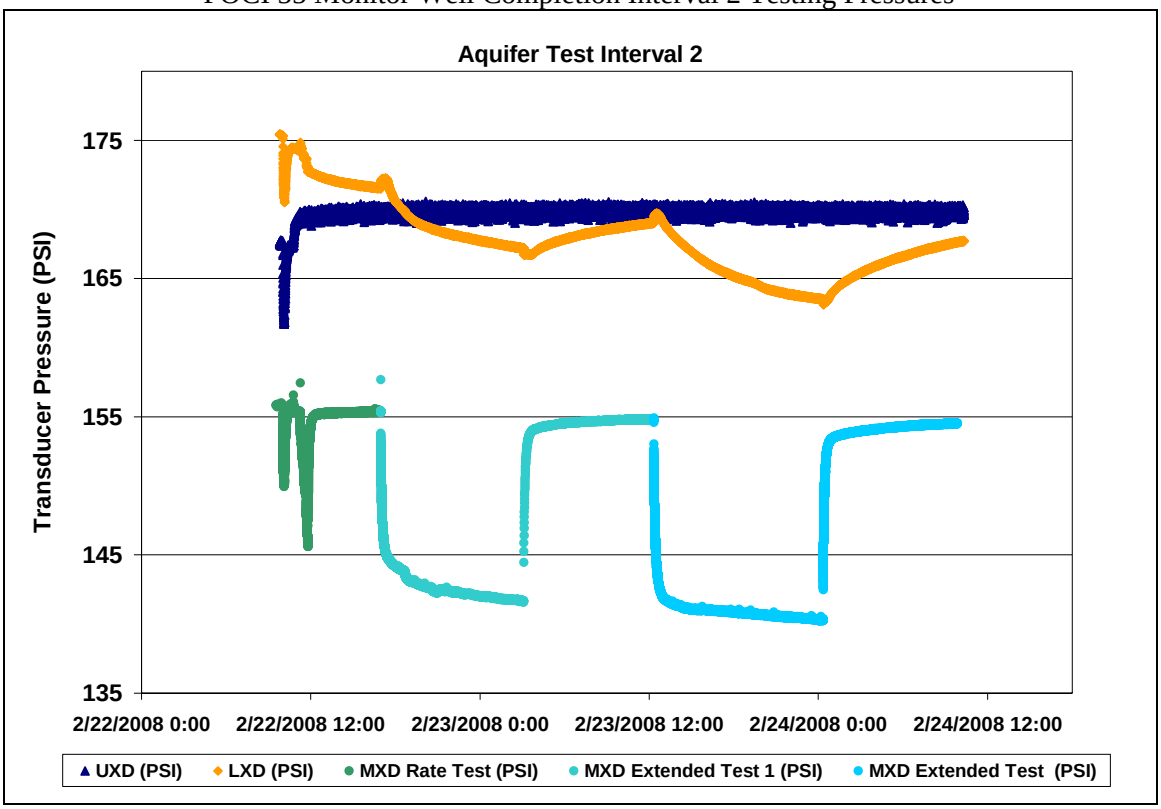
During testing the pressure in the lower zone was influenced by pumping and an equilibrium pressure was not obtained during this test. The influence due to pumping is significant. All equipment was checked prior to entering the well. However, the pressure response observed in the lower zone is thought to be caused by a leak in the lower packer assembly because during the first test no response was observed in the non-pumped zone. In the first test a single packer isolated the lower zone that was pumped and the upper zones were monitored. The upper zones during the first test did not show any response while the response in the pumped lower zone was significant with a 215 psi pressure drop. This would indicate a leak in the lower packer assembly.

Prior to starting the longer term test the zone pressure was allowed to recover. Recovery was 100% at 155.3 psi prior to starting the next test. The test was run at the full pumping capacity beginning on February 22, 2008 at 16:59 pm. The test was running for approximately 10 hours until 3:00 am at which point the flow meter on the inlet to the separator failed. The Layne-Christensen technician supervising the operation at that time believed that there was a potential problem with the pump and the pump was shut-off ending the test prematurely in order to prevent ruing the pump. Analysis of the data indicated that the flow meter was the only problem and a second test was initiated.

Prior to starting the second long term test the well zone pressure was allowed to recover for approximately nine hours. The well was recovered to greater than 99% at 154.8 psi before starting a repeat long term test. The second test resulted in relatively good data and a smooth drawdown curve compared to the first test. The bumps and fluctuations observed in the data during the first test may be a result of well development. However, the second test still indicated

significant well bore damage. Recovery data indicated a good recovery and nearly full recovery where the pressure increased approximately back to its original value of 154.5 psi.

FIGURE 6-2
POCI 55 Monitor Well Completion Interval 2 Testing Pressures



During the testing of this interval only trace amounts of gas were identified and monitored. Approximately 2 to 3 mcf/day of gas was recorded from this zone only at the onset of pumping for approximately 15 to 20 minutes at which point the gas flow was below what could be recorded on the Barton chart recorder. This gas was also a measured as a mixture of combustibles (methane, ethane, and ethene), hydrogen sulfide, and carbon monoxide using the RKI handheld gas meter. The RKI gas readings fluctuated during the testing from ambient air to a maximum combustible gas content of 15% by volume. Similarly, the contributions of hydrogen sulfide and carbon monoxide also fluctuated from zero to higher values as shown in Table 6.2.2. This amount of gas is insignificant when compared to later testing and that found venting from domestic water wells in the near vicinity. In addition, the mixture of gases is an indication of a potentially different source of gas because the production gas does not contain significant contributions of hydrogen sulfide or carbon monoxide. The initial gas flow of 2 to 3 mcf/day observed at the onset of pumping that then declines to undetectable flow rates indicates that there is some gas building up within the casing from the aquifer in equilibrium with gas within that zone that then is alleviated during pumping. This aquifer zone is not capable of sustaining a significant volume of gas and is not expected to be included in the mitigation efforts.

TABLE 6.2.2
POCI 55 Monitor Well Completion Interval 2 Testing Gas Monitoring

Aquifer Test Interval 2						
Date	**Time**	**CH_4 (% Vol)**	**H_2S (ppm)**	**O_2 (% Vol)**	**CO (ppm)**	**Measurement Location**
2/22/08	17:08	8	0	16.5	0	Separator Vent
2/22/08	17:15	100	0	20.9	0	Casing Above Packer
2/22/08	17:20	0	0	20.9	0	Separator Vent
2/22/08	17:25	0	0	20.9	0	Separator Vent
2/22/08	18:43	15	0	15	17	Separator Vent
2/22/08	19:00	16	3	15	13	Separator Vent
2/22/08	21:00	13	0	17	12	Separator Vent
2/23/08	12:21	22	5	10	33	Separator Vent
2/23/08	14:09	11	12	14	45	Separator Vent
2/23/08	14:09	87	5	4	0	Casing Above Packer
2/23/08	15:00	4	4	18	10	Separator Vent
2/23/08	18:00	6	8	15	23	Separator Vent
2/23/08	19:00	8	4	15	25	Separator Vent
2/23/08	20:00	6	4	16	23	Separator Vent
2/23/08	20:05	100	0	0	0	Casing Above Packer
2/23/08	22:00	9	7	14	33	Separator Vent
2/24/08	0:05	8	8	13	40	Separator Vent

6.3 AQUIFER TEST 3 – COMPLETION INTERVAL 3, SLOTTED INTERVAL 687 TO 788 FEET

The packer assembly used for aquifer testing interval 2 was used for this test. The packers were deflated after aquifer testing interval 2 and six tubing joints were pulled out of the well and the packers were reset with the same spacing and transducer placement on the tubing string. The pipe tally for this test is provided in Table 6.3.1.

TABLE 6.3.1

POCI 55 Monitor Well Completion Interval 3 Testing Tubing Tally

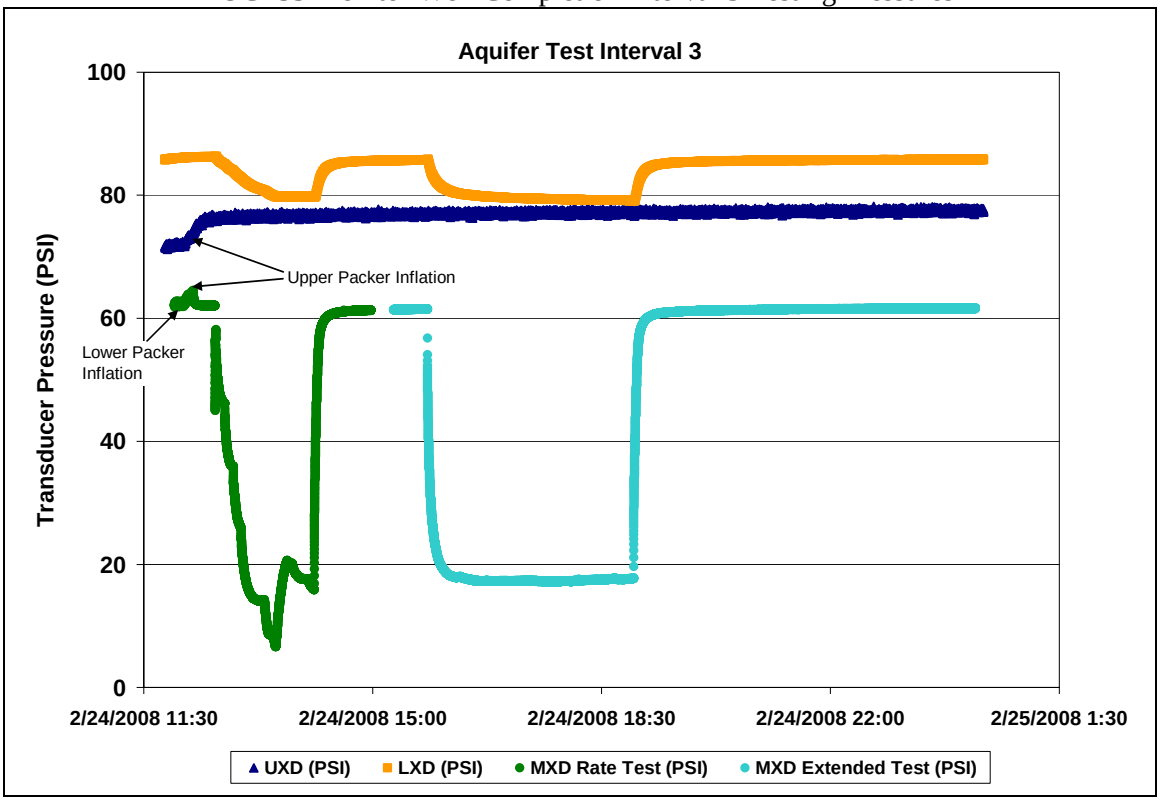
POCI 55 Test String Tubing Tally Bottom Zone 687' - 788' Open Hole DTW from Top of Casing = 530.8 ft Top of Pipe String Above GL (ft) 4 *Transducers Placed at bottom of this joint @ 654 feet			
ID	**Joint Lengths (ft)**	**LP CL Set Depth (ft)**	**UP CL Set Depth (ft)**
LP CL to bottom	8	-4	
LP CL to top	4.4	0.4	
j1	21.32	21.72	
j2	21.06	42.78	
j3	21.35	64.13	
j4	21.04	85.17	
j5	21.1	106.27	
j6	21	127.27	
UP CL to bottom	15.8	143.07	
UP CL To top	7	150.07	4.8
J1+ Check Valve	32.22*	182.29	37.02
J2	31.48	213.77	68.5
J3	31.22	244.99	99.72
J4	31.22	276.21	130.94
J5	31.33	307.54	162.27
J6	31.27	338.81	193.54
J7	31.22	370.03	224.76
J8	31.15	401.18	255.91
J9	31.35	432.53	287.26
J10	31.05	463.58	318.31
J11	31.3	494.88	349.61
J12	31.12	526	380.73
J13	31.2	557.2	411.93
J14	31.35	588.55	443.28
J15	31.25	619.8	474.53
J16	31.7	651.5	506.23
J17	31.35	682.85	537.58
J18	31.1	713.95	568.68
J19	31.45	745.4	600.13
J20	31.05	776.45	631.18
J21	31.2	807.65	662.38

The inflation of the packers did not influence the pressure monitored in the lower zone. However the inflation of the upper packer resulted in an increase in pressure in the upper zone indicating a separation of aquifers. The middle transducer shows a pressure increase with the lower packer inflation indicating that water was flowing out of this zone and down into the lower zone. After inflation of the upper packer the middle transducer shows a decrease in pressure indicating that water was being contributed from the upper zone.

A rate test was run to determine the best flow rate before running a longer term drawdown test. During the rate test it was found that the pump could not be pumped a very high production rate without dewatering. The formation was producing water but the amount of initial head available for drawdown was only 62 psi or 143 feet. The maximum flow rate of the pump at this depth was approximately 17 gallons per minute.

The testing showed a significant pressure response in the middle and the lower zone and not the upper zone. This is similar to the response observed during the second test and is most likely due to a leaking lower packer assembly. No response was observed in the upper zone during the entire testing indicating a good seal between zones within the casing and in the aquifer system.

FIGURE 6-3
POCI 55 Monitor Well Completion Interval 3 Testing Pressures



During the testing of this interval only trace amounts of gas were identified and monitored using the RKI handheld gas meter. The amount of gas produced was below what could be recorded on the Barton chart recorder. The trace amount of gas venting from the separator was measured as a mixture of combustibles (methane, ethane, and ethene), hydrogen sulfide, and carbon monoxide using the RKI handheld gas meter. The RKI gas readings fluctuated during the testing from ambient air to a maximum combustible gas content of 15% by volume. Similarly, the contributions of hydrogen sulfide and carbon monoxide also fluctuated from zero to higher values as shown in Table 6.3.2. This amount of gas is insignificant when compared to that found venting from domestic water wells in the near vicinity. In addition, the mixture of gases is an indication of a potentially different source of gas because the production gas does not contain significant contributions of hydrogen sulfide or carbon monoxide.

TABLE 6.3.2
POCI 55 Monitor Well Completion Interval 2 Testing Gas Monitoring

Aquifer Test Interval 3						
Date	**Time**	**CH_4 (% Vol)**	**H_2S (ppm)**	**O_2 (% Vol)**	**CO (ppm)**	**Measurement Location**
2/24/08	13:39	0	0	20.9	0	Separator Vent
2/24/08	13:52	100	0	0	0	Casing Above Packer
2/24/08	16:59	0	0	20.9	0	Separator Vent
2/24/08	17:57	1	0	20.9	0	Separator Vent

6.4 AQUIFER TEST 4 – COMPLETION INTERVAL 4, SLOTTED INTERVAL 527 TO 542 FEET

Initially this test was planned as a straddle packer test using an upper and a lower packer. The pipe tally for this test is provided in Table 6.4.1. However, only a small amount of water was available within this interval, as indicated by the pressure transducers reading seven pounds of water column above them, with significant volumes of methane gas. Additionally, at this point the submersible pump was not working either due to gas lock or failure. This led to an alternate wellhead design with a pack off at the surface such that the upper packer could be deflated allowing the gas to flow out through the casing to a Barton gas recorder at the surface while the lower packer remained inflated. The pump at that point in time was inoperable and after later investigation was found to be damaged. The packer was set by pulling out six joints placing the lower packer center line at 620 feet.

TABLE 6.4.1

POCI 55 Monitor Well Completion Interval 4 Testing Tubing Tally

POCI 55 Test String Tubing Tally Bottom Zone 527' - 542' Open Hole DTW from Top of Casing = 530.8 ft Top of Pipe String Above GL (ft) 4 *Transducers Placed at bottom of this joint @ 467 feet			
ID	**Joint Lengths (ft)**	**LP CL Set Depth (ft)**	**UP CL Set Depth (ft)**
LP CL to bottom	8	-4	
LP CL to top	4.4	0.4	
j1	21.32	21.72	
j2	21.06	42.78	
j3	21.35	64.13	
j4	21.04	85.17	
j5	21.1	106.27	
j6	21	127.27	
UP CL to bottom	15.8	143.07	
UP CL To top	7	150.07	4.8
J1+ Check Valve	32.22*	182.29	37.02
J2	31.48	213.77	68.5
J3	31.22	244.99	99.72
J4	31.22	276.21	130.94
J5	31.33	307.54	162.27
J6	31.27	338.81	193.54
J7	31.22	370.03	224.76
J8	31.15	401.18	255.91
J9	31.35	432.53	287.26
J10	31.05	463.58	318.31
J11	31.3	494.88	349.61
J12	31.12	526	380.73
J13	31.2	557.2	411.93
J14	31.35	588.55	443.28
J15	31.25	619.8	474.53
J16	31.7	651.5	506.23
Pups	12	663.5	518.23

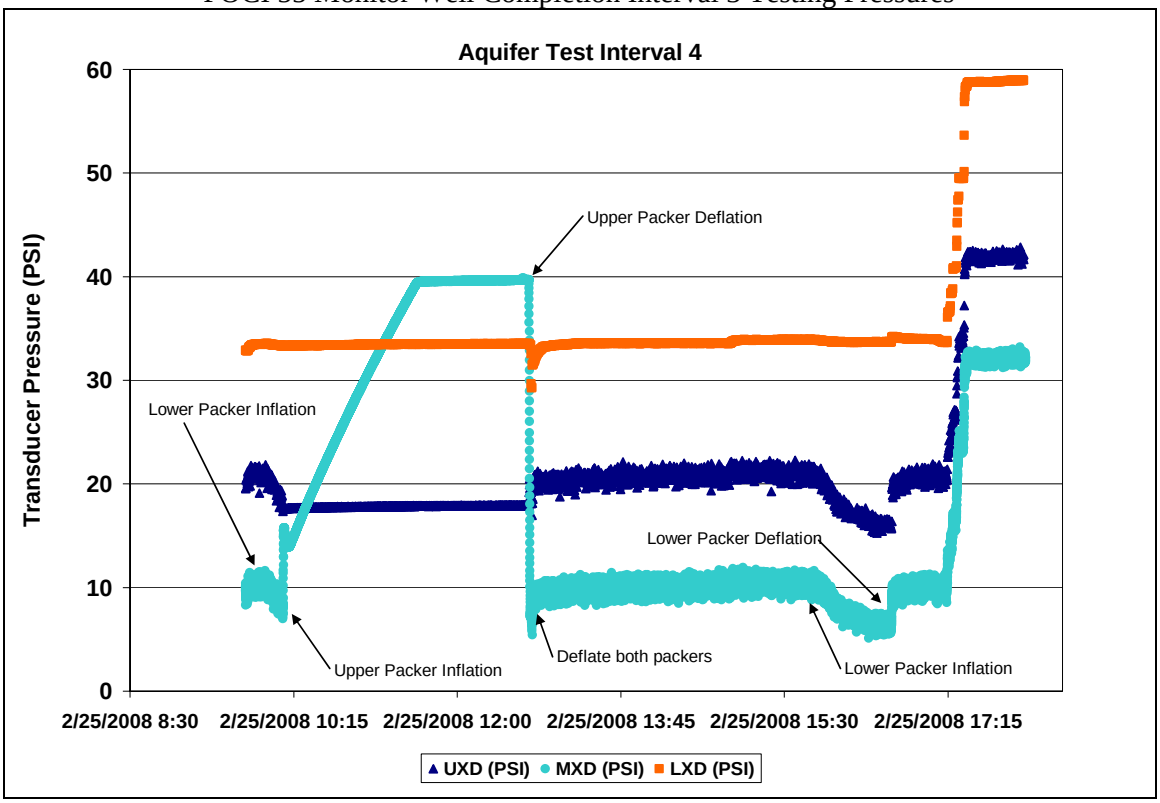
Significant gas was venting from above the lower packer during the entire testing of this zone at approximately 30 to 50 mcf/day. The handheld RKI gas meter registered 100% by volume combustible gas and no hydrogen sulfide or carbon monoxide as seen in the lower zones.

The pressure data changes shown in Figure 6-4 are only a function of packer inflation and deflation and not pumping. As described above the pump was inoperable at this time. The inflation of the lower packer resulted in a lowering of the potentiometric fluid level from an open hole transducer pressure of approximately 10 psi to approximately 8 psi. The pressure transducer signal is very noisy due to the rapid and violent exsolution of gas in this zone causing the testing string to bounce around. However, there is a measurable drop in both the middle and upper pressure transducers after inflating the lower packer indicating that the potentiometric head in this zone is lower than in the deeper zones resulting in an upward vertical gradient. This supports the isolation of zones within the casing annulus and between aquifers by natural shale aquitards. The difference in transducer pressures between the upper and middle transducers is due to the type of transducer as previously described and when taking barometric pressure into account for the upper transducer the two are reading similar values. However the lower transducer is reading a pressure significantly higher than the middle and upper indicating an inaccurate but precise value

due to the use of the ¼ inch nylon tubing. The equilibrium pressure from the upper zone with only the lower packer inflated is observed near the end of the testing at approximately 16:40 when the pressure from both the middle and upper, after taking into account atmospheric pressure, are reading 3.7 and 7.4 psi or 8.5 to 17 feet of fluid above the transducers. The range is large because of the turbulence caused by the gas emitting from the well. The set depth of the transducers at that time was 510 feet below ground level. This indicates a potentiometric fluid level for this zone between 493 and 502 feet below ground level.

After inflation of the lower packer at 9:56 am the upper packer was inflated at 10:08. Once the upper packer was inflated and the zone was isolated a significant build up of pressure occurred. This was due to the entrapment of gas between the packers held back by the column of water in the testing string. The test string has a check valve preventing flow of water out of the tubing and water was within the tubing up to surface. The gas increased pressure from the original fluid pressure of approximately 3.7 to 7.4 psi up to 40 psi and levelled off at 11:40 am. Both packers were then deflated to setup a wellhead pack off system that would allow water and gas to be separated without the upper packer in place and gas to flow because the fluid pressure in the testing string was holding it back with the upper packer inflated. The gas was diverted to a Barton chart recorder. The recorder measured the gas flow rate at approximately 30 to 50 mcf/day and was composed of 100% volume combustible gas.

FIGURE 6-4
POCI 55 Monitor Well Completion Interval 3 Testing Pressures



6.5 AQUIFER TESTING WATER QUALITY

While water quality data is presented here the results are not considered completely representative of the background groundwater because of the high pH values (>9.5 standard units) (Table 6.5.1), indicating the influence of drilling mud or grout, and lower than expected purge volumes needed to clear the well and formation of drilling mud and fines. Additional water quality samples will be collected from the mitigation system production wells after suitable volumes of water have been purged and representative formation water is being pumped from the system. These water quality samples will provide a more realistic representation of baseline water quality.

TABLE 6.5.1
POCI 55 Monitor Well Water Quality Parameters

Aquifer Test Interval 1						
Date	**Time**	**Turbidity**	**Temperature (Celcius)**	**SpC**	**pH**	**Comments**
2/21/08	1:00		13	670	9.92	
2/21/08	13:00		14	730	9.80	Collected 9 bottle sample set
Aquifer Test Interval 2						
Date	**Time**	**Turbidity**	**Temperature (Celcius)**	**SpC**	**pH**	**Comments**
2/22/08	18:00	99	16	587	10.61	
2/22/08	19:05	221	16	599	10.43	
2/23/08	12:30	206	15	608	10.27	pH meter checked against buffers (7.03)7.04, (10.09)10.09
2/23/08	15:10	203	18	621	9.97	
2/23/08	18:05	194	18	612	9.82	pH meter checked against buffers (7.04)7.04, (10.10)10.13
2/23/08	19:05	181	18	609	9.81	
2/23/08	20:05	182	18	610	9.80	
2/23/08	22:05	176	18	610	9.75	
2/24/08	0:00	151	17	608	9.72	Collected 9 bottle sample set
Aquifer Test Interval 3						
Date	**Time**	**Turbidity**	**Temperature (Celcius)**	**SpC**	**pH**	**Comments**
2/24/08	18:00	174	18	698	11.20	
2/24/08	18:47	174	16	676	11.10	Collected 9 bottle sample set

Water quality sample results from each test zone and analyzed by Evergreen Analytical Laboratory are presented in Appendix F. All samples were received in good condition and in the proper containers, and volatile organic compound (VOC) samples were received with no headspace. However, a delivery error by FedEx resulted in a late arrival to the laboratory and Nitrate and Nitrite for sample MMW (849 - 995) (laboratory ID 08-1189-01), and pH for MMW (1009 - 1048) (laboratory ID 08-1122), MMW (849 - 995) (laboratory ID 08-1189-01) and MMW (687 - 788) (laboratory ID 08-1189-02) exceeded holding times.

All organics in all samples were non-detect with the exception of toluene. Trace amounts of toluene were found in all samples MMW (1009 - 1048), MMW (849 - 995), MMW (687 - 788) with values of 12.4, 3.36, and 12.1 μg/L, respectively. These detections may be related to the drilling and or well completion materials. However, the domestic well of Vince Coleman also showed the presence of toluene in a sample collected on November 11, 2007. This could indicate that there is already toluene present within the system. These trace amounts of toluene could also be due to analytical error.

The dissolved methane, ethane, and ethene results from test intervals 1 through 3 indicate the presence of dissolved gas in the lower zones as well (Table 6.5.2). In addition to the presence of methane and ethane, sulfide is present in the MMW (849-788) sample and carbon dioxide is present in the MMW (1009-1048) sample. These are indicators of biogenic processes that may be

involved in the oxidation of methane. These gas results support the observations of gas detected with the handheld RKI gas meter at the water gas separator vent from the same zones where combustible gases were detected in combination with carbon monoxide and hydrogen sulfide. Thus, there may be bioremediation of the dissolved gas in the deeper zones that will result in the removal of the methane over time. The dissolved methane values from these zones are very low with respect to values that would be produced in the presence of large volumes of methane that are venting from the shallow zone.

TABLE 6.5.2
POCI 55 Monitor Well Dissolved Gas Results

Sample ID	Date Sampled	Methane (mg/L)	Ethane (mg/L)	Ethene (mg/L)	Carbon Dioxide (µg/L)	Sulfide (mg/L)
MMW (1009-1048)	2/21/2008	0.51	ND	ND	48.8	ND
MMW (849-995)	2/24/2008	3.4	0.0021	ND	ND	2.5
MMW (687-788)	2/24/2008	3.8	0.0028	ND	ND	ND

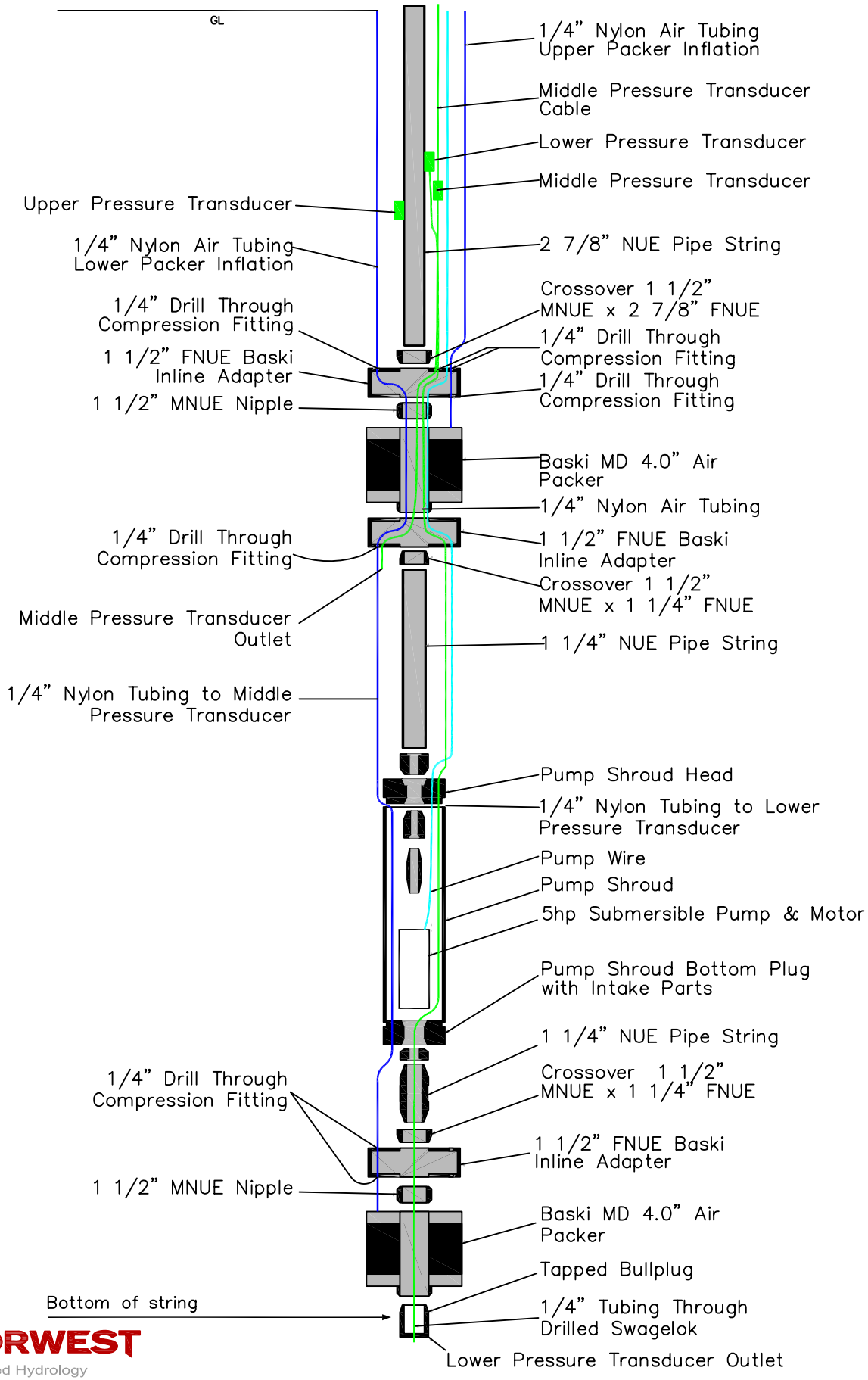
6.6 AQUIFER TESTING SUMMARY

Aquifer testing indicated a significant flow of combustible gas from the upper zone during the entire study. The gas was 100% combustible gases with a trace amount of hydrogen sulfide showing up in one recoded reading. Smaller trace amounts of gas were also found in the deeper zones. However, the amount of gas did not indicate that these deeper zones are the primary source venting from nearby domestic water wells. The amount of gas was not recordable on the Barton gas flow meter with the exception of the second test zone showing a very short duration, approximately ten to fifteen minute, spike of two to three mcf/day. This gas was recorded as a mixture of gases; combustible, hydrogen sulfide, and carbon monoxide. The spike of gas was only observed at the onset of pumping. Trace amounts of combustible, hydrogen sulfide, and carbon monoxide gases were also found when monitoring the gas water separator vent while testing zones 1 and 3. However the amount of gas venting could not be registered on the Barton flow chart. The lower zones were also associated with greater volumes of water while the upper most zone had a relatively limited amount of water.

The testing data and gas monitoring data is supported by the water quality samples collected. The water quality samples showed relatively low concentrations of dissolved methane with some ethane in two samples and carbon dioxide and sulfide in one sample each. The presence of sulfide and carbon dioxide indicate potential biological oxidation and removal of the methane gas.

The aquifer testing showed a potential connection between aquifer zones as indicated by the lower pressure transducer. However, the upper pressure transducer did not show any response in the upper zones when the middle target zone was pumped indicating that there is a good natural seal between aquifer zones and a leak in the lower packer assembly. This is not considered to have interfered with the determination of the zone producing gas. However, it does interfere with the ability to interpret the data to obtain permeability values. Additionally, the isolation of zones indicates that the potentiometric fluid level is greater in the second test zone and that there is a limited amount of water in the upper sands while significant volumes of water are available in the lower zones.

MONITOR WELL PUMPING TEST PACKER ASSEMBLY



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7 CASED HOLE VIDEO LOGGING

A video log was performed after the testing to determine the condition of the well and to confirm the presence of gas only in the upper most portion of the well. The video log indicated that gas was only present in the upper most slotted casing interval and no gas bubbles were noticed deeper within the casing of the well. Additionally, the video showed water being forced upward to approximately 390 feet while the water column starts at 526.5 feet. This indicates that a water level obtained using a water level tape or sounder could be inaccurate and lead to much shallower water level due to the water thrown higher up in the casing causing a premature signature. A large number of the bottom slots of the monitor well appear to be clogged with drilling mud, debris, and or possibly grout. Grout is not thought to be the plugging agent because during completion sand was placed approximately 10 feet or higher above the slots with nine feet of bentonite seal above the sand prior to placing grout. Additionally, the cement bond log does not show a correlation with cement and slotted casing. It is possible that during the drill out of the cement in the bottom of the well that debris was sent up into the casing slots causing what is observed in the video log in the deeper zones.

8 CONCLUSIONS AND RECOMMENDATIONS

The data collected from monitor well POCI 55 indicates that the large volume of fugitive gas is trapped in the upper portion of the Poison Canyon Formation. There are trace amounts of gas in the deeper zones that could potentially be removed through biological oxidation of methane and the presence of this gas does not significantly contribute to high volumes of gas venting from the Poison Canyon Formation. The presence of the large volumes of fugitive gas within the upper zone and not the lower zones indicates the pathway for the gas migration is not wide spread and is linked with the upper zone possibly by a man made conduit. The upper zone where fugitive gas is found is also associated with minor quantities of water while the deeper zones are able to produce large quantities of water.

The recommendation is to drill the mitigation production and monitor wells within this shallow upper zone. This will maximize the gas removal and minimize the amount of water withdrawn. Placing the mitigation wells deeper to try and remove the smaller amounts of gas found in the deeper zones will result in the handling of large volumes of water with little additional removal of methane. The removal of the trace amounts of methane gas from the deeper zones may occur through natural attenuation and biological oxidation without active mitigation efforts.

Additional data may be obtained from monitor well POCI 55 for the upper zone as needed. The placement of a bridge plug below the slotted interval and a wellhead configuration that will pack off gas and allow it to flow through a gas flow recorder is recommended. It is also recommended that a transducer be placed below the bridge plug to monitor pressure changes as the mitigation wells are drilled and tested.

Water quality samples should be collected from the mitigation production wells in order to define baseline conditions for injection of Vermejo Formation water. The samples that have been collected from POCI 55 are assumed to be non-representative of the shallow zone that will be mitigated because of commingling and impacts due to drilling.

APPENDIX A

Layne Christensen Company Drilling Report

Petroglyph Energy, Inc.

555 S. COLE RD.
BOISE, ID 83709
(208) 377-6000

Drilling Chronological

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP/	Location Desc:	RRR Lot 55	District:	COLORADO
Project AFE:	**42567**	AFEs Associated:			/ / /

Daily Summary

Activity Date :	**2/2/2008**	Days From Spud :	-1	Current Depth :	40 Ft	24 Hr. Footage Made :	40 Ft
Formation :				Weather:			
Rig Company :				Rig Name:			
Daily Cost:	$0		Cum DHC:	$0		Total Well Cost:	$0

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
7:00	14.50	01	Drill 143/4" hole 40' deep. Set 40' of 12 3/4" x 33.38# casing. Poured 30 sks of type G cement mixed, 6 gal per sk H2O 3% calcium. Yeild = 14.7 lbs per gal approx down annulas.	0	40	NIH
21:30	2.50	13	Stand by for cement to cure.	40	40	NIH
Total:	17.00					

Daily Summary

Activity Date :	**2/3/2008**	Days From Spud :	1	Current Depth :	40 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$15,000		Cum DHC:	$15,000		Total Well Cost:	$15,000

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	7.00	13	Stand by for cement to set up.	40	40	NIH
7:00	17.00	02	Drill Cut surface casing off at GL. Weld 12 3/4" flange. Bolt on diverter head & diverter pipe. Tag cement @ 27' drill out. Wait stand by for 2 hrs for Geo to arrive. Sack cuttings into mud pump, Thin back mud to 8.5#, 31 vis. Drill out 13' of cement.	40	40	NIH
Total:	24.00					

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/4/2008	Days From Spud :	2	Current Depth :	300 Ft	24 Hr. Footage Made :	260 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$19,551	Cum DHC:	$34,551	Total Well Cost:	$34,551		

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	24.00	02	Drill from 47' to 300'. Drilling rate 25.7' per hour @ 19:30. 3.5' to 2.4' min per ft.	40	300	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
60	6:30	0.00	8.50	31	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
165	9:38	0.00	8.50	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
178	12:00	0.00	9.10	38	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
208	13:30	0.00	9.30	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
238	16:08	0.00	9.60	37	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
266	18:30	0.00	9.60	42	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
300	0:00	0.00	9.10	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	LYPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/5/2008	Days From Spud :	3	Current Depth :	480 Ft	24 Hr. Footage Made :	180 Ft
Formation :				Weather:	Weather: 12" of snow at the rig by noon.		
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$13,810	Cum DHC:		$48,361	Total Well Cost:		$48,361

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
	24.00	02	Drill from 300' to 480'. 0 water or gas to note. Muck pit & mix mud.	300	480	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
300	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
360	4:00	0.00	9.50	34	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
388	6:30	0.00	9.50	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
410	10:00	0.00	9.60	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
428	14:30	0.00	9.80	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
460	22:50	0.00	8.60	36	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
480	0:00	0.00	8.50	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/6/2008	Days From Spud :	4	Current Depth :	689 Ft	24 Hr. Footage Made :	209 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$15,863	Cum DHC:		$64,224	Total Well Cost:		$64,224

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
	24.00	02	Drill from 480' to 689' 15 units of gas were noted @ 600'.	480	689	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
480	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
500	2:30	0.00	8.80	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
520	4:30	0.00	8.80	37	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
549	7:00	0.00	8.90	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
569	9:30	0.00	9.00	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
607	13:30	0.00	9.10	37	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
619	15:20	0.00	9.30	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
629	17:00	0.00	8.90	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
645	18:40	0.00	8.90	36	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
659	20:10	0.00	8.90	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
670	22:00	0.00	8.90	39	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
689	0:00	0.00	8.90	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/7/2008	Days From Spud :	5	Current Depth :	765 Ft	24 Hr. Footage Made :	76 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$7,102	Cum DHC:		$71,326	Total Well Cost:		$71,326

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	13.00	02	Drill from 689' to 765'. At 760' we lost approx 10 bbls mud/H2O mix.	689	765	NIH
13:00	0.50	10	Ran survey. 9/10°	765	765	NIH
13:30	5.50	06	Replace bit. POOH Pulled 15,000 to 20,000 over for first 300' off bottom. After that rotated the rest of the way out.	765	765	NIH
19:00	5.00	06	PU & GIH with #3 11" mill tooth bit sn# CHIGHM5214068. # 18 jets cir & ream going into well bore.	765	765	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
689	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
680	1:30	0.00	9.00	36	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
685	2:30	0.00	9.10	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
730	5:00	0.00	9.10	36	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
749	8:00	0.00	9.10	37	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
760	8:45	0.00	9.10	37	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp	Remarks
0	0.0	0.0	0	Lost 4" of pit volume.

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
765	10:00	0.00	9.20	41	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/8/2008	Days From Spud :	6	Current Depth :	930 Ft	24 Hr. Footage Made :	165 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$15,930	Cum DHC:		$87,256	Total Well Cost:		$87,256

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	2.50	02	Replace Bit GIH with bit # 3 sn # CHIGHM521406E with # 18 jets. Reamed to TIH with new 11" mill tooth bit.	765	765	NIH
2:30	14.50	02	Drill from 765' to 930'. Lost Circulation. Lost 160 bbls 40 vis mud @ 930'. Mix and pump 320 bbls of 70 vis mud with LCM (cotton seed hulls). No luck regaining circulation.	765	930	NIH
17:00	7.00	39	Pull Drill String. POOH with 15 ea DP & LD = 450'.	930	930	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
765	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
779	2:10	0.00	9.10	46	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
300	4:30	0.00	9.00	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
350	9:54	0.00	8.90	36	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
307	14:30	0.00	8.80	37	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
930	17:00	0.00	9.10	40	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		160

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			Lost Circulation at 930'.

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP/	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/9/2008	Days From Spud :	7	Current Depth :	930 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$14,430	Cum DHC:		$101,686	Total Well Cost:		$101,686

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	4.50	39	Pull Drill String. POOH with 16 ea DC & LD 480'. 2 ea xovers, 1 ea 11" bit. Bit is at surface @ 04:30.	930	930	NIH
4:30	1.50	08	Rig Repair. Work on air lines on collar trailer to move away from well head.	930	930	NIH
6:00	3.00	44	Run Tbg. Spot tremmie pipe trailer in. Talley & GIH. Stop.	930	930	NIH
9:00	3.00	24	Wait on order.	930	930	NIH
12:00	1.00	06	Trips. POOH w/ 2 ea jts of tremmie pipe. LD. Move trailer.	930	930	NIH
13:00	1.00	23	Roll Hole. Dump 200 bbls of fresh H2O in well bore to flush mud prior to drill with air.	930	930	NIH
14:00	5.00	20	Welding Extend booie line. Dig reserve pit larger	930	930	NIH
19:00	5.00	44	RIH w/ bit. GIH w/ rerun 11" bit # 2 & xovers, 16 ea 5 1/2" x 2000# collars and 15 ea DP = 930'.	930	930	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
930	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Daily Summary

Activity Date :	2/10/2008	Days From Spud :	8	Current Depth :	1080 Ft	24 Hr. Footage Made :	150 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$21,541	Cum DHC:		$123,227	Total Well Cost:		$123,227

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	9.00	02	Drilling Geo ran test on equipment. Drill from 930' to 1079.5' with 2200 psi of air. Detected H20 from 930' thru 1079'. Approx 100 bbls per hr while drilling. Also dected gas per Geo(Blanco's) report. Drill to TD @ 9:01. No deviation ran per Tom.	930	1080	NIH
9:00	3.00	39	Pull DP & DL = 21 ea DP @ 16 ea, DL 1 ea, reran bit & xover. Bit @ surface 12:00.	1080	1080	NIH
12:00	4.50	11	Run Logs RU Superior Wire Line & Run logs. Cut Flange Could not cut flange off due to gas bubbling in well bore (24 ppm). Spot tremmie pipe trailer in.	1080	1080	NIH
16:30	2.50	44	Run Tbg Talley & run 1 ea window jt 16' long & 1064' of tremmie pipe tag TD @ 1080'.	1080	1080	NIH
19:00	3.00	24	Wait on orders (determine where to place screen.) Load 1075' of 5 1/2 x 17 # casing & screen.	1080	1080	NIH
22:00	2.00	08	Rig Time Build table to hold spider & slips on.	1080	1080	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
930	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/11/2008	Days From Spud :	9	Current Depth :	1080 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$39,261	Cum DHC:		$143,677	Total Well Cost:		$162,488

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	9.00	12	Run Casing GIH placing screen, casing & centralizers per Norwest. Land casing float valve @ 1075.48'. Note: ran casing into well bore along side tremmie pipe.	1080	1080	NIH
9:00	2.50	24	Weld stops on 5 1/2" casing to suspend 5 1/2" casing & screen inside well bore.	1080	1080	NIH
11:30	1.00	12	Pump Cement Pump 14 cf type 1-2 cement mix 6 sks per gal of H2O 3 % calc chloride. Displace with 240 gals water. Pull & LD 2 ea jts tremmie pipe = 60'.	1080	1080	NIH
12:30	5.50	13	Wait Stand by for cement to set up.	1080	1080	NIH
18:00	1.50	43	Run wire line tag @ 1040' w/ wire line.	1080	1080	NIH
19:30	1.50	08	Wait Rig time Wire line broke a bracket on rig while pulling out.	1080	1080	NIH
21:00	1.00	24	Pump Sand Pump 1 3000 # sk of 6-9 sand tag thru tremmie pipe @ 990' (Tremmie Talley = 990'). Pull & LD 2 ea jts of tremmie pipe = 60'. Bottom of treemie window is @ 930'.	1080	1080	NIH
22:00	2.00	24	Pour 3 ea 3/8 x 50 # buckets of coated bentenite tablets. Wait After wait 1 1/2 hrs on bentenite to hydrate, Norwest said to pour 4 more 50# buckets of bentenite for a total of 7 ea buckets.	1080	1080	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
1080	1:00	0.00	9.40	35	0	0	0/0/0	0 0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/12/2008	Days From Spud :	10	Current Depth :	1080 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$19,490		Cum DHC:	$163,167		Total Well Cost:	$181,978

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	2.00	24	Stand by for bentonite to hydrate.	1080	1080	NIH
2:00	2.00	24	Pour Sand Mix H2O & sand. Pump 3000 #'s of sand, tag at 900'. Mix & pump 500 #'s more & tag at 880'. POOH w/ 60' of tremme pipe & LD.	1080	1080	NIH
4:00	2.00	24	Pour Bentonite Pour 7 ea 50 # buckets 3/8 bentionite tablets dn annulas. Wait	1080	1080	NIH
6:00	1.67	13	Called cement tk. Order 40 sks 6 gp sk 3% calc chloride. Cement on location @ 7:40.	1080	1080	NIH
7:40	1.17	12	Pump cement. Pump 73 lf cement. Plug 870' to 797'.	1080	1080	NIH
8:50	6.17	13	Wait on cement to cure.	1080	1080	NIH
15:00	2.50	43	Tag cement @ 797'. Pump 3/4 sk = 2750 # of 6-9 sand approx tag sand @ 677'. Bridged off with 3/4 of left in hopper = 2700 #. Flush 1000 gals H2O on top of sand to try to push dn.	1080	1080	NIH
17:30	2.50	01	RU Air Line & attempt to drive tremme pipe thru sand to blow thru sand bridge. Tag sand @ 663'. Pump 3000 # more sand for a total of 6000 # of 6-9 sand. Tag sand @ 638'.	1080	1080	NIH
20:00	2.00	13	Called cement tk. Ordered & pumped 22 sks type III cement @ 6 gp sk & 3% cc = 50 lf of 11" hole & 55 casing inside. Cement on loc @ 21:38. Pump 24.7 cf cement slurry. Displace w/ 196 gals fresh water. Cement dn @ 22:00.	1080	1080	NIH
22:00	2.00	13	Wait on cement.	1080	1080	NIH
Total:	24.01					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	Fl	HTFL	FC	HTFC	Solid	Water	Oil	Sand
1080	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	LYPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/13/2008	Days From Spud :	11	Current Depth :	1080 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$25,990	Cum DHC:		$189,157	Total Well Cost:		$207,968

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	4.00	13	Wait on cement.	1080	1080	NIH
4:00	0.50	43	Tag cement @ 628'. Cement is 40 lf lower than calculated.	1080	1080	NIH
4:30	2.50	24	Wait on orders & for cement to arrive on location.	1080	1080	NIH
7:00	1.00	12	Cement Pump 29 sks cement 6 gpsk, 3% CC thru trimmie pipe. Pump 144 gals fresh H2O displacement. Cement down @ 7:40.	1080	1080	NIH
8:00	6.00	13	Wait on cement to cure.	1080	1080	NIH
14:00	1.00	43	Tag Attemp to tag cement with trimmie pipe. No luck. Trimmie is @ 527', top of screen is at 526'.	1080	1080	NIH
15:00	1.00	24	Wait on string line. String would not go dn. Got hung up at 225'. Ran water measuring tape FL @ 450'. No luck tagging cement.	1080	1080	NIH
16:00	5.50	24	Pump sand approx 750 # sand screenout. Pull up 35'. Wait. Go dn. Tag sand @ 510'. RU Air Washed dn to 515'. Trimmie pipe plugged off. Worked plug out. Pump sand mix. Pump 500 #'s of sand, wash sand dn. Returns out of annulas 19:40. Mud H2O mix Return quit flowing @ 19:50. Attempt to tag sand . Pump sand Pump approx 500 # of 6-9 sand. Tag sand @ 430.67'. Pump sand Pump approx 1000 # of 6-9 sand. Tag @ 420'. Pump sand Pump approx 1000 # 6-9 sand tag @ 410'.	1080	1080	NIH
21:30	2.50	44	Run Drill Pipe PU & GIH w/ 540' of 4 1/2" DP open ended. Ran in side 5 1/2" casing. Blow from 535' for 30 min. Retag @ 410'.	1080	1080	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
1080	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	YPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/14/2008	Days From Spud :	12	Current Depth :	1080 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$18,510	Cum DHC:		$207,667	Total Well Cost:		$226,478

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	1.00	43	POOH with 540' of DP & LD. Go dn annulas with trimme pipe tag cement at 410'.	1080	1080	NIH
1:00	4.00	24	Dump 7 ea 50 # buckets of 3/8 bentonite tablets. Wait for hydration from 4010' - 400'. Called cement @ 2:00 order 189 sks w/ 6 gpsk H2O 3% cc.	1080	1080	NIH
5:00	2.00	12	Cement on location @ 5:00. Pump cement fill annulas from 400' to surface with 179 sks of type III cement 6 gpsk 3% cc.	1080	1080	NIH
7:00	12.00	13	Wait for cement to cure. 12 hours	1080	1080	NIH
19:00	2.00	06	Run drill pipe. GIH with 4 1/2 DP tag @ 1035'.	1080	1080	NIH
21:00	1.00	06	Trip up to 810'. No luck lifting H2O.	1080	1080	NIH
22:00	1.00	06	Trip up to 610'. No luck lifting H2O.	1080	1080	NIH
23:00	1.00	06	Trip out with all 4 1/2" DP. Laid all down.	1080	1080	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
1080	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Daily Summary

Activity Date :	2/15/2008	Days From Spud :	13	Current Depth :	1080 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$17,490	Cum DHC:		$225,157	Total Well Cost:		$243,968

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	1.50	06	Change over tools from 4 1/2" to 2 7/8" trimmie pipe. GIH with 2 7/8" trimmie pipe. Tag cement @ 1035'.	1080	1080	NIH
1:30	10.50	24	Clean well bore. Airlift to develop well from 1034'.	1080	1080	NIH
12:00	1.50	25	Pull Tbg POOH w/ 1035' of 3 1/4" tremmie pipe laid all dn.	1080	1080	NIH
13:30	2.50	24	RD Layne's diverter & booie line.	1080	1080	NIH
16:00	5.00	35	Run Tbg with KR Fishing (Rex Pearson) on loc. RU 5 1/2" well head flange diverter & 2 7/8" booie line. GIH w/ 4 3/4" bit, bit subs, 4 ea 3 1/2" collars = 800 #'s. Drill 37' of cement from 1035' to 1072'.	1080	1080	NIH
21:00	3.00	24	Clean well bore.	1080	1080	NIH
Total:	24.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
1080	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Pom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Well Name:POCI 55 MONITOR WELL

Field Name:	RATON	S/T/R:	3/29S/67W	County,State:	HUERFANO, CO
Operator:	LYPH OPERATING COMP	Location Desc:	RRR Lot 55	District:	COLORADO

Daily Summary

Activity Date :	2/16/2008	Days From Spud :	14	Current Depth :	1080 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$3,660	Cum DHC:		$228,817	Total Well Cost:		$247,628

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
0:00	6.00	25	Pull Tbg POOH w/ 31 ea jts of 2 7/8" tbg & 4 ea collars w/ xovers. Laid all dn.	1080	1080	NIH
6:00	9.00	01	RDMO Final Report	1080	1080	NIH
15:00	4.00	24	Travel	1080	1080	NIH
Total:	19.00					

Mud Properties

Depth	Time	Wt In	Wt Out	Vis	PV	YP	Gels	FL	HTFL	FC	HTFC	Solid	Water	Oil	Sand
1080	1:00	0.00	9.40	35	0	0	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%	0.0%

MBT	pH	Pm	Pf	Mf	Cl	Ca	ES	Fom	Lime	Total Sal.	CaCl2	EDTA	O/W Ratio	Mud Loss
0.0	0.00	0.00	0.00	0.00	0	0	0	0.00	0.00	0	0	0.00		0

Water Loss	LCM	ECD	FL Temp			Remarks
0	0.0	0.0	0			

Daily Summary

Activity Date :	2/18/2008	Days From Spud :	16	Current Depth :	1080 Ft	24 Hr. Footage Made :	0 Ft
Formation :				Weather:			
Rig Company :	Layne Christensen			Rig Name:	Layne Christensen Rig # 405		
Daily Cost:	$6,010	Cum DHC:		$234,827	Total Well Cost:		$253,638

Operations

Start	Hrs	Code	Remarks	Start Depth	End Depth	Run
9:30	7.00	11	Cement Bond Log Superior wire line on location @ 11:30. Ran cement bond long and cased hole neutron log.	1080	1080	NIH
Total:	7.00					

Formation

Formation Name	Current Well Top	Subsea Datum	Ref Well Top	Elec Top	Comments

Casing

DateIn	Setting Depth	Jts Run	Type	Size	Weight	Grade	MINID	HoleDiam	TD
2/11/2008	1074.81	48	5. Production	5.5	17	LS	0	11	1080

APPENDIX B

Geophysical Log Reports

BLANCO
Geological Services LLC

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

Well Name:	POCI 55		
Location:	Sec3 T29S R67W		
Licence Number:	05-071-275819-00	Region:	Purgatoire River
Spud Date:	02/04/08	Drilling Completed:	02/10/08
Surface Coordinates:	851' FSL & 1773' FWL		
Bottom Hole Coordinates:			
Ground Elevation (ft):	6690'	K.B. Elevation (ft):	6690'
Logged Interval (ft):	50' To: 1079'	Total Depth (ft):	1079'
Formation:			
Type of Drilling Fluid:	Mud/ Gel & Air		

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

OPERATOR

Company: Petroglyph Operrating Company, Inc.
Address: 555Sought Cole Rd.
Boise, ID 83709
Ph: (719) 742-5570

GEOLOGIST

Name: Leeo Carrasco
Company: BLANCO Geological Services LLC
Address: 806 Robinson Ave.
Trinidad CO 81082
(719) 846-3364

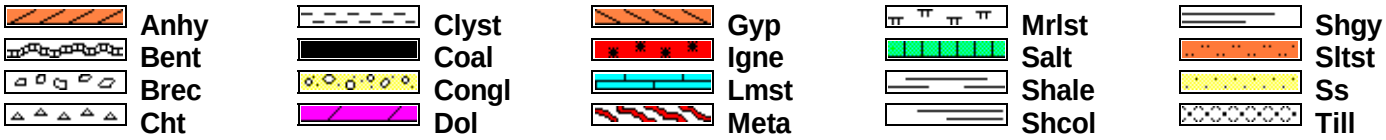
Rig

LW Rig # 14

Comments

12.75" Surface Casing set @ 40'

ROCK TYPES



ACCESSORIES

MINERAL
- 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

FOSSIL
- Algae
- Amph
- Belm
- Bioclst
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram
- Fossil
- Gastro
- Oolite
- Ostra
- Pelec
- Pellet
- Pisolite
- Plant
- Strom

STRINGER
- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst
- Sltstrg
- Ssstrg

TEXTURE
- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackest

OTHER SYMBOLS

POROSITY TYPE
- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint
- Vuggy

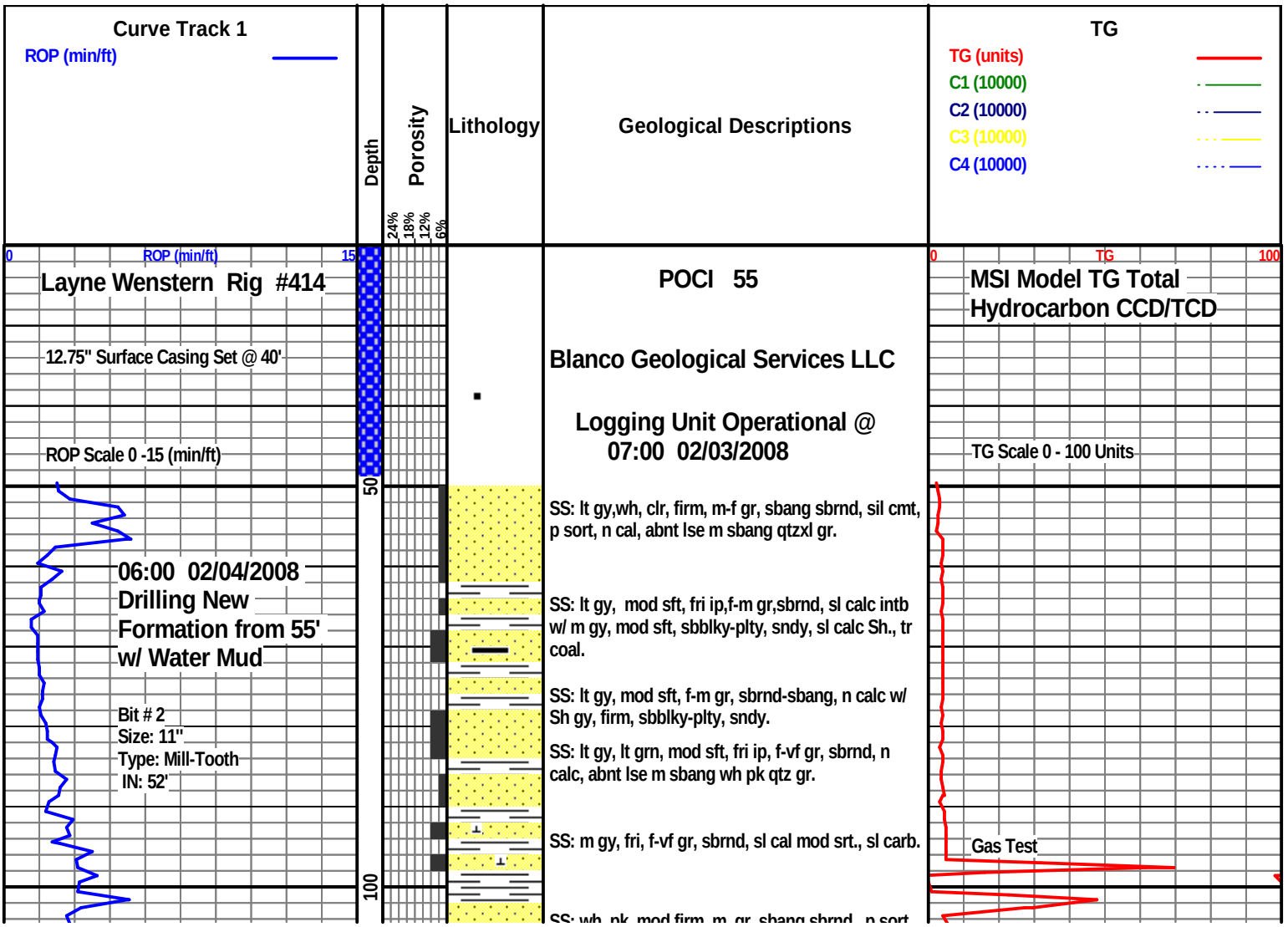
SORTING
- Well
- Moderate
- Poor

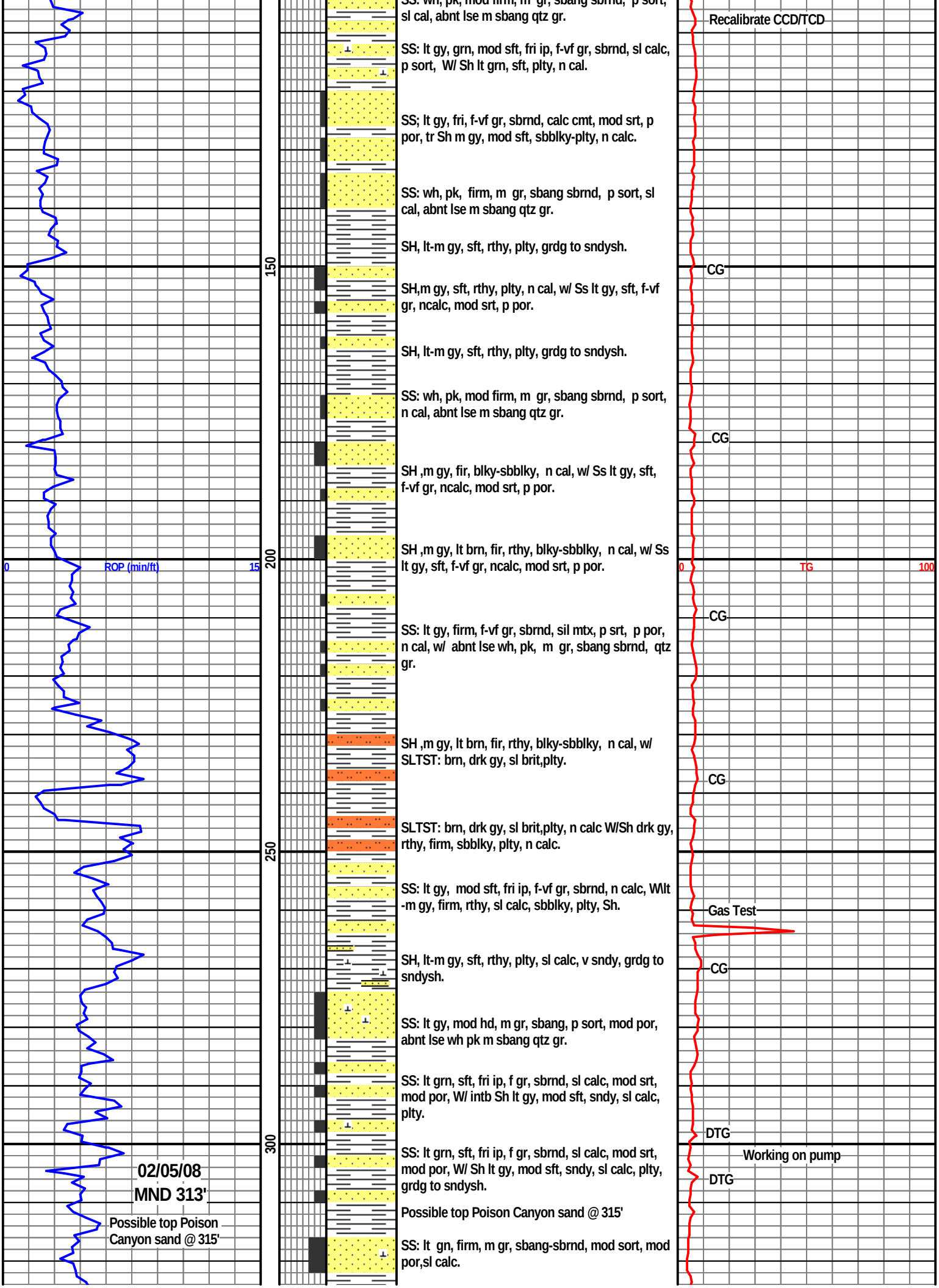
ROUNDING
- Rounded
- Subrnd
- Subang
- Angular

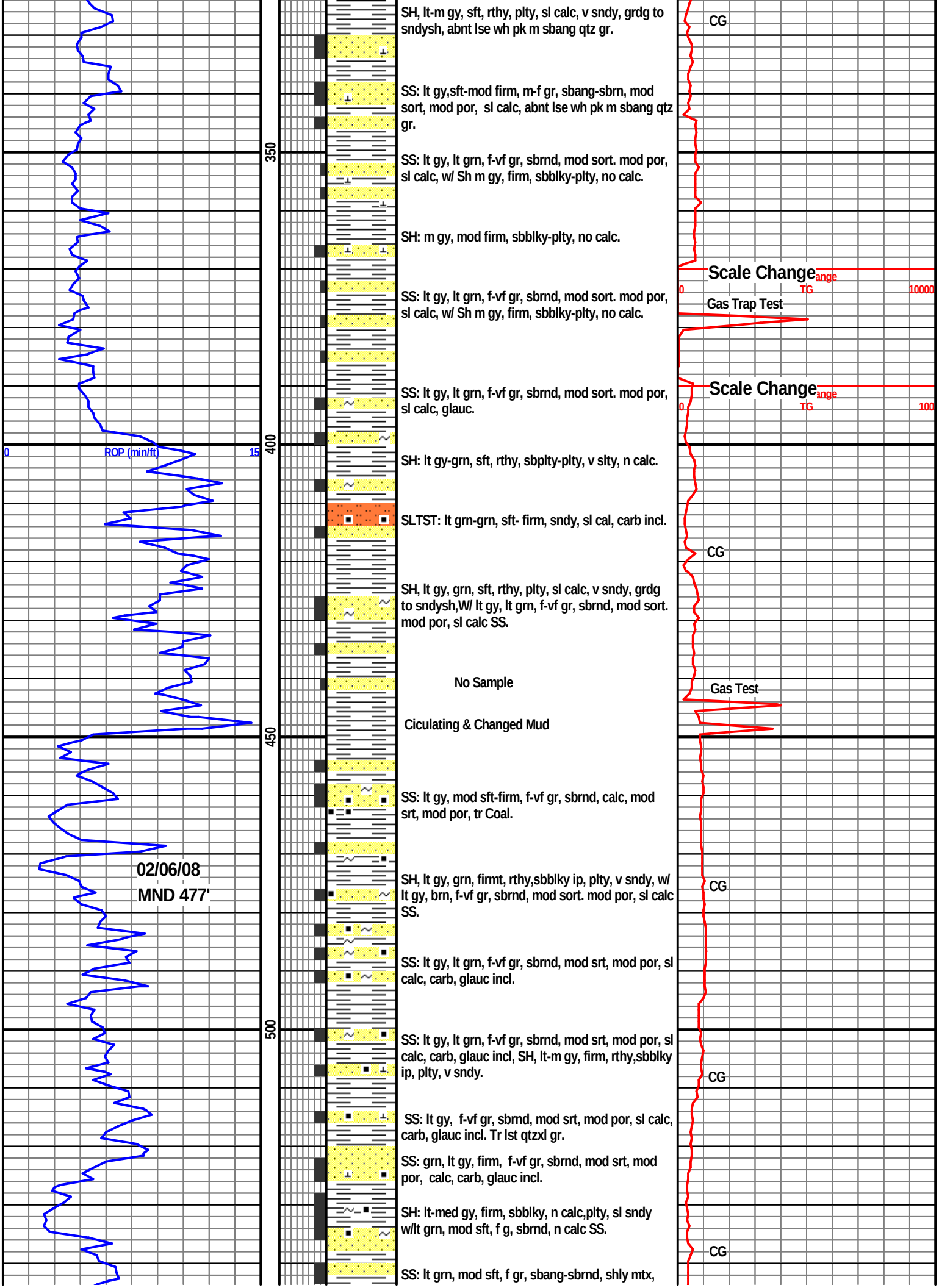
OIL SHOWS
- Even
- Spotted
- Ques
- Dead

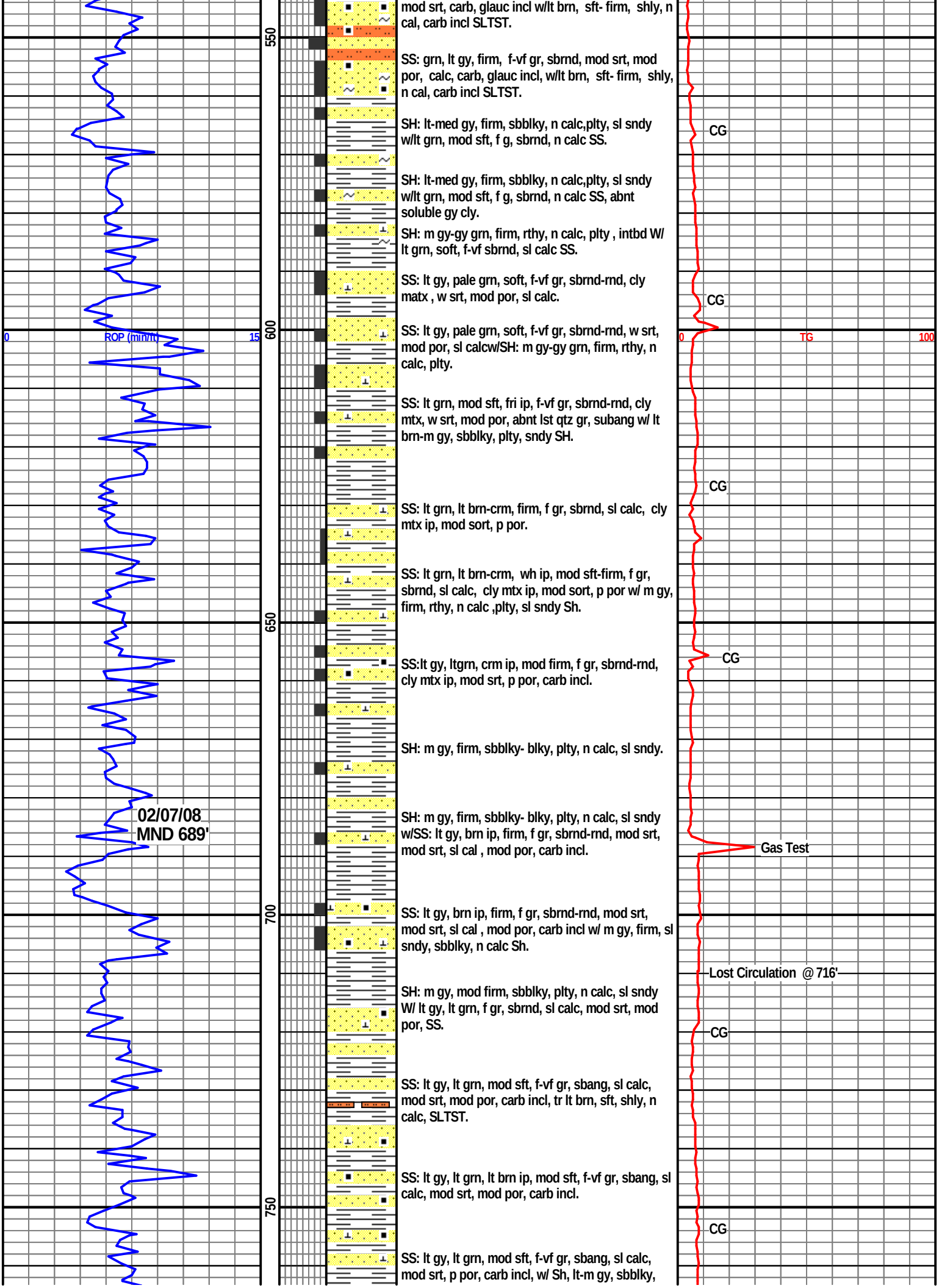
INTERVALS
- Core
- Dst
- Srfcsg
- Cv-v
- Cv-c

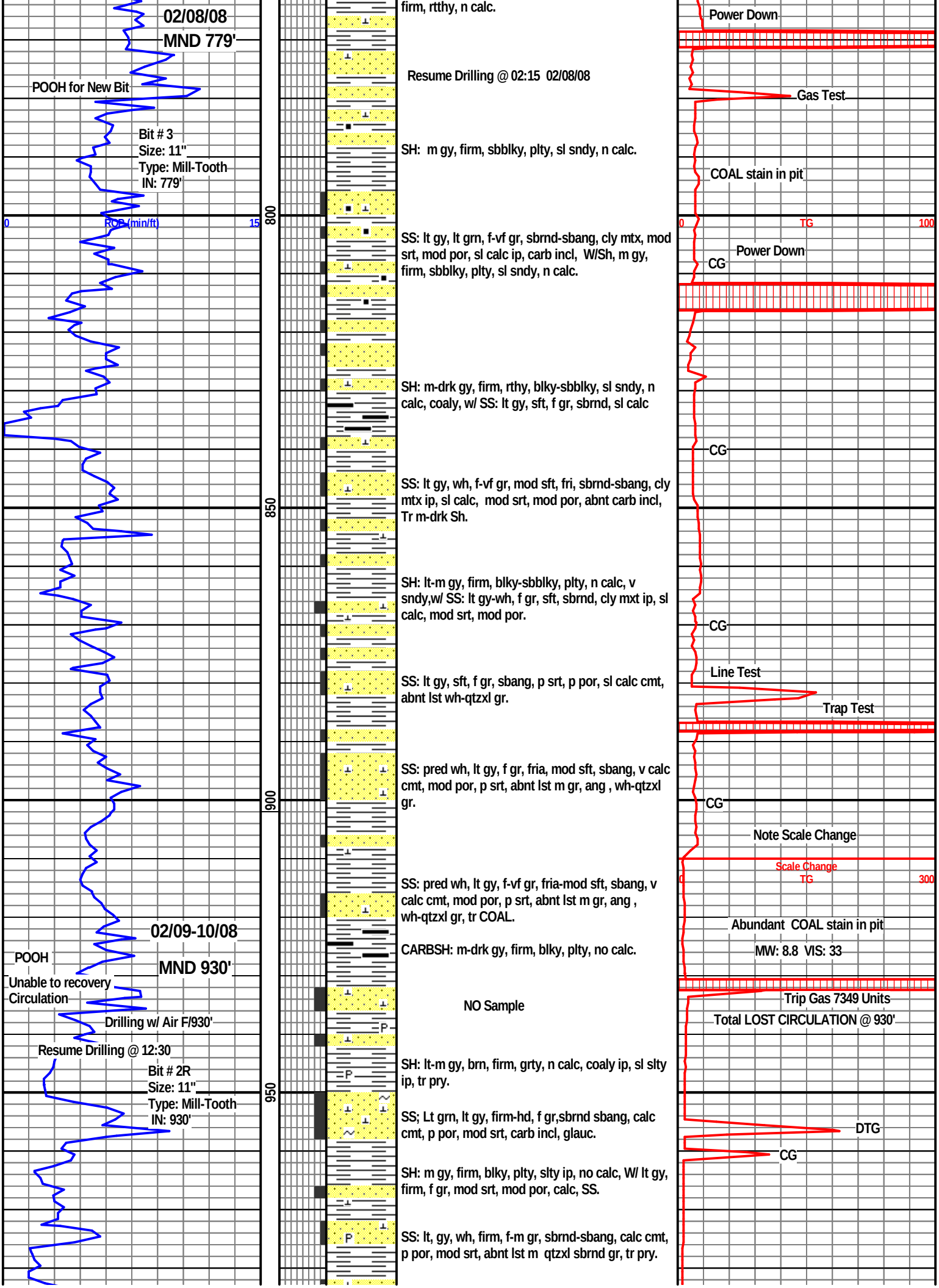
EVENTS
- Rft
- Sidewall
- Srfcsg

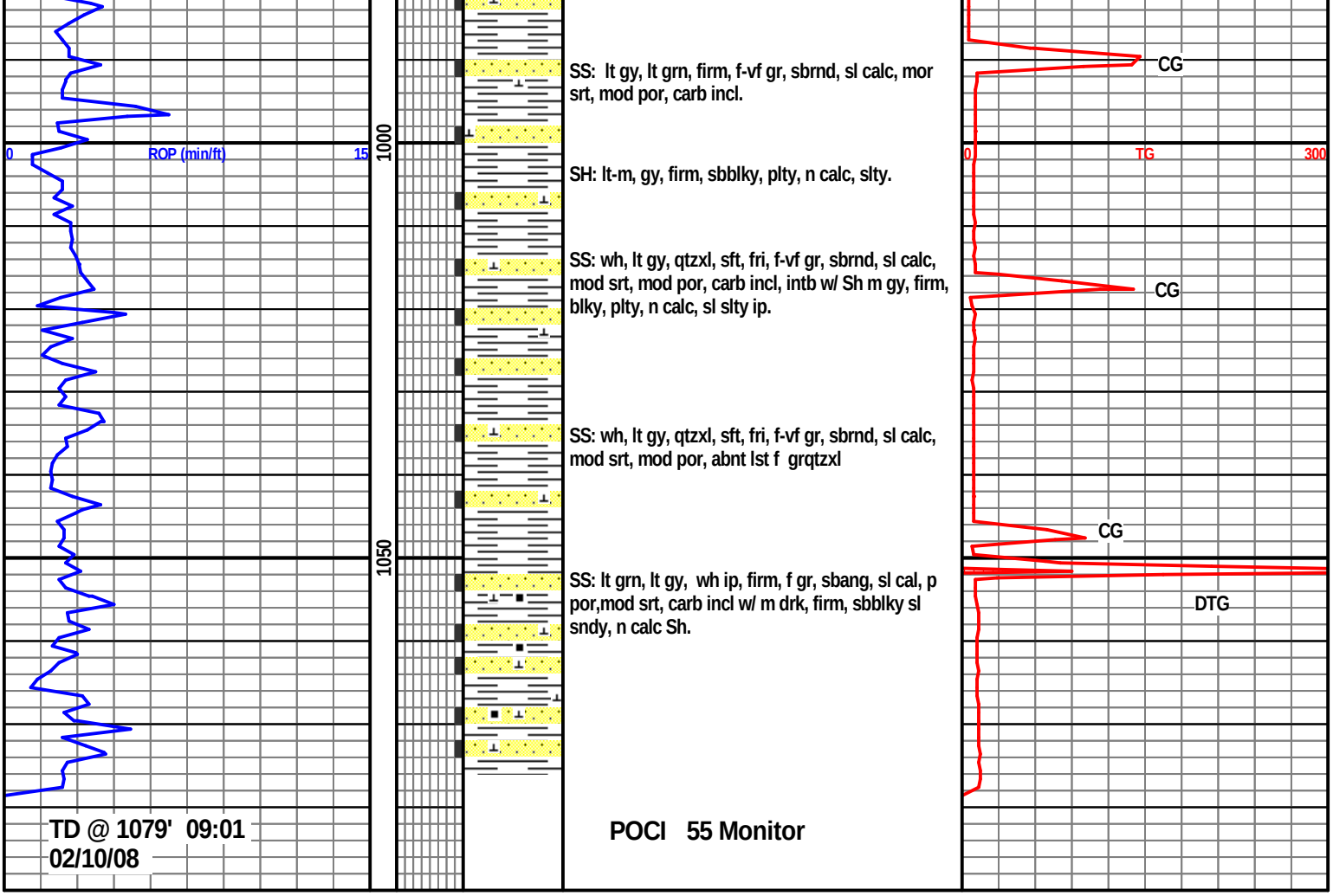



SS: wh, pk, mod firm, m gr, sbang sbrnd, p sort, sl cal, abnt lse m sbang qtz gr.
SS: lt gy, grn, mod sft, fri ip, f-vf gr, sbrnd, sl calc, p sort, W/ Sh lt grn, sft, plty, n cal.
SS; lt gy, fri, f-vf gr, sbrnd, calc cmt, mod srt, p por, tr Sh m gy, mod sft, sbblky-plty, n calc.
SS: wh, pk, firm, m gr, sbang sbrnd, p sort, sl cal, abnt lse m sbang qtz gr.
SH, lt-m gy, sft, rthy, plty, grdg to sndysh.
SH,m gy, sft, rthy, plty, n cal, w/ Ss lt gy, sft, f-vf gr, ncalc, mod srt, p por.
SH, lt-m gy, sft, rthy, plty, grdg to sndysh.
SS: wh, pk, mod firm, m gr, sbang sbrnd, p sort, n cal, abnt lse m sbang qtz gr.
SH ,m gy, fir, blky-sbblky, n cal, w/ Ss lt gy, sft, f-vf gr, ncalc, mod srt, p por.
SH ,m gy, lt brn, fir, rthy, blky-sbblky, n cal, w/ Ss lt gy, sft, f-vf gr, ncalc, mod srt, p por.
SS: lt gy, firm, f-vf gr, sbrnd, sil mtx, p srt, p por, n cal, w/ abnt lse wh, pk, m gr, sbang sbrnd, qtz gr.
SH ,m gy, lt brn, fir, rthy, blky-sbblky, n cal, w/ SLTST: brn, drk gy, sl brit,plty.
SLTST: brn, drk gy, sl brit,plty, n calc W/Sh drk gy, rthy, firm, sbblky, plty, n calc.
SS: lt gy, mod sft, fri ip, f-vf gr, sbrnd, n calc, W\lt -m gy, firm, rthy, sl calc, sbblky, plty, Sh.
SH, lt-m gy, sft, rthy, plty, sl calc, v sndy, grdg to sndysh.
SS: lt gy, mod hd, m gr, sbang, p sort, mod por, abnt lse wh pk m sbang qtz gr.
SS: lt grn, sft, fri ip, f gr, sbrnd, sl calc, mod srt, mod por, W/ intb Sh lt gy, mod sft, sndy, sl calc, plty.
SS: lt grn, sft, fri ip, f gr, sbrnd, sl calc, mod srt, mod por, W/ Sh lt gy, mod sft, sndy, sl calc, plty, grdg to sndysh.
Possible top Poison Canyon sand @ 315'
SS: lt gn, firm, m gr, sbang-sbrnd, mod sort, mod por,sl calc.
150
200
250
300
0
ROP (min/ft)
15
0
TG
100
Recalibrate CCD/TCD
CG
CG
CG
CG
Gas Test
CG
DTG
Working on pump
DTG
02/05/08
MND 313'
Possible top Poison Canyon sand @ 315'


0
ROP (min/ft)
15
350
400
450
500
02/06/08
MND 477'
SH, lt-m gy, sft, rthy, plty, sl calc, v sndy, grdg to sndysh, abnt lse wh pk m sbang qtz gr.
SS: lt gy,sft-mod firm, m-f gr, sbang-sbrn, mod sort, mod por, sl calc, abnt lse wh pk m sbang qtz gr.
SS: lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, w/ Sh m gy, firm, sbblky-plty, no calc.
SH: m gy, mod firm, sbblky-plty, no calc.
SS: lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, w/ Sh m gy, firm, sbblky-plty, no calc.
SS: lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, glauc.
SH: lt gy-grn, sft, rthy, sbplty-plty, v slty, n calc.
SLTST: lt grn-grn, sft- firm, sndy, sl cal, carb incl.
SH, lt gy, grn, sft, rthy, plty, sl calc, v sndy, grdg to sndysh,W/ lt gy, lt grn, f-vf gr, sbrnd, mod sort. mod por, sl calc SS.
No Sample
Ciculating & Changed Mud
SS: lt gy, mod sft-firm, f-vf gr, sbrnd, calc, mod srt, mod por, tr Coal.
SH, lt gy, grn, firmt, rthy,sbblky ip, plty, v sndy, w/ lt gy, brn, f-vf gr, sbrnd, mod sort. mod por, sl calc SS.
SS: lt gy, lt grn, f-vf gr, sbrnd, mod srt, mod por, sl calc, carb, glauc incl.
SS: lt gy, lt grn, f-vf gr, sbrnd, mod srt, mod por, sl calc, carb, glauc incl, SH, lt-m gy, firm, rthy,sbblky ip, plty, v sndy.
SS: lt gy, f-vf gr, sbrnd, mod srt, mod por, sl calc, carb, glauc incl. Tr lst qtzxl gr.
SS: grn, lt gy, firm, f-vf gr, sbrnd, mod srt, mod por, calc, carb, glauc incl.
SH: lt-med gy, firm, sbblky, n calc,plty, sl sndy w/lt grn, mod sft, f g, sbrnd, n calc SS.
SS: lt grn, mod sft, f gr, sbang-sbrnd, shly mtx,
CG
Scale Change
angle
0
TG
10000
Gas Trap Test
Scale Change
angle
0
TG
100
CG
CG
Gas Test
CG
CG
CG


mod srt, carb, glauc incl w/lt brn, sft- firm, shly, n cal, carb incl SLTST.
SS: grn, lt gy, firm, f-vf gr, sbrnd, mod srt, mod por, calc, carb, glauc incl, w/lt brn, sft- firm, shly, n cal, carb incl SLTST.
SH: lt-med gy, firm, sbblky, n calc,plty, sl sndy w/lt grn, mod sft, f g, sbrnd, n calc SS.
SH: lt-med gy, firm, sbblky, n calc,plty, sl sndy w/lt grn, mod sft, f g, sbrnd, n calc SS, abnt soluble gy cly.
SH: m gy-gy grn, firm, rthy, n calc, plty , intbd W/ lt grn, soft, f-vf sbrnd, sl calc SS.
SS: lt gy, pale grn, soft, f-vf gr, sbrnd-rnd, cly matx , w srt, mod por, sl calc.
SS: lt gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calcw/SH: m gy-gy grn, firm, rthy, n calc, plty.
SS: lt grn, mod sft, fri ip, f-vf gr, sbrnd-rnd, cly mtx, w srt, mod por, abnt lst qtz gr, subang w/ lt brn-m gy, sbblky, plty, sndy SH.
SS: lt grn, lt brn-crm, firm, f gr, sbrnd, sl calc, cly mtx ip, mod sort, p por.
SS: lt grn, lt brn-crm, wh ip, mod sft-firm, f gr, sbrnd, sl calc, cly mtx ip, mod sort, p por w/ m gy, firm, rthy, n calc ,plty, sl sndy Sh.
SS:lt gy, ltgrn, crm ip, mod firm, f gr, sbrnd-rnd, cly mtx ip, mod srt, p por, carb incl.
SH: m gy, firm, sbblky- blky, plty, n calc, sl sndy.
SH: m gy, firm, sbblky- blky, plty, n calc, sl sndy w/SS: lt gy, brn ip, firm, f gr, sbrnd-rnd, mod srt, mod srt, sl cal , mod por, carb incl.
SS: lt gy, brn ip, firm, f gr, sbrnd-rnd, mod srt, mod srt, sl cal , mod por, carb incl w/ m gy, firm, sl sndy, sbblky, n calc Sh.
SH: m gy, mod firm, sbblky, plty, n calc, sl sndy W/ lt gy, lt grn, f gr, sbrnd, sl calc, mod srt, mod por, SS.
SS: lt gy, lt grn, mod sft, f-vf gr, sbang, sl calc, mod srt, mod por, carb incl, tr lt brn, sft, shly, n calc, SLTST.
SS: lt gy, lt grn, lt brn ip, mod sft, f-vf gr, sbang, sl calc, mod srt, mod por, carb incl.
SS: lt gy, lt grn, mod sft, f-vf gr, sbang, sl calc, mod srt, p por, carb incl, w/ Sh, lt-m gy, sbblky,
550
600
650
700
750
0
ROP (min/ft)
15
0
TG
100
CG
CG
CG
CG
CG
Gas Test
Lost Circulation @ 716'
CG
CG
02/07/08
MND 689'


02/08/08
MND 779'
POOH for New Bit
Bit # 3
Size: 11"
Type: Mill-Tooth
IN: 779'
0
ROP (min/ft)
15
800
850
900
950
02/09-10/08
MND 930'
POOH
Unable to recovery
Circulation
Drilling w/ Air F/930'
Resume Drilling @ 12:30
Bit # 2R
Size: 11"
Type: Mill-Tooth
IN: 930'
firm, rtthy, n calc.
Resume Drilling @ 02:15 02/08/08
SH: m gy, firm, sbblky, plty, sl sndy, n calc.
SS: lt gy, lt grn, f-vf gr, sbrnd-sbang, cly mtx, mod srt, mod por, sl calc ip, carb incl, W/Sh, m gy, firm, sbblky, plty, sl sndy, n calc.
SH: m-drk gy, firm, rthy, blky-sbblky, sl sndy, n calc, coaly, w/ SS: lt gy, sft, f gr, sbrnd, sl calc
SS: lt gy, wh, f-vf gr, mod sft, fri, sbrnd-sbang, cly mtx ip, sl calc, mod srt, mod por, abnt carb incl, Tr m-drk Sh.
SH: lt-m gy, firm, blky-sbblky, plty, n calc, v sndy,w/ SS: lt gy-wh, f gr, sft, sbrnd, cly mxt ip, sl calc, mod srt, mod por.
SS: lt gy, sft, f gr, sbang, p srt, p por, sl calc cmt, abnt lst wh-qtzxl gr.
SS: pred wh, lt gy, f gr, fria, mod sft, sbang, v calc cmt, mod por, p srt, abnt lst m gr, ang , wh-qtzxl gr.
SS: pred wh, lt gy, f-vf gr, fria-mod sft, sbang, v calc cmt, mod por, p srt, abnt lst m gr, ang , wh-qtzxl gr, tr COAL.
CARBSH: m-drk gy, firm, blky, plty, no calc.
NO Sample
SH: lt-m gy, brn, firm, grty, n calc, coaly ip, sl slty ip, tr pry.
SS; Lt grn, lt gy, firm-hd, f gr,sbrnd sbang, calc cmt, p por, mod srt, carb incl, glauc.
SH: m gy, firm, blky, plty, slty ip, no calc, W/ lt gy, firm, f gr, mod srt, mod por, calc, SS.
SS: lt, gy, wh, firm, f-m gr, sbrnd-sbang, calc cmt, p por, mod srt, abnt lst m qtzxl sbrnd gr, tr pry.
Power Down
Gas Test
COAL stain in pit
0
TG
100
Power Down
CG
CG
CG
Line Test
Trap Test
CG
Note Scale Change
Scale Change
0
TG
300
Abundant COAL stain in pit
MW: 8.8 VIS: 33
Trip Gas 7349 Units
Total LOST CIRCULATION @ 930'
DTG
CG


0
ROP (min/ft)
15
1000
1050
SS: lt gy, lt grn, firm, f-vf gr, sbrnd, sl calc, mor srt, mod por, carb incl.
SH: lt-m, gy, firm, sbblky, plty, n calc, slty.
SS: wh, lt gy, qtzxl, sft, fri, f-vf gr, sbrnd, sl calc, mod srt, mod por, carb incl, intb w/ Sh m gy, firm, blky, plty, n calc, sl slty ip.
SS: wh, lt gy, qtzxl, sft, fri, f-vf gr, sbrnd, sl calc, mod srt, mod por, abnt lst f grqtzxl
SS: lt grn, lt gy, wh ip, firm, f gr, sbang, sl cal, p por,mod srt, carb incl w/ m drk, firm, sbblky sl sndy, n calc Sh.
CG
0
TG
300
CG
CG
DTG
TD @ 1079' 09:01
02/10/08
POCI 55 Monitor

SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

COMPENSATED DENSITY NEUTRON LOG

Company Petroglyph Operating Company Inc.
Well Poci 55 Monitor Well
Field Purgatoire River
County Huerfano
State Colorado

Company Petroglyph Operating Company Inc.

Well Poci 55 Monitor Well

Field Purgatoire River

County Huerfano State Colorado

Location: API # : ----------

Water Well Permit Number 275819
851' FSL & 1773' FWL
SEC 3 TWP 29S RGE 67W

Other Services

sil

Elevation

Permanent Datum	Ground Level	Elevation	6690'
Log Measured From	Ground Level		
Drilling Measured From	Ground Level		

K.B. ------
D.F. ------
G.L. 6690'

Date	2-10-08		
Run Number	One		
Depth Driller	1079'		
Depth Logger	1079'		
Bottom Logged Interval	1063'		
Top Log Interval	Surface Casing		
Casing Driller	12.75" @ 40'		
Casing Logger	39'		
Bit Size	11"		
Type Fluid in Hole	Water		
Density / Viscosity	///		
pH / Fluid Loss	///		
Source of Sample	///		
Rm @ Meas. Temp	///		
Rmf @ Meas. Temp	///		
Rmc @ Meas. Temp	///		
Source of Rmf / Rmc	///		
Rm @ BHT	///		
Time Circulation Stopped	9:45 a.m.		
Time Logger on Bottom	1:15 p.m.		
Maximum Recorded Temperature	72 DEG F		
Equipment Number	T0701		
Location	Trinidad		
Recorded By	L. Smith		
Witnessed By	Mr. Tom Melland		

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Comments

Compensated Density Neutron Porosity Presented On Sandstone Matrix.
ABHV Calculated For 5 1/2" Casing.
Go 3.5 miles from west edge of Walsenburg and turn left on Cnty. rd. 346. (by blue water tank)
Stay on main rd. to crossroads and go right. stay on main rd. (left@ Y) 3.4 miles to
Deer Meadows Rd. Go left to location.

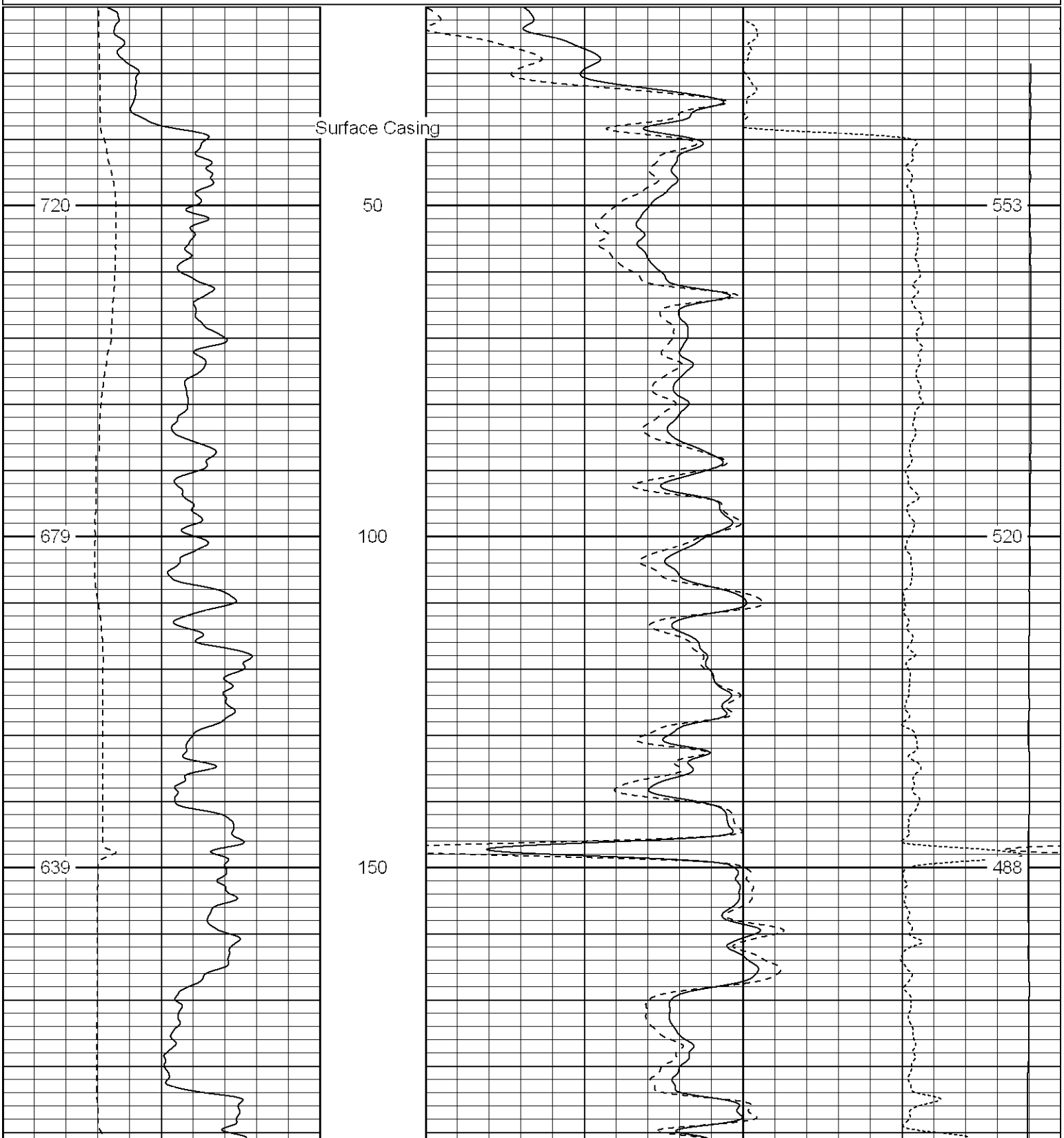
Main Pass

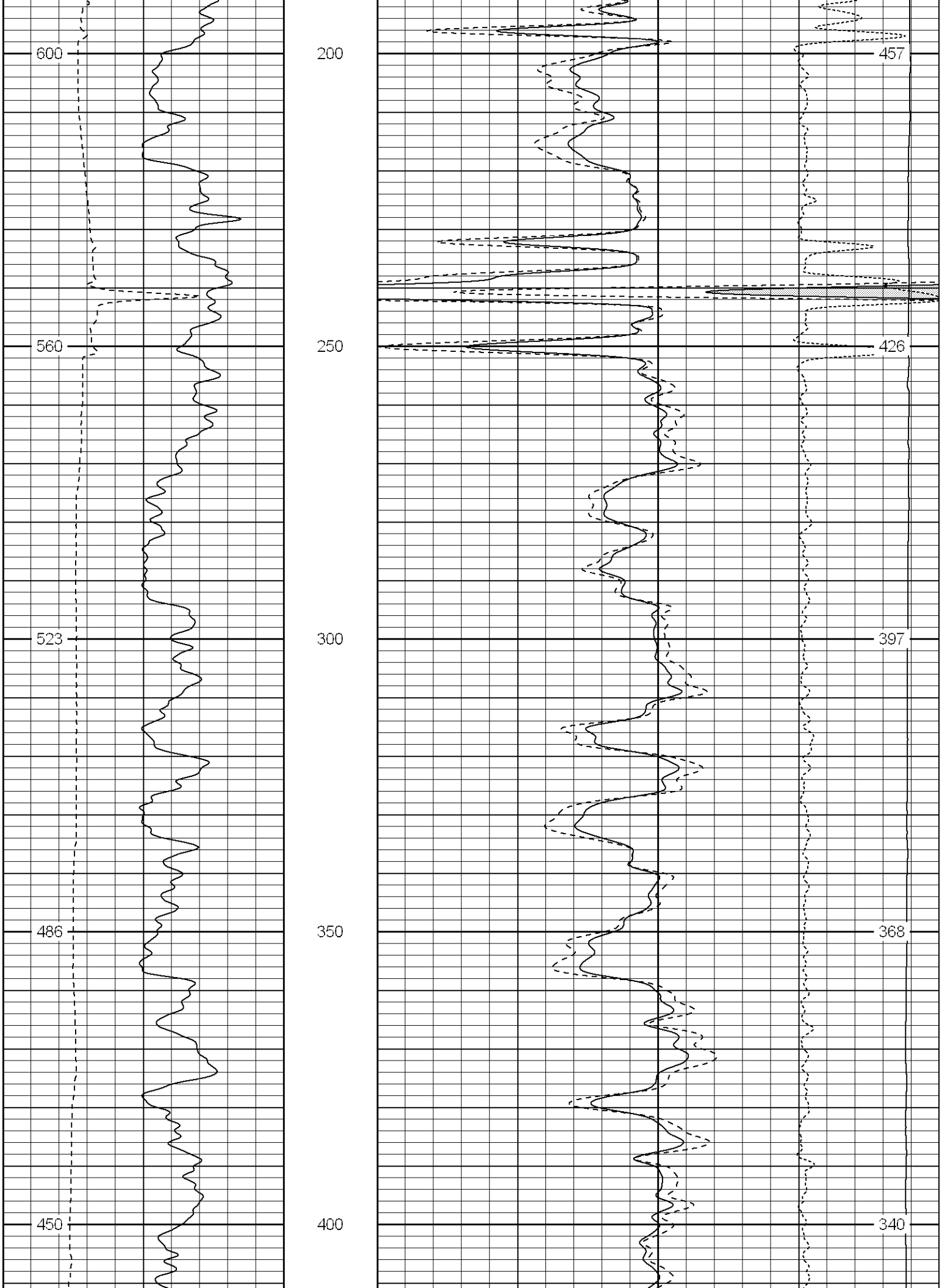
SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

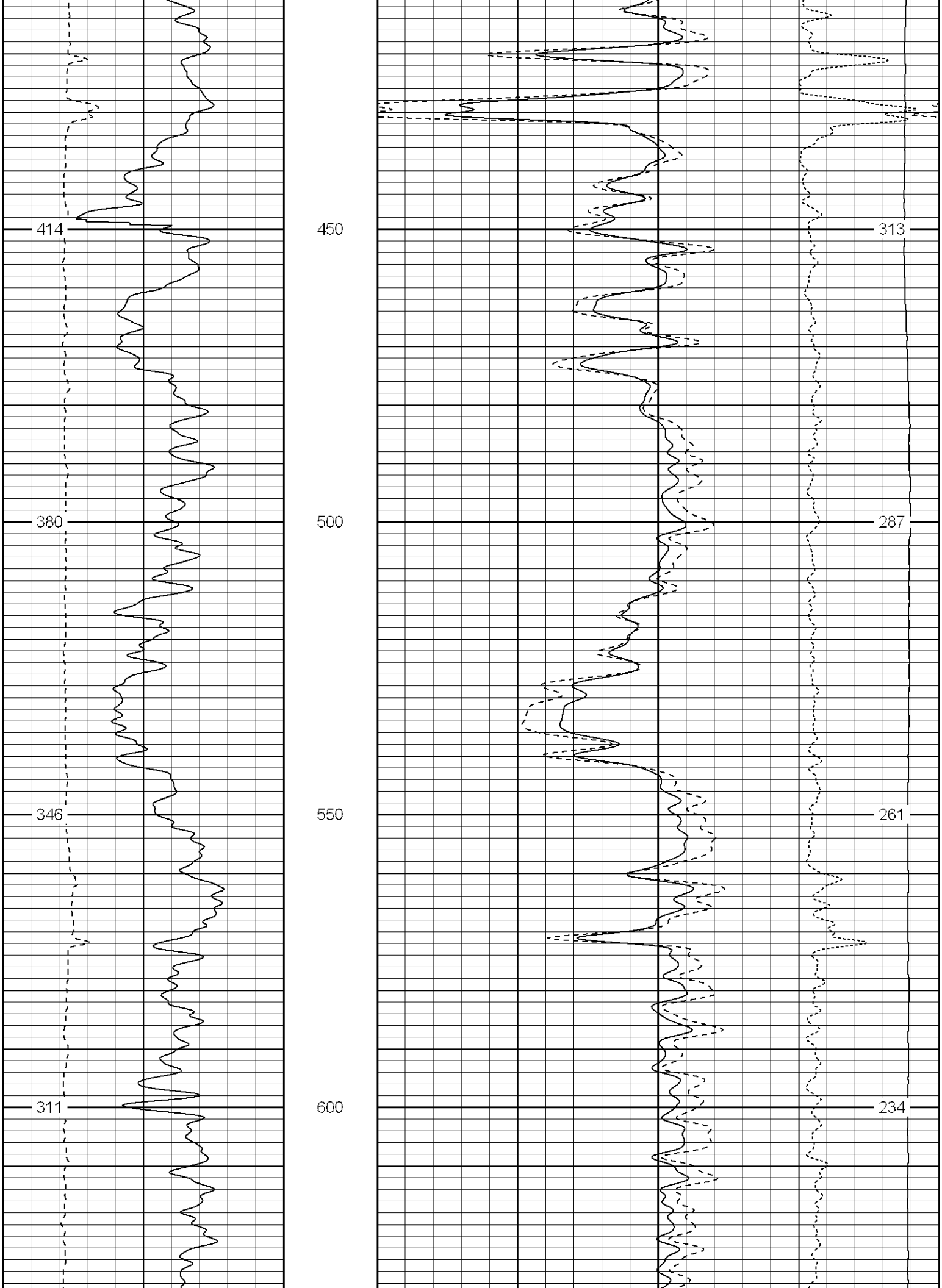
Database File:	poci55.db
Dataset Pathname:	pass4
Presentation Format:	cdl
Dataset Creation:	Sun Feb 10 15:05:35 2008
Charted by:	Depth in Feet scaled 1:240

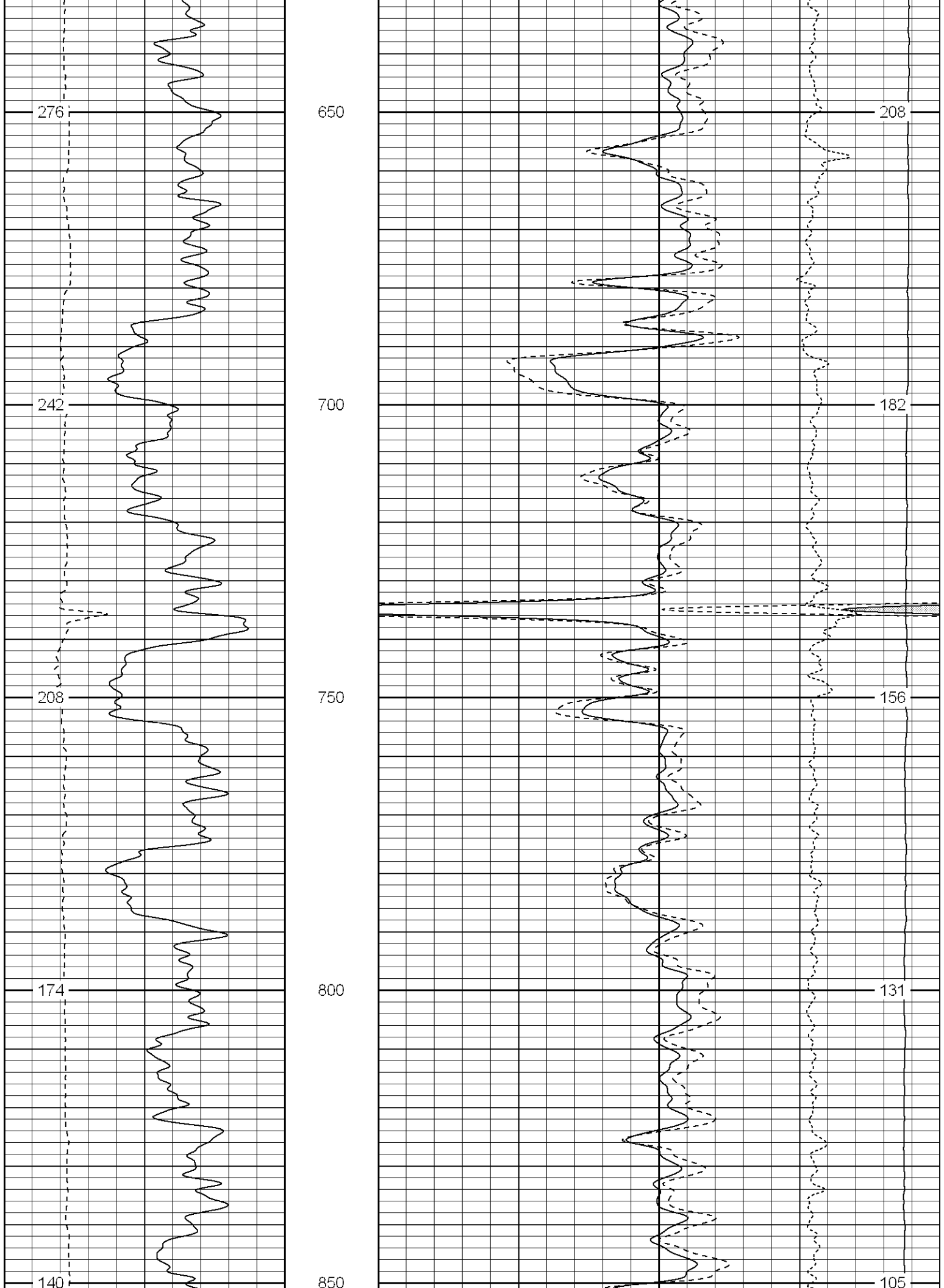
0	GR (GAPI)	200
9	DCAL (in)	19
	TBHV (ft3)	

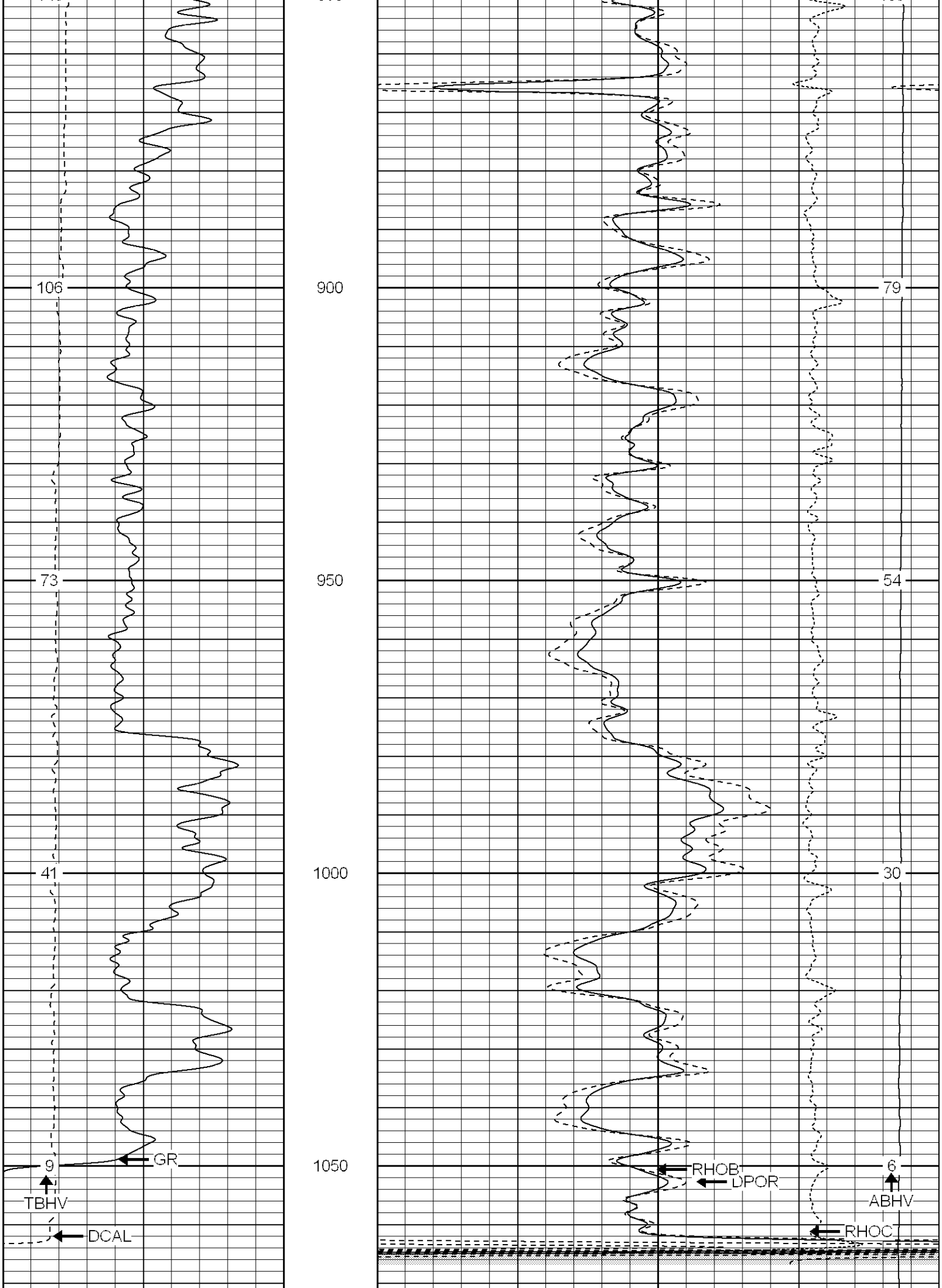
2	RHOB (g/cc)	3
1	RHOB (g/cc)	2
30	DPOR (pu)	-10
-0.5	RHOC (g/cc)	0.5
4000	LTEN (lb)	0
	ABHV (ft3)	




600
560
523
486
450
200
250
300
350
400
457
426
397
368
340


414
380
346
311
450
500
550
600
313
287
261
234


276
242
208
174
140
650
700
750
800
850
208
182
156
131
105


106
73
41
9
TBHV
GR
DCAL
900
950
1000
1050
79
54
30
6
ABHV
RHOB
DPOR
RHOC

0	GR (GAPI)	200
9	DCAL (in)	19
TBHV (ft3)		

2	RHOB (g/cc)	3
1	RHOB (g/cc)	2
30	DPOR (pu)	-10
-0.5	RHOC (g/cc)	0.5
4000	LTEN (lb)	0
ABHV (ft3)		

SUPERIOR WELL SERVICES

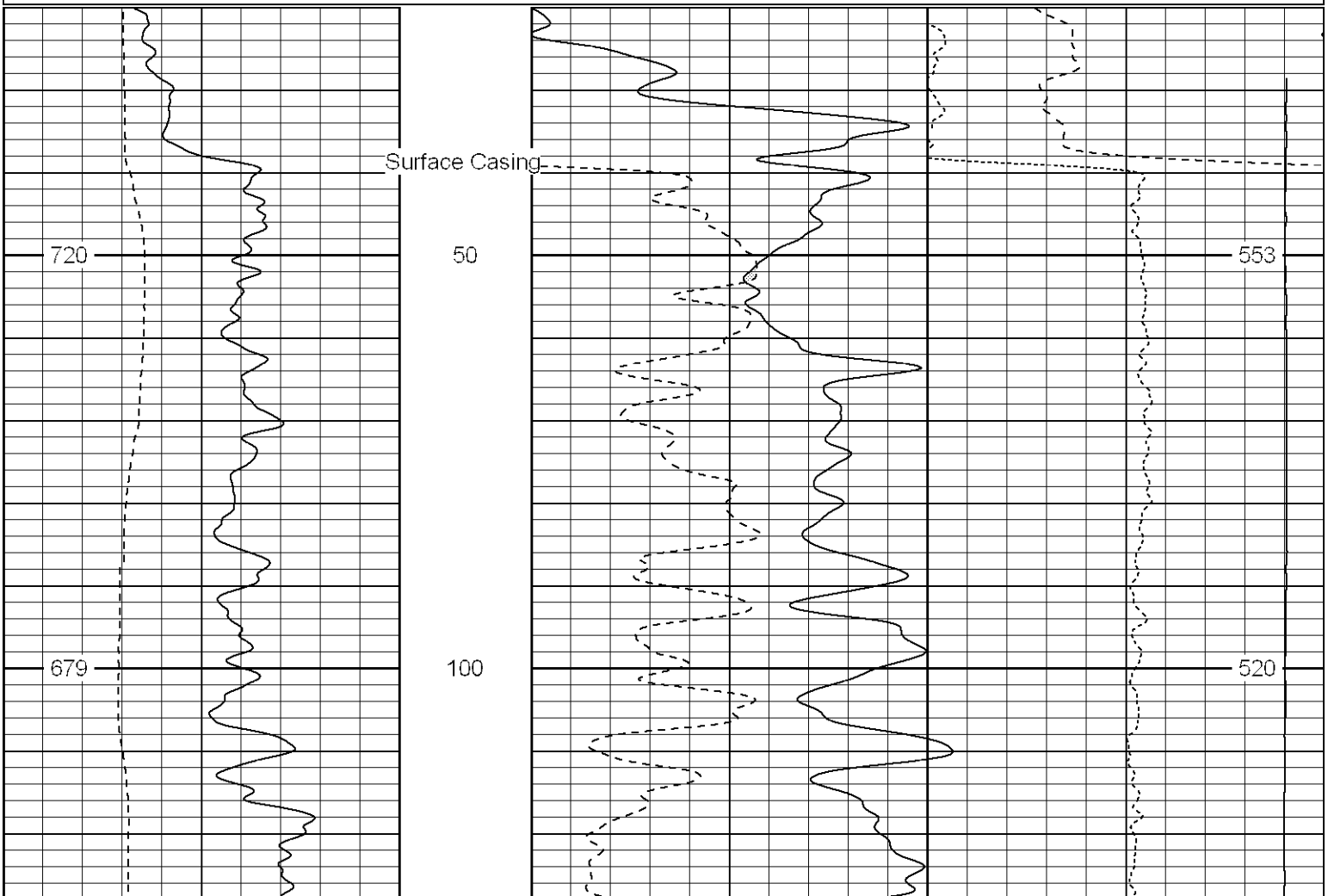
SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

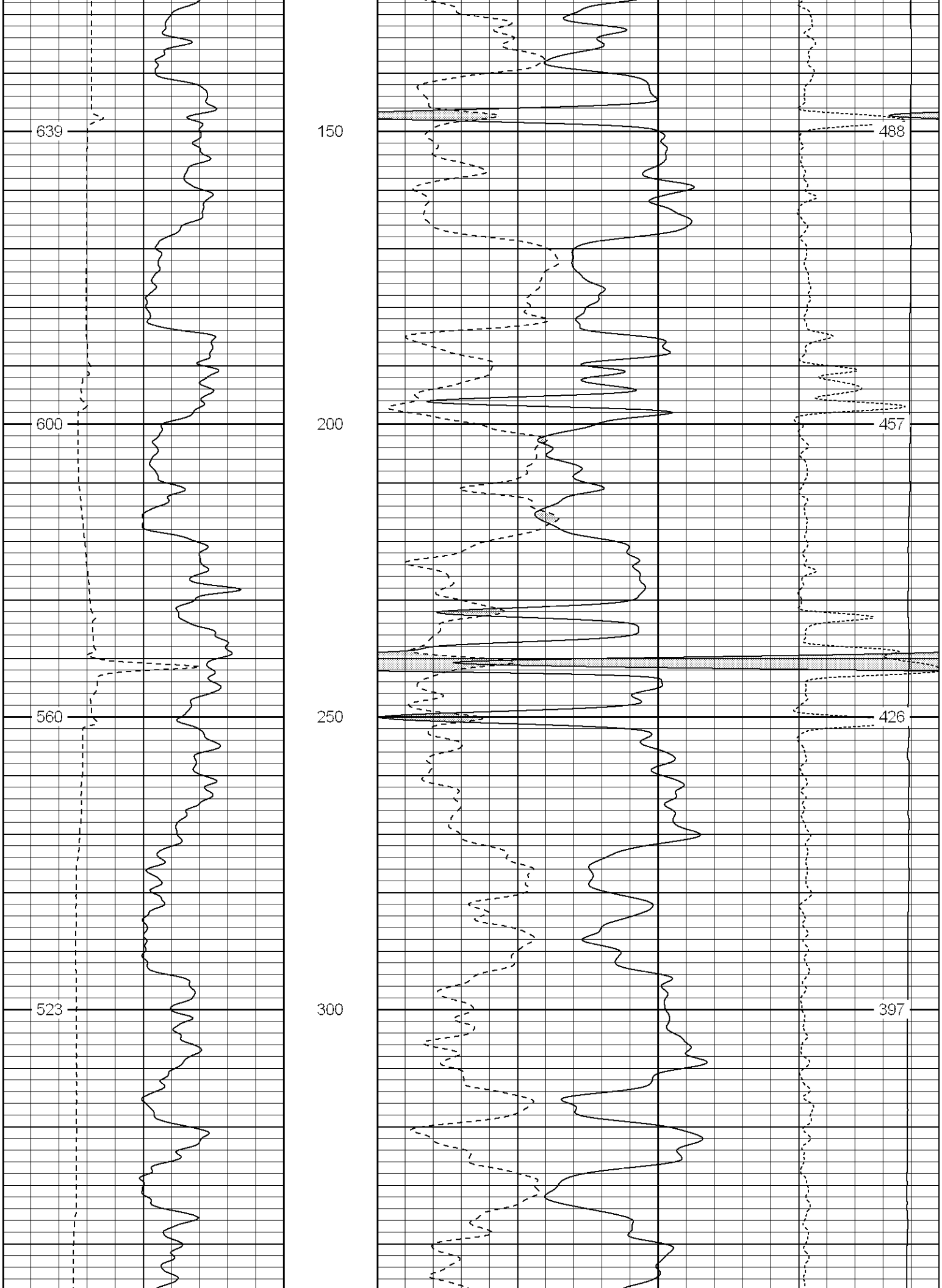
Main Pass

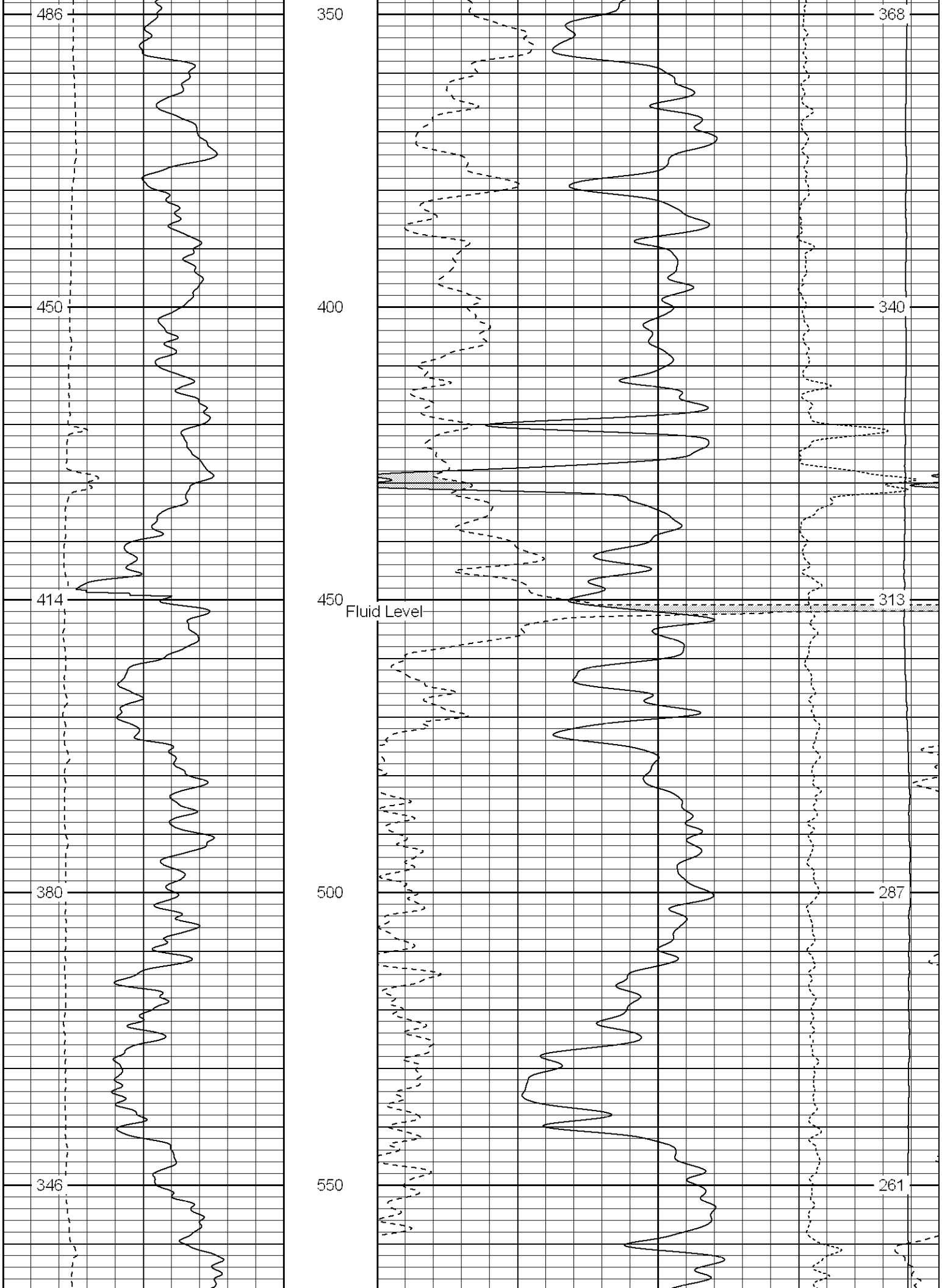
Database File:	poci55.db
Dataset Pathname:	pass4
Presentation Format:	cdnl
Dataset Creation:	Sun Feb 10 15:05:35 2008
Charted by:	Depth in Feet scaled 1:240

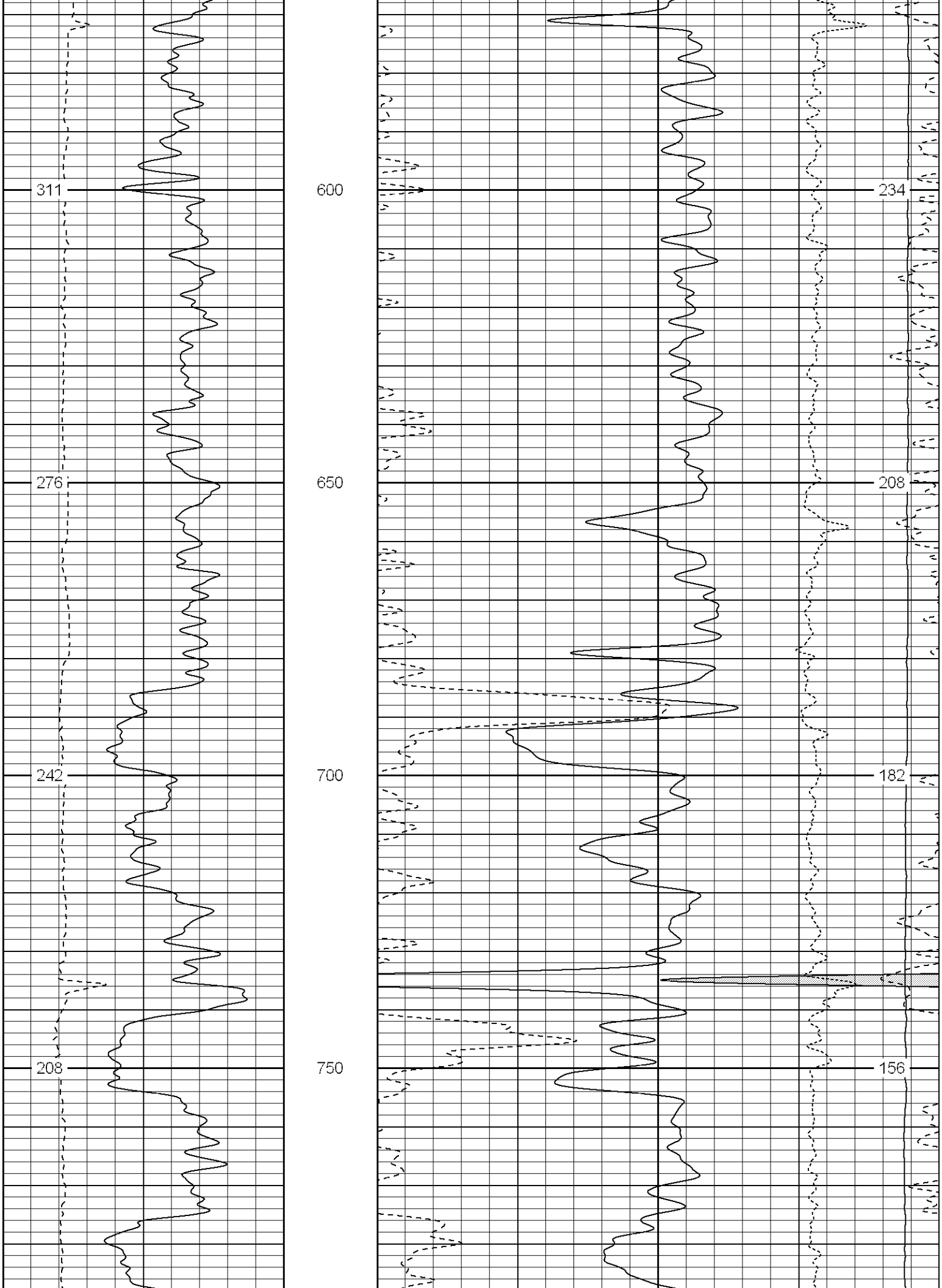
0	GR (GAPI)	200
9	DCAL (in)	19
TBHV (ft3)		

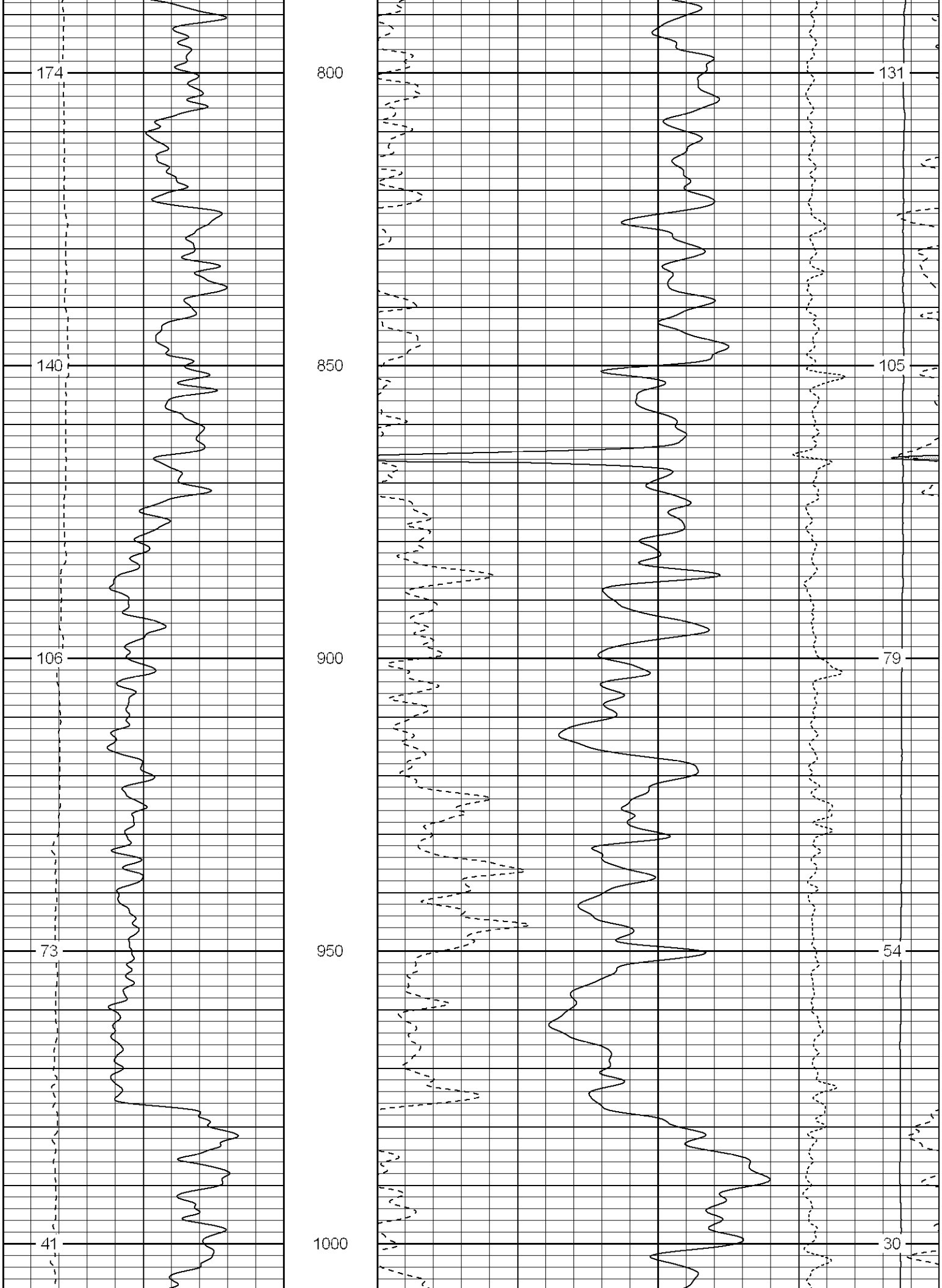
30	NPOR (pu)	-10
30	DPOR (pu)	-10
-0.5	RHOC (g/cc)	0.5
4000	LTEN (lb)	0
ABHV (ft3)		

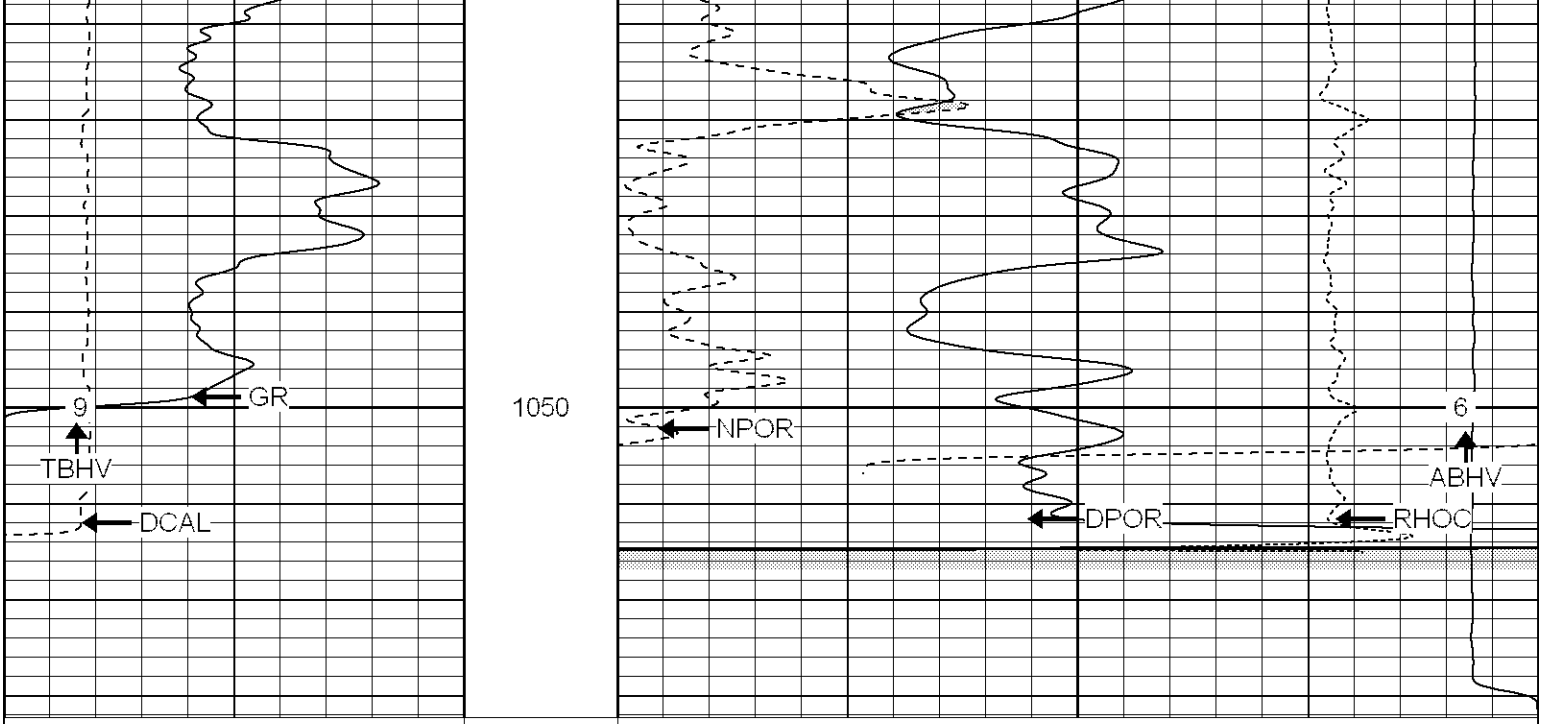



639
600
560
523
150
200
250
300
488
457
426
397


486
450
414
380
346
350
400
450
500
550
Fluid Level
368
340
313
287
261


311
276
242
208
600
650
700
750
234
208
182
156


174
140
106
73
41
800
850
900
950
1000
131
105
79
54
30



0	GR (GAPI)	200
9	DCAL (in)	19
TBHV (ft3)		

30	NPOR (pu)	-10
30	DPOR (pu)	-10
-0.5	RHOC (g/cc)	0.5
4000	LTEN (lb)	0
ABHV (ft3)		

SUPERIOR WELL SERVICES

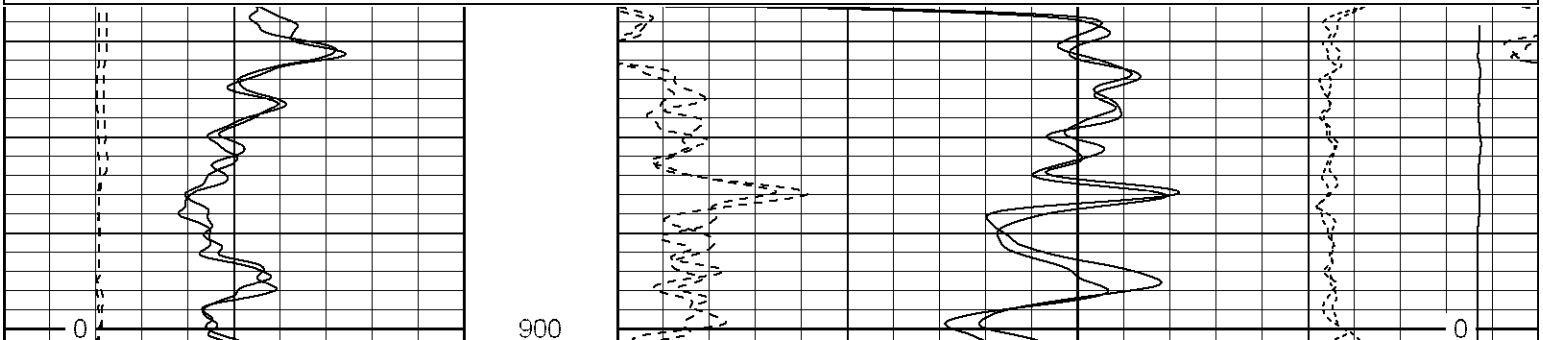
SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

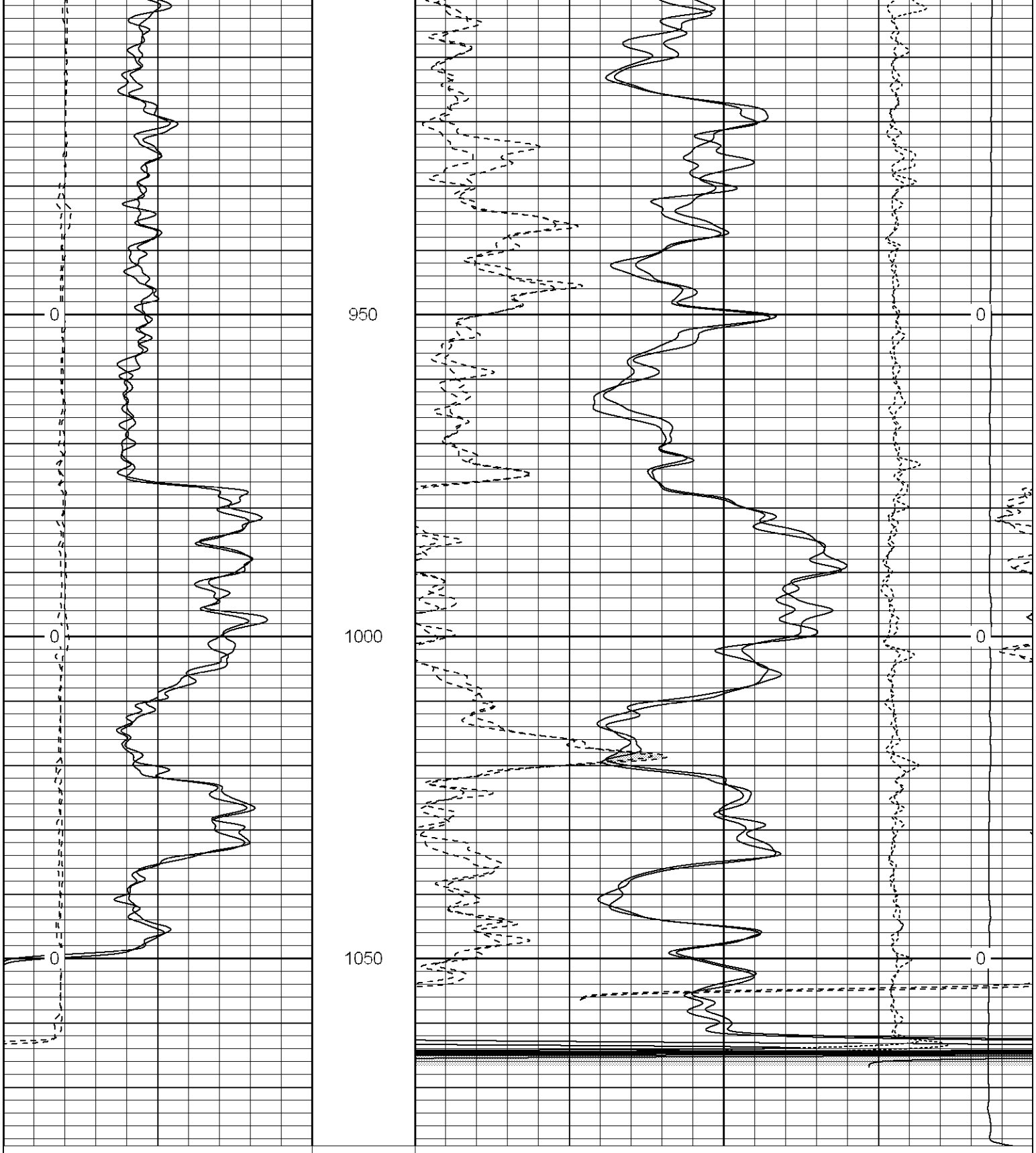
Repeat Pass

Database File:	poci55.db
Dataset Pathname:	pass3.1
Presentation Format:	cdnl
Dataset Creation:	Sun Feb 10 14:55:22 2008 by Calc Open-Cased 070814
Charted by:	Depth in Feet scaled 1:240

0	GR (GAPI)	200
9	DCAL (in)	19
0	GR-repeat (GAPI)	200
9	DCAL-repeat (in)	19
TBHV (ft3)		

30	NPOR (pu)	-10
30	DPOR (pu)	-10
30	NPOR-repeat (pu)	-10
30	DPOR-repeat (pu)	-10
-0.5	RHOC (g/cc)	0.5
4000	LTEN (lb)	0
-0.5	RHOC-repeat (g/cc)	0.5
ABHV (ft3)		





0	GR (GAPI)	200
9	DCAL (in)	19
0	GR-repeat (GAPI)	200
9	DCAL-repeat (in)	19
TBHV (ft3)		

30	NPOR (pu)	-10
30	DPOR (pu)	-10
30	NPOR-repeat (pu)	-10
30	DPOR-repeat (pu)	-10

-0.5	RHOC (g/cc)	0.5
4000	LTEN (lb)	0
-0.5	RHOC-repeat (g/cc)	0.5
	ABHV (ft3)	

Calibration Report

Database File: poci55.db
Dataset Pathname: pass1
Dataset Creation: Sun Feb 10 12:51:37 2008 by Log Open-Cased 070814

Induction Tool Calibration Report

Serial Number:	040903
Tool Model:	Probe
Downhole Cal Performed:	Fri Feb 01 16:21:08 2008
Surface Cal Performed:	Fri Feb 01 12:36:59 2008

Surface Calibration:	Air	Loop	
Conductivity Reference:	0.000	500.000	mmho
Conductivity Reading:	-0.045	0.654	V
Internal Reference:	Zero	Cal	
Conductivity Reference:	0.000	500.000	mmho
Conductivity Reading:	0.012	0.653	V

Downhole Calibration:	Internal Zero	Internal Cal	
Conductivity Reference:	-1.440	499.433	mmho
Conductivity Reading:	-1.554	499.247	V
Short Normal Reference:	0.000	20.000	Ohm-m
Short Normal Reading:	0.007	0.214	V

Results:	Gain	Offset
Loop Conductivity:	715.585	32.201
Downhole Correction:	1.000	0.115
Short Normal Resistivity:	75.774	-4.000

Compensated Density Calibration Report

Serial-Model:	902-2.75POH
Source / Verifier:	/
Master Calibration Performed:	Thu Jan 31 13:50:50 2008

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.710	g/cc	1164.05	575.44	cps
Aluminum	2.590	g/cc	207.67	288.30	cps

Spine Angle = 68.15 Density/Spine Ratio = 0.474

	Size		Reading	
Small Ring	8.35	in	2.15	V
Large Ring	17.00	in	4.64	V

Neutron Calibration Report

Serial Number:	802	
Tool Model:	2.75POH	
Performed:	Fri Feb 01 09:47:24 2008	
Calibrator Value:	1	NAPI
Calibrator Reading:	1	cps
Sensitivity:	1	NAPI/cps

Gamma Ray Calibration Report

Serial Number:	801

Tool Model:	2.75POH	
Performed:	Fri Feb 01 08:19:35 2008	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	0.8000	GAPI/cps

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
			None	0.75	1.50	5.00
GR	29.58		GR-2.75POH (801) Probe	3.73	2.75	43.00
NEU	24.04		NEU-2.75POH (802) Probe Epithermal	4.75	2.75	58.00
			CDL-2.75POH (902) Probe	8.43	2.75	106.00
LSD	16.21					
DCAL	15.94					
SSD	15.69					
DIC	6.24		IEL-Probe (040903)	13.46	2.75	93.00
SP	2.25					
SN	1.71					

Dataset:	poci55.db: field/well/run1/pass1
Total Length:	31.11 ft
Total Weight:	305.00 lb
O.D.	2.75 in

SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

SINGLE INDUCTION LOG

Company Petroglyph Operating Company Inc.
Well Poci 55 Monitor Well
Field Purgatoire River
County Huerfano
State Colorado

Company Petroglyph Operating Company Inc.

Well Poci 55 Monitor Well

Field Purgatoire River

County Huerfano State Colorado

Location: API # : ----------

Water Well Permit Number 275819
851' FSL & 1773' FWL

SEC 3 TWP 29S RGE 67W

Other Services

cdl
neutron

Elevation

K.B. ------
D.F. ------
G.L. 6690'

Permanent Datum	Ground Level	Elevation	6690'
Log Measured From	Ground Level		
Drilling Measured From	Ground Level		

Date	2-10-08		
Run Number	One		
Depth Driller	1079'		
Depth Logger	1079'		
Bottom Logged Interval	1077'		
Top Log Interval	Surface Casing		
Casing Driller	12.75" @ 40'		
Casing Logger	39'		
Bit Size	11"		
Type Fluid in Hole	Water		
Density / Viscosity	///		
pH / Fluid Loss	///		
Source of Sample	///		
Rm @ Meas. Temp	///		
Rmf @ Meas. Temp	///		
Rmc @ Meas. Temp	///		
Source of Rmf / Rmc	///		
Rm @ BHT	///		
Time Circulation Stopped	9:45 a.m.		
Time Logger on Bottom	1:15 p.m.		
Maximum Recorded Temperature	72 DEG F		
Equipment Number	T0701		
Location	Trinidad		
Recorded By	L. Smith		
Witnessed By	Mr. Tom Melland		

<<< Fold Here >>>

Comments

Go 3.5 miles from west edge of Walsenburg and turn left on Cnty. rd. 346. (by blue water tank)
Stay on main rd. to crossroads and go right. stay on main rd. (left@ Y) 3.4 miles to
Deer Meadows Rd. Go left to location.

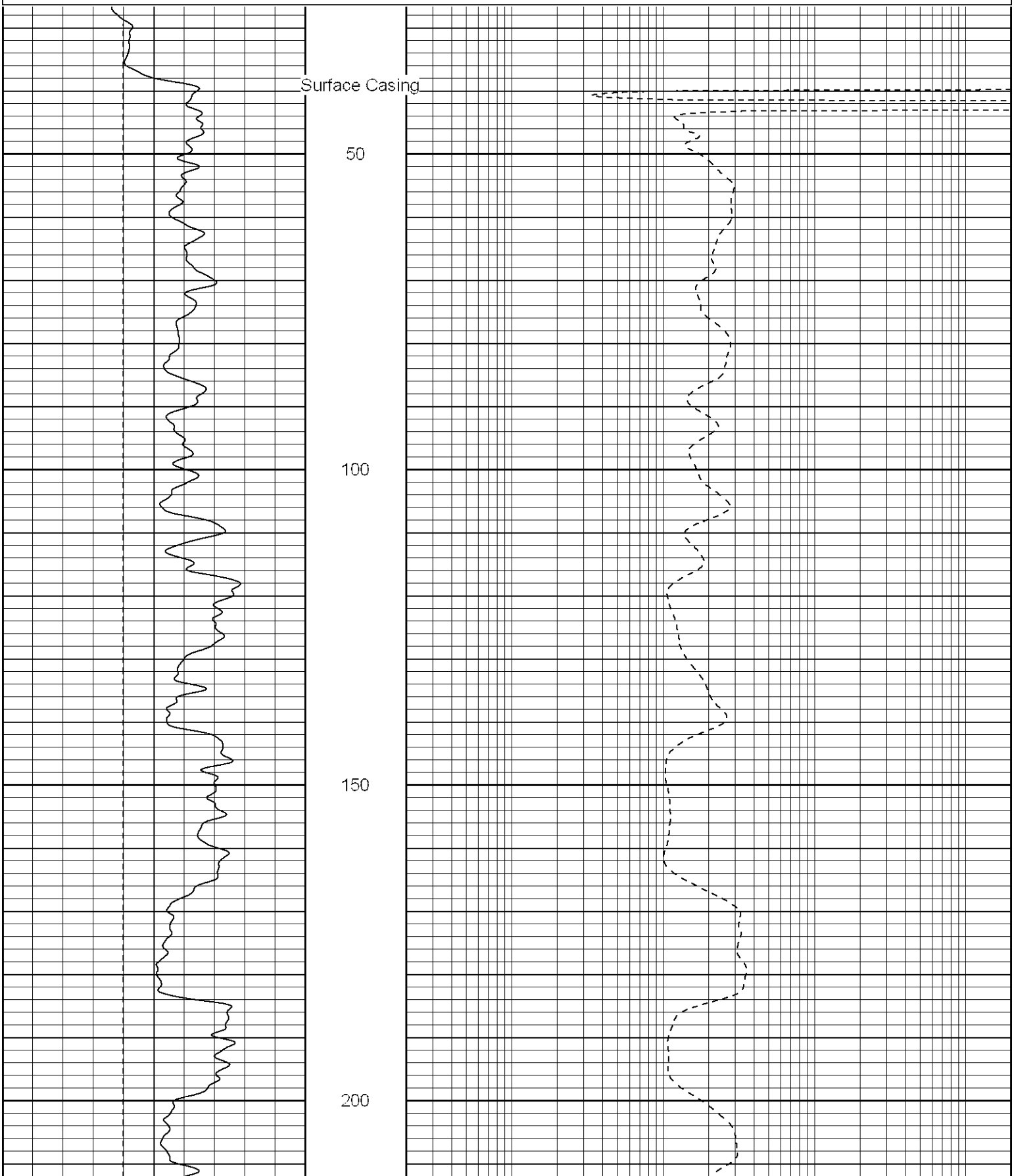
Main Pass

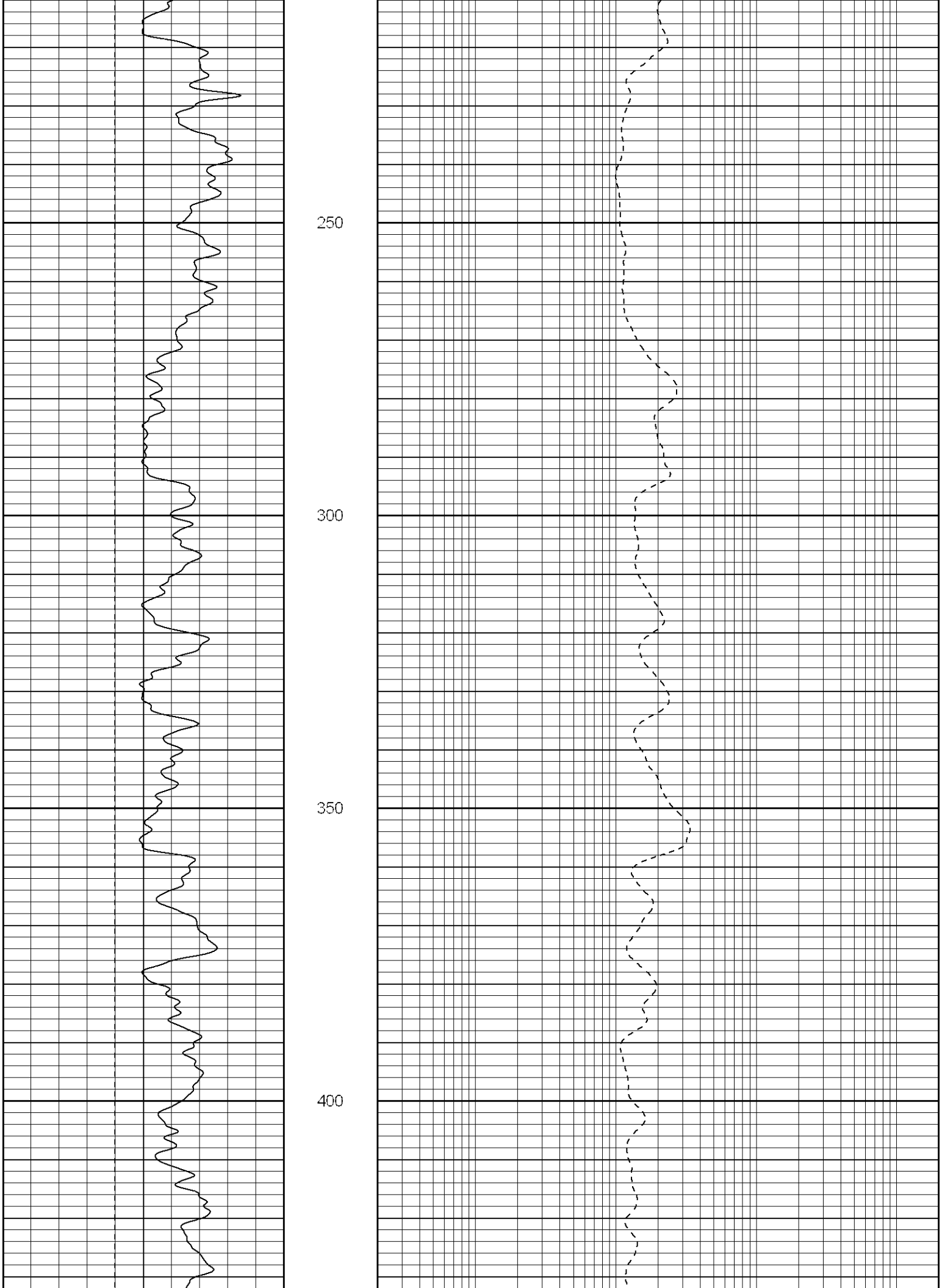
SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

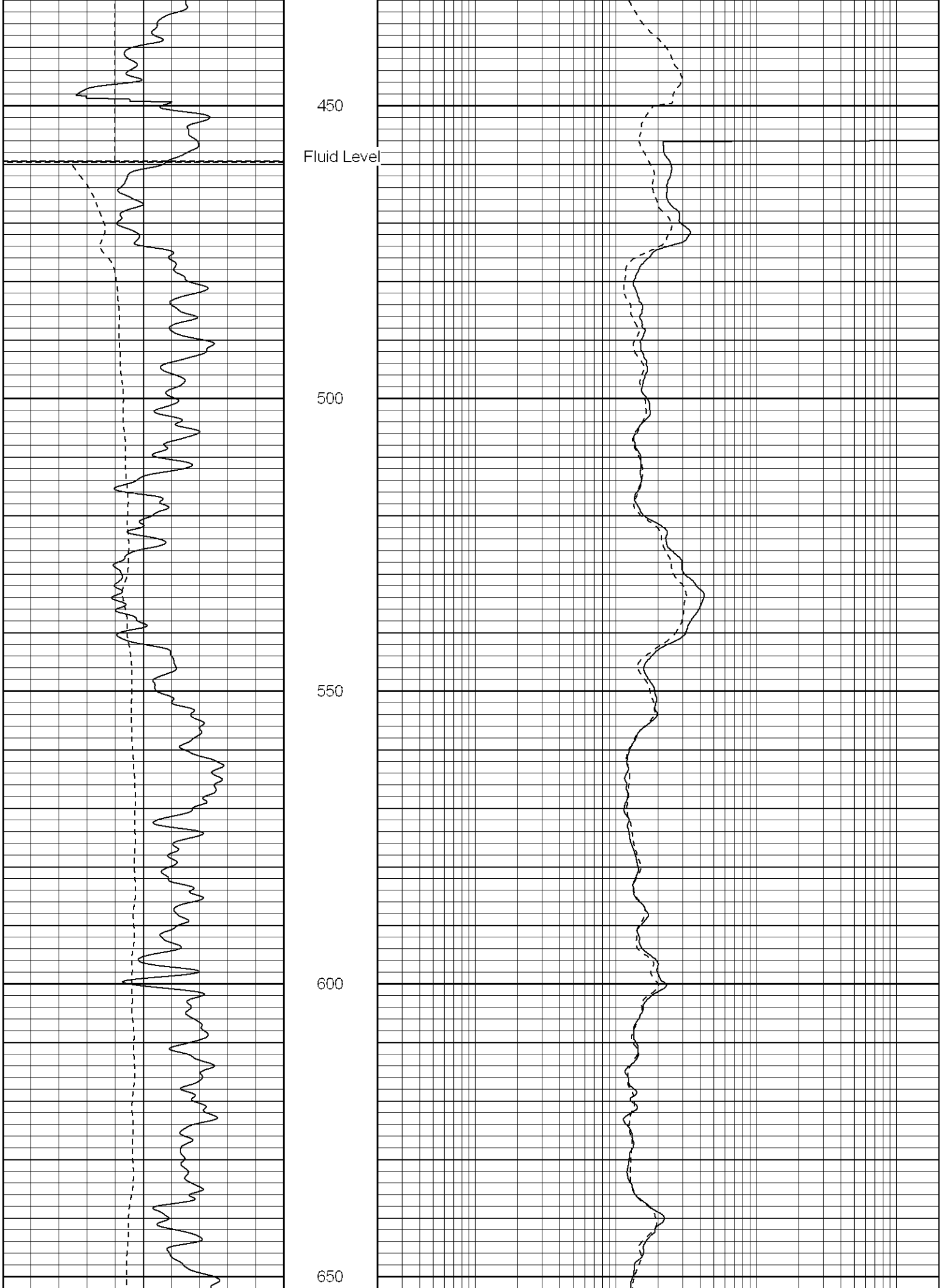
Database File:	poci55.db
Dataset Pathname:	pass2.2
Presentation Format:	iel
Dataset Creation:	Sun Feb 10 14:44:24 2008 by Calc Open-Cased 070814
Charted by:	Depth in Feet scaled 1:240

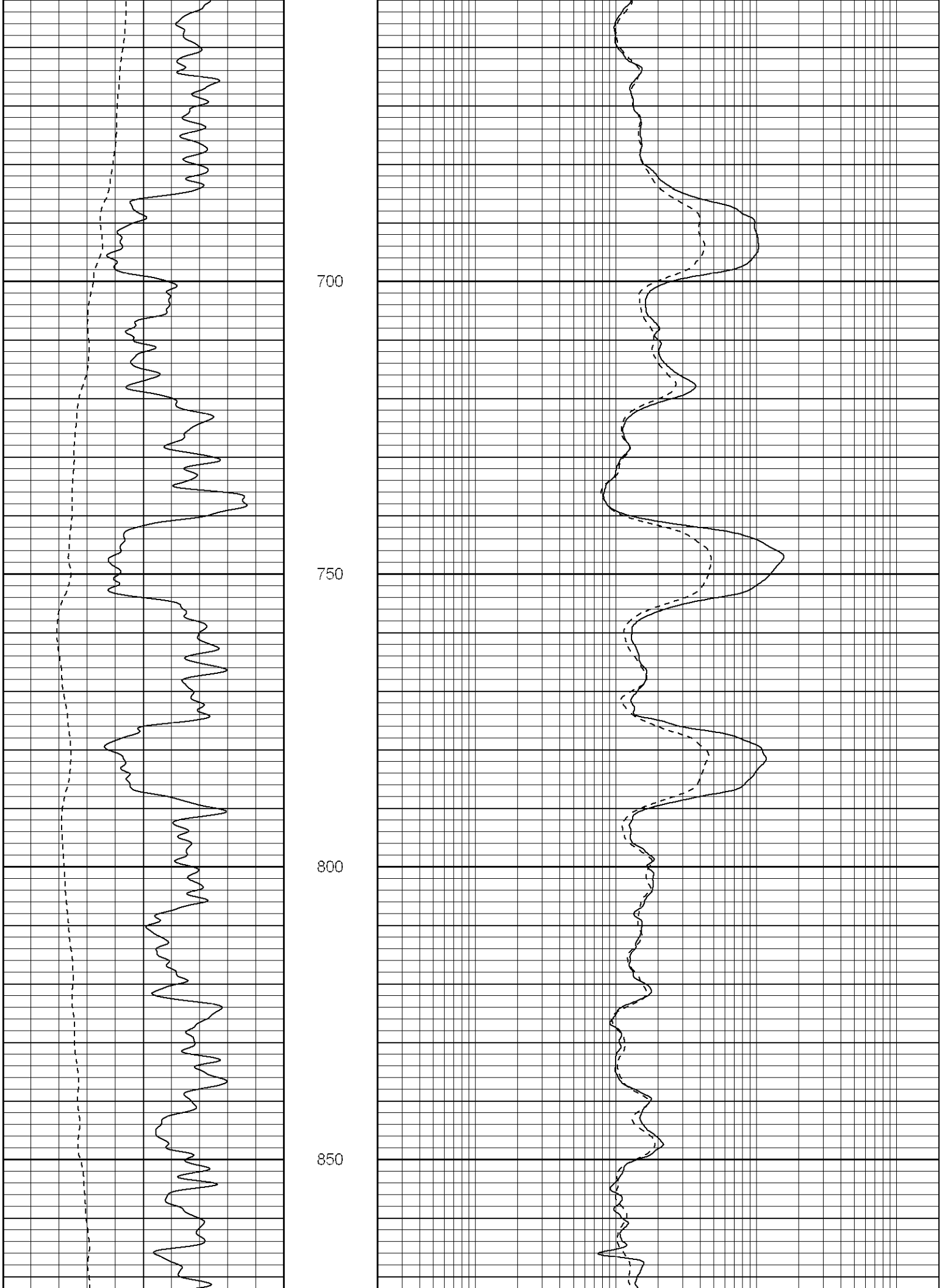
0	GR (GAPI)	200
-80	SP (mV)	120

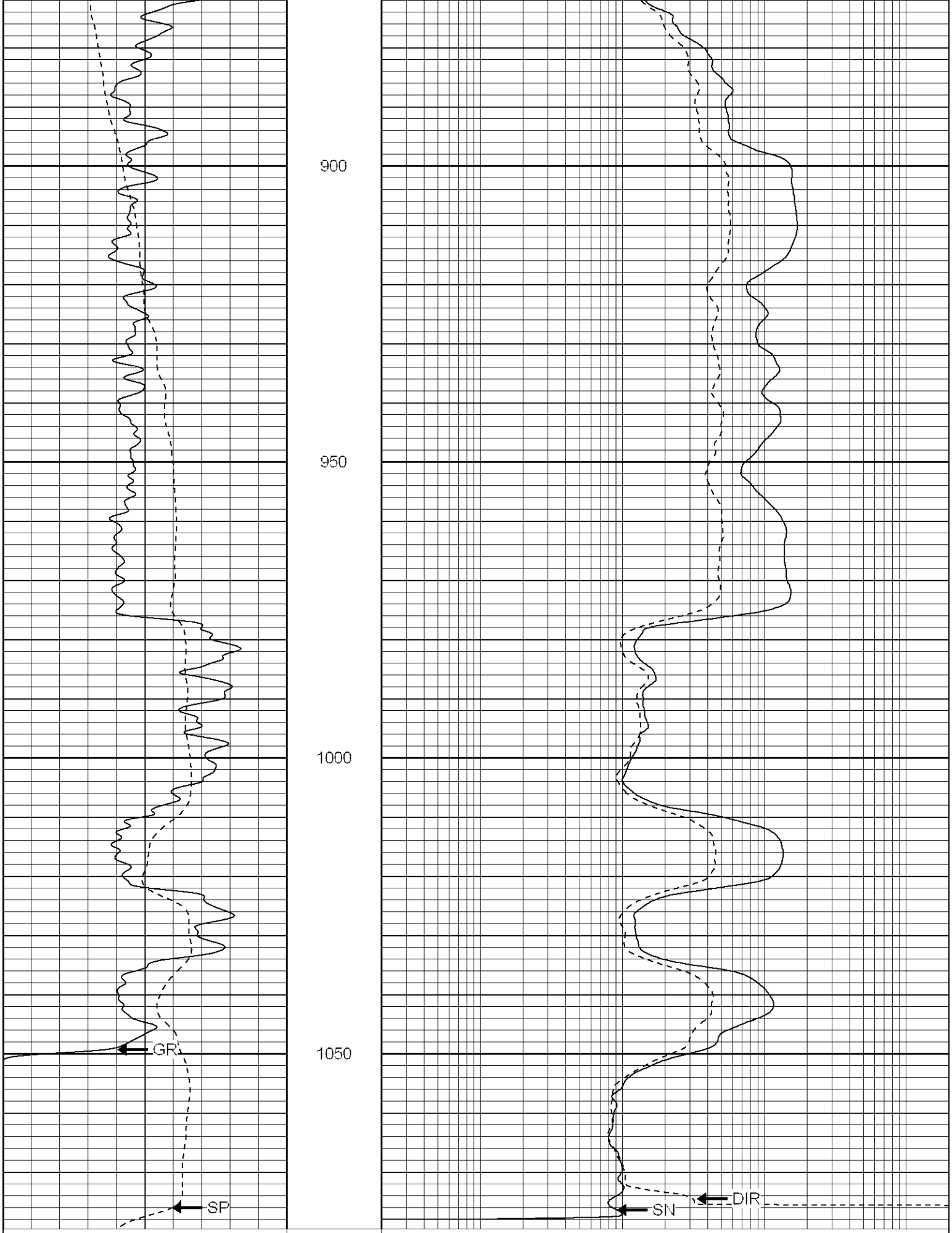
0.2	DIR (Ohm-m)	2000
0.2	SN (Ohm-m)	2000




250
300
350
400


450
Fluid Level
500
550
600
650


700
750
800
850


900
950
1000
1050
GR
SP
DIR
SN
0
GR (GAPI)
200
-80
SP (mV)
120
0.2
DIR (Ohm-m)
2000
0.2
SN (Ohm-m)
2000

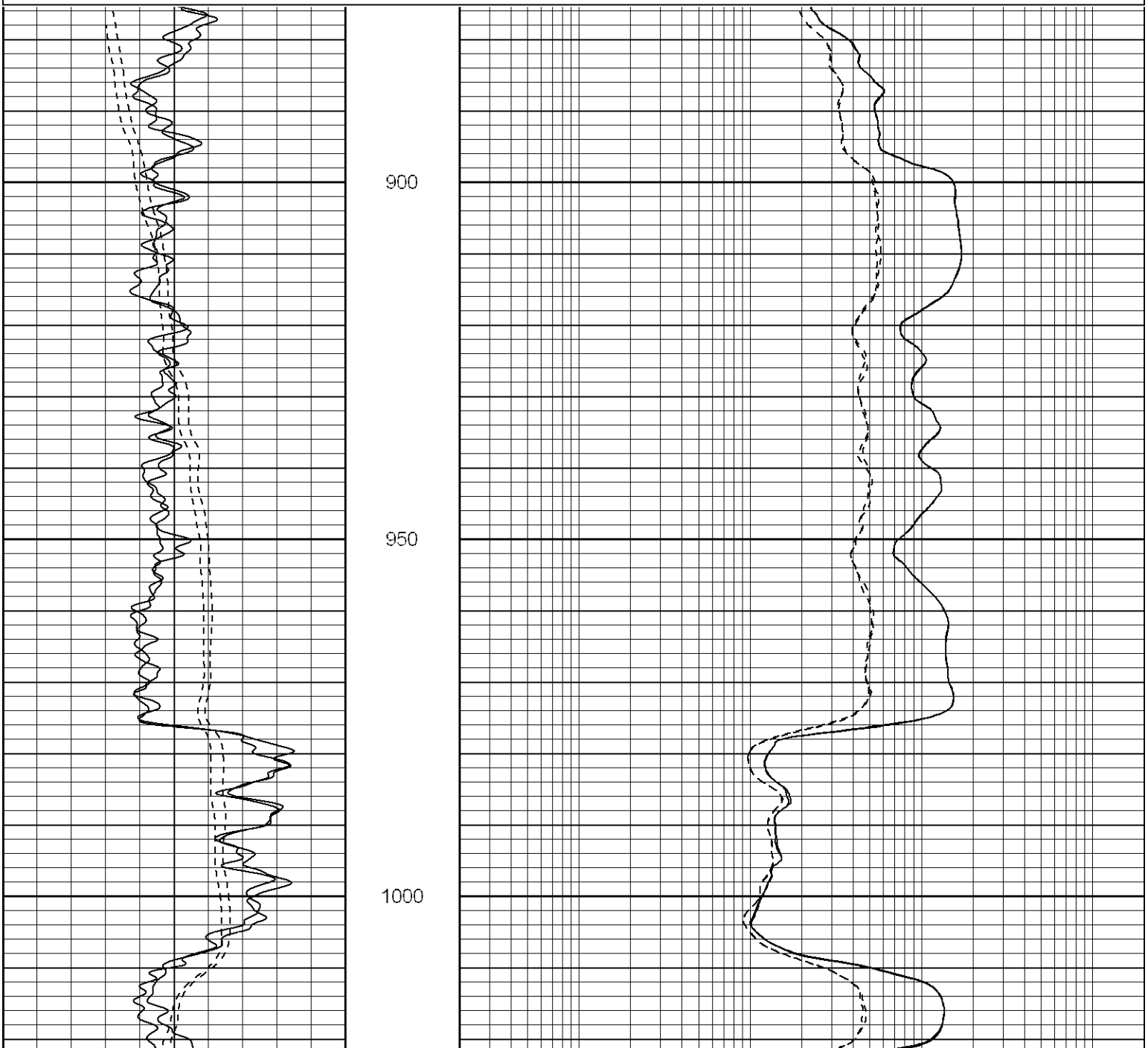
SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

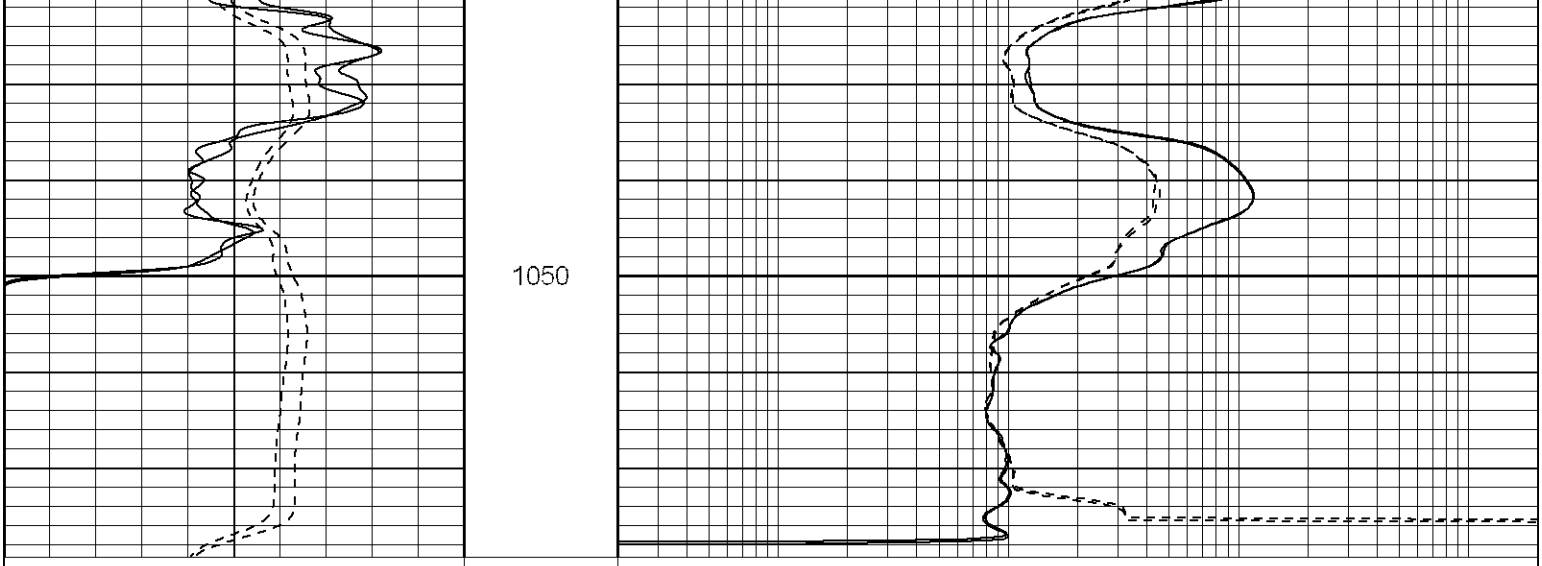
Repeat Pass

Database File:	poci55.db
Dataset Pathname:	pass1.1
Presentation Format:	iel
Dataset Creation:	Sun Feb 10 14:53:32 2008 by Calc Open-Cased 070814
Charted by:	Depth in Feet scaled 1:240

0	GR (GAPI)	200
-80	SP (mV)	120
0	GR-repeat (GAPI)	200
-80	SP-repeat (mV)	120

0.2	DIR (Ohm-m)	2000
0.2	SN (Ohm-m)	2000
0.2	DIR-repeat (Ohm-m)	2000
0.2	SN-repeat (Ohm-m)	2000





0	GR (GAPI)	200
-80	SP (mV)	120
0	GR-repeat (GAPI)	200
-80	SP-repeat (mV)	120

0.2	DIR (Ohm-m)	2000
0.2	SN (Ohm-m)	2000
0.2	DIR-repeat (Ohm-m)	2000
0.2	SN-repeat (Ohm-m)	2000

Calibration Report

Database File: poci55.db
Dataset Pathname: pass1
Dataset Creation: Sun Feb 10 12:51:37 2008 by Log Open-Cased 070814

Induction Tool Calibration Report

Serial Number:	040903
Tool Model:	Probe
Downhole Cal Performed:	Fri Feb 01 16:21:08 2008
Surface Cal Performed:	Fri Feb 01 12:36:59 2008

Surface Calibration:	Air	Loop	
Conductivity Reference:	0.000	500.000	mmho
Conductivity Reading:	-0.045	0.654	V
Internal Reference:	Zero	Cal	
Conductivity Reference:	0.000	500.000	mmho
Conductivity Reading:	0.012	0.653	V

Downhole Calibration:	Internal Zero	Internal Cal	
Conductivity Reference:	-1.440	499.433	mmho
Conductivity Reading:	-1.554	499.247	V
Short Normal Reference:	0.000	20.000	Ohm-m
Short Normal Reading:	0.007	0.214	V

Results:	Gain	Offset
Loop Conductivity:	715.585	32.201
Downhole Correction:	1.000	0.115
Short Normal Resistivity:	75.774	-4.000

Compensated Density Calibration Report

Serial-Model:	902-2.75POH
Source / Verifier:	/
Master Calibration Performed:	Thu Jan 31 13:50:50 2008

Master Calibration

	Density	Far Detector	Near Detector

Magnesium	1.710	g/cc	1164.05	575.44	cps
Aluminum	2.590	g/cc	207.67	288.30	cps

Spine Angle = 68.15 Density/Spine Ratio = 0.474

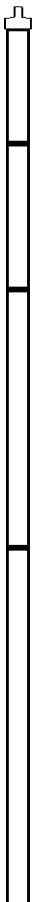
	Size		Reading	
Small Ring	8.35	in	2.15	V
Large Ring	17.00	in	4.64	V

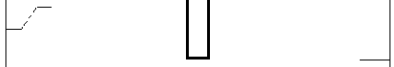
Neutron Calibration Report

Serial Number:	802	
Tool Model:	2.75POH	
Performed:	Fri Feb 01 09:47:24 2008	
Calibrator Value:	1	NAPI
Calibrator Reading:	1	cps
Sensitivity:	1	NAPI/cps

Gamma Ray Calibration Report

Serial Number:	801	
Tool Model:	2.75POH	
Performed:	Fri Feb 01 08:19:35 2008	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	0.8000	GAPI/cps

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
			None	0.75	1.50	5.00
GR	29.58		GR-2.75POH (801) Probe	3.73	2.75	43.00
NEU	24.04		NEU-2.75POH (802) Probe Epithermal	4.75	2.75	58.00
			CDL-2.75POH (902) Probe	8.43	2.75	106.00
LSD	16.21					
DCAL	15.94					
SSD	15.69					
DIC	6.24		IEL-Probe (040903)	13.46	2.75	93.00
SP	2.25					

SN	1.71					

Dataset:	poci55.db: field/well/run1/pass1
Total Length:	31.11 ft
Total Weight:	305.00 lb
O.D.	2.75 in

SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

GAMMA NEUTRON LOG

Company Petroglyph Operating Company Inc.
Well Poci 55 Monitor Well
Field Huerfano
County Las Animas State CO

Location: API # :
Water Well Permit Number 275819
851' FSL & 1773' FWL
SEC 3 TWP 29S RGE 67W

Other Services
SCBL

Permanent Datum Ground Level Elevation 6690'
Log Measured From Ground Level
Drilling Measured From Ground Level

Elevation
K.B. -------
D.F. -------
G.L. 6690'

Date	2/18/08		
Run Number	one		
Depth Driller	1079'		
Depth Logger	1070'		
Bottom Logged Interval	1066'		
Top Log Interval	Surf.		
Open Hole Size	11"		
Type Fluid	water		
Density / Viscosity	///		
Max. Recorded Temp.	///		
Estimated Cement Top	NA		
Time Well Ready	ROA		
Time Logger on Bottom	12:30		
Equipment Number	0703		
Location	Trinidad		
Recorded By	Worley		
Witnessed By	Mr. Melland	Mr. Valdez	

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	12.75"		00	39'
Prot. String				
Production String	5 1/2"		00	NA
Liner				

<<< Fold Here >>>

All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Go 3.5 miles from west edge of Walsenburg and turn left on Cnty, road 346. (by blue water tank) stay on main road to crossroads and go right. stay on main road (left @ Y) 3.4 miles to Deer Meadows Road, go left to location.

Neutron affectted by gas flow from 530' to surface.
Well flowing at time of log.

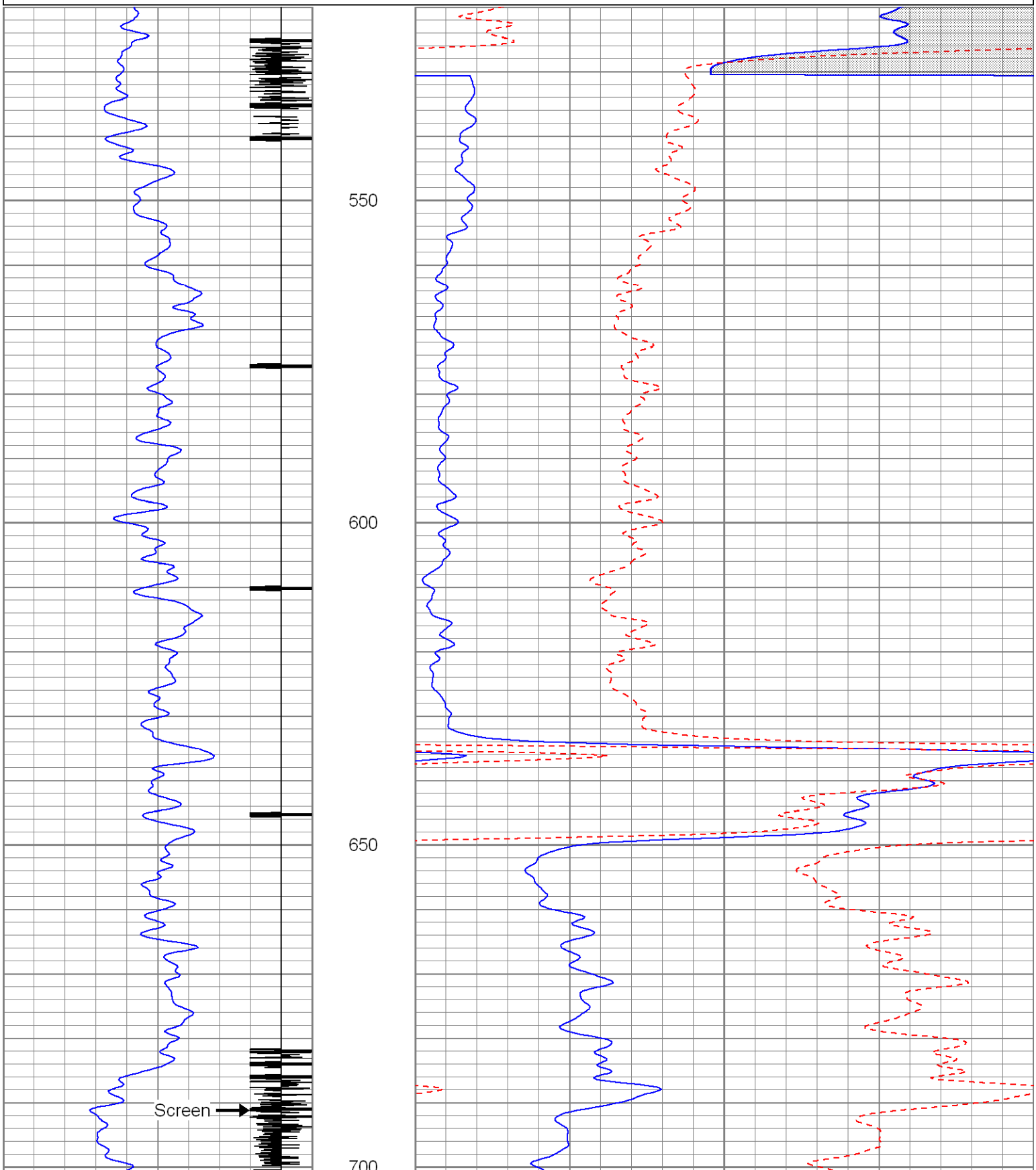
Main Pass

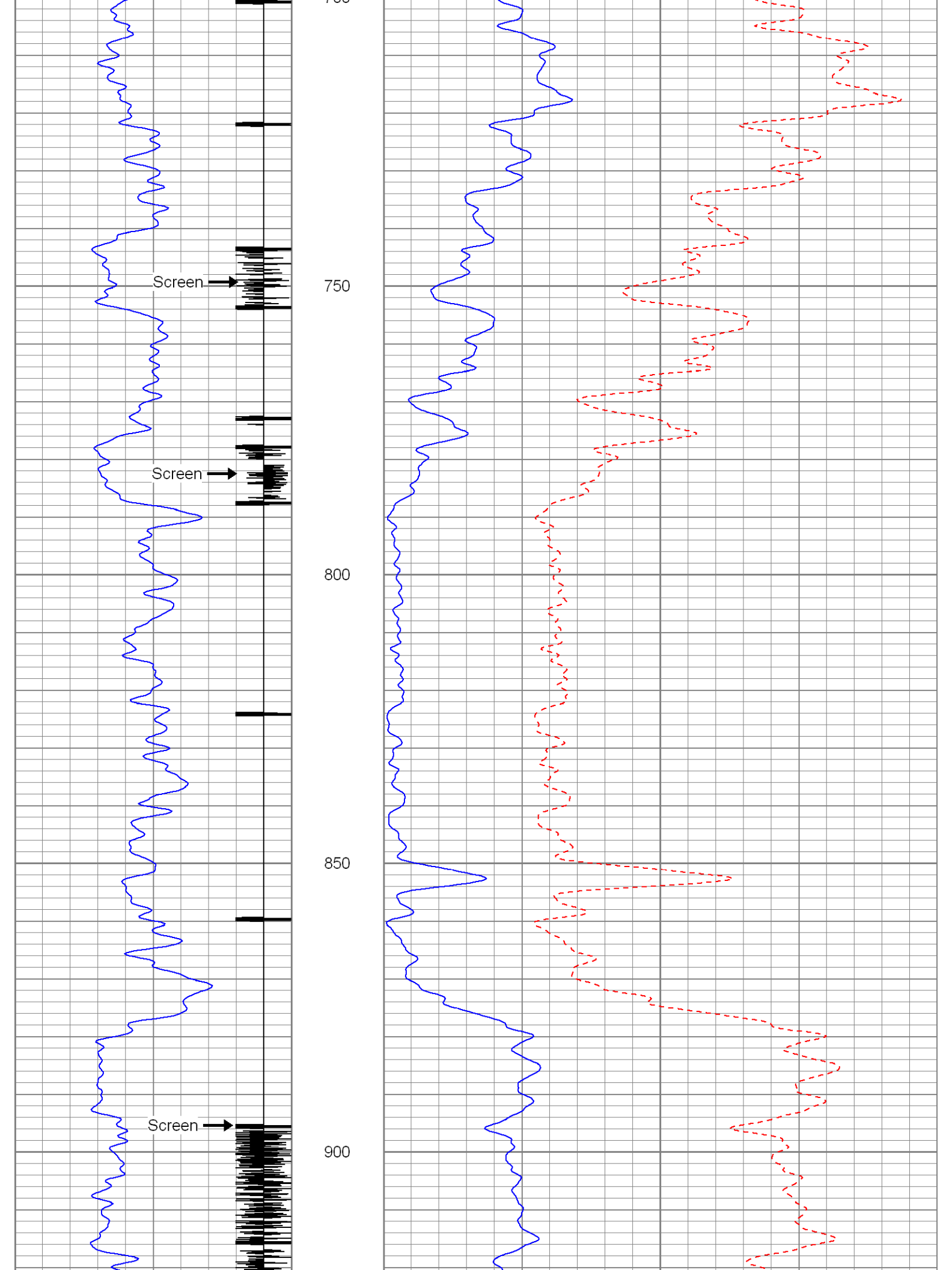
SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

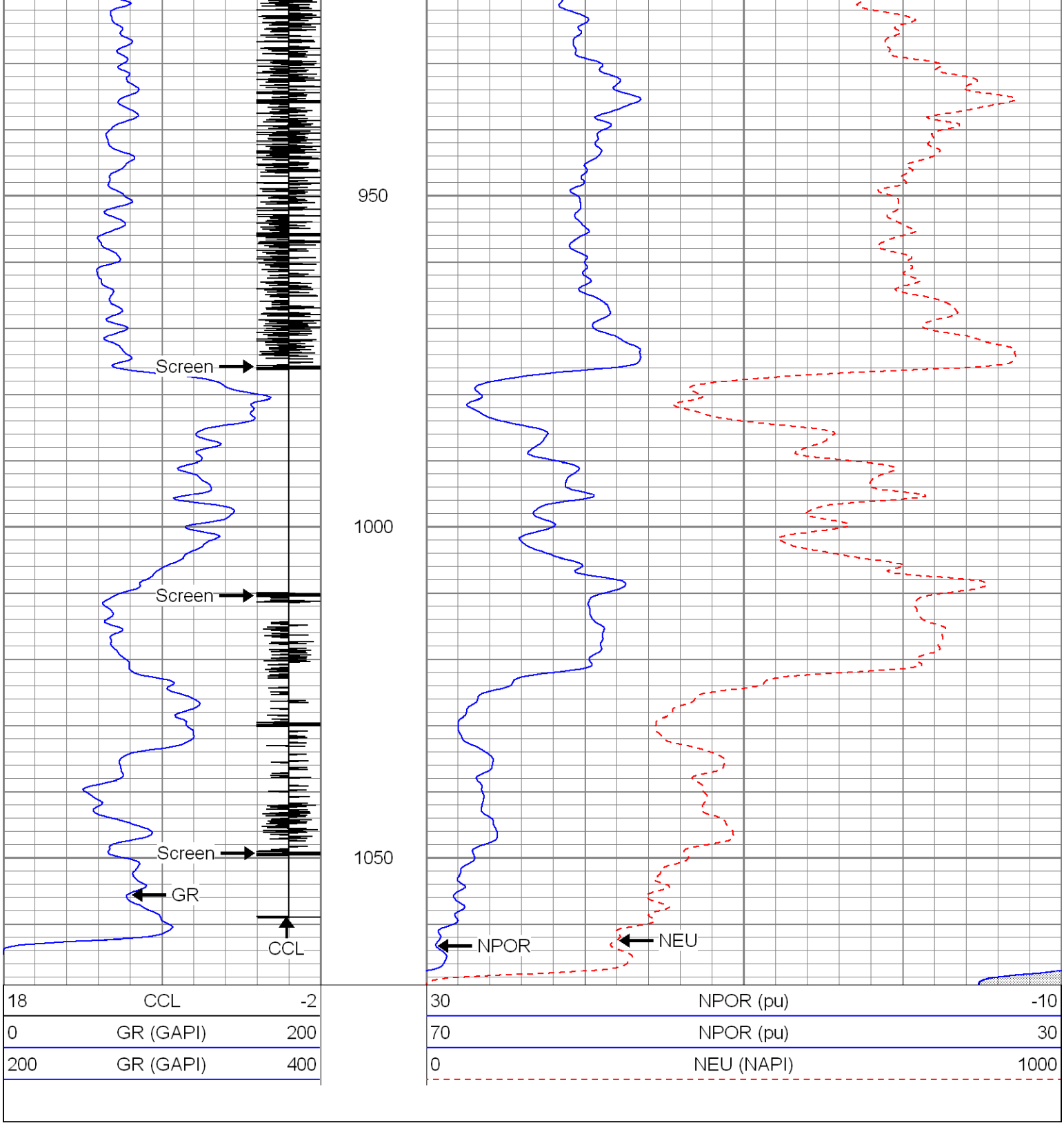
Database File:	poci55monitorwell21808.db
Dataset Pathname:	pass7.1
Presentation Format:	gr-n-ccl
Dataset Creation:	Mon Feb 18 15:56:11 2008 by Calc Open-Cased 071220
Charted by:	Depth in Feet scaled 1:240

18	CCL	-2
0	GR (GAPI)	200
200	GR (GAPI)	400

30	NPOR (pu)	-10
70	NPOR (pu)	30
0	NEU (NAPI)	1000




Screen
Screen
Screen
750
800
850
900



Calibration Report

Database File: poci55monitorwell21808.db
Dataset Pathname: pass7.1
Dataset Creation: Mon Feb 18 15:56:11 2008 by Calc Open-Cased 071220

Neutron Calibration Report

Serial Number:	Titan	
Tool Model:	T	
Performed:	Thu May 08 11:16:24 2003	
Calibrator Value:	1200	NAPI
Calibrator Reading:	1700	cps

Calibrator Reading:	1700	cps
Sensitivity:	1	NAPI/cps

Gamma Ray Calibration Report

Serial Number:	Slimhole	
Tool Model:	SH	
Performed:	Mon Feb 18 13:28:53 2008	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	1.2000	GAPI/cps

SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

SECTOR CEMENT BOND GAMMA RAY

Company Petroglyph Operating Company Inc.
Well Poci 55 Monitor Well
Field Huerfano
County Las Animas State CO

Location: API # :

Water Well Permit Number 275819
851' FSL & 1773' FWL

SEC 3 TWP 29S RGE 67W

Other Services
NEU

Permanent Datum	Ground Level	Elevation	6690'
Log Measured From	Ground Level		
Drilling Measured From	Ground Level		

Elevation
K.B. -------
D.F. -------
G.L. 6690'

Date	2/18/08		
Run Number	one		
Depth Driller	1079'		
Depth Logger	1070'		
Bottom Logged Interval	1066'		
Top Log Interval	450'		
Open Hole Size	11"		
Type Fluid	water		
Density / Viscosity	///		
Max. Recorded Temp.	///		
Estimated Cement Top	NA		
Time Well Ready	ROA		
Time Logger on Bottom	12:30		
Equipment Number	0703		
Location	Trinidad		
Recorded By	Worley		
Witnessed By	Mr. Melland	Mr. Valdez	

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	12.75"		00	39'
Prot. String				
Production String	5 1/2"		00	NA
Liner				

<<< Fold Here >>>

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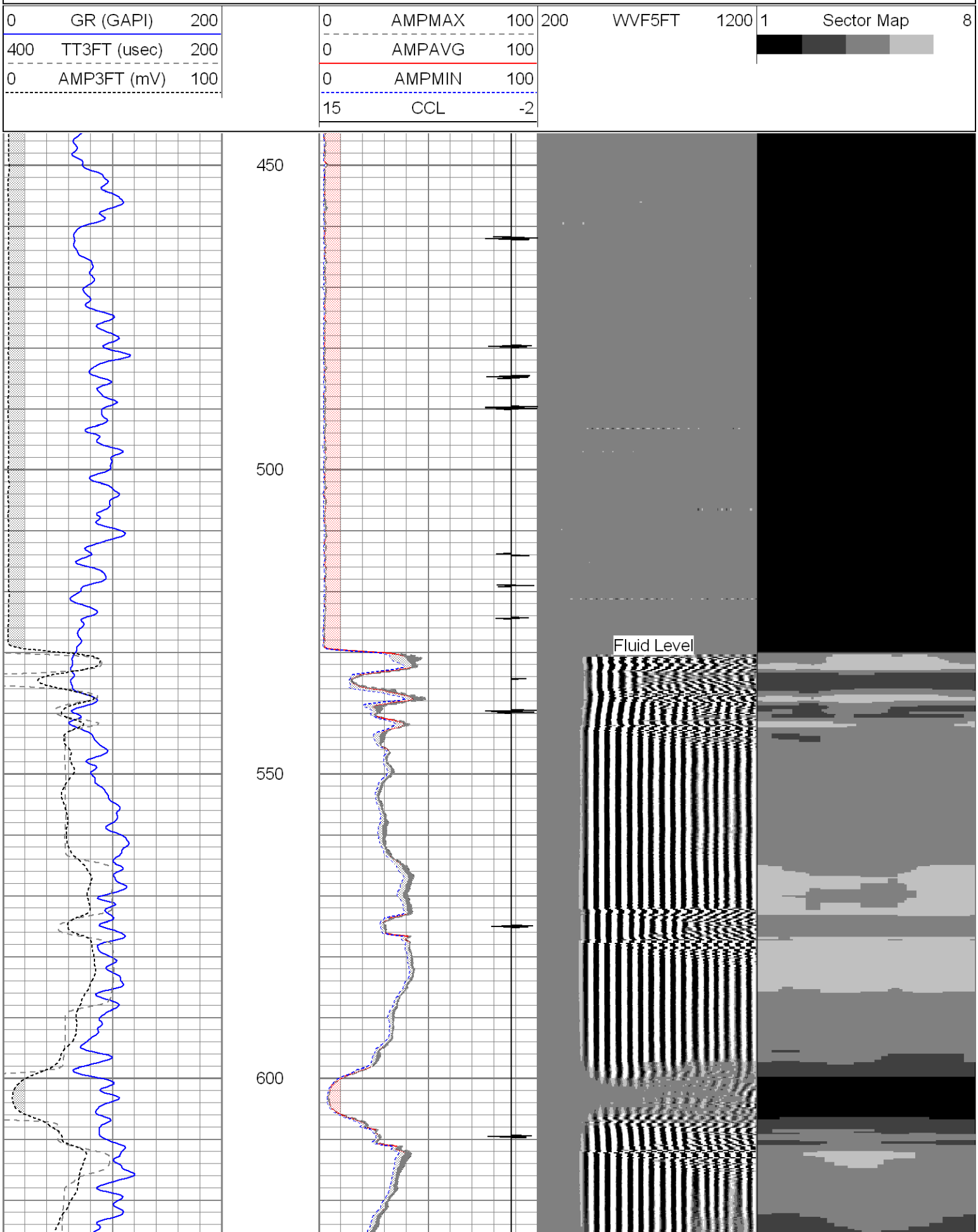
Comments

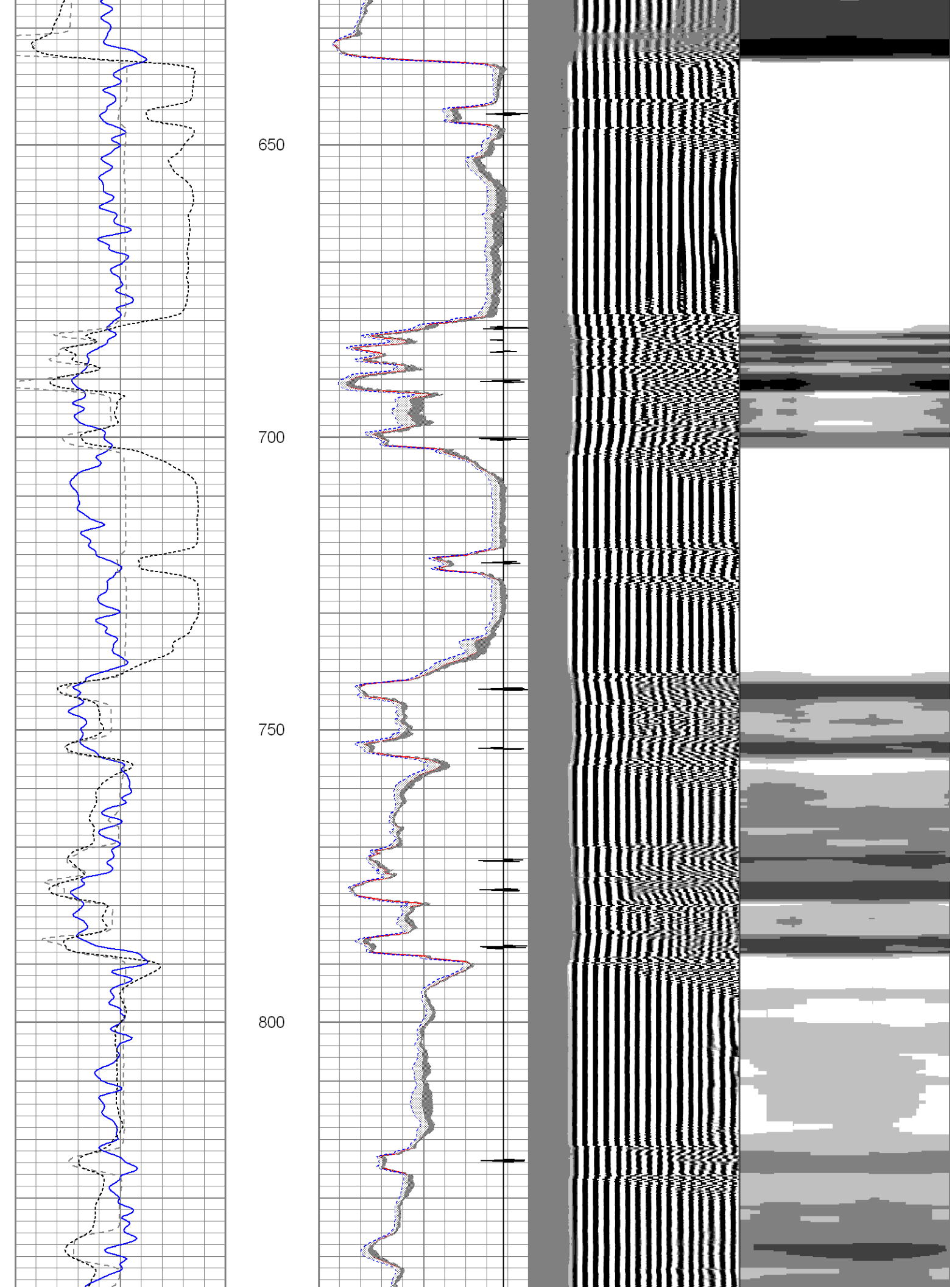
Go 3.5 miles from west edge of Walsenburg and turn left on Cnty, road 346. (by blue water tank) stay on main road to crossroads and go right. stay on main road (left @ Y) 3.4 miles to Deer Meadows Road, go left to location.

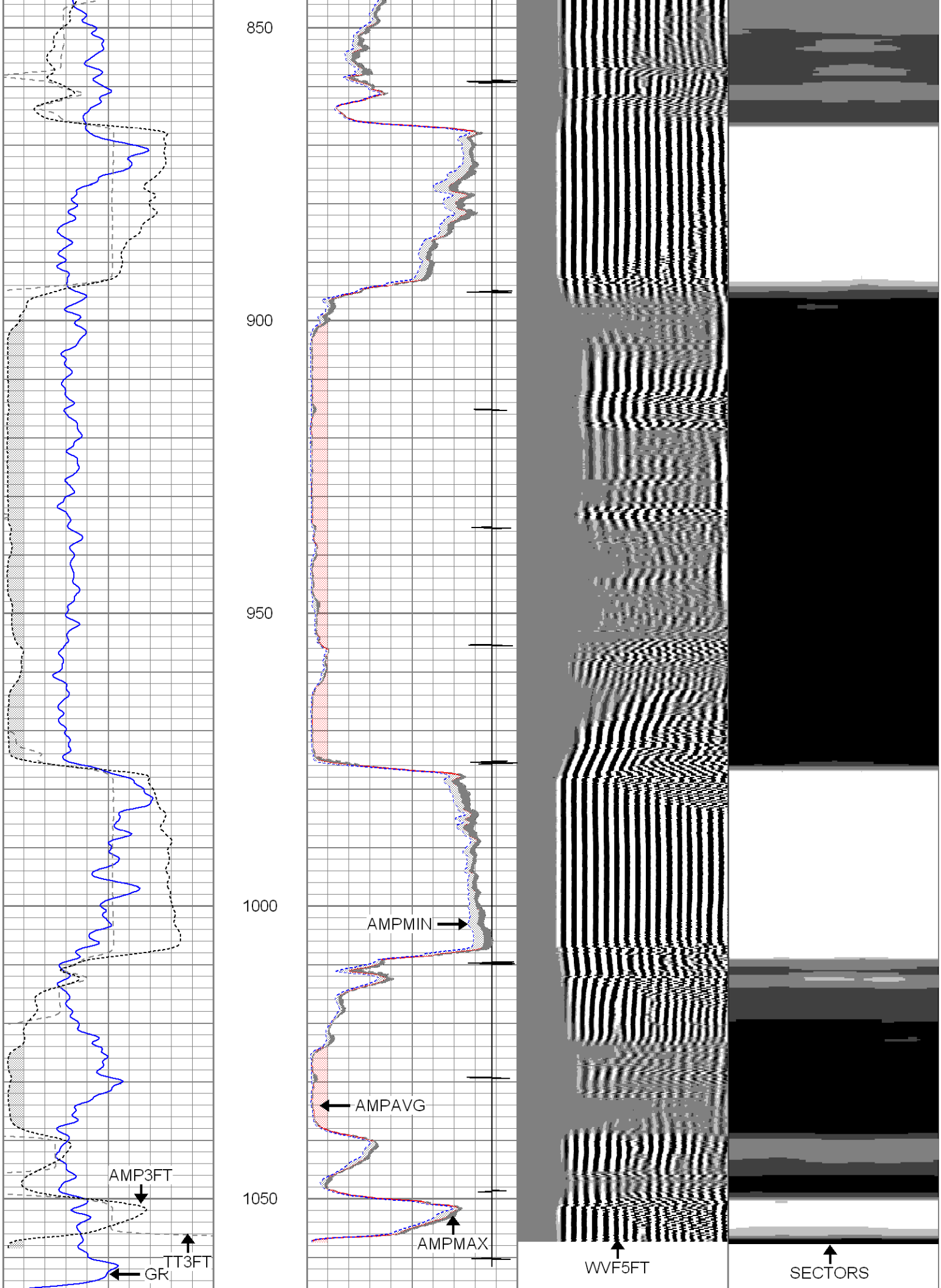
Main Pass

SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

Database File:	poci55monitorwell21808.db
Dataset Pathname:	pass5
Presentation Format:	sector
Dataset Creation:	Mon Feb 18 12:57:54 2008 by Log Open-Cased 071220
Charted by:	Depth in Feet scaled 1:240




650
700
750
800


850
900
950
1000
1050
AMPMIN
AMPAVG
AMPMAX
AMP3FT
TT3FT
GR
WVF5FT
SECTORS

0	GR (GAPI)	200	0	AMPMAX	100	200	WVF5FT	1200	1 Sector Map 8
400	TT3FT (usec)	200	0	AMPAVG	100				
0	AMP3FT (mV)	100	0	AMPMIN	100				
			15	CCL	-2				

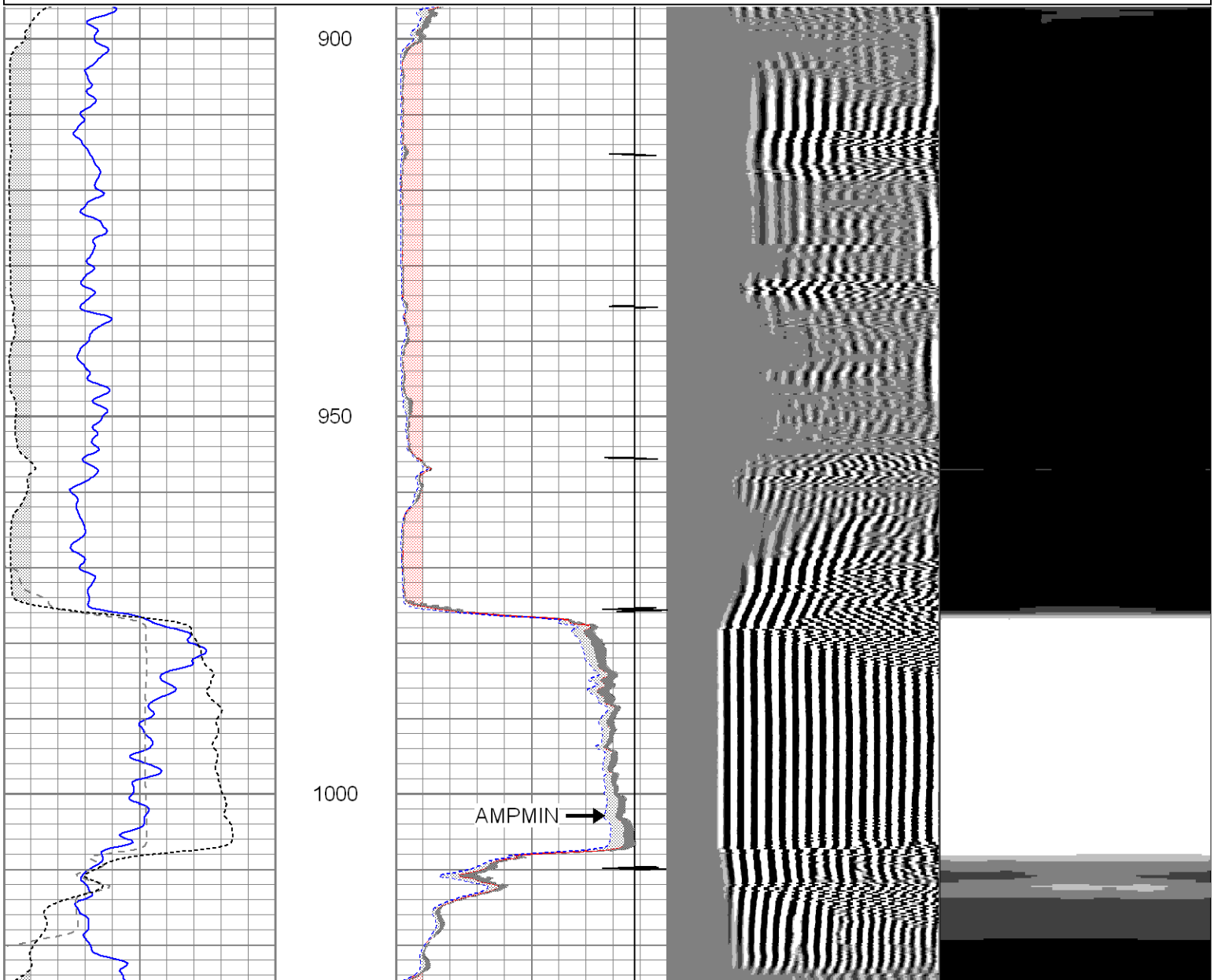
SUPERIOR WELL SERVICES

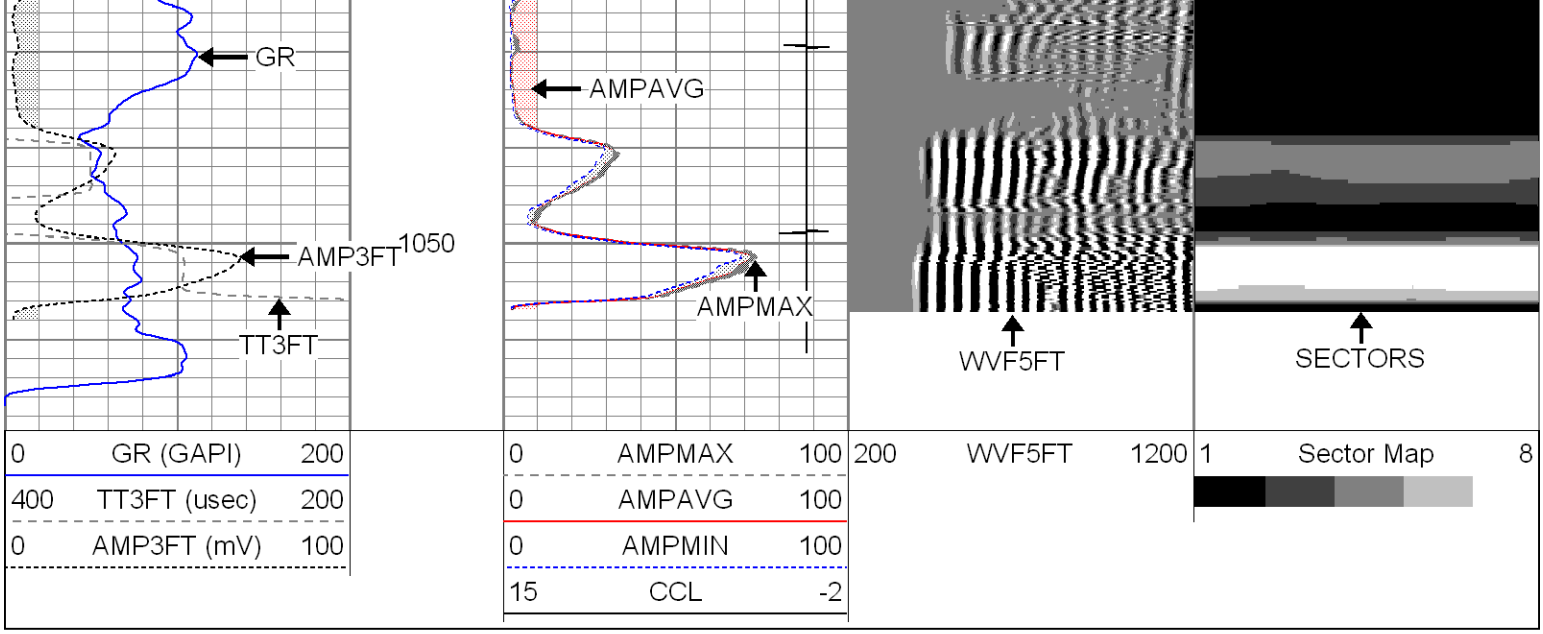
SUPERIOR
Black Lick, Pa.
Mercer, Pa.
Wooster, Oh.
Cleveland, Ok.
Trinidad, Co.

Repeat Section

Database File: poci55monitorwell21808.db
Dataset Pathname: pass4
Presentation Format: sector
Dataset Creation: Mon Feb 18 12:50:52 2008 by Log Open-Cased 071220
Charted by: Depth in Feet scaled 1:240

0	GR (GAPI)	200	0	AMPMAX	100	200	WVF5FT	1200	1 Sector Map 8
400	TT3FT (usec)	200	0	AMPAVG	100				
0	AMP3FT (mV)	100	0	AMPMIN	100				
			15	CCL	-2				





Calibration Report

Database File: poci55monitorwell21808.db
Dataset Pathname: pass4
Dataset Creation: Mon Feb 18 12:50:52 2008 by Log Open-Cased 071220

Gamma Ray Calibration Report

Serial Number:	Slimhole	
Tool Model:	SH	
Performed:	Fri Feb 15 11:43:05 2008	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	cps
Calibrator Reading:	1.0	cps
Sensitivity:	0.3500	GAPI/cps

Segmented Cement Bond Log Calibration Report

Serial Number:	0001	
Tool Model:	ProbeRadII	
Calibration Casing Diameter:	5.500	in
Calibration Depth:	669.827	ft

Master Calibration, performed Mon Feb 18 12:25:07 2008:

	Raw (v)		Calibrated (mv)		Results	
	Zero	Cal	Zero	Cal	Gain	Offset
3'	-0.050	1.508	0.000	85.000	54.567	2.728
CAL	-0.005	1.409				
5'	-0.040	1.569	0.000	85.000	52.840	2.114
SUM						
S1	-0.050	1.405	0.000	85.000	58.410	2.920
S2	-0.050	1.414	0.000	85.000	58.056	2.903
S3	-0.050	1.488	0.000	85.000	55.268	2.763
S4	-0.050	1.553	0.000	85.000	53.030	2.651
S5	-0.050	1.618	0.000	85.000	50.956	2.548
S6	-0.050	1.615	0.000	85.000	51.063	2.553
S7	-0.050	1.567	0.000	85.000	52.581	2.629
S8	-0.050	1.484	0.000	85.000	55.407	2.770

APPENDIX C

Layne Christensen Company Testing Report

Petroglyph Energy, Inc.

555 S. COLE RD.
BOISE, ID 83709
(208) 377-6000

Wellwork Chronological Report

Well Name : POCI 55 MONITOR WELL					
Prospect:				AFE #:	42567
Sec/Twp/Rge:	3 / 29S / 67W			AFE Total:	$210,465
API #:	275819	Field:	RATON	This AFE Cost:	$253,638
Work Type:	Completion	County , St.:	HUERFANO, CO	Tot Assoc AFE's:	$253,638
Operator:	PH OPERATING COM	Supervisor:		Phone:	
Production Current/Expected	Oil: 0 / 0	Gas: 0 / 0		Water: 0 / 0	

Wellwork Details

Date :	2/20/2008	Days:	1	DC :	$0	CCC:	$0	CWC:	$253,638
Activity:	Test			Rig Name:	Layne Christensen Rig # 405				

Daily Report Summary :

Daily Report Detail:

Rig crew and hydrologist Konrad Quast on location at 7:00.

GIH with submersible pump with shroud, inflatable packer, 2 pressure transducers and 2 7/8" tubing. Set packer at 992' and inflate to 330 psig. Gages at 984'.

Conduct pump rate test and set pump rate at 5 gpm. Released rig crew at 21:00.

Konrad conducted pump test starting at 23:50. IBHP was 217 psig. Pumped for 4.5 hrs bring pressure down to FBHP of 17 psig. Pumped 1378 gallons of water. No gas flow visible. No gas detected with RKI GX2003 gas monitor.Shut pump down for pressure build up. Pumped 1378 gallons of water.

Date :	2/21/2008	Days:	2	DC :	$0	CCC:	$0	CWC:	$253,638
Activity:	Test			Rig Name:	Layne Christensen Rig # 405				

Daily Report Summary :

Daily Report Detail:

Pressure build up until 12:00. FBHP was 178 psig but was still increasing at a very slow rate. Decided to stop build up.

13:00 Pump 387 gallons of water and then grab sample for analysis.

14:00 Rig crew on location and start to POOH. Released packer and pressure went to 230 psig.

17:00 BH test assembly on bank. Add pressure trandducer and packer to test assembly. Packers spaced 145 ft center of packer to center of packer. GIH with test assembly and one jt of tubing. SDFN at 20:00

Pressure summary: Tested screened zone 1010' to 1049 ft. Gages at 984'. IBHP 217 psig. Pumped 1378 gallons in 4.5 hrs. BHP when pump stopped 17 psig. Pressure build up for 7.5 hrs. with FBHP at 178 psig and climbling very slowly.
Pressure above packer was constant 243 psig during testing.

Date :	2/22/2008	Days:	3	DC :	$0	CCC:	$0	CWC:	$253,638
Activity:	Test			Rig Name:	Layne Christensen Rig # 405				

Daily Report Summary :

Daily Report Detail:

7:00 GIH with downhole test assembly. Set packers at 849' and 995'. Mid and top gages at 845'.
9:30 Start pump and fill tubing with water.
10:30 Inflate packers, lower packer to 340 psig, top packer to 260 psig. BHP before and after inflation 156 psig.
11:15 Perform pump rate test: 4.7 gpm for 5 min.; 7.8 gpm for 8 min; 10 gpm for 11 min. at this time saw 2" WC differential of gas flow; 14.5 gpm for 8 min. Pumped total of 318 gallons. Stopped pump at 11:50 for pressure to recover.
17:00 Start pump test. Pump rate 14.5 to 13.5 gpm. Slight gas spike at start. No gas flow during most of pumping. IBHP 156 psig pump down and maintainged 140 psig during pump test.
3:05 (2/23/05) Shut pump off. Thought it was starved for fluid but wasn't. Keep shut down for recovery.

Well Name : POCI 55 MONITOR WELL					
Prospect:				AFE #:	42567
Sec/Twp/Rge:	3 / 29S / 67W			AFE Total:	$210,465
API #:	275819	Field:	RATON	This AFE Cost:	$253,638
Work Type:	Completion	County , St.:	HUERFANO, CO	Tot Assoc AFE's:	$253,638
Operator:	PH OPERATING COM	Supervisor:		Phone:	
Production Current/Expected	Oil: 0 / 0	Gas: 0 / 0		Water: 0 / 0	

Date :	2/23/2008	Days:	4	DC :	$0	CCC:	$0	CWC:	$253,638
Activity:	Test			Rig Name:	Layne Christensen Rig # 405				
Daily Report Summary :									
Daily Report Detail:	7:00 Interval between 896 and 976 building up until 12:20. FBHP 156. 12:20 Start pump to test same interval again. Pump 14.5 to 13.5 gpm, IBHP 156 psig. Pump for 12 hrs, 10,550 gallons. 00:20 (2/24/08) /shut pump down and let pressure build up until 11:00 (2/24/08) .								
Date :	2/24/2008	Days:	5	DC :	$0	CCC:	$0	CWC:	$253,638
Activity:	Test			Rig Name:	Layne Christensen Rig # 405				
Daily Report Summary :									
Daily Report Detail:	7:00 pressure build up in 896' to 976' interval. 11:00 Stop build up. FBHP 154 psig. Deflate packers. LD 6 joints tubing. Set packers at 662' and 808'. Upper packer inflated to 175 psig, lower packer inflated to 240 psig. Mid and upper gages at 658'. Perform pump rate test 17.5 gpm 15:50 Start pump test IBHP 61.5 psig. Pressure stabilizing at 17 psig during pumping. 19:00 Shut pump down. Start pressure build up period.								
Date :	2/25/2008	Days:	6	DC :	$0	CCC:	$0	CWC:	$253,638
Activity:	Test			Rig Name:	Layne Christensen Rig # 405				
Daily Report Summary :									
Daily Report Detail:	8:50 Stop pressure build up. Deflate packers. LD 6 jts. PU 12' pup. Set top packer at 518' and lower packer at 652', isolating 527' to 542' screened section. . Mid and top gage at 5 14' . Lower packer inflated to 170 psig, upper packer inflated to 110 psig. Pressure started increasing immediately from 7 to 28 psig. indicating gas pressure building up. Started pump but would not pump water. Release upper packer and install tubing head on top of well to pack off annulus and allow annular gas flow measurement at surface. Started pump but would not pump. Released lower packer and added 3 jts tubing to increase head on pump. Start pump but would not pump water. Decided to conclude well testing. Start POOH with test equipment.								
Date :	2/26/2008	Days:	7	DC :	$0	CCC:	$0	CWC:	$253,638
Activity:	Test			Rig Name:	Layne Christensen Rig # 405				
Daily Report Summary :									
Daily Report Detail:	POOH and LD test equipment. RDMO Layne Christensen Rig 405. Layne Christensen ran camera survey.								

Casing

DateIn	Setting Depth	Jts Run	Type	Size	Weight	Grade	MINID	HoleDiam	TD
2/11/2008	1074.81	48	5. Production	5.5	17	LS	0	11	1080

APPENDIX D

Testing Flow Rates and Notes

Aquifer Test Interval 1

Date	Time	Flow Rate In (gpm)	Flow Rate Out (gpm)	Total Gallons In	Total Gallons Out	UP presssure (psi)	LP Pressure (psi)	Comments
2/20/08	14:15			0	0	330		Inflate Packer
2/20/08	16:39							Pump On
2/20/08	16:48							Pump Off. Need to switch pump leads.
2/20/08	16:50							Pump On
2/20/08	16:55							Pump off after filling tsting tubing to surface.
2/20/08	17:06	5.8						Pump On
2/20/08	17:17	12.5						Increased flow rate
2/20/08	17:19	10.4						Decreased flow rate
2/20/08	17:22	10.2		140				
2/20/08	17:25							Pump off and alllow zone to recover.
2/20/08	20:15	10.5						Pump on for extended test.
2/20/08	20:18	9.4						
2/20/08	20:21	9.1		67				
2/20/08	20:24	9.0		88				
2/20/08	20:27	3.3						Decreased flow rate; too much drawdown.
2/20/08	20:29	4.3						Set to 6 gpm for final extended test
2/20/08	20:54							Pump off and alllow zone to recover.
2/20/08	23:51	5.9		276				Pump on for extended test. Flow Total Started at 276
2/20/08	23:53	5.9		285				
2/20/08	20:57	5.8		310				
2/21/08	0:02	5.6		341				
2/21/08	0:04	5.6		350				
2/21/08	0:07	5.6		366				No gas recorded on Barton from separator
2/21/08	0:15	5.5		411		330		
2/21/08	0:30	5.4	5.7	493	160			Flow out of separator now recording.
2/21/08	1:00	5.2	5.6	652	326			
2/21/08	1:15	5.1	5.5	732	412			
2/21/08	1:30	5.1	5.3	810	492			Barton reading zero from separator. RKI casing above packer CH_4 = 100% vol
2/21/08	1:54	5.1	5.1	931	618			
2/21/08	3:03	4.9	5.3	1277	980			RKI on casing above packer CH_4 = 100% volume
2/21/08	4:00	4.8	5.0	1558	1278			RKI on casing above packer CH_4 = 100% volume
2/21/08	4:20	5.1		1378		330		Pump Off
2/21/08	12:30	2.4		0		330		Pump on to purge and collect WQ sample
2/21/08	13:00							Collected WQ sample
2/21/08	13:30	2.4		387				Pump Off. Total Gallons Pumped = 1,765
2/21/08	13:51					330		Defalte packer

Aquifer Test Interval 2

Date	Time	Flow Rate In (gpm)	Flow Rate Out (gpm)	Total Gallons In	Total Gallons Out	UP presssure (psi)	LP Pressure (psi)	Comments
2/22/08	10:01			0	0			Pump on to fill test tubing to surface.
2/22/08	10:08							Pump off to fix stuck valve.
2/22/08	10:10							Pump on to fill test tubing to surface.
2/22/08	10:11	15.0						Water to surface; Pump off
2/22/08	10:33						280	Inflate Lower Packer Partially. Out of nitrogen. Switch bottles.
2/22/08	10:41						340	Finish Inflating Lower Packer
2/22/08	10:46					260		Inflate Upper Packer
2/22/08	10:50					270	340	Packers holding pressure
2/22/08	11:16	4.6		0	0			Pump on for rate test
2/22/08	11:19	4.7						
2/22/08	11:21	4.7		21				
2/22/08	11:22	7.8						
2/22/08	11:26	7.7		57				
2/22/08	11:30	7.8		88				
2/22/08	11:31	10.5		107				Barton recording ~2-3 mcf/day
2/22/08	11:37	10.5		166				
2/22/08	11:41	15.0		219				Increased flow rate
2/22/08	11:48	14.5		308				Valve is fully open. Will pump at maximum.
2/22/08	11:49			318				Pump Off. Barton recorder back to zero.
2/22/08	11:50					270	340	Allow zone to recover before starting extended test.
2/22/08	16:55					270	340	Packers holding pressure
2/22/08	16:59	16.0		12				Pump on for extended test
2/22/08	17:01	15.3		29				
2/22/08	17:05	14.5		91				Barton recording ~2-3 mcf/day
2/22/08	17:08	14.3		138				
2/22/08	17:13	14.3		154				
2/22/08	17:15	14.3	16.6	180	45			
2/22/08	17:19	14.1	16.3	235	105			Barton recording zero gas flow. RKI reading ambient air on separator vent.
2/22/08	17:25	13.5	16.3	320	197			Barton recording zero gas flow. RKI reading ambient air on separator vent.
2/22/08	18:00	13.9	16.6	796	820			
2/22/08	18:30	13.3	13.9	1190	1263	270	340	Packers holding pressure
2/22/08	18:43	13.8	13.2	1375	1440			Barton recording zero gas flow. RKI reading trace CH_4 and CO on separator vent.
2/22/08	19:00	13.8	13.6	1600	1658			RKI reading trace CH_4 and CO on separator vent.
2/22/08	19:05							Collected WQ parameters. Barton recording zero gas flow.
2/22/08	21:00	13.7	14.2	3252	3318			Barton recording zero gas flow. RKI reading trace CH_4 and CO on separator vent.
2/22/08	22:00	13.5	13.8	4102	4181			
2/22/08	23:00	13.4	13.6	4920	5018			
2/23/08	0:00	13.5	13.8	5730	5838			
2/23/08	1:00	13.3	13.7	6535	6652			
2/23/08	3:00			6749	8322			
2/23/08	3:05			6749	8504			Pump off due to tenical problem. Allow zone to recover.
2/23/08	12:21					270	340	Pump on for second extended test; full open. Packers holding pressure. Flow meter on inlet not working. Barton recording ~2-3 mcf/day. RKI measuring trace CH_4, H_2S and CO
2/23/08	12:30							Collect WQ parameters.
2/23/08	12:40		14.3		130			Barton recording zero gas flow.
2/23/08	13:20		15.5		772			Bucket test 5 gal in 18 sec = 16.7 gpm.
2/23/08	13:21							Second bucket test 5 gal in 18 sec = 16.7 gpm.
2/23/08	13:24	15.9		8				Inlet fow meter working again.
2/23/08	13:26	15.8	13.8	39	860			
2/23/08	14:09	13.5	14.1	476	1415			Barton recording zero gas flow. RKI measuring trace CH_4, H_2S and CO on separator vent and in casing above upper packer registering CH_4 = 87% vol. and H_2S = 4.5 ppm
2/23/08	15:00	13.9	15.0	1159	2148	270	340	Packers holding pressure. Barton recording zero gas flow. RKI measuring trace CH4, H2S and CO on separator vent.
2/23/08	15:10							Collected WQ parameters.
2/23/08	18:00	14.6	14.6	3828	4835	270	340	RKI measuring trace CH4, H2S and CO on separator vent.
2/23/08	18:05							Collected WQ parameters. Barton recodring zero gas flow.
2/23/08	19:00	12.3	14.5	4642	5727			RKI measuring trace CH4, H2S and CO on separator vent.
2/23/08	19:05							Collected WQ parameters.
2/23/08	20:00	12.8	14.5	5382	6596			RKI measuring trace CH4, H2S and CO on separator vent.
2/23/08	20:05					270	340	Collected WQ parameters. RKI on casing above packer CH_4 = 100% volume.
2/23/08	22:00	14.6	14.6	7082	8357			Barton recording zero gas flow. RKI measuring trace CH4, H2S and CO on separator vent.
2/23/08	22:05							Collected WQ parameters.
2/24/08	0:00							Collected water quality parameters and sample 'MMW (849-995)'
2/24/08	0:05	16.5	14.4	9021	10187	270	340	Barton recording zero gas flow. RKI measuring trace CH4, H2S and CO on separator vent.
2/24/08	0:21			9286	10549			Pump Off
2/24/08	11:00					270	340	Pressure recovered to 154 psi; good recovery.
2/24/08	11:02							Deflate upper packer
2/24/08	11:10							Deflate lower packer
2/24/08	11:20							Pull out six tubing joints

Aquifer Test Interval 3

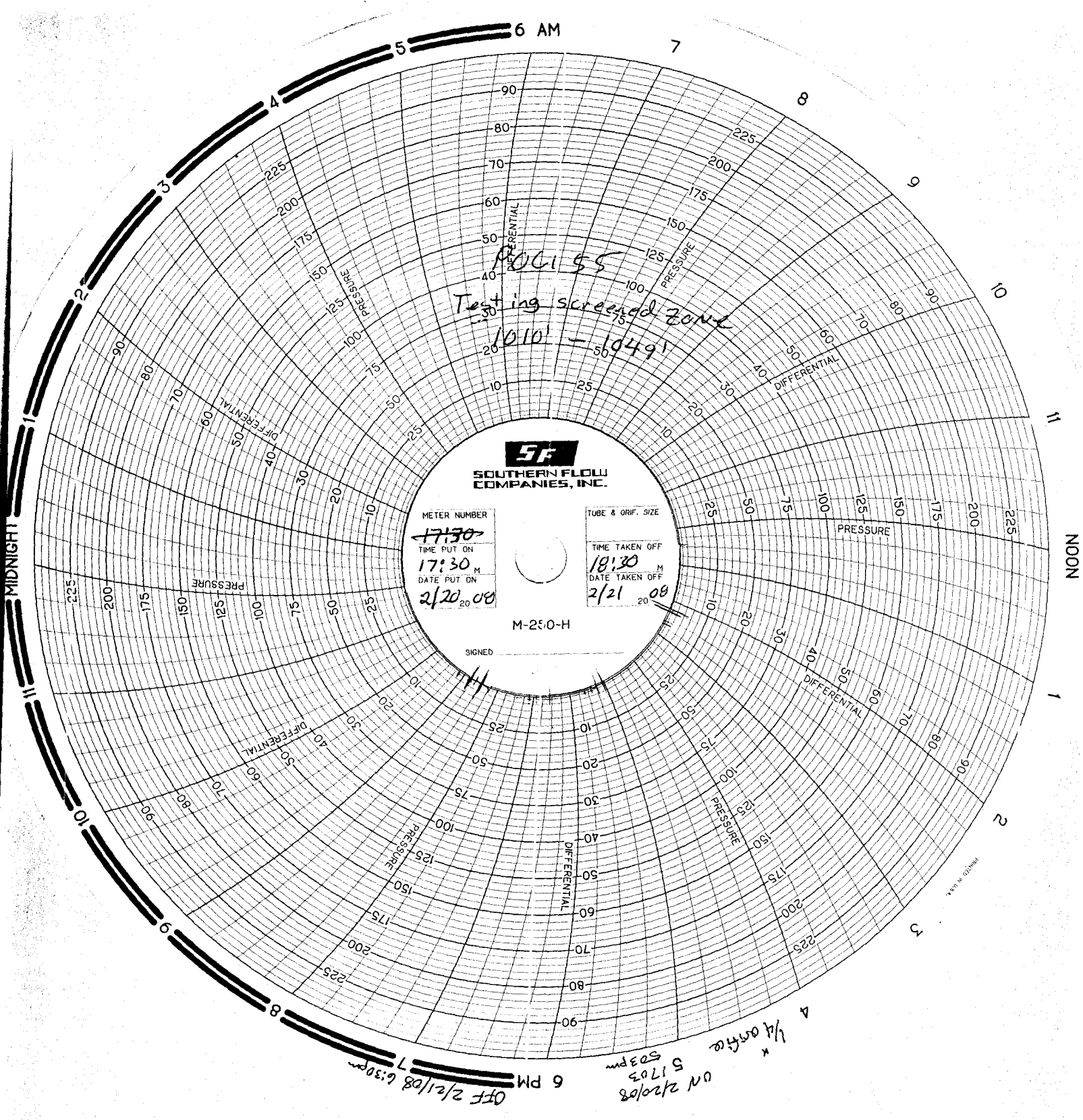
Date	Time	Flow Rate In (gpm)	Flow Rate Out (gpm)	Total Gallons In	Total Gallons Out	UP presssure (psi)	LP Pressure (psi)	Comments
2/24/08	12:07						240	Inflate Lower Packer
2/24/08	12:15					170		Inflate Upper Packer
2/24/08	12:26					175	240	Packers holding pressure
2/24/08	12:36			0	0			Pump on for rate test
2/24/08	12:37	5.7						
2/24/08	12:39	5.6		11				
2/24/08	12:42	5.7		28				
2/24/08	12:45	5.8		47				
2/24/08	12:49	9.7		85				
2/24/08	12:51	9.6		104				
2/24/08	12:53	9.6		118				
2/24/08	12:55	13.0		152				Increase rate as drawdown levels off.
2/24/08	12:58	13.5		190				Pressure leveling off at 25.5 psi.
2/24/08	13:00	17.0		N/A				Increase rate as drawdown levels off.
2/24/08	13:02	17.0		250				
2/24/08	13:04	17.2		284				
2/24/08	13:07	17.9		340				
2/24/08	13:10	17.2		394				Barton recording zero gas flow.
2/24/08	13:14	17.3		460				Well is recovering; opened valve full open; ~9.5 psi of head left.
2/24/08	13:20	15.0						
2/24/08	13:25	17.0						
2/24/08	13:32	15.0						Reduce flow; pressure only 6 psi and dropping.
2/24/08	13:34	14.9		798				
2/24/08	13:38	15.2		860				Barton recording zero gas flow. RKI gas meeter reading ambient air.
2/24/08	13:42	15.5						Open valve to increase flow rate. No increase.
2/24/08	13:48	15.6						
2/24/08	13:54	15.4		1103		175	240	RKI on casing above upper packer reading CH_4 = 100% vol
2/24/08	14:07			1315				Pump Off. Allow zone to recover for extended test.
2/24/08	15:51	17.5		0	1097			Pump on for extended test. Flow meter on separator outlet not zeroed.
2/24/08	15:57	17.2		110				
2/24/08	16:18	17.4		478		170	240	Packers holding pressure.
2/24/08	16:59	17.6	15.4	1195	1952			Barton recording zero gas flow. RKI gas meeter reading ambient air.
2/24/08	17:27	17.3						
2/24/08	17:57							Barton recording zero gas flow. RKI gas meeter reading CH_4 = 20% LEL.
2/24/08	18:00							Collect WQ parameters.
2/24/08	18:36	17.7		2928				
2/24/08	18:37		14.4		3357			
2/24/08	18:45							Collect WQ parameters and sample 'MMW (687-788)'
2/24/08	19:00							Pump Off. Test ended due to well recovering at maximunm pumping rate..
2/24/08	19:20			3336	3724			
2/25/08	8:51					170		Deflate Upper Packer.
2/25/08	9:01						240	Deflate Lower Packer.
2/25/08	9:25							Pull out six tubing joints and add 12 feet of pup joints

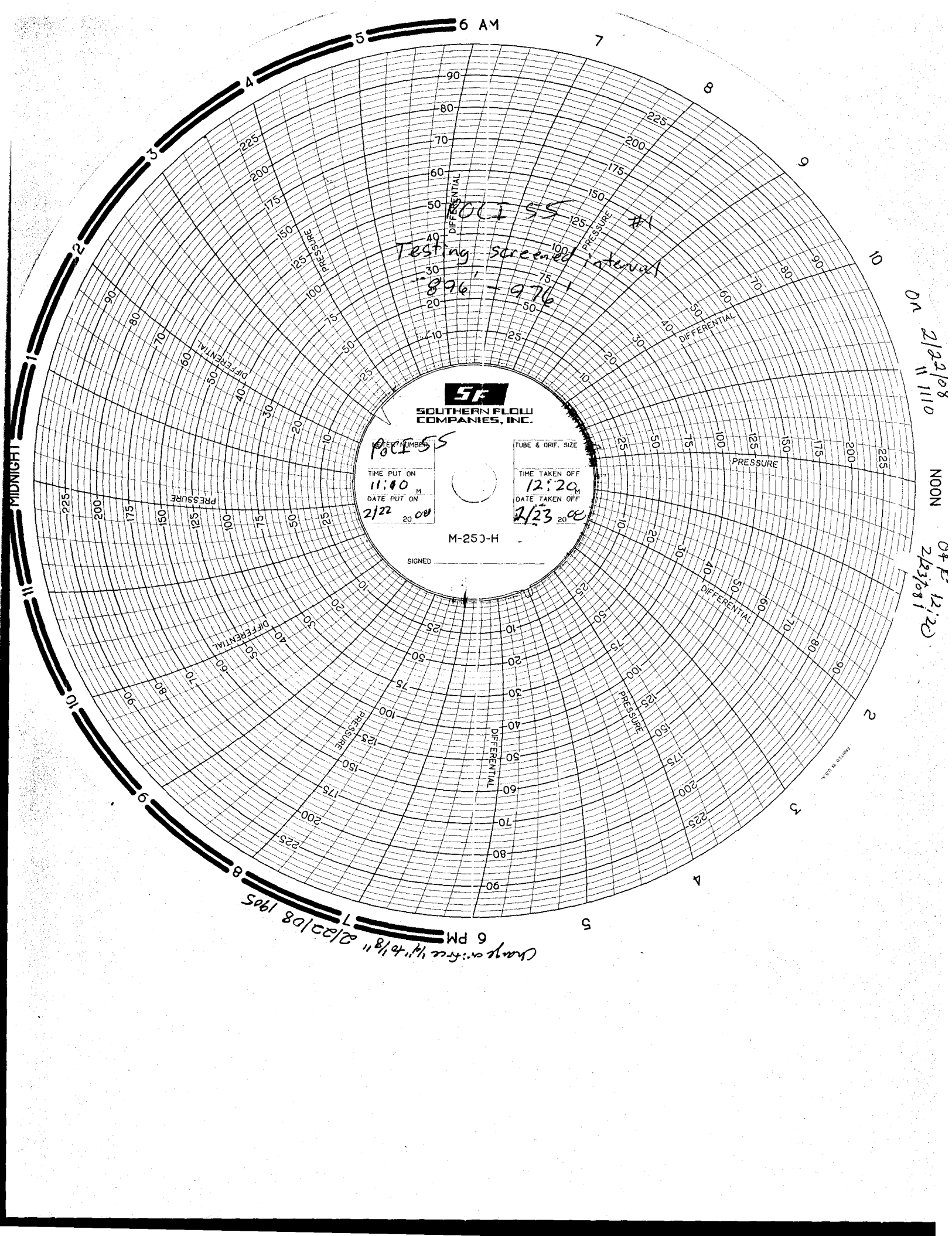
Aquifer Test Interval 4

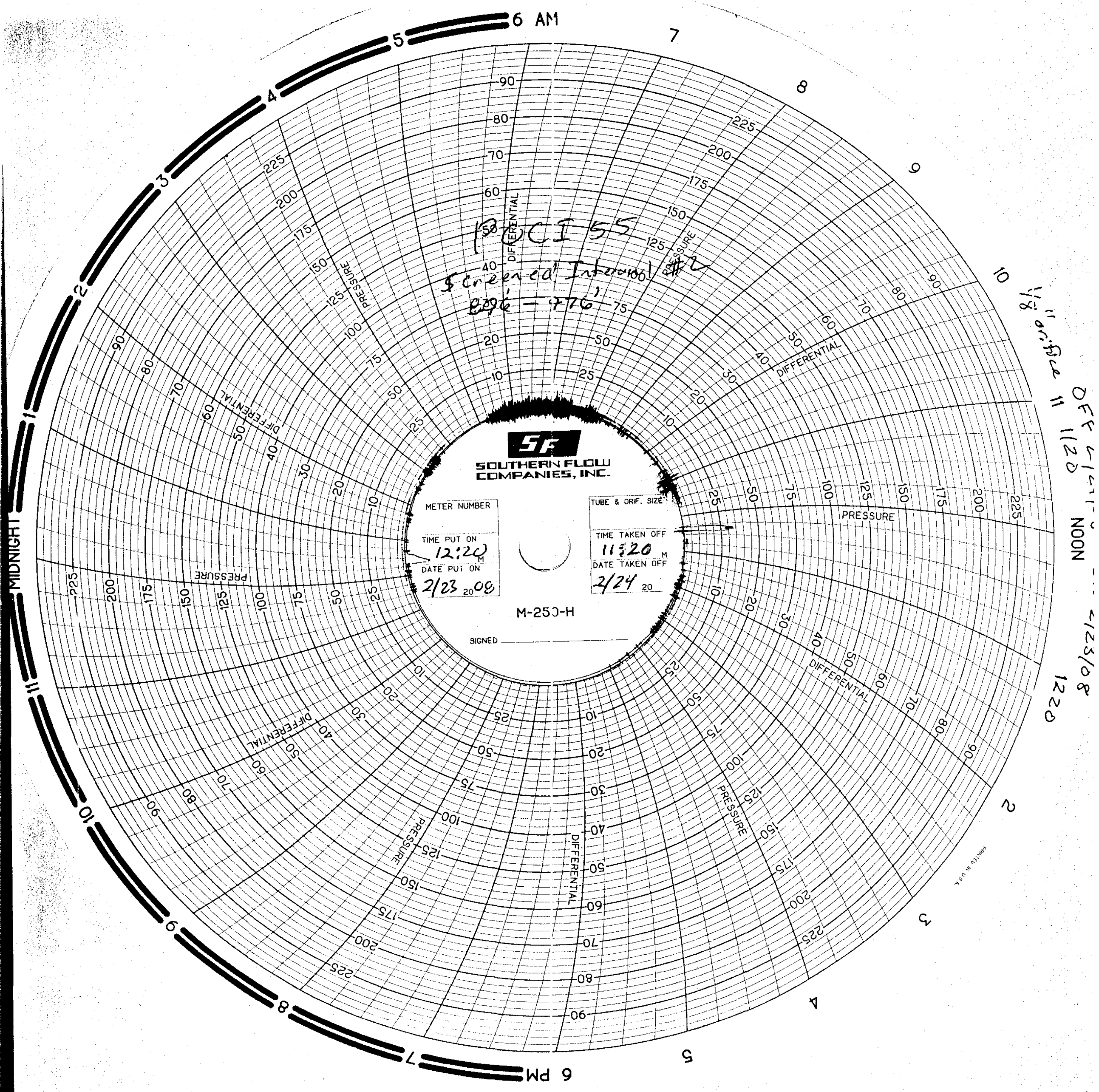
Date	Time	UP presssure (psi)	LP Pressure (psi)	Comments
2/25/08	9:56		170	Inflate Lower Packer.
2/25/08	10:08	110		Inflate Upper Packer.
2/25/08	10:42	110	170	Packers holding pressure.
2/25/08	10:56			Pump On. No flow or pressure drop. Maybe gas locked.
2/25/08	10:57			Pump Off.
2/25/08	12:47			Deflate packers to setup wellhead pack off with only a lower packer.
2/25/08	15:48		170	Inflate Lower Packer.
2/25/08	16:16			Pump On. No flow or pressure drop. May be gas locked.
2/25/08	16:38			Deflate packer and lower pump 3 tubing jointd to remove gas.
2/25/08	17:52			Pump On; Still not working.
2/26/08	8:00			Start pulling tubing string out.
2/26/08	9:30			Out of hole.

APPENDIX E

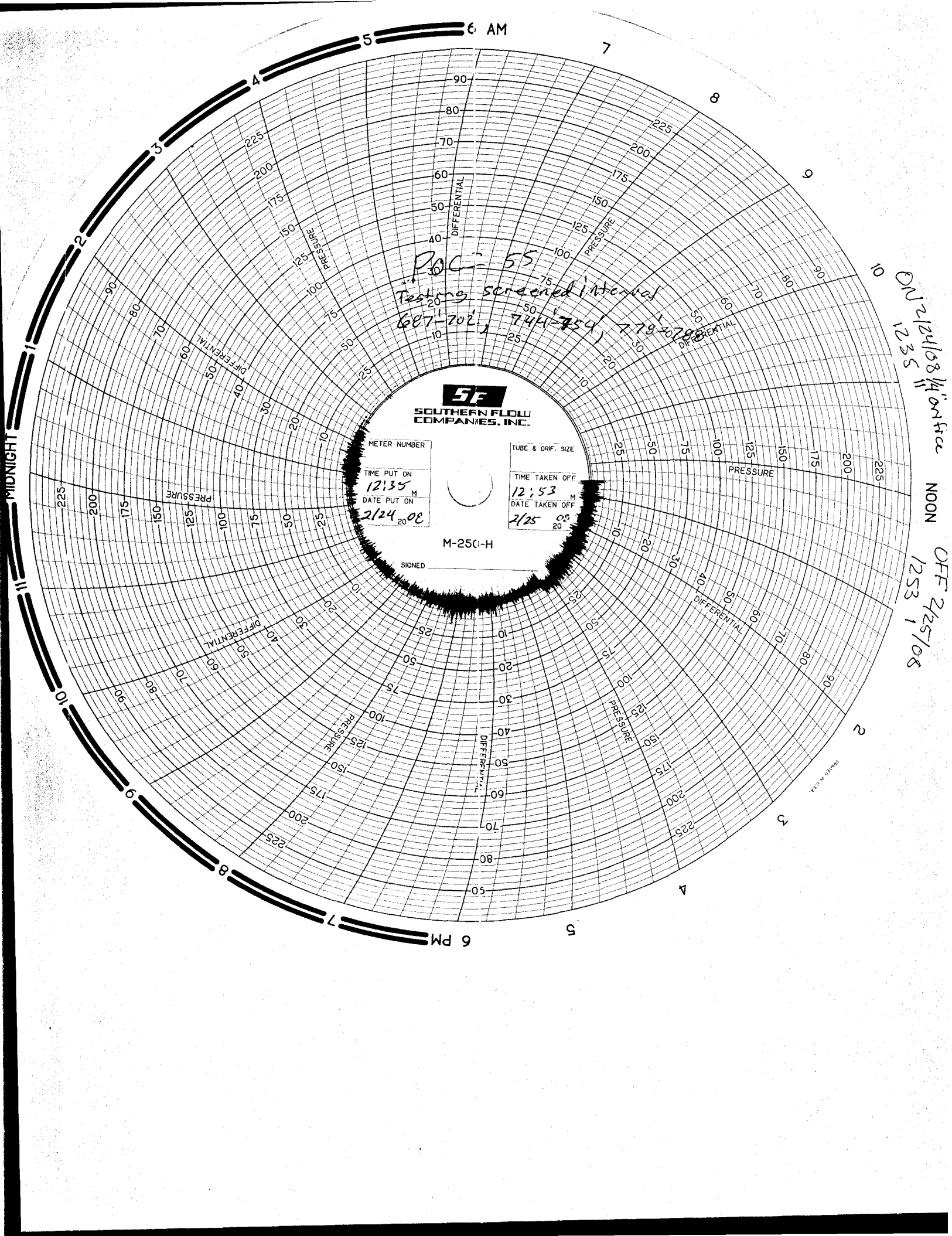
Barton Gas Flow Recorder Charts


6 AM
NOON
MIDNIGHT
6 PM
SOUTHERN FLOW COMPANIES, INC.
METER NUMBER
~~17130~~
TIME PUT ON
17:30 M
DATE PUT ON
2/20 2008
TUBE & ORIF. SIZE
TIME TAKEN OFF
18:30 M
DATE TAKEN OFF
2/21 2008
M-2510-H
SIGNED
PRESSURE
DIFFERENTIAL
Process
Testing screened zone
1610' - 1649'
ON 2/20/08 5:17pm
OFF 2/21/08 6:30pm
1/4 orifice


6 AM
NOON
MIDNIGHT
6 PM
SOUTHERN FLOW COMPANIES, INC.
METER NUMBER
PCI55
TUBE & ORIF. SIZE
TIME PUT ON
11:40 M
DATE PUT ON
2/22 20 08
TIME TAKEN OFF
12:20 M
DATE TAKEN OFF
2/23 20 08
M-250-H
SIGNED
DIFFERENTIAL
PRESSURE
PCI 55 #1
Testing screened interval
-896' - 976'
On 2/22/08 @ 1110
Off 2/23/08 @ 1220
Change orifice 1/4" to 1/8" 2/22/08 1985



6 AM
NOON
6 PM
MIDNIGHT
PRESSURE
DIFFERENTIAL
SOUTHERN FLOW COMPANIES, INC.
METER NUMBER
TIME PUT ON 12:20 M
DATE PUT ON 2/23 2008
TUBE & ORIF. SIZE
TIME TAKEN OFF 11:20 M
DATE TAKEN OFF 2/24 20
M-250-H
SIGNED
1/8" orifice
1120
1220
2/23/08

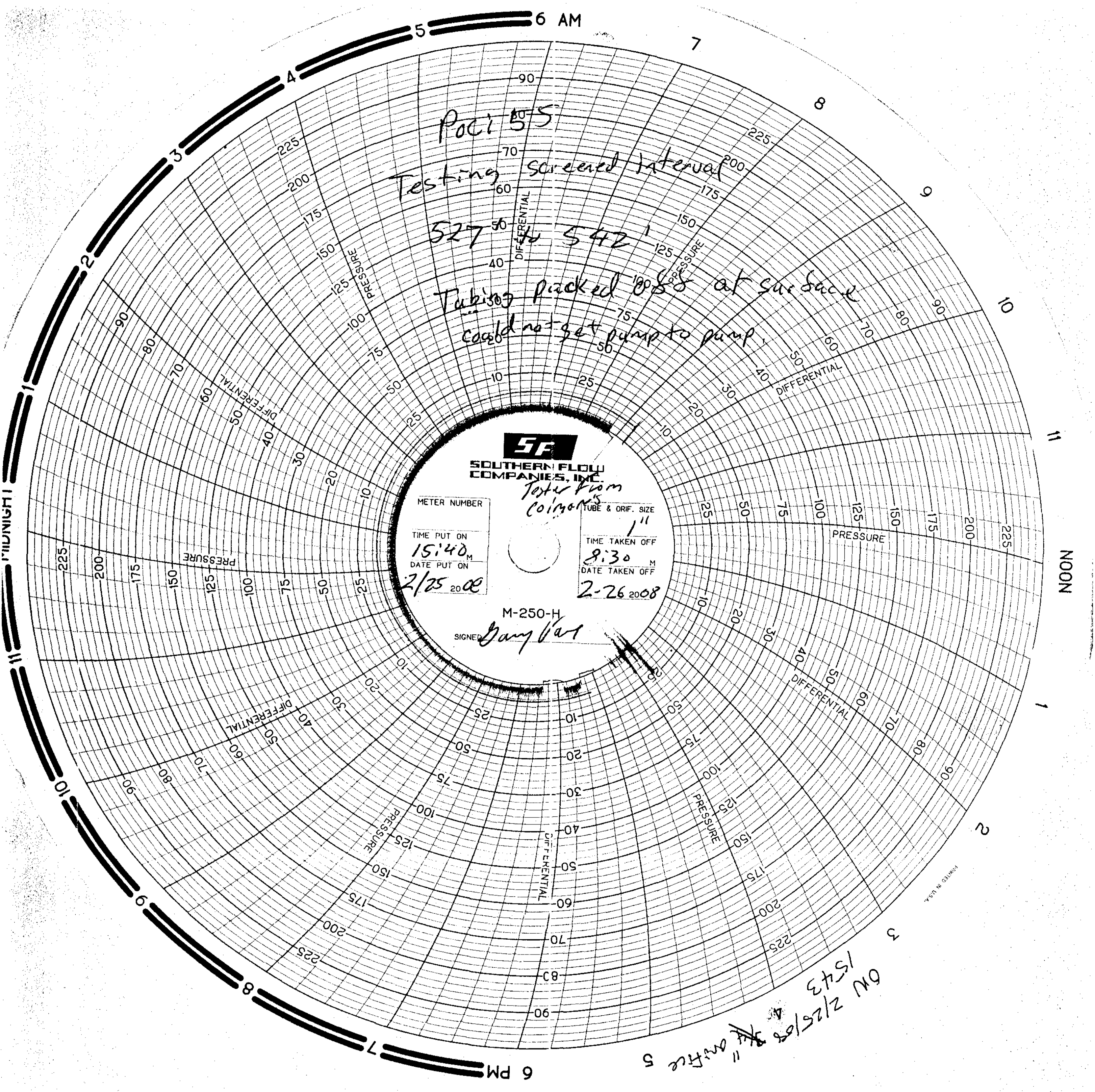


POC = 55

Testing screened interval 667'-702', 744'-754', 779'-798'

ON 2/24/08 1/4" orifice 1235

OFF 2/25/08 1253


6 AM
NOON
6 PM
MIDNIGHT
Poci 5S
Testing screened interval
527' to 542'
Tubing packed off at surface
could not get pump to pump.
SF
SOUTHERN FLOW
COMPANIES, INC.
Tester from Coimons
METER NUMBER
TIME PUT ON 15:40 M
DATE PUT ON 2/25 2008
TUBE & ORIF. SIZE 1"
TIME TAKEN OFF 8:30 M
DATE TAKEN OFF 2-26 2008
M-250-H
SIGNED Gary Vat
ON 2/25/08
1543
4" orifice
PRESSURE
DIFFERENTIAL
PRINTED IN U.S.A.

APPENDIX F

Evergreen Analytical Laboratory Water Quality Results

WORK ORDER Summary Evergreen Analytical, Inc. 08-1122

Rpt To: Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055
(719) 742-5570

Email To: Tmelland@petroglyphenergy.com

2/22/08 10:44:55 AM

Client Project ID: Petroglyph CBM wells

QC Level: Level I+

Comments:

Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Test Code	Test Name	Hold	MS	Date Due	Hold Time
08-1122-01A	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	ANIONS_W *	300.0: Anions by IC	☐	☐	3/07/08	2/23/08
08-1122-01B	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	F_W	Fluoride	☐	☐	3/07/08	3/20/08
08-1122-01C	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	200.8_DHG *	200.8 Drinking Water 11 Regulated	☐	☐	3/07/08	3/20/08
08-1122-01D	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	ALK_WGRP *	Alkalinity	☐	☐	3/07/08	3/06/08
08-1122-01E	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	504 *	504: Standard List	☐	☐	3/07/08	3/06/08
08-1122-01F	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	524 *	524.2: Standard List	☐	☐	3/07/08	3/06/08
08-1122-01F	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	VOATICS	VOA TICS (Largest 10)	☐	☐	3/07/08	3/06/08
08-1122-01G	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	MEEP_W *	RSK175M: MEE	☐	☐	3/07/08	3/06/08
08-1122-01H	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	SULF_W	Total Sulfide	☐	☐	3/07/08	2/28/08
08-1122-01I	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	PH_W	Discharge Water pH	☐	☐	3/07/08	2/21/08
08-1122-01I	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	TDS_W	Total Dissolved Solids (TDS)	☐	☐	3/07/08	2/28/08
08-1122-01I	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	TSS	Total Suspended Solids (TSS)	☐	☐	3/07/08	2/28/08

Definitions: * - Test Code has a Select List

002

CHAIN OF CUSTODY RECORD / ANALYTICAL SERVICES AGREEMENT **

Evergreen Analytical Laboratory Inc.

Page 1 of 1

CLIENT INFORMATION

Mail **Original** Report to: Petroglyph Energy
Attn Tom Melland
Address PO Box 979
City La Veta State CO Zip 81055
Tel # 7197425570 Fax # 7197425571 E-mail tmelland@petroglyphenergy.com
REPORT ALSO BY ☐ FAX ☒ PDF ☒ EDD
REPORT CHROMATOGRAMS ☐ YES

Mail Invoice to: ~~PO Box 979~~ Petroglyph
Attn Tom Melland
Address PO Box 979
City La Veta State CO Zip 81055
Tel # 7197425570 Fax # 7197425571
Project ID# Petroglyph CBM Wells
P.O. ____ Quote 8948
Sampler Konrad Quast

NOTE: *Identify Known Hazards Below*

4036 Youngfield St.
Wheat Ridge, Colorado 80033
(303) 425-6021
FAX (303) 425-6854
(877) 737-4521
e-mail info@evergreenanalytical.com

Report Results by: ____ (Date)*
Standard 2 working weeks ☒
UST Analyses per Fee Schedule ☐
* Rush: ☐ less than 24 hrs, 150% ☐ 1 - 2 work days, 100%
☐ 3 - 5 work days, 50% ☐ 6 - 9 work days, 25%
*Subject to surcharge & exceptions noted in fee schedule.

SAMPLE IDENTIFICATION	DATE SAMPLED	TIME	No. of Containers	MATRIX: 1)Drinking Water or 2)Discharge Water or 3)Ground Water (circle one)	Soil / Solid / Air / Gas	Oil / Sludge / Wipe	A: 300.0 Anions by IC	B: Fluoride	C: 200.8 Unregulated	D: Alkalinity	E: 504.1 EDB/DBCP	F: 524.2 VOA TICs	G: RSKSOP-175M Total Sulfide	H: TSS, TDS, pH	I:	For Laboratory Use Only
MMW(1009-1048)	2/21/08	1300	14				✓	✓	✓	✓	✓	✓	✓	✓		01

W.O. # 08-1122
B.O.F. # -
C/S (O) -/-
C/S (I) C+(R) KUPS
Temp. °C 0.8 / Ice
Seals Present Y (N) NA
Samples Pres (Y) / N / NA
Headspace Y / (N) NA
By mo /

Does this analysis involve property transfer? ☐ Yes or ☒ No

Sample Fraction

Instructions:

** **Important Note:** See reverse side hereof for terms and conditions.

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	2/21/08 1430					[signature]	2/22/8 10:20A

Evergreen Analytical, Inc. **Date:** *06-Mar-08*

Client Project ID: Petroglyph CBM wells
Lab Order: 08-1122

CASE NARRATIVE

SAMPLE RECEIVING

Custody seals were not present.
The temperature of the sample(s) upon arrival was 0.8 °C.
Sample(s) were received in good condition and in the proper container.
The pH sample was received out of holding time
VOC sample(s) were marked as preserved on the bottle labels.
VOC sample(s) were received with no headspace present. NJO

QUALITY ASSURANCE (QA)

Analyses performed on samples in this work order by EAL meet the requirements of the EAL Quality Assurance Program unless otherwise explained. Analyses of discharge samples meet the requirements of 40 CFR Part 136 unless otherwise explained.

CLIENT SERVICES

The analytes for anion, metal, and alkalinity analyses were logged in per the quotation. There are no other anomalies to report. EKH/RAK

GENERAL CHEMISTRY

As noted above, the pH sample required analysis out of holding time. The flagged Fluoride result being greater than the MCL, applies to drinking water only. There are no other anomalies to report. MM/RAK

METALS ANALYSIS

Sample(s) were preserved by the metals group prior to the analysis. There are no other anomalies to report. MB/RAK

GAS CHROMATOGRAPHY

Method 504.1: There are no anomalies to report. AE
Method MEEP_W: There are no anomalies to report. MS

GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Method 524.2: There are no anomalies to report. DC

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

Client Sample ID: MMW (1009-1048)
Client Project ID: Petroglyph CBM wells
Date Collected: 2/21/08 1300
Date Received: 2/22/08

Lab Work Order 08-1122
Lab Sample ID: 08-1122-01
Sample Matrix: Groundwater

ANIONS BY IC

Method: E300.0

Prep Method:

Date Prepared: 2/22/08
Date Analyzed: 2/22/08 1315

Method Blank: METHOD BLANK

Dilution Factor: 1
Lab Fraction ID: 08-1122-01A

Analytes	CAS Number	Result	LQL	Units
Chloride	7647-14-5	23.3	0.50	mg/L
Nitrite-N		0.00654	0.0040	mg/L
Bromide	7647-15-6	0.265	0.050	mg/L
Nitrate-N		U	0.010	mg/L
Sulfate	7778-80-2	44.2	0.50	mg/L

J. Lange
Analyst

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/25/08

Evergreen Analytical, Inc.

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(303) 425-6021

Client Sample ID: MMW (1009-1048)
Client Project ID: Petroglyph CBM wells
Date Collected: 2/21/08 1300
Date Received: 2/22/08

Lab Work Order 08-1122
Lab Sample ID: 08-1122-01
Sample Matrix: Groundwater

ALKALINITY

Method: SM2320B **Prep Method:**

Date Prepared: 2/26/08 **Lab File ID:** 70 **Dilution Factor:** 1
Date Analyzed: 2/26/08 **Method Blank:** MBLK **Lab Fraction ID:** 08-1122-01D

Analytes	CAS Number	Result	LQL	Units
Total Alkalinity		247	5.0	mg/L CaCO3
Bicarbonate		129	5.0	mg/L CaCO3
Carbonate		118	5.0	mg/L CaCO3

FLUORIDE

Method: SM 4500-F C **Prep Method:**

Date Prepared: 2/26/08 **Lab File ID:** 16 **Dilution Factor:** 1
Date Analyzed: 2/26/08 **Method Blank:** MBLK **Lab Fraction ID:** 08-1122-01B

Analytes	CAS Number	Result	LQL	Units
Fluoride	16984-48-8	8.6 *	0.20	mg/L

DISCHARGE WATER PH

Method: SM 4500H+ B **Prep Method:**

Comments: This is a field parameter with a 15min. holding time.

Date Prepared: 2/22/08 **Dilution Factor:** 1
Date Analyzed: 2/22/08 1110 **Lab Fraction ID:** 08-1122-01I

Analytes	CAS Number	Result	LQL	Units
pH		9.91 H	1.00	pH Units

TOTAL SULFIDE

Method: SM 4500-S C/F **Prep Method:**

Date Prepared: 2/27/08 **Lab File ID:** 70 **Dilution Factor:** 1
Date Analyzed: 2/27/08 **Method Blank:** MBLK **Lab Fraction ID:** 08-1122-01H

Analytes	CAS Number	Result	LQL	Units
Total Sulfide		U	0.50	mg/L

Analyst

Approved

Qualifiers:
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U - Compound analyzed for but not detected
X - See case narrative
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Definitions:
NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/28/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (1009-1048)
Client Project ID: Petroglyph CBM wells
Date Collected: 2/21/08 1300
Date Received: 2/22/08

Lab Work Order 08-1122
Lab Sample ID: 08-1122-01
Sample Matrix: Groundwater

TOTAL DISSOLVED SOLIDS (TDS)

Method: SM 2540C **Prep Method:**

Date Prepared: 2/25/08
Date Analyzed: 2/25/08
Lab File ID: 75
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1122-011

Analytes	CAS Number	Result	LQL	Units
Total Dissolved Solids		416	10.0	mg/L

TOTAL SUSPENDED SOLIDS (TSS)

Method: SM 2540 D **Prep Method:**

Date Prepared: 2/25/08
Date Analyzed: 2/25/08
Lab File ID: 58
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1122-011

Analytes	CAS Number	Result	LQL	Units
Total Suspended Solids		17.3	5.0	mg/L

Analyst

Approved

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LQL - Lower Quantitation Limit
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Print Date: 2/28/2008

Evergreen Analytical, Inc.

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(303) 425-6021

Client Sample ID: MMW (1009-1048)
Client Project ID: Petroglyph CBM wells
Date Collected: 2/21/08
Date Received: 2/22/08

Lab Work Order 08-1122
Lab Sample ID: 08-1122-01
Sample Matrix: Groundwater

TOTAL METALS

Method: E200.8 **Prep Method: E200.8**

Date Prepared: 2/28/08
Date Analyzed: 2/28/08
Lab File ID: 080228A.B\036SMPL.D
Method Blank: MB-14848
Dilution Factor: 1
Lab Fraction ID: 08-1122-01C

Analytes	CAS Number	Result	LQL	Units
Antimony	7440-36-0	U	0.00200	mg/L
Arsenic	7440-38-2	0.0152	0.00200	mg/L
Barium	7440-39-3	0.0538	0.0100	mg/L
Beryllium	7440-41-7	U	0.00100	mg/L
Boron	7440-42-8	U	0.200	mg/L
Cadmium	7440-43-9	U	0.000500	mg/L
Calcium	7440-70-2	8.62	0.400	mg/L
Chromium	7440-47-3	0.00238	0.00220	mg/L
Copper	7440-50-8	U	0.0100	mg/L
Iron	7439-89-6	2.84	0.200	mg/L
Lead	7439-92-1	0.00139	0.00100	mg/L
Magnesium	7439-95-4	0.150	0.0500	mg/L
Manganese	7439-96-5	0.0652	0.00500	mg/L
Molybdenum	7439-98-7	0.0155	0.00500	mg/L
Nickel	7440-02-0	U	0.0100	mg/L
Potassium	7440-09-7	6.05	0.125	mg/L
Selenium	7782-49-2	U	0.00200	mg/L
Silver	7440-22-4	U	0.000200	mg/L
Sodium	7440-23-5	143	0.500	mg/L
Strontium	7440-24-6	0.234	0.0980	mg/L
Thallium	7440-28-0	U	0.00100	mg/L
Zinc	7440-66-6	0.0147	0.00500	mg/L

MB
Analyst

Approved

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LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 3/4/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (1009-1048)
Client Project ID: Petroglyph CBM wells
Date Collected: 2/21/08
Date Received: 2/22/08

Lab Work Order 08-1122
Lab Sample ID: 08-1122-01
Sample Matrix: Groundwater

MERCURY, DRINKING WATER

Method: E245.1 **Prep Method: E245.1**

Date Prepared: 2/29/08
Date Analyzed: 2/29/08
Lab File ID: 022908w
Method Blank: MB-14861
Dilution Factor: 1
Lab Fraction ID: 08-1122-01C

Analytes	CAS Number	Result	LQL	Units
Mercury	7439-97-6	U	0.00010	mg/L

MB
Analyst

Approved

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S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
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LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 3/4/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (1009-1048)	**Lab Work Order:**	08-1122
Client Project ID:	Petroglyph CBM wells	**Lab Sample ID:**	08-1122-01E
Date Collected:	2/21/2008	**Sample Matrix:**	Groundwater
Date Received:	2/22/2008	**Lab File ID:**	037.D
Date Prepared:	2/28/2008	**Method Blank:**	MB-14851
Date Analyzed:	2/28/2008	**Prep Factor:**	0.057
Percent Moisture:	NA	**Dilution Factor:**	1.00

Method: E504.1 **EDB/DBCP**
Prep Method: E504.1

Units: µg/L

Analytes	CAS Number	Result	MDL	LQL
1,2-Dibromo-3-chloropropane	96-12-8	U	0.02	0.02
1,2-Dibromoethane	106-93-4	U	0.01	0.01

Analyst

Approved

Qualifiers: **See the case narrative for a discussion**
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H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 2/29/2008

Evergreen Analytical, Inc.
4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (1009-1048)	**Lab Work Order:**	08-1122
Client Project ID:	Petroglyph CBM wells	**Lab Sample ID:**	08-1122-01F
Date Collected:	2/21/2008	**Sample Matrix:**	Groundwater
Date Received:	2/22/2008	**Lab File ID:**	\VOA40304\1701017.D
Date Prepared:	3/4/2008	**Method Blank:**	MB4030408a
Date Analyzed:	3/4/2008	**Prep Factor:**	1.000
Percent Moisture:	NA	**Dilution Factor:**	1.00

VOLATILE COMPOUNDS

Method: E524.2
Prep Method: E524.2

Units: µg/L

Analytes	CAS Number	Result	LQL
Benzene	71-43-2	U	0.50
Bromobenzene	108-86-1	U	0.50
Bromochloromethane	74-97-5	U	0.50
Bromodichloromethane	75-27-4	U	0.50
Bromoform	75-25-2	U	0.50
Bromomethane	74-83-9	U	0.50
n-Butylbenzene	104-51-8	U	0.50
sec-Butylbenzene	135-98-8	U	0.50
t-Butylbenzene	98-06-6	U	0.50
Carbon tetrachloride	56-23-5	U	0.50
Chlorobenzene	108-90-7	U	0.50
Chloroethane	75-00-3	U	0.50
Chloroform	67-66-3	U	0.50
Chloromethane	74-87-3	U	0.50
2-Chlorotoluene	95-49-8	U	0.50
4-Chlorotoluene	106-43-4	U	0.50
Dibromochloromethane	124-48-1	U	0.50
Dibromomethane	74-95-3	U	0.50
1,2-Dichlorobenzene	95-50-1	U	0.50
1,3-Dichlorobenzene	541-73-1	U	0.50
1,4-Dichlorobenzene	106-46-7	U	0.50
Dichlorodifluoromethane	75-71-8	U	0.50
1,1-Dichloroethane	75-34-3	U	0.50
1,2-Dichloroethane	107-06-2	U	0.50
1,1-Dichloroethene	75-35-4	U	0.50
cis-1,2-Dichloroethene	156-59-2	U	0.50
trans-1,2-Dichloroethene	156-60-5	U	0.50
1,2-Dichloropropane	78-87-5	U	0.50
1,3-Dichloropropane	142-28-9	U	0.50
2,2-Dichloropropane	590-20-7	U	0.50
1,1-Dichloropropene	563-58-6	U	0.50
cis-1,3-Dichloropropene	10061-01-5	U	0.50
trans-1,3-Dichloropropene	10061-02-6	U	0.50
1,3-Dichloropropene	542-75-6	U	0.50
Ethylbenzene	100-41-4	U	0.50
Hexachlorobutadiene	87-68-3	U	0.50
Isopropylbenzene	98-82-8	U	0.50
p-Isopropyltoluene	99-87-6	U	0.50
Methylene chloride	75-09-2	U	0.50
Naphthalene	91-20-3	U	0.50

Analyst **Approved**

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Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/5/2008

Evergreen Analytical, Inc.
4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (1009-1048)	**Lab Work Order:**	08-1122
Client Project ID:	Petroglyph CBM wells	**Lab Sample ID:**	08-1122-01F
Date Collected:	2/21/2008	**Sample Matrix:**	Groundwater
Date Received:	2/22/2008	**Lab File ID:**	\VOA40304\1701017.D
Date Prepared:	3/4/2008	**Method Blank:**	MB4030408a
Date Analyzed:	3/4/2008	**Prep Factor:**	1.000
Percent Moisture:	NA	**Dilution Factor:**	1.00

VOLATILE COMPOUNDS

Method: E524.2
Prep Method: E524.2

Units: µg/L

Analytes	CAS Number	Result		LQL
n-Propylbenzene	103-65-1	U		0.50
Styrene	100-42-5	U		0.50
1,1,1,2-Tetrachloroethane	630-20-6	U		0.50
1,1,2,2-Tetrachloroethane	79-34-5	U		0.50
Tetrachloroethene	127-18-4	U		0.50
Toluene	108-88-3	12.4		0.50
1,2,3-Trichlorobenzene	87-61-6	U		0.50
1,2,4-Trichlorobenzene	120-82-1	U		0.50
1,1,1-Trichloroethane	71-55-6	U		0.50
1,1,2-Trichloroethane	79-00-5	U		0.50
Trichloroethene	79-01-6	U		0.50
Trichlorofluoromethane	75-69-4	U		0.50
1,2,3-Trichloropropane	96-18-4	U		0.50
1,2,4-Trimethylbenzene	95-63-6	U		0.50
1,3,5-Trimethylbenzene	108-67-8	U		0.50
Vinyl chloride	75-01-4	U		0.50
m,p-Xylene	1330-20-7	U		0.50
o-Xylene	95-47-6	U		0.50
Xylenes, Total	1330-20-7	U		0.50
Total THM (Summation of above)		U		0.50
Surr: 1,2-Dichlorobenzene-d4	2199-69-1	98	**QC Limits:**	70-130 %REC
Surr: 4-Bromofluorobenzene	460-00-4	96	**QC Limits:**	70-130 %REC

Analyst **Approved**

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LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/5/2008

Tentatively Identified Compound (TIC) summary

Operator ID: Don Chamot Date Acquired: 4 Mar 2008 11:29 pm
Data File: C:\MSDCHEM\1\DATA\VOA40304\1701017.D
Name: 08-1122-01F
Misc: SAMP 524
Method: C:\MSDCHEM\1\METHODS\5240303.M (RTE Integrator)
Title: VOA4 524.2 Revision 4.1
Library Searched: C:\DATABASE\NIST98.L

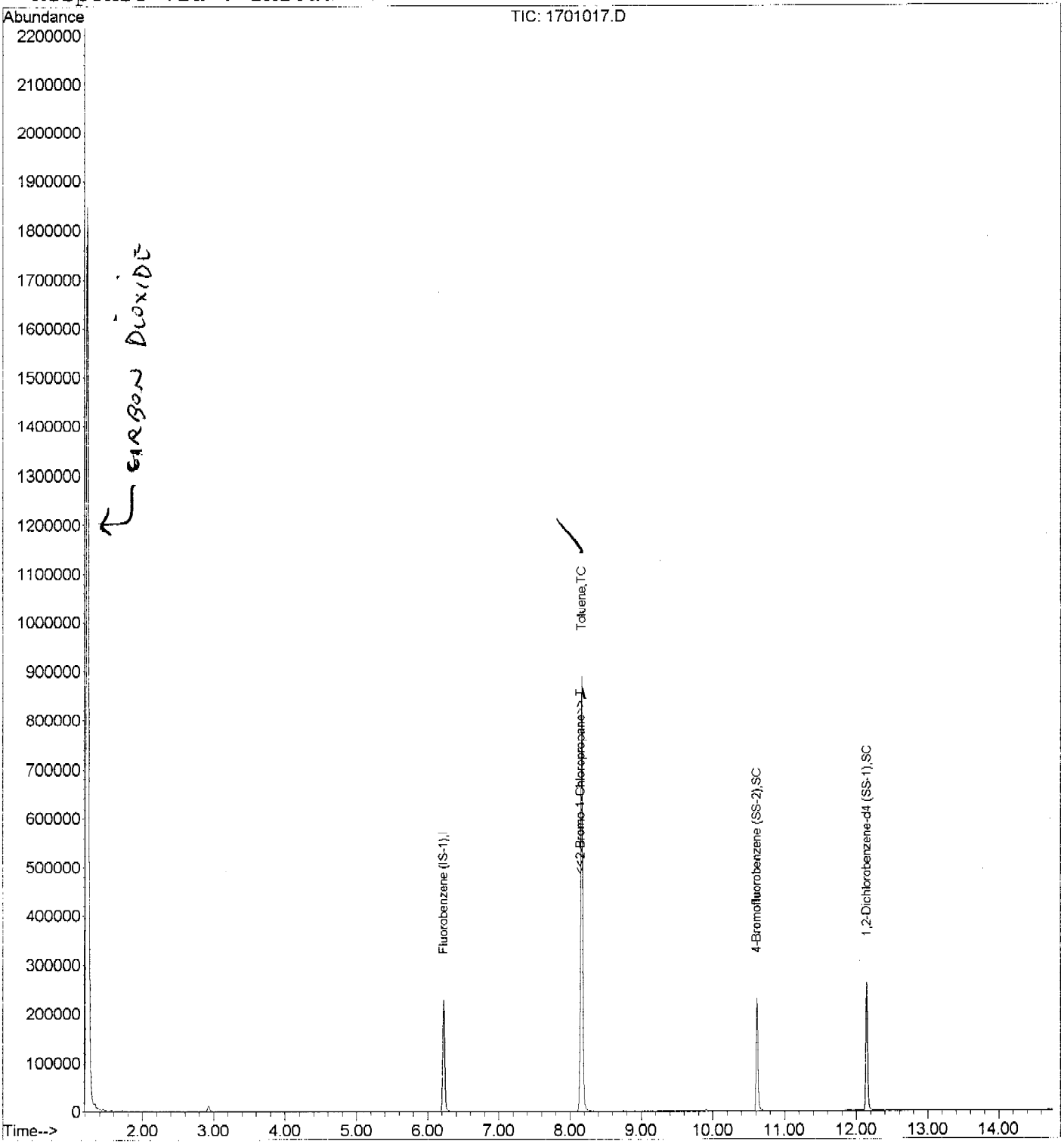
TIC Top Hit name	RT	EstConc	Units	Response	--Internal Standard--- #	RT	Resp	Conc
Carbon dioxide	1.23	48.8	ug/l	4410190	1	6.22	451712	5.0

NO OTHER TICs DETECTED CK 3/7/08

Quantitation Report (QT Reviewed)

Data File : C:\MSDCHEM\1\DATA\VOA40304\1701017.D Vial: 17
Acq On : 4 Mar 2008 11:29 pm Operator: Don Chamot
Sample : 08-1122-01F Inst : Instrumen
Misc : SAMP 524 Multiplr: 1.00
MS Integration Params: RTEINT.P
Quant Time: Mar 5 13:08 2008 Quant Results File: 5240303.RES

Method : C:\MSDCHEM\1\METHODS\5240303.M (RTE Integrator)
Title : VOA4 524.2 Revision 4.1
Last Update : Tue Mar 04 11:34:07 2008
Response via : Initial Calibration



3/17/08

Library Search Compound Report

Data File : C:\MSDCHEM\1\DATA\VOA40304\1701017.D
Acq On : 4 Mar 2008 11:29 pm
Sample : 08-1122-01F
Misc : SAMP 524
MS Integration Params: RTEINT.P

Vial: 17
Operator: Don Chamot
Inst : Instrumen
Multiplr: 1.00

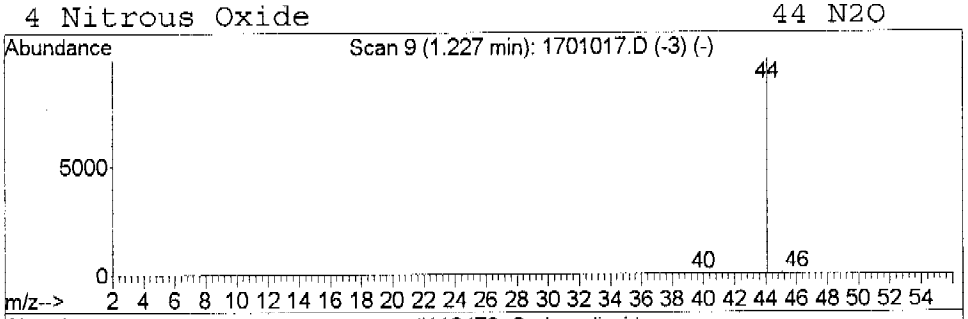
Quant Method : C:\MSDCHEM\1\METHODS\5240303.M (RTE Integrator)
Title : VOA4 524.2 Revision 4.1
Library : C:\DATABASE\NIST98.L

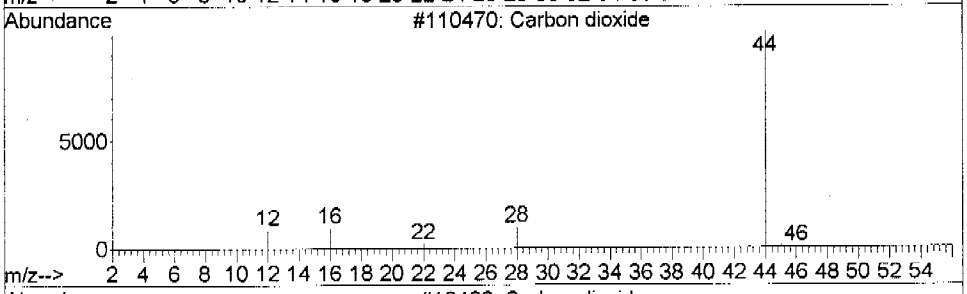
****

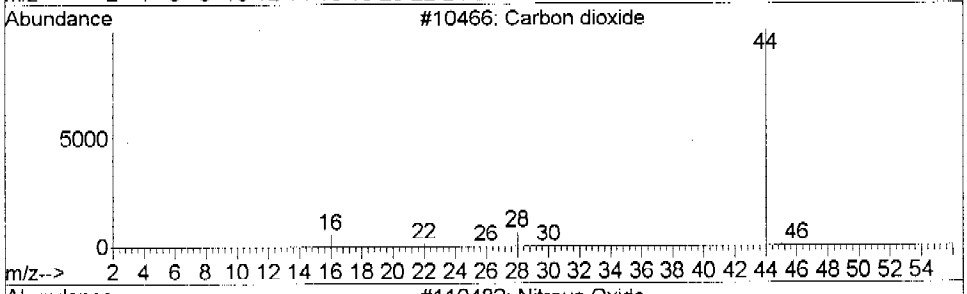
Peak Number 1 Carbon dioxide Concentration Rank 1

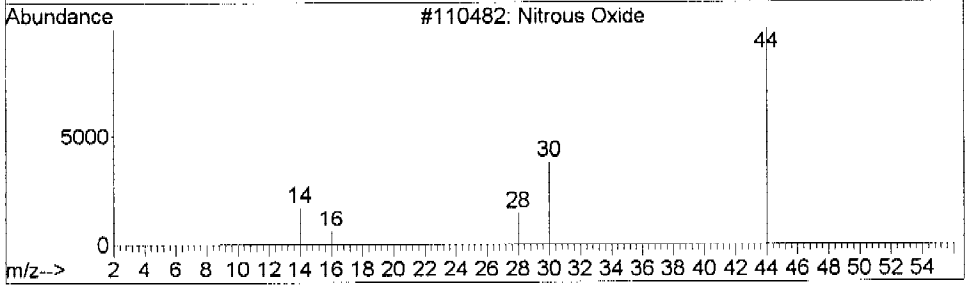
R.T.	EstConc	Area	Relative to ISTD	R.T.
1.23	48.82 ug/l	4410190	Fluorobenzene (IS-1)	6.22

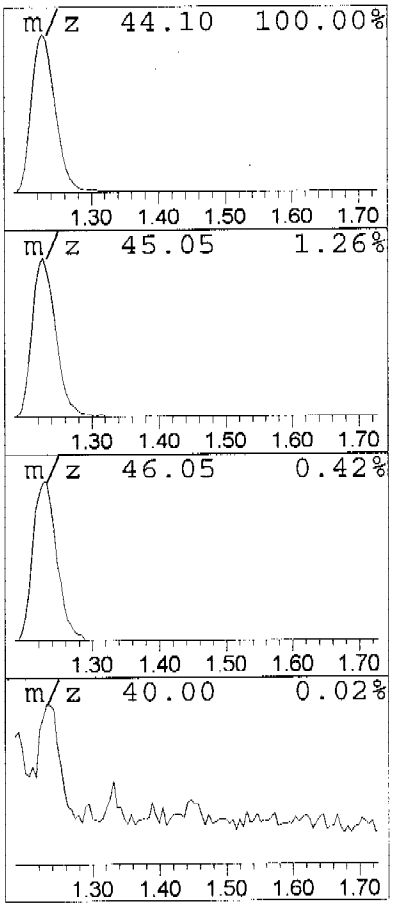
Hit# of 5	Tentative ID	MW	MolForm	CAS#	Qual
1	Carbon dioxide	44	CO2	000124-38-9	4
2	Carbon dioxide	44	CO2	000124-38-9	4
3	Nitrous Oxide	44	N2O	010024-97-2	3
4	Nitrous Oxide	44	N2O	010024-97-2	3











Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (1009-1048)	**Lab Work Order**	08-1122
Client Project ID:	Petroglyph CBM wells	**Lab Sample ID:**	08-1122-01G
Date Collected:	2/21/08	**Sample Matrix:**	Groundwater
Date Received:	2/22/08	**Lab File ID:**	GAS0304009
Date Prepared:	3/4/08	**Method Blank:**	GB030408
Date Analyzed:	3/4/08	**Prep Factor:**	1.000
Percent Moisture	NA	**Dilution Factor:**	1.00

Method: RSKSOP175M **RSKSOP-175M HEADSPACE**
Prep Method: RSKSOP175M

Units: mg/L

Analytes	CAS Number	Result	LQL
Ethane	74-84-0	U	0.0016
Ethene	74-85-1	U	0.0024
Methane	74-82-8	0.51	0.00080

Analyst

Approved

Qualifiers: **See the case narrative for a discussion**
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Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/4/08

QUALITY ASSURANCE REPORTS

METHOD BLANKS (MB, MEB)

LABORATORY CONTROL SPIKES (LCS)

MATRIX SPIKES (MS/MSD)*

DUPLICATES (DUP)*

*Only included if requested or if performed on this client's samples.

Evergreen Analytical, Inc.

Date: *25-Feb-08*

Work Order: 08-1122

Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: ANIONS_W

Sample ID: **METHOD BLANK**	SampType: **MBLK**	TestCode: **ANIONS_W**	Run ID: **IC-DX120_080222A**	Prep Date: **2/22/08**	Units: **mg/L**
	Batch ID: **R37352**	TestNo: **E300.0**	FileID:	Analysis Date: **2/22/08**	SeqNo: **659311**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	U	0.50									
Nitrite-N	U	0.0040									
Bromide	U	0.050									
Nitrate-N	U	0.010									
Sulfate	U	0.50									

Sample ID: **LCS ALLT218024**	SampType: **LCS**	TestCode: **ANIONS_W**	Run ID: **IC-DX120_080222A**	Prep Date: **2/22/08**	Units: **mg/L**
	Batch ID: **R37352**	TestNo: **E300.0**	FileID:	Analysis Date: **2/22/08**	SeqNo: **659310**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	18.73	1.0	20	0	93.7	90	110	0	0		
Nitrite-N	6.047	0.0080	6.09	0	99.3	90	110	0	0		
Bromide	20.35	0.10	20	0	102	90	110	0	0		
Nitrate-N	4.584	0.020	4.518	0	101	90	110	0	0		
Sulfate	29.88	1.0	30	0	99.6	90	110	0	0		

Qualifiers:

U - Not detected at or above the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside acceptance limits
E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Evergreen Analytical, Inc.

Date: *28-Feb-08*

Work Order: 08-1122

Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: ALK_WGRP

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **ALK_WGRP**	Run ID: **ALK_080226A**	Prep Date: **2/26/2008**	Units: **mg/L CaCO3**
	Batch ID: **R37391**	TestNo: **SM2320B**	FileID: **47**	Analysis Date: **2/26/2008**	SeqNo: **660218**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Alkalinity	U	5.0									

Sample ID **LCS**	SampType: **LCS**	TestCode: **ALK_WGRP**	Run ID: **ALK_080226A**	Prep Date: **2/26/2008**	Units: **mg/L CaCO3**
	Batch ID: **R37391**	TestNo: **SM2320B**	FileID: **48**	Analysis Date: **2/26/2008**	SeqNo: **660219**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Alkalinity	98.81	5.0	100	0	98.8	90	110	0	0		

Qualifiers:

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E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: F_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **F_W**	Run ID: **F_080226A**	Prep Date: **2/26/2008**	Units: **mg/L**
	Batch ID: **R37385**	TestNo: **SM 4500-F C**	FileID: **1**	Analysis Date: **2/26/2008**	SeqNo: **660120**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	U	0.20									

Sample ID **LCS**	SampType: **LCS**	TestCode: **F_W**	Run ID: **F_080226A**	Prep Date: **2/26/2008**	Units: **mg/L**
	Batch ID: **R37385**	TestNo: **SM 4500-F C**	FileID: **2**	Analysis Date: **2/26/2008**	SeqNo: **660121**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	9.7	0.20	10	0	97	95	105	0	0		

Qualifiers:

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R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: PH_W

Sample ID	LCS-R37337	SampType:	LCS	TestCode:	PH_W	Run ID:	PH_080222A	Prep Date:	2/22/2008	Units:	pH Units
		Batch ID:	R37337	TestNo:	SM 4500H+ B	FileID:		Analysis Date:	2/22/2008	SeqNo:	659151

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
pH	7.98	1.00	8	0	99.8	99.3	100.7	0	0		

Qualifiers:

U - Not detected at or above the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside acceptance limits
E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: SULF_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **SULF_W**	Run ID: **REACT_080227B**	Prep Date: **2/27/2008**	Units: **mg/L**
	Batch ID: **R37421**	TestNo: **SM 4500-S C/**	FileID: **68**	Analysis Date: **2/27/2008**	SeqNo: **660574**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Sulfide	U	0.50									

Sample ID **LCS**	SampType: **LCS**	TestCode: **SULF_W**	Run ID: **REACT_080227B**	Prep Date: **2/27/2008**	Units: **mg/L**
	Batch ID: **R37421**	TestNo: **SM 4500-S C/**	FileID: **69**	Analysis Date: **2/27/2008**	SeqNo: **660575**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Sulfide	2.7	0.50	2.46	0	110	70	130	0	0		

Qualifiers:

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S - Spike Recovery outside acceptance limits
E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: TDS_W

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **TDS_W**	Run ID: **ANALYTICAL BALANCE_080226A**	Prep Date: **2/25/2008**	Units: **mg/L**
	Batch ID: **R37389**	TestNo: **SM 2540C**	FileID: **65**	Analysis Date: **2/25/2008**	SeqNo: **660199**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids	U	10.0									

Sample ID **LCS**	SampType: **LCS**	TestCode: **TDS_W**	Run ID: **ANALYTICAL BALANCE_080226A**	Prep Date: **2/25/2008**	Units: **mg/L**
	Batch ID: **R37389**	TestNo: **SM 2540C**	FileID: **66**	Analysis Date: **2/25/2008**	SeqNo: **660200**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids	403	10.0	400	0	101	90	110	0	0		

Qualifiers:

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J - Analyte detected below quantitation limits
S - Spike Recovery outside acceptance limits
E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: TSS

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **TSS**	Run ID: **ANALYTICAL BALANCE_080225A**	Prep Date: **2/25/2008**	Units: **mg/L**
	Batch ID: **R37368**	TestNo: **SM 2540 D**	FileID: **47**	Analysis Date: **2/25/2008**	SeqNo: **659552**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	U	5.0									

Sample ID **LCS**	SampType: **LCS**	TestCode: **TSS**	Run ID: **ANALYTICAL BALANCE_080225A**	Prep Date: **2/25/2008**	Units: **mg/L**
	Batch ID: **R37368**	TestNo: **SM 2540 D**	FileID: **48**	Analysis Date: **2/25/2008**	SeqNo: **659553**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	299	5.0	300	0	99.7	90	110	0	0		

Qualifiers:

U - Not detected at or above the Reporting Limit
J - Analyte detected below quantitation limits
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E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Evergreen Analytical, Inc.

Date: *04-Mar-08*

Work Order: 08-1122

Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

BatchID: 14848

Sample ID: **MB-14848**	SampType: **MBLK**	TestCode: **200.8_TR**	Run ID: **ICPMS_080228A**	Prep Date: **2/28/08**	Units: **mg/L**
	Batch ID: **14848**	TestNo: **E200.8**	FileID: **080228A.B\020SMPL.D**	Analysis Date: **2/28/08**	SeqNo: **661427**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	U	0.00200									
Arsenic	U	0.00200									
Barium	U	0.0100									
Beryllium	U	0.00100									
Boron	U	0.200									
Cadmium	U	0.000500									
Calcium	U	0.400									
Chromium	U	0.00220									
Copper	U	0.0100									
Iron	U	0.200									
Lead	U	0.00100									
Magnesium	U	0.0500									
Manganese	U	0.00500									
Molybdenum	U	0.00500									
Nickel	U	0.0100									
Potassium	U	0.125									
Selenium	U	0.00200									
Silver	U	0.000200									
Sodium	U	0.500									
Strontium	U	0.0980									
Thallium	U	0.00100									
Zinc	U	0.00500									

Sample ID: **LCS-14848**	SampType: **LCS**	TestCode: **200.8_TR**	Run ID: **ICPMS_080228A**	Prep Date: **2/28/08**	Units: **mg/L**
	Batch ID: **14848**	TestNo: **E200.8**	FileID: **080228A.B\021SMPL.D**	Analysis Date: **2/28/08**	SeqNo: **661428**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	0.00982	0.00200	0.01	0	98.2	85	115	0	0		
Arsenic	0.102	0.00200	0.1	0	102	85	115	0	0		

Qualifiers:

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R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Evergreen Analytical, Inc.

Date: *29-Feb-08*

Work Order: 08-1122

Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 504

Sample ID: **MB-14851**	SampType: **MBLK**	TestCode: **504**	Run ID: **ECD7_080228A**	Prep Date: **2/28/2008**	Units: **µg/L**
	Batch ID: **14851**	TestNo: **E504.1**	FileID: **029.D**	Analysis Date: **2/28/2008**	SeqNo: **661130**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	U	0.020									
1,2-Dibromoethane	U	0.010									

Sample ID: **LCS-14851**	SampType: **LCS**	TestCode: **504**	Run ID: **ECD7_080228A**	Prep Date: **2/28/2008**	Units: **µg/L**
	Batch ID: **14851**	TestNo: **E504.1**	FileID: **030.D**	Analysis Date: **2/28/2008**	SeqNo: **661131**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	0.276	0.020	0.25	0	110	70	130	0	0		
1,2-Dibromoethane	0.263	0.010	0.25	0	105	70	130	0	0		

Sample ID: **LCS-14851-2**	SampType: **LCS**	TestCode: **504**	Run ID: **ECD7_080228A**	Prep Date: **2/28/2008**	Units: **µg/L**
	Batch ID: **14851**	TestNo: **E504.1**	FileID: **031.D**	Analysis Date: **2/28/2008**	SeqNo: **661132**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	0.272	0.020	0.25	0	109	70	130	0	0		
1,2-Dibromoethane	0.264	0.010	0.25	0	106	70	130	0	0		

Sample ID: **08-1060-01BMS**	SampType: **MS**	TestCode: **504**	Run ID: **ECD7_080228A**	Prep Date: **2/28/2008**	Units: **µg/L**
	Batch ID: **14851**	TestNo: **E504.1**	FileID: **033.D**	Analysis Date: **2/28/2008**	SeqNo: **661134**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	1.059	0.020	1	0	106	65	135	0	0		
1,2-Dibromoethane	1.079	0.010	1	0	108	65	135	0	0		

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R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Evergreen Analytical, Inc.

Date: *05-Mar-08*

Work Order: 08-1122

Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

Sample ID: **MB4030408a**	SampType: **MBLK**	TestCode: **524**	Run ID: **VOA-4_080304A**	Prep Date: **3/4/2008**	Units: **µg/L**
	Batch ID: **R37558**	TestNo: **E524.2**	FileID: **\VOA40304\0501005.D**	Analysis Date: **3/4/2008**	SeqNo: **662567**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	U	0.50									
Bromobenzene	U	0.50									
Bromochloromethane	U	0.50									
Bromodichloromethane	U	0.50									
Bromoform	U	0.50									
Bromomethane	U	0.50									
n-Butylbenzene	U	0.50									
sec-Butylbenzene	U	0.50									
t-Butylbenzene	U	0.50									
Carbon tetrachloride	U	0.50									
Chlorobenzene	U	0.50									
Chloroethane	U	0.50									
Chloroform	U	0.50									
Chloromethane	U	0.50									
2-Chlorotoluene	U	0.50									
4-Chlorotoluene	U	0.50									
Dibromochloromethane	U	0.50									
Dibromomethane	U	0.50									
1,2-Dichlorobenzene	U	0.50									
1,3-Dichlorobenzene	U	0.50									
1,4-Dichlorobenzene	U	0.50									
Dichlorodifluoromethane	U	0.50									
1,1-Dichloroethane	U	0.50									
1,2-Dichloroethane	U	0.50									
1,1-Dichloroethene	U	0.50									
cis-1,2-Dichloroethene	U	0.50									
trans-1,2-Dichloroethene	U	0.50									
1,2-Dichloropropane	U	0.50									
1,3-Dichloropropane	U	0.50									

Qualifiers:

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E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

Sample ID: MB4030408a	SampType: MBLK	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\0501005.D	Analysis Date: 3/4/2008	SeqNo: 662567

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,2-Dichloropropane	U	0.50									
1,1-Dichloropropene	U	0.50									
cis-1,3-Dichloropropene	U	0.50									
trans-1,3-Dichloropropene	U	0.50									
Ethylbenzene	U	0.50									
Hexachlorobutadiene	U	0.50									
Isopropylbenzene	U	0.50									
p-Isopropyltoluene	U	0.50									
Methylene chloride	U	0.50									
Naphthalene	U	0.50									
n-Propylbenzene	U	0.50									
Styrene	U	0.50									
1,1,1,2-Tetrachloroethane	U	0.50									
1,1,2,2-Tetrachloroethane	U	0.50									
Tetrachloroethene	U	0.50									
Toluene	U	0.50									
1,2,3-Trichlorobenzene	U	0.50									
1,2,4-Trichlorobenzene	U	0.50									
1,1,1-Trichloroethane	U	0.50									
1,1,2-Trichloroethane	U	0.50									
Trichloroethene	U	0.50									
Trichlorofluoromethane	U	0.50									
1,2,3-Trichloropropane	U	0.50									
1,2,4-Trimethylbenzene	U	0.50									
1,3,5-Trimethylbenzene	U	0.50									
Vinyl chloride	U	0.50									
m,p-Xylene	U	0.50									
o-Xylene	U	0.50									
1,3-Dichloropropene	U	0.50									
Xylenes, Total	U	0.50									
Total THM (Summation of above)	U	0.50									

Qualifiers:

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S - Spike Recovery outside acceptance limits
E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

Sample ID: MB4030408a	SampType: MBLK	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\0501005.D	Analysis Date: 3/4/2008	SeqNo: 662567

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2-Dichlorobenzene-d4	5.16	0	5	0	103	70	130	0	0		
Surr: 4-Bromofluorobenzene	4.85	0	5	0	97	70	130	0	0		

Sample ID: LCS4030408a	SampType: LCS	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\0601006.D	Analysis Date: 3/4/2008	SeqNo: 662568

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	4.96	0.50	5	0	99.2	70	130	0	0		
Bromobenzene	5.13	0.50	5	0	103	70	130	0	0		
Bromochloromethane	4.91	0.50	5	0	98.2	70	130	0	0		
Bromodichloromethane	5.09	0.50	5	0	102	70	130	0	0		
Bromoform	4.76	0.50	5	0	95.2	70	130	0	0		
Bromomethane	6.43	0.50	5	0	129	70	130	0	0		
n-Butylbenzene	5.13	0.50	5	0	103	70	130	0	0		
sec-Butylbenzene	5.04	0.50	5	0	101	70	130	0	0		
t-Butylbenzene	5.12	0.50	5	0	102	70	130	0	0		
Carbon tetrachloride	4.65	0.50	5	0	93	70	130	0	0		
Chlorobenzene	5.06	0.50	5	0	101	70	130	0	0		
Chloroethane	4.41	0.50	5	0	88.2	70	130	0	0		
Chloroform	4.91	0.50	5	0	98.2	70	130	0	0		
Chloromethane	4.16	0.50	5	0	83.2	70	130	0	0		
2-Chlorotoluene	5.24	0.50	5	0	105	70	130	0	0		
4-Chlorotoluene	5.01	0.50	5	0	100	70	130	0	0		
Dibromochloromethane	4.94	0.50	5	0	98.8	70	130	0	0		
Dibromomethane	4.85	0.50	5	0	97	70	130	0	0		
1,2-Dichlorobenzene	5	0.50	5	0	100	70	130	0	0		
1,3-Dichlorobenzene	4.93	0.50	5	0	98.6	70	130	0	0		
1,4-Dichlorobenzene	4.88	0.50	5	0	97.6	70	130	0	0		
Dichlorodifluoromethane	4.88	0.50	5	0	97.6	70	130	0	0		
1,1-Dichloroethane	4.56	0.50	5	0	91.2	70	130	0	0		
1,2-Dichloroethane	4.68	0.50	5	0	93.6	70	130	0	0		

Qualifiers:

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J - Analyte detected below quantitation limits
S - Spike Recovery outside acceptance limits
E - Extrapolated value, value exceeds calibration range.
R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

Sample ID: LCS4030408a	SampType: LCS	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\0601006.D	Analysis Date: 3/4/2008	SeqNo: 662568

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	4.9	0.50	5	0	98	70	130	0	0		
cis-1,2-Dichloroethene	4.85	0.50	5	0	97	70	130	0	0		
trans-1,2-Dichloroethene	4.64	0.50	5	0	92.8	70	130	0	0		
1,2-Dichloropropane	4.77	0.50	5	0	95.4	70	130	0	0		
1,3-Dichloropropane	5.12	0.50	5	0	102	70	130	0	0		
2,2-Dichloropropane	4.56	0.50	5	0	91.2	70	130	0	0		
1,1-Dichloropropene	4.76	0.50	5	0	95.2	70	130	0	0		
cis-1,3-Dichloropropene	4.69	0.50	5	0	93.8	70	130	0	0		
trans-1,3-Dichloropropene	4.63	0.50	5	0	92.6	70	130	0	0		
Ethylbenzene	5.23	0.50	5	0	105	70	130	0	0		
Hexachlorobutadiene	5.12	0.50	5	0	102	70	130	0	0		
Isopropylbenzene	4.67	0.50	5	0	93.4	70	130	0	0		
p-Isopropyltoluene	4.92	0.50	5	0	98.4	70	130	0	0		
Methylene chloride	4.64	0.50	5	0	92.8	70	130	0	0		
Naphthalene	5.24	0.50	5	0	105	70	130	0	0		
n-Propylbenzene	5.17	0.50	5	0	103	70	130	0	0		
Styrene	5.31	0.50	5	0	106	70	130	0	0		
1,1,1,2-Tetrachloroethane	4.95	0.50	5	0	99	70	130	0	0		
1,1,2,2-Tetrachloroethane	5.2	0.50	5	0	104	70	130	0	0		
Tetrachloroethene	5.01	0.50	5	0	100	70	130	0	0		
Toluene	5.02	0.50	5	0	100	70	130	0	0		
1,2,3-Trichlorobenzene	5.08	0.50	5	0	102	70	130	0	0		
1,2,4-Trichlorobenzene	4.96	0.50	5	0	99.2	70	130	0	0		
1,1,1-Trichloroethane	4.54	0.50	5	0	90.8	70	130	0	0		
1,1,2-Trichloroethane	4.99	0.50	5	0	99.8	70	130	0	0		
Trichloroethene	4.97	0.50	5	0	99.4	70	130	0	0		
Trichlorofluoromethane	4.8	0.50	5	0	96	70	130	0	0		
1,2,3-Trichloropropane	5.2	0.50	5	0	104	70	130	0	0		
1,2,4-Trimethylbenzene	5.28	0.50	5	0	106	70	130	0	0		
1,3,5-Trimethylbenzene	5.23	0.50	5	0	105	70	130	0	0		
Vinyl chloride	5.59	0.50	5	0	112	70	130	0	0		

Qualifiers:

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R - RPD outside acceptance limits
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H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

Sample ID: LCS4030408a	SampType: LCS	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\0601006.D	Analysis Date: 3/4/2008	SeqNo: 662568

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
m,p-Xylene	10.13	0.50	10	0	101	70	130	0	0		
o-Xylene	5.19	0.50	5	0	104	70	130	0	0		
1,3-Dichloropropene	9.32	0.50	10	0	93.2	70	130	0	0		
Xylenes, Total	15.32	0.50	15	0	102	70	130	0	0		
Total THM (Summation of above)	19.7	0.50	20	0	98.5	70	130	0	0		
Surr: 1,2-Dichlorobenzene-d4	5.15	0	5	0	103	70	130	0	0		
Surr: 4-Bromofluorobenzene	5.21	0	5	0	104	70	130	0	0		

Sample ID: LCSD4030408a	SampType: LCSD	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\2101021.D	Analysis Date: 3/5/2008	SeqNo: 662582

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	4.47	0.50	5	0	89.4	70	130	4.96	10.4	30	
Bromobenzene	4.42	0.50	5	0	88.4	70	130	5.13	14.9	30	
Bromochloromethane	4.36	0.50	5	0	87.2	70	130	4.91	11.9	30	
Bromodichloromethane	4.66	0.50	5	0	93.2	70	130	5.09	8.82	30	
Bromoform	4.2	0.50	5	0	84	70	130	4.76	12.5	30	
Bromomethane	5.53	0.50	5	0	111	70	130	6.43	15.1	30	
n-Butylbenzene	4.42	0.50	5	0	88.4	70	130	5.13	14.9	30	
sec-Butylbenzene	4.43	0.50	5	0	88.6	70	130	5.04	12.9	30	
t-Butylbenzene	4.45	0.50	5	0	89	70	130	5.12	14.0	30	
Carbon tetrachloride	4.37	0.50	5	0	87.4	70	130	4.65	6.21	30	
Chlorobenzene	4.41	0.50	5	0	88.2	70	130	5.06	13.7	30	
Chloroethane	3.94	0.50	5	0	78.8	70	130	4.41	11.3	30	
Chloroform	4.61	0.50	5	0	92.2	70	130	4.91	6.30	30	
Chloromethane	4.19	0.50	5	0	83.8	70	130	4.16	0.719	30	
2-Chlorotoluene	4.58	0.50	5	0	91.6	70	130	5.24	13.4	30	
4-Chlorotoluene	4.31	0.50	5	0	86.2	70	130	5.01	15.0	30	
Dibromochloromethane	4.32	0.50	5	0	86.4	70	130	4.94	13.4	30	
Dibromomethane	4.37	0.50	5	0	87.4	70	130	4.85	10.4	30	
1,2-Dichlorobenzene	4.28	0.50	5	0	85.6	70	130	5	15.5	30	

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R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
H - Prep or analytical holding time exceeded
X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

Sample ID: LCSD4030408a	SampType: LCSD	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\2101021.D	Analysis Date: 3/5/2008	SeqNo: 662582

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	4.31	0.50	5	0	86.2	70	130	4.93	13.4	30	
1,4-Dichlorobenzene	4.23	0.50	5	0	84.6	70	130	4.88	14.3	30	
Dichlorodifluoromethane	4.33	0.50	5	0	86.6	70	130	4.88	11.9	30	
1,1-Dichloroethane	4.38	0.50	5	0	87.6	70	130	4.56	4.03	30	
1,2-Dichloroethane	4.27	0.50	5	0	85.4	70	130	4.68	9.16	30	
1,1-Dichloroethene	4.62	0.50	5	0	92.4	70	130	4.9	5.88	30	
cis-1,2-Dichloroethene	4.53	0.50	5	0	90.6	70	130	4.85	6.82	30	
trans-1,2-Dichloroethene	4.47	0.50	5	0	89.4	70	130	4.64	3.73	30	
1,2-Dichloropropane	4.39	0.50	5	0	87.8	70	130	4.77	8.30	30	
1,3-Dichloropropane	4.5	0.50	5	0	90	70	130	5.12	12.9	30	
2,2-Dichloropropane	4.04	0.50	5	0	80.8	70	130	4.56	12.1	30	
1,1-Dichloropropene	4.45	0.50	5	0	89	70	130	4.76	6.73	30	
cis-1,3-Dichloropropene	4.2	0.50	5	0	84	70	130	4.69	11.0	30	
trans-1,3-Dichloropropene	4.07	0.50	5	0	81.4	70	130	4.63	12.9	30	
Ethylbenzene	4.55	0.50	5	0	91	70	130	5.23	13.9	30	
Hexachlorobutadiene	4.33	0.50	5	0	86.6	70	130	5.12	16.7	30	
Isopropylbenzene	4.07	0.50	5	0	81.4	70	130	4.67	13.7	30	
p-Isopropyltoluene	4.26	0.50	5	0	85.2	70	130	4.92	14.4	30	
Methylene chloride	4.32	0.50	5	0	86.4	70	130	4.64	7.14	30	
Naphthalene	4.43	0.50	5	0	88.6	70	130	5.24	16.8	30	
n-Propylbenzene	4.42	0.50	5	0	88.4	70	130	5.17	15.6	30	
Styrene	4.61	0.50	5	0	92.2	70	130	5.31	14.1	30	
1,1,1,2-Tetrachloroethane	4.34	0.50	5	0	86.8	70	130	4.95	13.1	30	
1,1,2,2-Tetrachloroethane	4.45	0.50	5	0	89	70	130	5.2	15.5	30	
Tetrachloroethene	4.34	0.50	5	0	86.8	70	130	5.01	14.3	30	
Toluene	4.47	0.50	5	0	89.4	70	130	5.02	11.6	30	
1,2,3-Trichlorobenzene	4.3	0.50	5	0	86	70	130	5.08	16.6	30	
1,2,4-Trichlorobenzene	4.23	0.50	5	0	84.6	70	130	4.96	15.9	30	
1,1,1-Trichloroethane	4.31	0.50	5	0	86.2	70	130	4.54	5.20	30	
1,1,2-Trichloroethane	4.33	0.50	5	0	86.6	70	130	4.99	14.2	30	
Trichloroethene	4.58	0.50	5	0	91.6	70	130	4.97	8.17	30	

Qualifiers:

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R - RPD outside acceptance limits
B - Analyte detected in the associated Method Blank
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X - See case narrative

Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

Sample ID: LCSD4030408a	SampType: LCSD	TestCode: 524	Run ID: VOA-4_080304A	Prep Date: 3/4/2008	Units: µg/L
	Batch ID: R37558	TestNo: E524.2	FileID: \VOA40304\2101021.D	Analysis Date: 3/5/2008	SeqNo: 662582

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane	4.51	0.50	5	0	90.2	70	130	4.8	6.23	30	
1,2,3-Trichloropropane	4.43	0.50	5	0	88.6	70	130	5.2	16.0	30	
1,2,4-Trimethylbenzene	4.63	0.50	5	0	92.6	70	130	5.28	13.1	30	
1,3,5-Trimethylbenzene	4.53	0.50	5	0	90.6	70	130	5.23	14.3	30	
Vinyl chloride	5.07	0.50	5	0	101	70	130	5.59	9.76	30	
m,p-Xylene	8.83	0.50	10	0	88.3	70	130	10.13	13.7	30	
o-Xylene	4.52	0.50	5	0	90.4	70	130	5.19	13.8	30	
1,3-Dichloropropene	8.27	0.50	10	0	82.7	70	130	9.32	11.9	30	
Xylenes, Total	13.35	0.50	15	0	89	70	130	15.32	13.7	30	
Total THM (Summation of above)	17.79	0.50	20	0	89	70	130	19.7	10.2	30	
Surr: 1,2-Dichlorobenzene-d4	4.71	0	5	0	94.2	70	130	0	0	0	
Surr: 4-Bromofluorobenzene	4.92	0	5	0	98.4	70	130	0	0	0	

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Evergreen Analytical, Inc.

Date: *04-Mar-08*

Work Order: 08-1122

Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

BatchID: GAS030408

Sample ID: GB030408	SampType: MBLK	TestCode: MEEP_W	Run ID: FID4_080304A	Prep Date: 3/4/08	Units: mg/L
	Batch ID: GAS030408	TestNo: RSKSOP175	FileID: GAS0304004	Analysis Date: 3/4/08	SeqNo: 662138

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethane	U	0.0016									
Ethene	U	0.0024									
Methane	U	0.00080									

Sample ID: LCS030408	SampType: LCS	TestCode: MEEP_W	Run ID: FID4_080304A	Prep Date: 3/4/08	Units: mg/L
	Batch ID: GAS030408	TestNo: RSKSOP175	FileID: GAS0304005	Analysis Date: 3/4/08	SeqNo: 662139

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethane	1.081	0.016	0.9548	0	113	70	130	0	0		
Ethene	1.114	0.024	0.8913	0	125	70	140	0	0		
Methane	0.5722	0.0080	0.5094	0	112	70	130	0	0		

Sample ID: LCSD030408	SampType: LCSD	TestCode: MEEP_W	Run ID: FID4_080304A	Prep Date: 3/4/08	Units: mg/L
	Batch ID: GAS030408	TestNo: RSKSOP175	FileID: GAS0304006	Analysis Date: 3/4/08	SeqNo: 662140

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethane	1.087	0.016	0.9548	0	114	70	130	1.081	0.517	30	
Ethene	1.114	0.024	0.8913	0	125	70	140	1.114	0.0183	30	
Methane	0.572	0.0080	0.5094	0	112	70	130	0.5722	0.0306	30	

Sample ID: 08-1310-01AMS	SampType: MS	TestCode: MEEP_W	Run ID: FID4_080304A	Prep Date: 3/4/08	Units: mg/L
	Batch ID: GAS030408	TestNo: RSKSOP175	FileID: GAS0304013	Analysis Date: 3/4/08	SeqNo: 662132

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethane	1.071	0.016	0.9548	0	112	70	130	0	0		
Ethene	1.107	0.024	0.8913	0	124	70	140	0	0		
Methane	0.5648	0.0080	0.5094	0.002153	111	70	130	0	0		

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Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

BatchID: GAS030408

Sample ID: **08-1310-01AMSD**	SampType: **MSD**	TestCode: **MEEP_W**	Run ID: **FID4_080304A**	Prep Date: **3/4/08**	Units: **mg/L**
	Batch ID: **GAS030408**	TestNo: **RSKSOP175**	FileID: **GAS0304014**	Analysis Date: **3/4/08**	SeqNo: **662133**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethane	1.072	0.016	0.9548	0	112	70	130	1.071	0.155	30	
Ethene	1.103	0.024	0.8913	0	124	70	140	1.107	0.331	30	
Methane	0.5664	0.0080	0.5094	0.002153	111	70	130	0.5648	0.289	30	

Qualifiers:

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X - See case narrative

Evergreen
Analytical
Laboratory

March 07, 2008

Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055

Lab Work Order: 08-1122
Client Project ID: Petroglyph CBM wells

Dear Tom Melland:

Enclosed are the analytical results for the samples shown in the Laboratory Work Order Summary. The invoice is included with this report or has been mailed to another party as indicated on the chain of custody.

The enclosed data for testing performed at Evergreen Analytical Laboratory (EAL) have been reviewed for quality assurance. A case narrative is included to describe any anomalies associated with the samples or data.

EAL will dispose of all samples one month from the date of this letter. If you want samples returned, please advise us by mail or fax as soon as possible.

A copy of this project report and supporting data will be retained for a period of five years unless we are otherwise advised by you. A document retrieval charge will apply.

Thank you for using the services of Evergreen Analytical. If you have any questions concerning the analytical data, please contact me. Please direct other questions to Client Services.

Sincerely,

Carl Smits / Kaprie Hollman
Technical Director of Chemical Analysis

WORK ORDER Summary Evergreen Analytical, Inc. 08-1189

Rpt To: Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055
(719) 742-5570

Email To: Tmelland@petroglyphenergy.com

2/26/08 4:06:15 PM

Client Project ID:

QC Level: Level I+

Comments:

Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Test Code	Test Name	Hold	MS	Date Due	Hold Time
08-1189-01A	MMW (849-995)	Water	2/24/08 0000	2/26/08	524 *	524.2: Standard List	☐	☐	3/11/08	3/09/08
08-1189-01B	MMW (849-995)	Water	2/24/08 0000	2/26/08	504 *	504: Standard List	☐	☐	3/11/08	3/09/08
08-1189-01C	MMW (849-995)	Water	2/24/08 0000	2/26/08	200.8_TR * ^	200.8: Total Metals	☐	☐	3/11/08	8/22/08
08-1189-01C	MMW (849-995)	Water	2/24/08 0000	2/26/08	245.1_WT * ^	245.1: Mercury, Total Water	☐	☐	3/11/08	3/23/08
08-1189-01D	MMW (849-995)	Water	2/24/08 0000	2/26/08	ALK_WGRP *	Alkalinity	☐	☐	3/11/08	3/09/08
08-1189-01E	MMW (849-995)	Water	2/24/08 0000	2/26/08	MEEP_W *	RSK175M: MEE	☐	☐	3/11/08	3/09/08
08-1189-01F	MMW (849-995)	Water	2/24/08 0000	2/26/08	SULF_W	Total Sulfide	☐	☐	3/11/08	3/02/08
08-1189-01G	MMW (849-995)	Water	2/24/08 0000	2/26/08	F_W	Fluoride	☐	☐	3/11/08	3/23/08
08-1189-01H	MMW (849-995)	Water	2/24/08 0000	2/26/08	ANIONS_W *	300.0: Anions by IC	☐	☐	3/11/08	2/26/08
08-1189-01I	MMW (849-995)	Water	2/24/08 0000	2/26/08	PH_W	Discharge Water pH	☐	☐	3/11/08	2/24/08
08-1189-01I	MMW (849-995)	Water	2/24/08 0000	2/26/08	TDS_W	Total Dissolved Solids (TDS)	☐	☐	3/11/08	3/02/08
08-1189-01I	MMW (849-995)	Water	2/24/08 0000	2/26/08	TSS	Total Suspended Solids (TSS)	☐	☐	3/11/08	3/02/08
08-1189-02A	MMW (687-788)	Water	2/24/08 1845	2/26/08	524 *	524.2: Standard List	☐	☐	3/11/08	3/09/08
08-1189-02B	MMW (687-788)	Water	2/24/08 1845	2/26/08	504 *	504: Standard List	☐	☐	3/11/08	3/09/08
08-1189-02C	MMW (687-788)	Water	2/24/08 1845	2/26/08	200.8_TR *	200.8: Total Metals	☐	☐	3/11/08	8/22/08
08-1189-02C	MMW (687-788)	Water	2/24/08 1845	2/26/08	245.1_WT *	245.1: Mercury, Total Water	☐	☐	3/11/08	3/23/08
08-1189-02D	MMW (687-788)	Water	2/24/08 1845	2/26/08	ALK_WGRP *	Alkalinity	☐	☐	3/11/08	3/09/08
08-1189-02E	MMW (687-788)	Water	2/24/08 1845	2/26/08	MEEP_W *	RSK175M: MEE	☐	☐	3/11/08	3/09/08
08-1189-02F	MMW (687-788)	Water	2/24/08 1845	2/26/08	SULF_W	Total Sulfide	☐	☐	3/11/08	3/02/08
08-1189-02G	MMW (687-788)	Water	2/24/08 1845	2/26/08	F_W	Fluoride	☐	☐	3/11/08	3/23/08
08-1189-02H	MMW (687-788)	Water	2/24/08 1845	2/26/08	ANIONS_W *	300.0: Anions by IC	☐	☐	3/11/08	2/26/08

Definitions: * - Test Code has a Select List

002

WORK ORDER Summary Evergreen Analytical, Inc. 08-1189

Rpt To: Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055
(719) 742-5570

Email To: Tmelland@petroglyphenergy.com

2/26/08 4:06:15 PM

Client Project ID:

QC Level: Level I+

08-1189-021	MMW (687-788)	Water	2/24/08 1845	2/26/08	PH_W	Discharge Water pH	☐	☐	3/11/08	2/24/08
08-1189-021	MMW (687-788)	Water	2/24/08 1845	2/26/08	TDS_W	Total Dissolved Solids (TDS)	☐	☐	3/11/08	3/02/08
08-1189-021	MMW (687-788)	Water	2/24/08 1845	2/26/08	TSS	Total Suspended Solids (TSS)	☐	☐	3/11/08	3/02/08

Definitions: * - Test Code has a Select List

003

CHAIN OF CUSTODY RECORD / ANALYTICAL SERVICES AGREEMENT**

Evergreen Analytical Laboratory Inc.

Page 1 of 1

CLIENT INFORMATION

Mail **Original** Report to: Petroglyph Energy
Attn Tom Melland
Address PO Box 979
City La Veta State CO Zip 81055
Tel # 719 742 5520 Fax # 719 742 5571 E-mail tmelland@petroglyphenergy.com
REPORT ALSO BY ☐ FAX ☒ PDF ☒ EDD
Mail Invoice to: Petroglyph
Attn Tom Melland
Address PO Box 979
City La Veta State CO Zip 81055
Tel # 719 742 5520 Fax # 719 742 5571
P.O. _____ Quote 8945
Sampler Konrad Quast

4036 Youngfield Street
Wheat Ridge, Colorado 80033
(303) 425-6021
FAX (303) 425-6854
(877) 737-4521
info@evergreenanalytical.com

PWSID No. / Proj ID _____
Are State forms required? ☐ Yes ☐ No
Is the laboratory to mail forms to State? ☐ Yes ☐ No
Standard Turnaround ☒ Yes ☐ No
Other Turnaround* _____ (Specify)
*Rush analysis subject to additional fee

SAMPLE IDENTIFICATION	DATE SAMPLED	TIME	No. of Containers	VOA or THM 524.2 (Circle)	Haloacetic Acid 552.2	SOC 525.2	EDB/DBCP 504.1	Pesticides 525.2 & 200.8 if requested	Pesticides / PCB's 508	Herbicides 515.4	Carbamates 531.1	Glyphosate 547	Endothall 548.1	Diquat 549.2	SUVA, UV254 (Circle)	Anions (Circle below) 300.0 by IC	Cyanide 4500 CNE	Metals (11 regulated or list below)	Langelier Index, Alkalinity (Circle)	TOC, DOC SM5310C (Circle)	TSS, TDS, pH	Total Coliform	Outside Lab Analyses (Circle Test): Gross A + B + Total Solids	Ra 226	Ra 228	Radon, Uranium	For Laboratory use only
MMW (849 - 995)	2/24/08	0000	14	X			X	X	X	X	X	X				X					X						01
MMW (687 - 788)	2/24/08	1845	14																								02
																											visual fil / turbidity, 200.8 TR + 245.1
Sample Fraction				A			B	C	D	E	F	G	K			H I J					I J						Loc

W.O. # 08-1189
B.O.F. # —
C/S (O) — / —
C/S (I) C(R) / UPS
Temp. °C C(R) Ice 5.1
Seals Present Y / N / NA
Samples Pres. Y / N / NA
Headspace Y / N / NA
By NO

Instructions:

** **Important Note:** See reverse side for Terms and Conditions.

Anions: Chloride, Nitrite, Nitrate, Nitrite + Nitrate, Sulfate, Fluoride (Circle)

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	2/25/08 8:45am	[signature] 2-25-08	8:45	[signature] 2-25-08	9:45	[signature]	2/26/8 330p

Evergreen Analytical, Inc. **Date:** *12-Mar-08*

Client Project ID:
Lab Order: 08-1189

CASE NARRATIVE

SAMPLE RECEIVING

Custody seals were not present.
The temperature of the sample(s) upon arrival was 5.1 °C.
Sample(s) were received in good condition and in the proper container.
Both pH samples and NO2 and NO3 for 08-1189-01 were received out of holding time.
VOC sample(s) were received with no headspace present. NJO

QUALITY ASSURANCE (QA)

Analyses performed on samples in this work order by EAL meet the requirements of the EAL Quality Assurance Program unless otherwise explained. RCRA analyses meet the requirements of NELAC and Utah Rule R444-14 unless otherwise explained.
The QA pages were retained in the project file and are available upon request. CMS

CLIENT SERVICES

There are no anomalies to report. SG

GENERAL CHEMISTRY

Both pH samples and sample 08-1189-01 nitrate and nitrite were received (and analyzed) out of holding times (H). The fluoride results exceeded the drinking water MCL of 4.0 mg/L (*). There are no other anomalies to report. JML/CMS

METALS ANALYSIS

Sample(s) were preserved by the metals group prior to the analysis. There are no anomalies to report. MB

GAS CHROMATOGRAPHY

Method 504.1: There are no anomalies to report. AE

Method MEEP_W: There are no anomalies to report. MS

GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Method 524.2: There are no anomalies to report. DC

Evergreen Analytical, Inc.
4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (849-995)	**Lab Work Order:**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-01A
Date Collected:	2/24/2008	**Sample Matrix:**	Water
Date Received:	2/26/2008	**Lab File ID:**	1701017.D
Date Prepared:	3/5/2008	**Method Blank:**	MB6030508
Date Analyzed:	3/5/2008	**Prep Factor:**	1.000
Percent Moisture:	NA	**Dilution Factor:**	1.00

Method: E524.2
Prep Method: E524.2

VOLATILE COMPOUNDS

Units: µg/L

Analytes	CAS Number	Result	LQL
Benzene	71-43-2	U	0.50
Bromobenzene	108-86-1	U	0.50
Bromochloromethane	74-97-5	U	0.50
Bromodichloromethane	75-27-4	U	0.50
Bromoform	75-25-2	U	0.50
Bromomethane	74-83-9	U	0.50
n-Butylbenzene	104-51-8	U	0.50
sec-Butylbenzene	135-98-8	U	0.50
t-Butylbenzene	98-06-6	U	0.50
Carbon tetrachloride	56-23-5	U	0.50
Chlorobenzene	108-90-7	U	0.50
Chloroethane	75-00-3	U	0.50
Chloroform	67-66-3	U	0.50
Chloromethane	74-87-3	U	0.50
2-Chlorotoluene	95-49-8	U	0.50
4-Chlorotoluene	106-43-4	U	0.50
Dibromochloromethane	124-48-1	U	0.50
Dibromomethane	74-95-3	U	0.50
1,2-Dichlorobenzene	95-50-1	U	0.50
1,3-Dichlorobenzene	541-73-1	U	0.50
1,4-Dichlorobenzene	106-46-7	U	0.50
Dichlorodifluoromethane	75-71-8	U	0.50
1,1-Dichloroethane	75-34-3	U	0.50
1,2-Dichloroethane	107-06-2	U	0.50
1,1-Dichloroethene	75-35-4	U	0.50
cis-1,2-Dichloroethene	156-59-2	U	0.50
trans-1,2-Dichloroethene	156-60-5	U	0.50
1,2-Dichloropropane	78-87-5	U	0.50
1,3-Dichloropropane	142-28-9	U	0.50
2,2-Dichloropropane	590-20-7	U	0.50
1,1-Dichloropropene	563-58-6	U	0.50
cis-1,3-Dichloropropene	10061-01-5	U	0.50
trans-1,3-Dichloropropene	10061-02-6	U	0.50
1,3-Dichloropropene	542-75-6	U	0.50
Ethylbenzene	100-41-4	U	0.50
Hexachlorobutadiene	87-68-3	U	0.50
Isopropylbenzene	98-82-8	U	0.50
p-Isopropyltoluene	99-87-6	U	0.50
Methylene chloride	75-09-2	U	0.50
Naphthalene	91-20-3	U	0.50

Analyst **Approved**

Qualifiers: **See case narrative for a discussion**
B - Analyte detected in the Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/6/2008

Evergreen Analytical, Inc.
4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (849-995)	**Lab Work Order:**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-01A
Date Collected:	2/24/2008	**Sample Matrix:**	Water
Date Received:	2/26/2008	**Lab File ID:**	1701017.D
Date Prepared:	3/5/2008	**Method Blank:**	MB36030508
Date Analyzed:	3/5/2008	**Prep Factor:**	1.000
Percent Moisture:	NA	**Dilution Factor:**	1.00

Method: E524.2 — VOLATILE COMPOUNDS

Prep Method: E524.2

Units: µg/L

Analytes	CAS Number	Result	LQL
n-Propylbenzene	103-65-1	U	0.50
Styrene	100-42-5	U	0.50
1,1,1,2-Tetrachloroethane	630-20-6	U	0.50
1,1,2,2-Tetrachloroethane	79-34-5	U	0.50
Tetrachloroethene	127-18-4	U	0.50
Toluene	108-88-3	3.36	0.50
1,2,3-Trichlorobenzene	87-61-6	U	0.50
1,2,4-Trichlorobenzene	120-82-1	U	0.50
1,1,1-Trichloroethane	71-55-6	U	0.50
1,1,2-Trichloroethane	79-00-5	U	0.50
Trichloroethene	79-01-6	U	0.50
Trichlorofluoromethane	75-69-4	U	0.50
1,2,3-Trichloropropane	96-18-4	U	0.50
1,2,4-Trimethylbenzene	95-63-6	U	0.50
1,3,5-Trimethylbenzene	108-67-8	U	0.50
Vinyl chloride	75-01-4	U	0.50
m,p-Xylene	1330-20-7	U	0.50
o-Xylene	95-47-6	U	0.50
Xylenes, Total	1330-20-7	U	0.50
Total THM (Summation of above)		U	0.50
Surr: 1,2-Dichlorobenzene-d4	2199-69-1	105	**QC Limits:** 70-130 %REC
Surr: 4-Bromofluorobenzene	460-00-4	104	**QC Limits:** 70-130 %REC

Analyst **Approved**

Qualifiers: **See case narrative for a discussion**

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Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/6/2008

Evergreen Analytical, Inc.
4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (687-788)	**Lab Work Order:**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-02A
Date Collected:	2/24/2008	**Sample Matrix:**	Water
Date Received:	2/26/2008	**Lab File ID:**	1801018.D
Date Prepared:	3/5/2008	**Method Blank:**	MB6030508
Date Analyzed:	3/5/2008	**Prep Factor:**	1.000
Percent Moisture:	NA	**Dilution Factor:**	1.00

Method: E524.2 — VOLATILE COMPOUNDS

Prep Method: E524.2

Units: µg/L

Analytes	CAS Number	Result	LQL
Benzene	71-43-2	U	0.50
Bromobenzene	108-86-1	U	0.50
Bromochloromethane	74-97-5	U	0.50
Bromodichloromethane	75-27-4	U	0.50
Bromoform	75-25-2	U	0.50
Bromomethane	74-83-9	U	0.50
n-Butylbenzene	104-51-8	U	0.50
sec-Butylbenzene	135-98-8	U	0.50
t-Butylbenzene	98-06-6	U	0.50
Carbon tetrachloride	56-23-5	U	0.50
Chlorobenzene	108-90-7	U	0.50
Chloroethane	75-00-3	U	0.50
Chloroform	67-66-3	U	0.50
Chloromethane	74-87-3	U	0.50
2-Chlorotoluene	95-49-8	U	0.50
4-Chlorotoluene	106-43-4	U	0.50
Dibromochloromethane	124-48-1	U	0.50
Dibromomethane	74-95-3	U	0.50
1,2-Dichlorobenzene	95-50-1	U	0.50
1,3-Dichlorobenzene	541-73-1	U	0.50
1,4-Dichlorobenzene	106-46-7	U	0.50
Dichlorodifluoromethane	75-71-8	U	0.50
1,1-Dichloroethane	75-34-3	U	0.50
1,2-Dichloroethane	107-06-2	U	0.50
1,1-Dichloroethene	75-35-4	U	0.50
cis-1,2-Dichloroethene	156-59-2	U	0.50
trans-1,2-Dichloroethene	156-60-5	U	0.50
1,2-Dichloropropane	78-87-5	U	0.50
1,3-Dichloropropane	142-28-9	U	0.50
2,2-Dichloropropane	590-20-7	U	0.50
1,1-Dichloropropene	563-58-6	U	0.50
cis-1,3-Dichloropropene	10061-01-5	U	0.50
trans-1,3-Dichloropropene	10061-02-6	U	0.50
1,3-Dichloropropene	542-75-6	U	0.50
Ethylbenzene	100-41-4	U	0.50
Hexachlorobutadiene	87-68-3	U	0.50
Isopropylbenzene	98-82-8	U	0.50
p-Isopropyltoluene	99-87-6	U	0.50
Methylene chloride	75-09-2	U	0.50
Naphthalene	91-20-3	U	0.50

Analyst **Approved**

Qualifiers: **See case narrative for a discussion**

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Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/6/2008

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4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (687-788)	**Lab Work Order:**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-02A
Date Collected:	2/24/2008	**Sample Matrix:**	Water
Date Received:	2/26/2008	**Lab File ID:**	1801018.D
Date Prepared:	3/5/2008	**Method Blank:**	MB36030508
Date Analyzed:	3/5/2008	**Prep Factor:**	1.000
Percent Moisture:	NA	**Dilution Factor:**	1.00

Method: E524.2 — VOLATILE COMPOUNDS

Prep Method: E524.2

Units: µg/L

Analytes	CAS Number	Result		LQL
n-Propylbenzene	103-65-1	U		0.50
Styrene	100-42-5	U		0.50
1,1,1,2-Tetrachloroethane	630-20-6	U		0.50
1,1,2,2-Tetrachloroethane	79-34-5	U		0.50
Tetrachloroethene	127-18-4	U		0.50
Toluene	108-88-3	12.1		0.50
1,2,3-Trichlorobenzene	87-61-6	U		0.50
1,2,4-Trichlorobenzene	120-82-1	U		0.50
1,1,1-Trichloroethane	71-55-6	U		0.50
1,1,2-Trichloroethane	79-00-5	U		0.50
Trichloroethene	79-01-6	U		0.50
Trichlorofluoromethane	75-69-4	U		0.50
1,2,3-Trichloropropane	96-18-4	U		0.50
1,2,4-Trimethylbenzene	95-63-6	U		0.50
1,3,5-Trimethylbenzene	108-67-8	U		0.50
Vinyl chloride	75-01-4	U		0.50
m,p-Xylene	1330-20-7	U		0.50
o-Xylene	95-47-6	U		0.50
Xylenes, Total	1330-20-7	U		0.50
Total THM (Summation of above)		U		0.50
Surr: 1,2-Dichlorobenzene-d4	2199-69-1	99	**QC Limits:**	70-130 %REC
Surr: 4-Bromofluorobenzene	460-00-4	99	**QC Limits:**	70-130 %REC

Analyst | **Approved**

Qualifiers: **See case narrative for a discussion**

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J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/6/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (849-995)	**Lab Work Order:**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-01B
Date Collected:	2/24/2008	**Sample Matrix:**	Water
Date Received:	2/26/2008	**Lab File ID:**	050.D
Date Prepared:	2/28/2008	**Method Blank:**	MB-14851
Date Analyzed:	2/28/2008	**Prep Factor:**	0.057
Percent Moisture:	NA	**Dilution Factor:**	1.00

Method: E504.1 **EDB/DBCP**
Prep Method: E504.1

Units: µg/L

Analytes	CAS Number	Result	MDL	LQL
1,2-Dibromo-3-chloropropane	96-12-8	U	0.02	0.02
1,2-Dibromoethane	106-93-4	U	0.01	0.01

Analyst **Approved**

Qualifiers: **See the case narrative for a discussion**
B - Analyte detected in the Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 2/29/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (687-788)	**Lab Work Order:**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-02B
Date Collected:	2/24/2008	**Sample Matrix:**	Water
Date Received:	2/26/2008	**Lab File ID:**	051.D
Date Prepared:	2/28/2008	**Method Blank:**	MB-14851
Date Analyzed:	2/28/2008	**Prep Factor:**	0.057
Percent Moisture:	NA	**Dilution Factor:**	1.00

Method: E504.1 **EDB/DBCP**
Prep Method: E504.1

Units: µg/L

Analytes	CAS Number	Result	MDL	LQL
1,2-Dibromo-3-chloropropane	96-12-8	U	0.02	0.02
1,2-Dibromoethane	106-93-4	U	0.01	0.01

Analyst

Approved

Qualifiers: **See the case narrative for a discussion**
B - Analyte detected in the Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 2/29/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (849-995)
Client Project ID:
Date Collected: 2/24/08
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-01
Sample Matrix: Water

TOTAL METALS

Method: E200.8 **Prep Method: E200.8**

Date Prepared: 2/28/08
Date Analyzed: 2/28/08
Lab File ID: 080228A.B\038SMPL.D
Method Blank: MB-14848
Dilution Factor: 1
Lab Fraction ID: 08-1189-01C

Analytes	CAS Number	Result	LQL	Units
Antimony	7440-36-0	U	0.00200	mg/L
Arsenic	7440-38-2	0.0206	0.00200	mg/L
Barium	7440-39-3	0.304	0.0100	mg/L
Beryllium	7440-41-7	U	0.00100	mg/L
Boron	7440-42-8	U	0.200	mg/L
Cadmium	7440-43-9	U	0.000500	mg/L
Calcium	7440-70-2	7.56	0.400	mg/L
Chromium	7440-47-3	0.00862	0.00220	mg/L
Copper	7440-50-8	U	0.0100	mg/L
Iron	7439-89-6	5.59	0.200	mg/L
Lead	7439-92-1	0.00409	0.00100	mg/L
Magnesium	7439-95-4	1.35	0.0500	mg/L
Manganese	7439-96-5	0.0868	0.00500	mg/L
Molybdenum	7439-98-7	0.0120	0.00500	mg/L
Nickel	7440-02-0	U	0.0100	mg/L
Potassium	7440-09-7	2.20	0.125	mg/L
Selenium	7782-49-2	U	0.00200	mg/L
Silver	7440-22-4	U	0.000200	mg/L
Sodium	7440-23-5	128	0.500	mg/L
Strontium	7440-24-6	0.204	0.0980	mg/L
Thallium	7440-28-0	U	0.00100	mg/L
Zinc	7440-66-6	0.0833	0.00500	mg/L

MB
Analyst

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL.
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 3/4/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (849-995)
Client Project ID:
Date Collected: 2/24/08
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-01
Sample Matrix: Water

MERCURY, DRINKING WATER

Method: E245.1 **Prep Method: E245.1**

Date Prepared: 2/29/08
Date Analyzed: 2/29/08
Lab File ID: 022908w
Method Blank: MB-14861
Dilution Factor: 1
Lab Fraction ID: 08-1189-01C

Analytes	CAS Number	Result	LQL	Units
Mercury	7439-97-6	U	0.00010	mg/L

MB
Analyst

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 3/4/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (687-788)
Client Project ID:
Date Collected: 2/24/08
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-02
Sample Matrix: Water

TOTAL METALS

Method: E200.8 **Prep Method: E200.8**

Date Prepared: 2/28/08
Date Analyzed: 2/28/08
Lab File ID: 080228A.B\039SMPL.D
Method Blank: MB-14848
Dilution Factor: 1
Lab Fraction ID: 08-1189-02C

Analytes	CAS Number	Result	LQL	Units
Antimony	7440-36-0	U	0.00200	mg/L
Arsenic	7440-38-2	0.0209	0.00200	mg/L
Barium	7440-39-3	0.121	0.0100	mg/L
Beryllium	7440-41-7	U	0.00100	mg/L
Boron	7440-42-8	U	0.200	mg/L
Cadmium	7440-43-9	U	0.000500	mg/L
Calcium	7440-70-2	20.0	0.400	mg/L
Chromium	7440-47-3	0.0106	0.00220	mg/L
Copper	7440-50-8	U	0.0100	mg/L
Iron	7439-89-6	5.49	0.200	mg/L
Lead	7439-92-1	0.00569	0.00100	mg/L
Magnesium	7439-95-4	1.22	0.0500	mg/L
Manganese	7439-96-5	0.117	0.00500	mg/L
Molybdenum	7439-98-7	0.0126	0.00500	mg/L
Nickel	7440-02-0	U	0.0100	mg/L
Potassium	7440-09-7	2.64	0.125	mg/L
Selenium	7782-49-2	U	0.00200	mg/L
Silver	7440-22-4	U	0.000200	mg/L
Sodium	7440-23-5	122	0.500	mg/L
Strontium	7440-24-6	0.205	0.0980	mg/L
Thallium	7440-28-0	U	0.00100	mg/L
Zinc	7440-66-6	0.142	0.00500	mg/L

MB
Analyst

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* - Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 3/4/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

Client Sample ID: MMW (687-788)
Client Project ID:
Date Collected: 2/24/08
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-02
Sample Matrix: Water

MERCURY, DRINKING WATER

Method: E245.1 **Prep Method: E245.1**

Date Prepared: 2/29/08
Date Analyzed: 2/29/08
Lab File ID: 022908w
Method Blank: MB-14861
Dilution Factor: 1
Lab Fraction ID: 08-1189-02C

Analytes	CAS Number	Result	LQL	Units
Mercury	7439-97-6	U	0.00010	mg/L

MB
Analyst

Approved

Qualifiers:
B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* - Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions:
NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 3/4/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (849-995)
Client Project ID:
Date Collected: 2/24/08 0000
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-01
Sample Matrix: Water

ALKALINITY

Method: SM2320B **Prep Method:**

Date Prepared: 2/29/08
Date Analyzed: 2/29/08
Lab File ID: 58
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1189-01D

Analytes	CAS Number	Result	LQL	Units
Total Alkalinity		185	5.0	mg/L CaCO3
Bicarbonate		114	5.0	mg/L CaCO3
Carbonate		71.7	5.0	mg/L CaCO3

FLUORIDE

Method: SM 4500-F C **Prep Method:**

Date Prepared: 2/28/08
Date Analyzed: 2/28/08
Lab File ID: 66
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1189-01G

Analytes	CAS Number	Result	LQL	Units
Fluoride	16984-48-8	6.3 *	0.20	mg/L

DISCHARGE WATER PH

Method: SM 4500H+ B **Prep Method:**

Comments: This is a field parameter with a 15min. holding time.

Date Prepared: 2/26/08
Date Analyzed: 2/26/08 1610
Dilution Factor: 1
Lab Fraction ID: 08-1189-01I

Analytes	CAS Number	Result	LQL	Units
pH		9.64 H	1.00	pH Units

TOTAL SULFIDE

Method: SM 4500-S C/F **Prep Method:**

Date Prepared: 2/27/08
Date Analyzed: 2/27/08
Lab File ID: 71
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1189-01F

Analytes	CAS Number	Result	LQL	Units
Total Sulfide		2.5	0.50	mg/L

Analyst

Approved

Qualifiers:
B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL.
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions:
NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/29/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

Client Sample ID: MMW (849-995)
Client Project ID:
Date Collected: 2/24/08 0000
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-01
Sample Matrix: Water

TOTAL DISSOLVED SOLIDS (TDS)

Method: SM 2540C

Prep Method:

Date Prepared: 2/28/08
Date Analyzed: 2/28/08

Lab File ID: 72
Method Blank: MBLK

Dilution Factor: 1
Lab Fraction ID: 08-1189-01I

Analytes	CAS Number	Result	LQL	Units
Total Dissolved Solids		492	10.0	mg/L

TOTAL SUSPENDED SOLIDS (TSS)

Method: SM 2540 D

Prep Method:

Date Prepared: 2/28/08
Date Analyzed: 2/28/08

Lab File ID: 7
Method Blank: MBLK

Dilution Factor: 1
Lab Fraction ID: 08-1189-01I

Analytes	CAS Number	Result	LQL	Units
Total Suspended Solids		45.9	5.0	mg/L

Analyst

Approved

Qualifiers:
B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/29/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (687-788)
Client Project ID:
Date Collected: 2/24/08 1845
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-02
Sample Matrix: Water

ALKALINITY

Method: SM2320B **Prep Method:**

Date Prepared: 2/29/08
Date Analyzed: 2/29/08
Lab File ID: 59
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1189-02D

Analytes	CAS Number	Result	LQL	Units
Total Alkalinity		189	5.0	mg/L CaCO3
Bicarbonate		8.25	5.0	mg/L CaCO3
Carbonate		180	5.0	mg/L CaCO3

FLUORIDE

Method: SM 4500-F C **Prep Method:**

Date Prepared: 2/28/08
Date Analyzed: 2/28/08
Lab File ID: 67
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1189-02G

Analytes	CAS Number	Result	LQL	Units
Fluoride	16984-48-8	6.7 *	0.20	mg/L

DISCHARGE WATER PH

Method: SM 4500H+ B **Prep Method:**

Comments: This is a field parameter with a 15min. holding time.

Date Prepared: 2/26/08
Date Analyzed: 2/26/08 1610
Dilution Factor: 1
Lab Fraction ID: 08-1189-02I

Analytes	CAS Number	Result	LQL	Units
pH		10.81 H	1.00	pH Units

TOTAL SULFIDE

Method: SM 4500-S C/F **Prep Method:**

Date Prepared: 2/27/08
Date Analyzed: 2/27/08
Lab File ID: 72
Method Blank: MBLK
Dilution Factor: 1
Lab Fraction ID: 08-1189-02F

Analytes	CAS Number	Result	LQL	Units
Total Sulfide		U	0.50	mg/L

Analyst

Approved

Qualifiers:
B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions:
NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/29/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

Client Sample ID: MMW (687-788)
Client Project ID:
Date Collected: 2/24/08 1845
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-02
Sample Matrix: Water

TOTAL DISSOLVED SOLIDS (TDS)

Method: SM 2540C

Prep Method:

Date Prepared: 2/28/08
Date Analyzed: 2/28/08

Lab File ID: 73
Method Blank: MBLK

Dilution Factor: 1
Lab Fraction ID: 08-1189-02I

Analytes	CAS Number	Result	LQL	Units
Total Dissolved Solids		476	10.0	mg/L

TOTAL SUSPENDED SOLIDS (TSS)

Method: SM 2540 D

Prep Method:

Date Prepared: 2/28/08
Date Analyzed: 2/28/08

Lab File ID: 8
Method Blank: MBLK

Dilution Factor: 1
Lab Fraction ID: 08-1189-02I

Analytes	CAS Number	Result	LQL	Units
Total Suspended Solids		87.8	5.0	mg/L

Analyst

Approved

Qualifiers:
B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions:
NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/29/2008

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (849-995)	**Lab Work Order**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-01E
Date Collected:	2/24/08	**Sample Matrix:**	Water
Date Received:	2/26/08	**Lab File ID:**	GAS0229015
Date Prepared:	2/29/08	**Method Blank:**	GB022908
Date Analyzed:	2/29/08	**Prep Factor:**	1.000
Percent Moisture	NA	**Dilution Factor:**	1.00

Method: RSKSOP175M **RSKSOP-175M HEADSPACE**
Prep Method: RSKSOP175M

Units: mg/L

Analytes	CAS Number	Result	LQL
Ethane	74-84-0	0.0021	0.0016
Ethene	74-85-1	U	0.0024

Analyst

Approved

Qualifiers: See the case narrative for a discussion
B - Analyte detected in the Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* - Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/3/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (849-995)	**Lab Work Order**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-01E
Date Collected:	2/24/08	**Sample Matrix:**	Water
Date Received:	2/26/08	**Lab File ID:**	GAS0229017
Date Prepared:	2/29/08	**Method Blank:**	GB022908
Date Analyzed:	2/29/08	**Prep Factor:**	1.000
Percent Moisture	NA	**Dilution Factor:**	10.00

Method: RSKSOP175M **RSKSOP-175M HEADSPACE**
Prep Method: RSKSOP175M

Units: mg/L

Analytes	CAS Number	Result	LQL
Methane	74-82-8	3.4	0.0080

Analyst

Approved

Qualifiers: **See the case narrative for a discussion**
B - Analyte detected in the Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* - Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/3/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (687-788)	**Lab Work Order**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-02E
Date Collected:	2/24/08	**Sample Matrix:**	Water
Date Received:	2/26/08	**Lab File ID:**	GAS0229018
Date Prepared:	2/29/08	**Method Blank:**	GB022908
Date Analyzed:	2/29/08	**Prep Factor:**	1.000
Percent Moisture	NA	**Dilution Factor:**	1.00

Method: RSKSOP175M **RSKSOP-175M HEADSPACE**
Prep Method: RSKSOP175M

Units: mg/L

Analytes	CAS Number	Result	LQL
Ethane	74-84-0	0.0028	0.0016
Ethene	74-85-1	U	0.0024

Analyst

Approved

Qualifiers: **See the case narrative for a discussion**
B - Analyte detected in the Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/3/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID:	MMW (687-788)	**Lab Work Order**	08-1189
Client Project ID:		**Lab Sample ID:**	08-1189-02E
Date Collected:	2/24/08	**Sample Matrix:**	Water
Date Received:	2/26/08	**Lab File ID:**	GAS0229020
Date Prepared:	2/29/08	**Method Blank:**	GB022908
Date Analyzed:	2/29/08	**Prep Factor:**	1.000
Percent Moisture	NA	**Dilution Factor:**	10.00

Method: RSKSOP175M **RSKSOP-175M HEADSPACE**
Prep Method: RSKSOP175M

Analytes	CAS Number	Result	Units: mg/L LQL
Methane	74-82-8	3.8	0.0080

Analyst

Approved

Qualifiers: **See the case narrative for a discussion**
B - Analyte detected in the Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Prep or Analytical holding time exceeded
S - Spike Recovery outside acceptance limits
X - See case narrative
* - Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Qualifiers: U - Analyte not detected at or above the reporting limit
J - Estimated value below the LQL

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
MDL - Method Detection Limit
Surr - Surrogate Standard

Print Date: 3/3/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: MMW (849-995)
Client Project ID:
Date Collected: 2/24/08 0000
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-01
Sample Matrix: Water

ANIONS BY IC

Method: E300.0 **Prep Method:**

Date Prepared: 2/26/08
Date Analyzed: 2/26/08 1605
Method Blank: METHOD BLANK
Dilution Factor: 1
Lab Fraction ID: 08-1189-01H

Analytes	CAS Number	Result	LQL	Units
Chloride	7647-14-5	14.8	0.50	mg/L
Nitrite-N		0.0157 H	0.0040	mg/L
Bromide	7647-15-6	0.157	0.050	mg/L
Nitrate-N		U H	0.010	mg/L

Date Prepared: 2/26/08
Date Analyzed: 2/26/08 1659
Method Blank: METHOD BLANK
Dilution Factor: 5
Lab Fraction ID: 08-1189-01H

Analytes	CAS Number	Result	LQL	Units
Sulfate	7778-80-2	73.5	2.5	mg/L

J. Lange
Analyst

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* - Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/28/08

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

Client Sample ID: MMW (687-788)
Client Project ID:
Date Collected: 2/24/08 1845
Date Received: 2/26/08

Lab Work Order 08-1189
Lab Sample ID: 08-1189-02
Sample Matrix: Water

ANIONS BY IC

Method: E300.0 **Prep Method:**

Date Prepared: 2/26/08
Date Analyzed: 2/26/08 1551
Method Blank: METHOD BLANK
Dilution Factor: 1
Lab Fraction ID: 08-1189-02H

Analytes	CAS Number	Result	LQL	Units
Chloride	7647-14-5	16.4	0.50	mg/L
Nitrite-N		0.00837	0.0040	mg/L
Bromide	7647-15-6	0.192	0.050	mg/L
Nitrate-N		U	0.010	mg/L

Date Prepared: 2/26/08
Date Analyzed: 2/26/08 1713
Method Blank: METHOD BLANK
Dilution Factor: 5
Lab Fraction ID: 08-1189-02H

Analytes	CAS Number	Result	LQL	Units
Sulfate	7778-80-2	74.4	2.5	mg/L

J. Lange
Analyst

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample analysis exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL), TCLP limit, or if compound is undetected, LQL exceeds MCL.

Definitions: NA - Not Applicable
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 2/28/08

Evergreen Analytical Laboratory

March 12, 2008

Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055

Lab Work Order: 08-1189
Client Project ID:

Dear Tom Melland:

Enclosed are the analytical results for the samples shown in the Laboratory Work Order Summary. The invoice is included with this report or has been mailed to another party as indicated on the chain of custody.

The enclosed data for testing performed at Evergreen Analytical Laboratory (EAL) have been reviewed for quality assurance. A case narrative is included to describe any anomalies associated with the samples or data.

EAL will dispose of all samples one month from the date of this letter. If you want samples returned, please advise us by mail or fax as soon as possible.

A copy of this project report and supporting data will be retained for a period of five years unless we are otherwise advised by you. A document retrieval charge will apply.

Thank you for using the services of Evergreen Analytical. If you have any questions concerning the analytical data, please contact me. Please direct other questions to Client Services.

Sincerely,

Carl Smits / Kaprie Hollman
Technical Director of Chemical Analysis

WORK ORDER Summary Evergreen Analytical, Inc. 08-1189

Rpt To: Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055
(719) 742-5570

Email To: Tmelland@petroglyphenergy.com

3/13/2008 3:14:08 PM

Client Project ID:

QC Level: Level I+

Comments:

Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Test Code	Test Name	Hold	MS	Date Due	Hold Time
08-1189-01A	MMW (849-995)	Water	2/24/08 0000	2/26/08	524 *	524.2: Standard List	☐	☐	3/11/08	3/09/08
08-1189-01A	MMW (849-995)	Water	2/24/08 0000	2/26/08	VOATICS	VOA TICS (Largest 10)	☐	☐	3/14/08	3/09/08
08-1189-01B	MMW (849-995)	Water	2/24/08 0000	2/26/08	504 *	504: Standard List	☐	☐	3/11/08	3/09/08
08-1189-01C	MMW (849-995)	Water	2/24/08 0000	2/26/08	200.8_TR *	200.8: Total Metals	☐	☐	3/11/08	8/22/08
08-1189-01C	MMW (849-995)	Water	2/24/08 0000	2/26/08	245.1_DKW	245.1: Mercury, Drinking Water	☐	☐	3/11/08	3/23/08
08-1189-01D	MMW (849-995)	Water	2/24/08 0000	2/26/08	ALK_WGRP *	Alkalinity	☐	☐	3/11/08	3/09/08
08-1189-01E	MMW (849-995)	Water	2/24/08 0000	2/26/08	MEEP_W *	RSK175M: MEE	☐	☐	3/11/08	3/09/08
08-1189-01F	MMW (849-995)	Water	2/24/08 0000	2/26/08	SULF_W	Total Sulfide	☐	☐	3/11/08	3/02/08
08-1189-01G	MMW (849-995)	Water	2/24/08 0000	2/26/08	F_W	Fluoride	☐	☐	3/11/08	3/23/08
08-1189-01H	MMW (849-995)	Water	2/24/08 0000	2/26/08	ANIONS_W *	300.0: Anions by IC	☐	☐	3/11/08	2/26/08
08-1189-01I	MMW (849-995)	Water	2/24/08 0000	2/26/08	PH_W	Discharge Water pH	☐	☐	3/11/08	2/24/08
08-1189-01I	MMW (849-995)	Water	2/24/08 0000	2/26/08	TDS_W	Total Dissolved Solids (TDS)	☐	☐	3/11/08	3/02/08
08-1189-01I	MMW (849-995)	Water	2/24/08 0000	2/26/08	TSS	Total Suspended Solids (TSS)	☐	☐	3/11/08	3/02/08
08-1189-02A	MMW (687-788)	Water	2/24/08 1845	2/26/08	524 *	524.2: Standard List	☐	☐	3/11/08	3/09/08
08-1189-02A	MMW (687-788)	Water	2/24/08 1845	2/26/08	VOATICS	VOA TICS (Largest 10)	☐	☐	3/14/08	3/09/08
08-1189-02B	MMW (687-788)	Water	2/24/08 1845	2/26/08	504 *	504: Standard List	☐	☐	3/11/08	3/09/08
08-1189-02C	MMW (687-788)	Water	2/24/08 1845	2/26/08	200.8_TR *	200.8: Total Metals	☐	☐	3/11/08	8/22/08
08-1189-02C	MMW (687-788)	Water	2/24/08 1845	2/26/08	245.1_DKW	245.1: Mercury, Drinking Water	☐	☐	3/11/08	3/23/08
08-1189-02D	MMW (687-788)	Water	2/24/08 1845	2/26/08	ALK_WGRP *	Alkalinity	☐	☐	3/11/08	3/09/08
08-1189-02E	MMW (687-788)	Water	2/24/08 1845	2/26/08	MEEP_W *	RSK175M: MEE	☐	☐	3/11/08	3/09/08
08-1189-02F	MMW (687-788)	Water	2/24/08 1845	2/26/08	SULF_W	Total Sulfide	☐	☐	3/11/08	3/02/08

Definitions: * - Test Code has a Select List

WORK ORDER Summary Evergreen Analytical, Inc. 08-1189

Rpt To: Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055
(719) 742-5570

Email To: Tmelland@petroglyphenergy.com

3/13/2008 3:14:08 PM

Client Project ID:

QC Level: Level I+

08-1189-02G	MMW (687-788)	Water	2/24/08 1845	2/26/08	F_W	Fluoride			3/11/08	3/23/08
08-1189-02H	MMW (687-788)	Water	2/24/08 1845	2/26/08	ANIONS_W *	300.0: Anions by IC			3/11/08	2/26/08
08-1189-02I	MMW (687-788)	Water	2/24/08 1845	2/26/08	PH_W	Discharge Water pH			3/11/08	2/24/08
08-1189-02I	MMW (687-788)	Water	2/24/08 1845	2/26/08	TDS_W	Total Dissolved Solids (TDS)			3/11/08	3/02/08
08-1189-02I	MMW (687-788)	Water	2/24/08 1845	2/26/08	TSS	Total Suspended Solids (TSS)			3/11/08	3/02/08

Definitions: * - Test Code has a Select List

Shea Greiner

From: Shea Greiner
Sent: Thursday, March 13, 2008 3:14 PM
To: Carl Smits; Jeremy Dechant; Nat Oppedal; Tami Buchner
Cc: Patty McClellan; Kelly O'Brien
Subject: Add TICs 08-1189

On a previous WO the client requested TICS on the 524.2 analysis. On this one he forgot to make the request. Carl says we should be able to report TICS on the 524.2 for the 2 samples on this WO. I have added the TICS, Carl will take care of the invoice, Tami, let me know if there is a problem.

Thanks, Shea

Tentatively Identified Compound (LSC) summary

Data Path : C:\msdchem\1\DATA\VOA60305\\
Data File : 1701017.D
Acq On : 5 Mar 2008 8:29 pmm
Operator : Don Chamott
Sample : 08-1189-01AA
Misc : SAMP 5244
ALS Vial : 17 Sample Multiplier: 11

MMW (849-995)

Quant Method : C:\msdchem\1\METHODS\5240305.MM
Quant Title : VOA4 524.2 Revision 4.11

TIC Library : C:\Database\NIST98.LL
TIC Integration Parameters: LSCINT.PP

TIC Top Hit name	RT	EstConc	Units	Response	--Internal Standard--- #	RT	Resp	Conc

No Library Search Compounds Detected

CMM 3/14/08

****

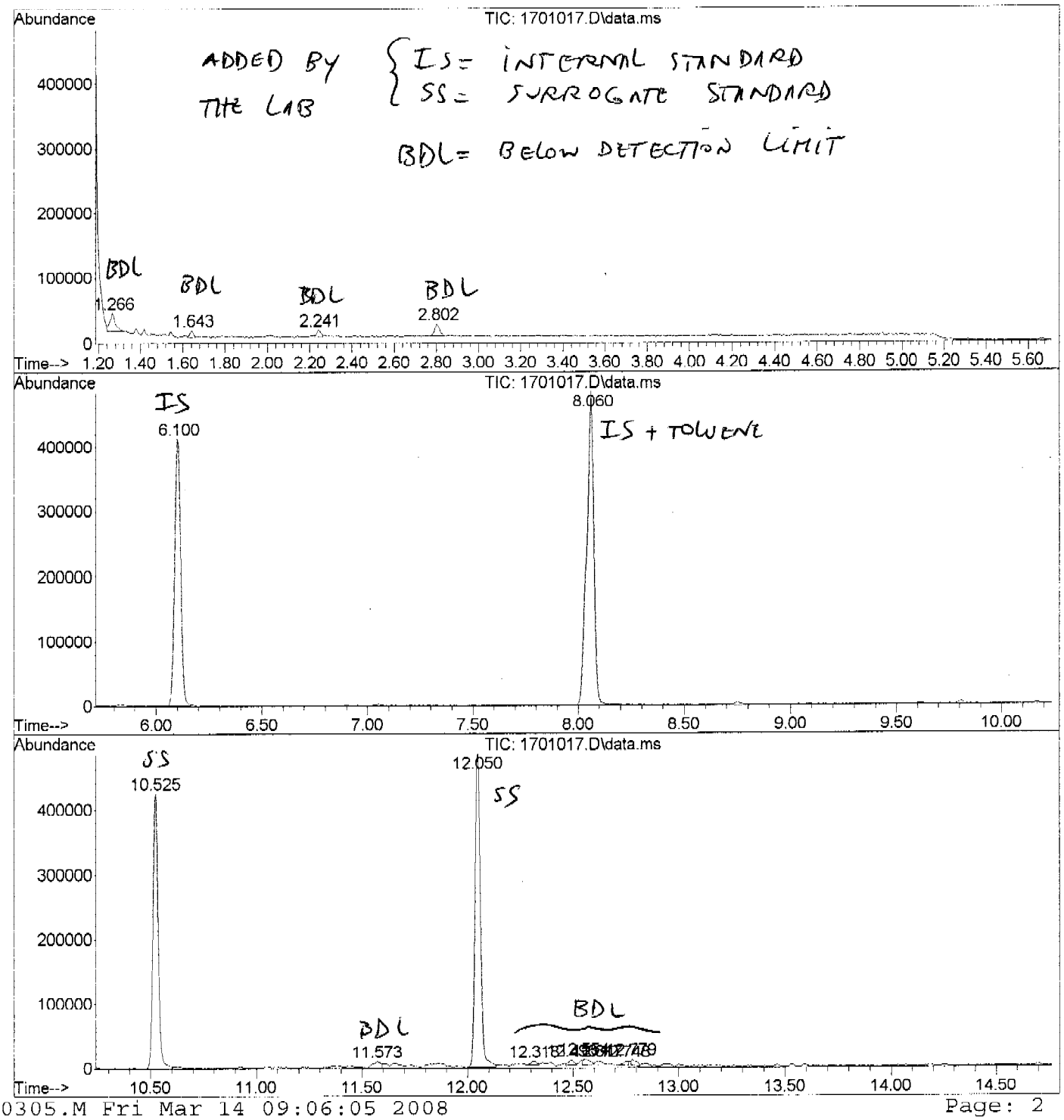
2/14/08

LSC Report - Integrated Chromatogram

Data Path : C:\msdchem\1\DATA\VOA60305\
Data File : 1701017.D
Acq On : 5 Mar 2008 8:29 pm
Operator : Don Chamot
Sample : 08-1189-01A
Misc : SAMP 524
ALS Vial : 17 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\5240305.M
Quant Title : VOA4 524.2 Revision 4.1

TIC Library : C:\Database\NIST98.L
TIC Integration Parameters: LSCINT.P



3/14/08

Tentatively Identified Compound (LSC) summary

Data Path : C:\msdchem\1\DATA\VOA60305\\
Data File : 1801018.D
Acq On : 5 Mar 2008 9:04 pmm
Operator : Don Chamott
Sample : 08-1189-02AA
Misc : SAMP 5244
ALS Vial : 18 Sample Multiplier: 11

MMW (687-788)

Quant Method : C:\msdchem\1\METHODS\5240305.MM
Quant Title : VOA4 524.2 Revision 4.11

TIC Library : C:\Database\NIST98.LL
TIC Integration Parameters: LSCINT.PP

TIC Top Hit name	RT	EstConc	Units	Response	--Internal Standard--- #	RT	Resp	Conc

No Library Search Compounds Detected CMR 3/14/08

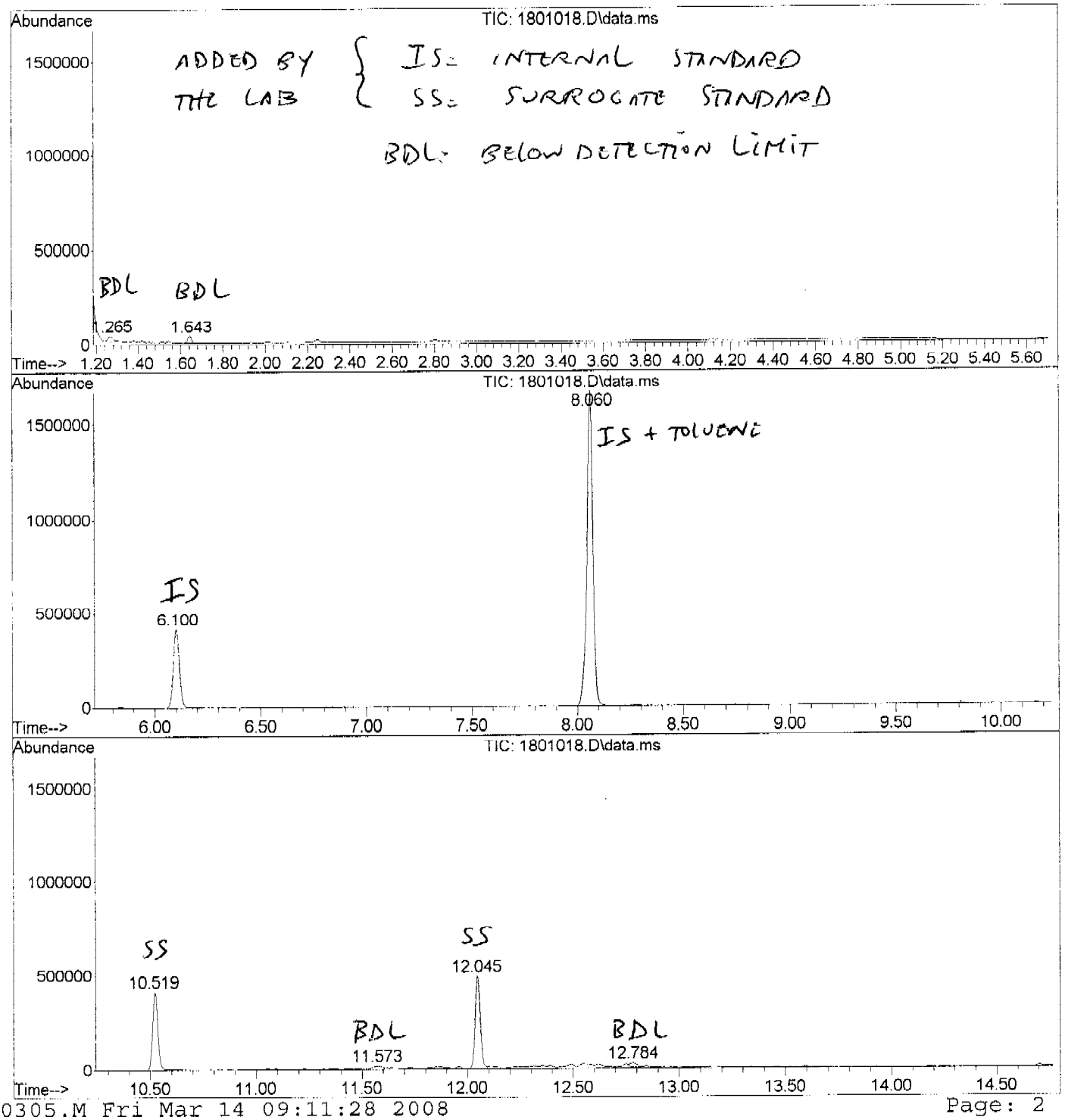
****

LSC Report - Integrated Chromatogram

Data Path : C:\msdchem\1\DATA\VOA60305\
Data File : 1801018.D
Acq On : 5 Mar 2008 9:04 pm
Operator : Don Chamot
Sample : 08-1189-02A
Misc : SAMP 524
ALS Vial : 18 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\5240305.M
Quant Title : VOA4 524.2 Revision 4.1

TIC Library : C:\Database\NIST98.L
TIC Integration Parameters: LSCINT.P



Evergreen Analytical Laboratory

March 15, 2008

Tom Melland
Petroglyph Energy
P.O. Box 979
La Veta, CO 81055

Lab Work Order: 08-1189
Client Project ID:

Dear Tom Melland:

ADDITIONAL REPORT

Attached are the 524.2 Library searches (TIC reports) requested on 3/13/08. No TICs were detected in either sample.
The invoice for this additional work is attached.

Thank you for using the services of Evergreen Analytical. If you require further information, I can be reached at 303-425-6021.

Sincerely,

Carl Smits
Technical Director of Chemical Analysis