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

Submitted to: **PETROGLYPH ENERGY, INC.**

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Norwest Applied Hydrology

950 So. Cherry St., Suite 810 Denver, Colorado 80246 Tel: (303) 782-0164 Fax: (303) 782-2560 Email appliedhydrology@norwestcorp.com

www.norwestcorp.com



TABLE OF CONTENTS

1	INT	RODUCTION	1-1
	1.1	Summary	1-1
2	DRI	LLING AND INITIAL OPEN HOLE LOGGING	2-1
	2.1 2.2	Drilling Mud and Gas Logging	
3	OPE	N HOLE GEOPHYSICAL LOGGING	
4	3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 WEI	GAMMA RAY (GR) SPONTANEOUS POTENTIAL (SP) DEEP INDUCTION RESISTIVITY (DIR) AND SHORT NORMAL (SN) INDUCTION CALIPER (DCAL) LINE TENSION (LTEN) CURVE DENSITY CORRECTION CURVE (RHOC) DENSITY POROSITY (DPOR) NEUTRON POROSITY (DPOR) GEOPHYSICAL LOGS EVALUATION	3-1 3-1 3-2 3-2 3-2 3-2 3-2 3-3 3-3 3-3
	4.1 4.2 4.3 4.4	CASING PLACEMENT Annular Completion Well Development Total Depth Drill Out	
5	CAS	ED HOLE GEOPHYSICAL LOGGING	5-1
	5.1 5.2 5.3	CEMENT BOND Collar Locator (CCL) Geophysical Log Evaluation	5-1
6	AQU	JIFER PACKER TESTING	6-1
	6.1 6.2 6.3 6.4 6.5 6.6	AQUIFER TEST 1 – COMPLETION INTERVAL 1, SLOTTED INTERVAL 1,010 TO 1,049 FEET AQUIFER TEST 2 – COMPLETION INTERVAL 2, SLOTTED INTERVAL 896 TO 976 FEET AQUIFER TEST 3 – COMPLETION INTERVAL 3, SLOTTED INTERVAL 687 TO 788 FEET AQUIFER TEST 4 – COMPLETION INTERVAL 4, SLOTTED INTERVAL 527 TO 542 FEET AQUIFER TESTING WATER QUALITY AQUIFER TESTING SUMMARY	6-4 6-8 6-11 6-14
7	CAS	ED HOLE VIDEO LOGGING	
8	CON	NCLUSIONS AND RECOMMENDATIONS	8-1

APPENDIX A	Layne Christensen Company Drilling Report
APPENDIX B	Geophysical Log Reports
APPENDIX C	Layne Christensen Company Testing Report
APPENDIX D	Testing Flow Rates and Notes
APPENDIX E	Barton Gas Flow Recorder Charts
APPENDIX F	Evergreen Analytical Laboratory Water Quality Result

List of Tables

Table 3.1.1	POCI 55 Monitor Well Aquifer Completion Intervals Summary	3-3
Table 4.1.1	POCI 55 Monitor Well Casing Tally	4-2
Table 4.1.2	POCI 55 Monitor Well Casing Summary Description	4-3
Table 4.2.1	POCI 55 Monitor Well Annular Space Completions	4-4
Table 6.1.1	POCI 55 Monitor Well Completion Interval 1 Testing Tubing Tally	6-2
Table 6.1.2	POCI 55 Monitor Well Completion Interval 1 Testing Gas Monitoring	6-4
Table 6.2.1	POCI 55 Monitor Well Completion Interval 2 Testing Tubing Tally	6-5
Table 6.2.2	POCI 55 Monitor Well Completion Interval 2 Testing Gas Monitoring	6-8
Table 6.3.1	POCI 55 Monitor Well Completion Interval 3 Testing Tubing Tally	6-9
Table 6.3.2	POCI 55 Monitor Well Completion Interval 3 Testing Gas Monitoring	6-11
Table 6.4.1	POCI 55 Monitor Well Completion Interval 4 Testing Tubing Tally	6-12
Table 6.5.1	POCI 55 Monitor Well Water Quality Parameters	6-14
Table 6.5.2	POCI 55 Monitor Well Dissolved Gas Results	6-15

List of Figures

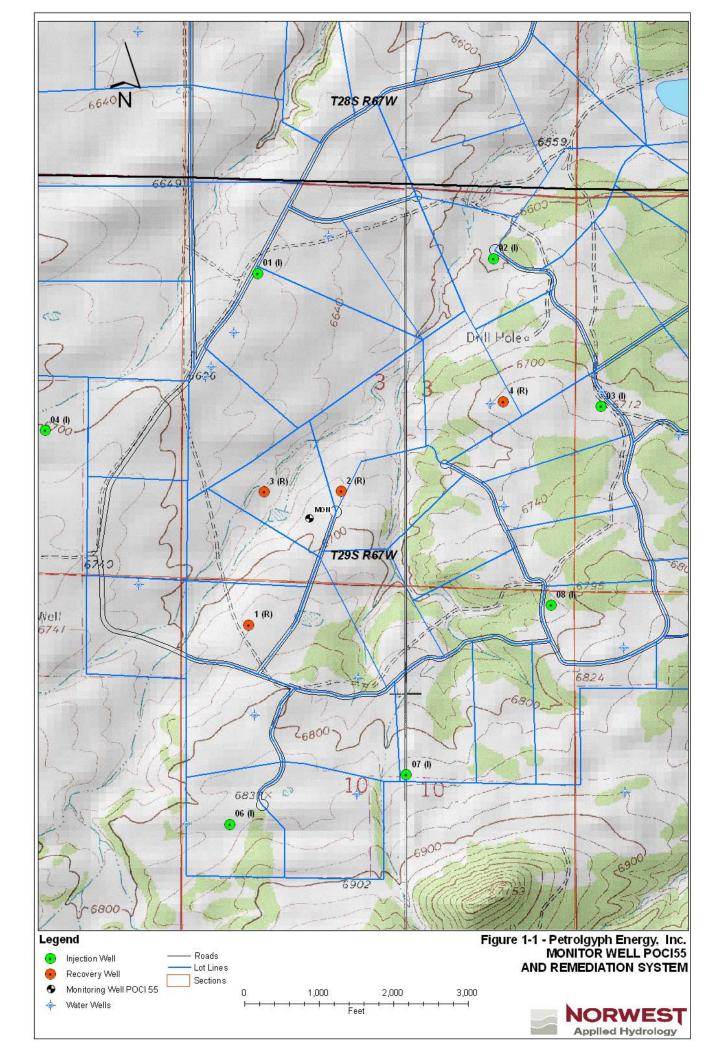
Figure 1-1 POCI 55 Well Location MapFollows	s Section 1
Figure 2-1 POCI 55 Well Completion Diagram with Mud and Gas LogsFollows	s Section 2
Figure 3-1 POCI 55 Well Completion and Open Hole Geophysical Logs Follows	s Section 3
Figure 5-1 POCI 55 Well Completion and Completed Hole Geophysical Logs Follows	s Section 5
Figure 6-1 POCI 55 Monitor Well Completion Interval 1 Testing Pressures	6-3
Figure 6-2 POCI 55 Monitor Well Completion Interval 2 Testing Pressures	6-7
Figure 6-3 POCI 55 Monitor Well Completion Interval 3 Testing Pressures	6-10
Figure 6-4 POCI 55 Monitor Well Completion Interval 4 Testing Pressures	6-13

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.



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 ³/₄ inches was drilled to 40 feet and 40 feet of 12 ³/₄ 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.

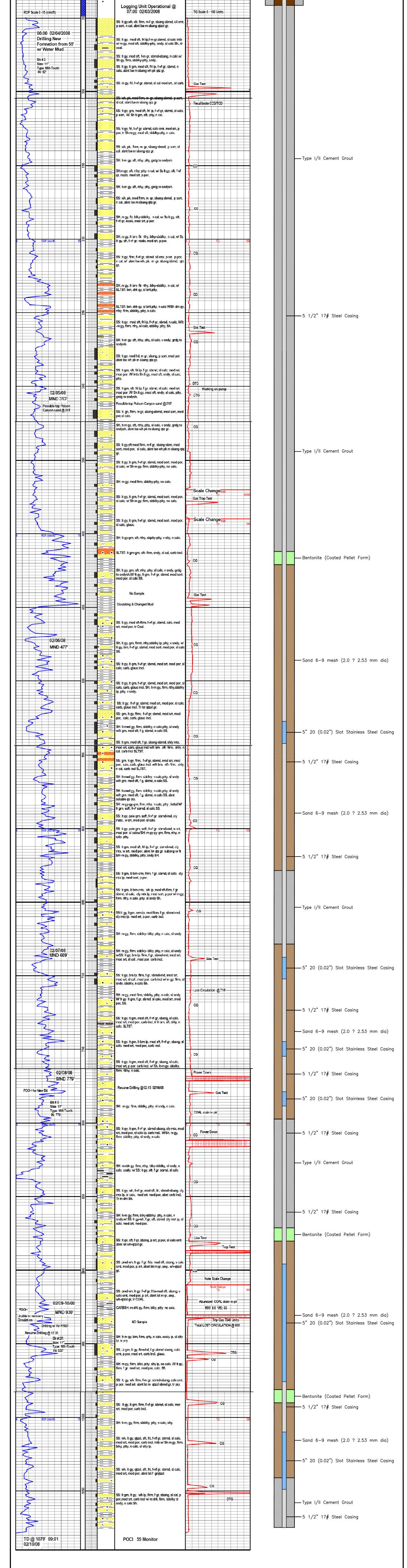
2.2 MUD AND GAS LOGGING

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	
	Sec3 T29S R67W 05-071-275819-00 Region: Purgatoire 02/04/08 Drilling Completed: 02/10/08 851' FSL & 1773' FWL 6690' K.B. Elevation (ft): 6690'	
	OPERATOR Petroglyph Operrating Company, Inc. 555Sought Cole Rd. Boise, ID 83709 Ph: (719) 742-5570	
Company:	GEOLOGIST Leeo Carrasco BLANCO Geological Services LLC 806 Robinson Ave. Trinidad CO 81082 (719) 846-3364	
LW Rig # 14	Rig	
12.75" Surface Casing set (Comments @ 40'	
Anhy Property Bent Cht	Coal Igne Salt	Shgy Sltst Ss Till
Image: Anhy Image: Arggrn Image: Arggrn Image: Arggrn Image: Arggrn Image: Arggrn Image: Bent Image: Bent Image: Bent	ACCESSORIES Gyp FOSSIL Image: Colspansion of the state	rg ndst ky In ny kin nst ogr oxin st
E Earthy Fenest SOR F Fracture 교 Inter 편	OTHER SYMBOLS Vuggy ROUNDING Spotted Cv-v R Rounded Ques TING Subrnd Dead Well Subang EVENTS Moderate Angular INTERVALS Poor OIL SHOWS Dst Srfcsg	wall
Curve Track 1 ROP (min/ft)	Ar Cithology Geological Descriptions TG (units) C1 (10000) C2 (10000) C3 (10000) C4 (10000) 16 POCI 55 MSI Model TG	Well: POCI 55 Surface Casing 12 3/4" 33.38# Steel Casing
Layne Wenstern Rig #414 12.75" Surface Casing Set @40'	Blanco Geological Services LLC	



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 (<u>www.glossary.oilfield.slb.com</u>). 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.

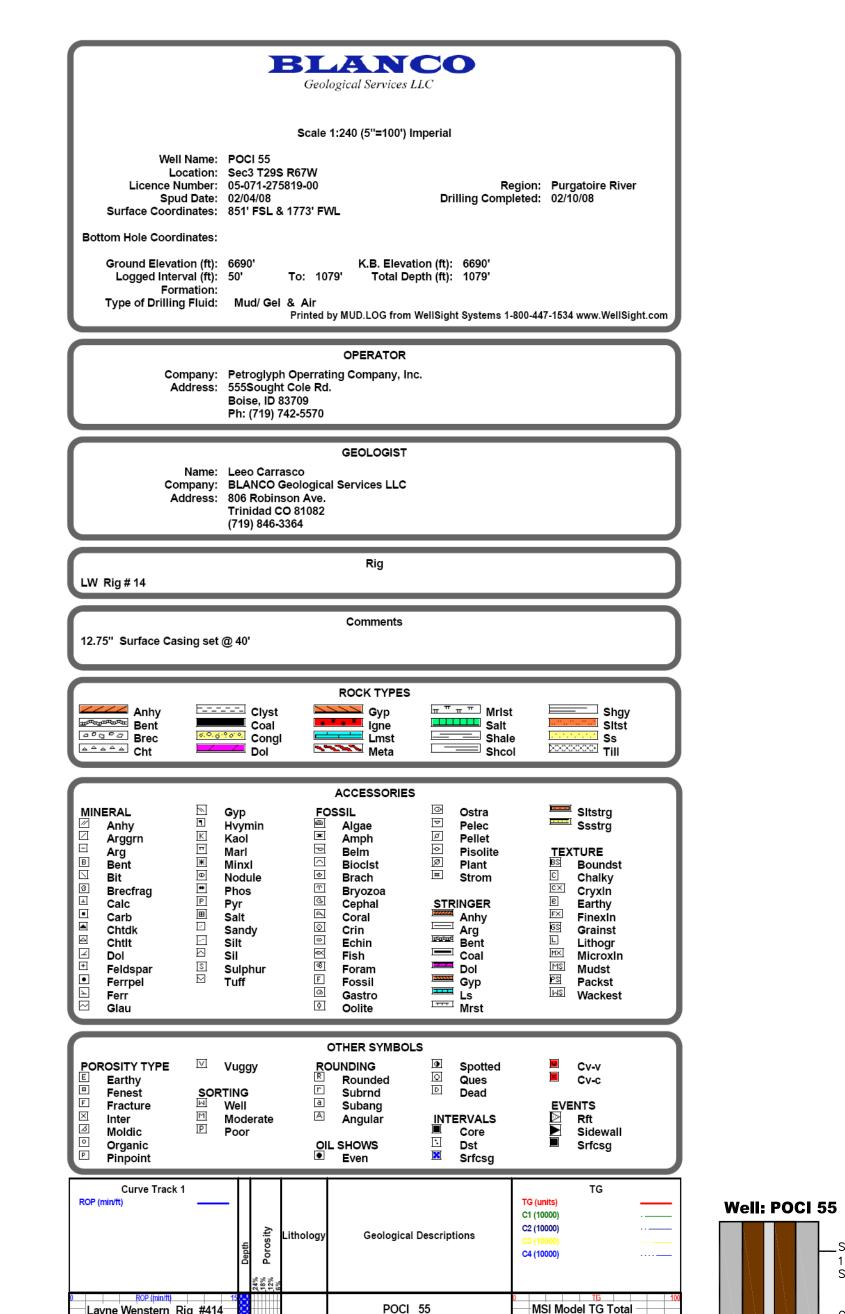
3.9 GEOPHYSICAL LOGS EVALUATION

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

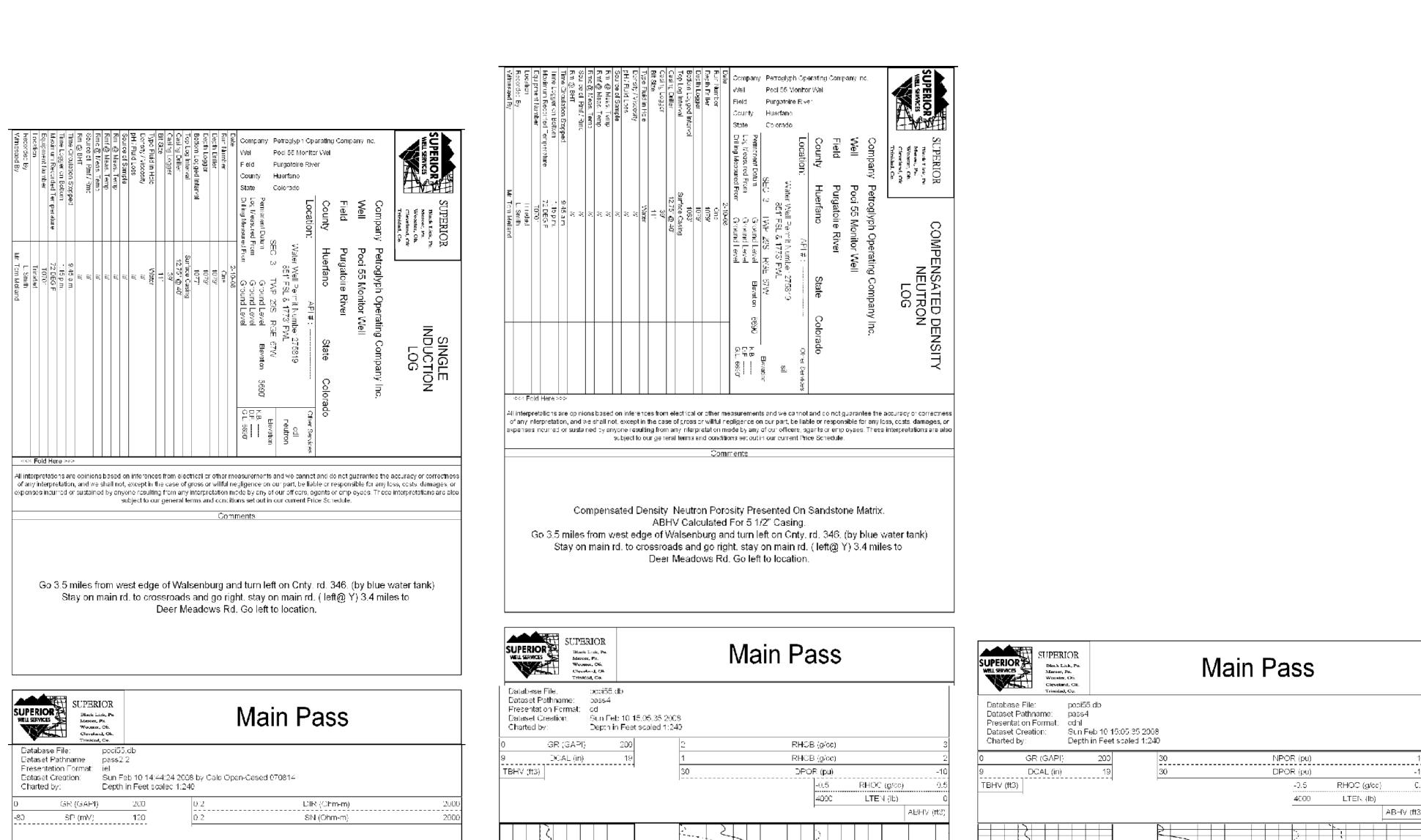
FOCI 55 Monitor wen Aquiter Completion intervals Summary					
Depth Interval	l (ft below GL)	Annulus Material	Aquifer Intervals		
420	628	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 4		
678	797	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 3		
880	981	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 2		
990	1041	Sand 6-9 mesh (2.0 – 2.53 mm dia)	Aquifer Completion 1		

 TABLE 3.1.1

 POCI 55 Monitor Well Aquifer Completion Intervals Summary



___Surface Casing 12 3/4" 33.38# Steel Casing



RHOC (g/cc)

ABHV (ft3)

LTEN (Ib)

Layne Wenstern Rig #414 POCI 55 MSI Model TG Total Hydrocarbon CCD/TCD	Grout		0.2 SN (Ohm-m) 2000			
12.75" Surface Casing Set @40" Blanco Geological Services LLC Logging Unit Operational @ Control of the second		Surface Ca	asing	Surface Casing		
ROP Scale 0 -15 (min/ft) 07:00 02/03/2008 TG Scale 0 - 100 Units SS: It gy,wh, clr, firm, m-f gr, sbang sbrnd, sil cmt, p sort, n cal, abnt ise m sbang qtzxl gr. Image: Comparison of the state o		50			553	
06:00 02/04/2008 Drilling New SS: It gy, mod sft, fri ip,f-m gr,sbrnd, sl calc intb Formation from 55' w/ m gy, mod sft, sbblky-plty, sndy, sl calc Sh., tr w/ Worter Wurd coal.						
w/ Water Mud coal. Bit #2 SS: It gy, mod sft, f-m gr, sbrnd-sbang, n calc w/ Size: 11" SS: It gy, mod sft, fringr, sbrnd-sbang, n calc w/ Size: 11" SS: It gy, mod sft, fringr, sbrnd-sbang, n calc w/ SS: It gy, mod sft, fringr, sbrnd-sbang, n calc w/ SS: It gy, mod sft, fringr, sbrnd-sbang, n calc w/						
S: n gy, fri f-vf gr, sbrnd, sl cal mod srt., sl carb.						
SS: wh, pk, mod firm, m gr, sbang sbrnd, p sort, sl cal, abnt Ise m sbang qtz gr.		100				
SS: It gy, grn, mod sft, fri ip, f-vf gr, sbrnd, sl calc, p sort, W/ Sh It 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-pity, 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.	— Type I/II Cement Grout					
SH,m gy, sft, rthy, plty, n cal, w/ Ss lt gy, sft, f-vf						
SF, It-m gy, sft, rthy, plty, grdg to sndysh. SS: wh, pk, mod firm, m gr, sbang sbrnd, p sort, n cal, abnt Ise m sbang qtz gr.						
SH ,m gy, fir, blky-sbblky, n cal, w/ Ss lt gy, sft,						
0 ROP (min/ft) 15 0 ROP (min/ft) 15		200				200
SS: It gy, firm, f-vf gr, sbrnd, sil mtx, p srt, p por, n cal, w/ abnt ise wh, pk, m gr, sbang sbrnd, qtz						
SH, m gy, lt brn, fir, rthy, blky-sbblky, n cal, w/						
SLTST: brn, drk gy, sl brit,plty, n calc W/Sh drk gy, rhy, firm, sbblky, plty, n calc.	5 1/2" 17# Steel Casing	250				
SS: lt gy, mod sft, fri ip, f-vf gr, sbrnd, n calc, Wit 						
sndysh. SS: It gy, mod hd, m gr, sbang, p sort, mod por, abnt ise wh pk m sbang qtz gr.						
SS: It gr, str, fri ip, f gr, sbrnd, sI calc, mod srt, mod por, W/ intb Sh It gy, mod sft, sndy, sI calc,						
02/05/08 SS: It grn, sft, fri ip, f gr, sbrnd, sl calc, mod srt, mod por, W/ Sh It gy, mod sft, sndy, sl calc, plty, grdg to sndysh. DTG		300				
Possible top Poison Canyon sand @ 315' SS: It gn, firm, m gr, sbang-sbrnd, mod sort, mod por, sl calc.						
SH, It-m gy, sft, rthy, plty, sl calc, v sndy, grdg to sndysh, abnt ise wh pk m sbang qtz gr.						
SS: It gy,sft-mod firm, m-f gr, sbang-sbrn, mod sort, mod por, sl calc, abnt Ise wh pk m sbang qtz gr.	— Type I/II Cement Grout					
SS: It gy, It grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, w/ Sh m gy, firm, sbblky-plty, no calc.		350				
St: ht gy, ht grn, f-vf gr, sbrnd, mod sort. mod por, Gas Trap Test						
sl calc, w/ Sh m gy, firm, sbblky-plty, no calc.						
SS: It gy, It grn, f-vf gr, sbrnd, mod sort. mod por, sl calc, glauc.		400				
SH: It gy-grn, sft, rthy, sbplty-plty, v slty, n calc.	Bentonite (Coated Pellet Form)					
SH, It gy, grn, sft, rthy, pity, sl calc, v sndy, grdg	Bentonite (Coated Pellet Form)					
mod por, sl calc SS. No Sample						
Ciculating & Changed Mud		450				450 Fluid Level
SS: lt gy, mod sft-firm, f-vf gr, sbrnd, calc, mod						
02/06/08 SH, It gy, grn, firmt, rthy,sbblky ip, plty, v sndy, w/ MND 477' SH, It gy, grn, firmt, rthy,sbblky ip, plty, v sndy, w/ SS. SS.						
SS: It gy, It grn, f-vf gr, sbrnd, mod srt, mod por, sl						
SS: It gy, It gm, f-vf gr, sbrnd, mod srt, mod por, sl calc, carb, glauc incl, SH, It-m gy, firm, rthy,sbblky pp Ity, v sndy.		500				
SS: It 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: It-med gy, firm, sbblky, n calc,plty, sl sndy wilt grn, mod sft, f g, sbrnd, n calc SS.	5" 20 (0.02") Slot Stainless Steel Casing					
SS: It 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.						
SS: grn, lt gy, firm, f-vf gr, sbrnd, mod srt, mod por, calc, carb, glauc incl, w/it brn, sft- firm, shly, n cal, carb incl SLTST.	5 1/2" 17# Steel Casing	550				
SH: It-med gy, firm, sbblky, n calc.plty, sl sndy Wilt grn, mod sft, f g, sbrnd, n calc SS. SH: It-med gy, firm, sbblky, n calc.plty, sl sndy SH: It-med gy, firm, sbblky, n calc.plty, sl sndy						
wilt 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/						
It grn, soft, f-vf sbmd, sl calc SS.						
SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, cly matx, w srt, mod por, sl calc.	— Sand 6-9 mesh (2.0 ? 2.53 mm dia)	600				
SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, cly matx, w srt, mod por, sl calc. SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc.//SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc.//SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, v srt, mod por, sl calc.//SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, v srt, mod por, sl calc.//SH: m gy-gy grn, firm, rthy, n calc, plty.	— Sand 6-9 mesh (2.0 ? 2.53 mm dia)	600				
SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, cly matx, w srt, mod por, sl calc. SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc. SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc. SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc. SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc. SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc. SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calc.//SH: m gy-gy grn, firm, rthy, n		600				
SS: It gy, pale gm, soft, f-vf gr, sbrnd-rnd, cly max, w srt, mod por, sl calc. SS: It gy, pale gm, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calcw/SH: m gy-gy gm, firm, rthy, n calc, pity. SS: It gm, nod sft, fri ip, f-vf gr, sbrnd-rnd, cly mtx, w srt, mod por, abnt ist qtz gr, subang w/ it bm-m gy, sbbliky, pity, sndy SH. SS: It gm, It bm-crm, firm, f gr, sbrnd, sl calc, cly mtx ip, mod sort, p por.		600				
SS: It gy, pale grn, soft, f-vf gr, sbrnd-rnd, cly matx, w srt, mod por, sl calc. SS: It 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: It grn, mod sft, fri ip, f-vf gr, sbrnd-rnd, cly mtx, w srt, mod por, abnt lst qtz gr, subang w/ It brn-m gy, sbblky, plty, sndy SH. SS: It grn, It brn-crm, firm, f gr, sbrnd, sl calc, cly		600 650				
SS: It gy, pale grm, soft, f-vf gr, sbrnd-rnd, cly matx, w srt, mod por, sl calc. SS: It gy, pale grm, soft, f-vf gr, sbrnd-rnd, w srt, mod por, sl calcw/SH: m gy-gy grn, firm, rthy, n calc, plty. SS: It grm, nod sft, fri ip, f-vf gr, sbrnd-rnd, cly mtx, w srt, mod por, abnt Ist qtz gr, subang w/ It brn-m gy, sbblky, plty, sndy SH. SS: It grm, It brn-crm, firm, f gr, sbrnd, sl calc, cly mtx ip, mod sort, p por. SS: It grm, It brn-crm, whip, mod sft-firm, f gr, sbrnd, sl calc, cly mtx ip, mod sort, p por w/ m gy,	5 1/2" 17# Steel Casing					
S: It gy, pale gm, soft, f-vf gr, sbmd-rnd, cly matx, w srt, mod por, si calc. SS: It gy, pale gm, soft, f-vf gr, sbmd-rnd, cly matx, w srt, mod por, si calc. SS: It gy, pale gm, soft, f-vf gr, sbmd-rnd, cly matx, w srt, mod por, si calc. SS: It gy, nod sft, fri ip, f-vf gr, sbmd-rnd, cly mtx, w srt, mod por, abrit Ist qtz gr, subang wit to bm-m gy, sbbiky, pity, sndy SH. SS: It gm, It bm-cm, whip, mod sft-film, f gr, sbmd, si calc, cly mtx ip, mod sort, p por wir mgy, fm, rthy, n calc, pity, si sndy Sh. SS: It gm, It bm-cm, whip, mod sft-film, f gr, sbmd, si calc, cly mtx ip, mod sort, p por wir mgy, fm, rthy, n calc, pity, si sndy Sh. SS: It gm, It bm-cm, whip, mod sft-film, f gr, sbmd, si calc, cly mtx ip, mod sort, p por wir mgy, fm, rthy, n calc, pity, si sndy Sh. SS: It gm, ftbm-cm, whip, mod sort, p por wir mgy, fm, rthy, n calc, pity, si sndy Sh. SS: It gm, ftbm-cm, bliky, pity, n calc, si sndy.	5 1/2" 17# Steel Casing					
S: It gr, nd sr, fin, fgr, sbrnd-rnd, cly ntx, w srt, mod por, sl calc. S: It gr, nd srt, fin jp, furf gr, sbrnd-rnd, cly ntx, w srt, mod por, sl calc. S: It gr, nd srt, fin jp, furf gr, sbrnd-rnd, cly ntx, w srt, mod por, sl calc. S: It grn, nd srt, fin jp, furf gr, sbrnd-rnd, cly ntx, w srt, mod por, sl calc. S: It grn, It brn-crm, film, fgr, sbrnd, sl calc, cly ntx ip, mod sort, p por. S: It grn, It brn-crm, film, fgr, sbrnd, sl calc, cly ntx ip, mod sort, p por wir mgy, firm, rthy, n calc, ply, sl sndy Sh. S: It grn, It brn-crm, mp, fgr, sbrnd, sl calc, cly ntx ip, mod sort, p por wir mgy, firm, rthy, n calc, ply, sl sndy Sh. S: It grn, it brn-crm, inm, fgr, sbrnd-rnd, cly ntx ip, mod sort, p por wir mgy, firm, rthy, n calc, ply, sl sndy Sh. S: It grn, it por, carb incl.	5 1/2" 17# Steel Casing					
Sb: It gy, pale gm, sbt, fvf gr, sbmd-md, cly mbt, w srt, mod por, sl cale. Sb: It gy, pale gm, sbt, fvf gr, sbmd-md, wrt, nac, pily. Sb: It gy, pale gm, sbt, fvf gr, sbmd-md, wrt, nac, pily. Sb: It gm, ndb or, sl cale. Sb: It gm, ndb or, p cor. Sb: It gm, ndb or, p cor. orb inel. Sb: It gm, it mr-cm, min, fgr, sbmd-rdd. Cb: Sb: It gm, it mr-cm, wi pin mod shr, mfr, gp, mod shr, ffr, sbmd-rdd. Cb: Sb: It gm, it mr-cm, wi pin mod shr, mfr, gp, mod shr, mfr, gp, mod shr, p cor. Sb: It gm, it mr, sbblig-bily, pily, n cale, si sndy wSB: It gr, it m j, fmr, fgr, sbmd-rdd. Cb: Sb: tr gy, it m j, fmr, fgr, sbmd-rdd. Sb: tr gy, it m j, fmr,	- 5 1/2" 17# Steel Casing - Type I/II Cement Grout					
S: It gy, pale gm, soft, fvf gr, stand-md, cly matx, w srt, mod por, sl calca. SS: It gy, pale gm, soft, fvf gr, stand-md, w srt, calc, pily. SS: It gy, pale gm, soft, fvf gr, stand-md, w srt, calc, pily. SS: It gy, nale gm, soft, fvf gr, stand-md, w srt, calc, pily. SS: It gy, nale gm, soft, fvf gr, stand-md, w srt, calc, pily. SS: It gy, nale gm, soft, fvf gr, stand-md, ely mtx w srt, mod por, start ist gt gr, subarg with pm-mg, sbolky, pily, andy St. SS: It gr, It bm-cm, thin, fgr, sbmd-st, sl calc, cly mtx ip, mod soft, poor wir mg, sS: It gr, It pm-cm, whip, mod sft-firm, fgr, sbmd, sl calc, cly mtx ip, mod soft, poor wir mg, sS: It gr, It pm-cm, thin, fgr, sbmd-std, cly mtx ip, mod soft, poor wir mg, sS: It gr, It pm, stabily-bilky, pily, n calc, sl sndy. WIND 689' WIND 689' WIND 689' SS: It gr, Jtm ip, fmr, fgr, sbmd-md, mod srt, mod srt, al cal, mod por, carb incl.	- 5 1/2" 17# Steel Casing - Type I/II Cement Grout - 5" 20 (0.02") Slot Stainless Steel Casing					
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Image: market in the second of th	 5 1/2" 17# Steel Casing Type 1/II Cement Grout 5" 20 (0.02") Slot Stainless Steel Casing 5 1/2" 17# Steel Casing Sand 6-9 mesh (2.0 ? 2.53 mm dia) 5" 20 (0.02") Slot Stainless Steel Casing 5 1/2" 17# Steel Casing Sond 6-9 mesh (2.0 ? 2.53 mm dia) 5 1/2" 17# Steel Casing Bentonite (Coated Pellet Form) 5" 20 (0.02") Slot Stainless Steel Casing Sond 6-9 mesh (2.0 ? 2.53 mm dia) 5" 20 (0.02") Slot Stainless Steel Casing Sond 6-9 mesh (2.0 ? 2.53 mm dia) 5" 20 (0.02") Slot Stainless Steel Casing 					

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 ¹/₂ 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.

POCI 55 M	1 able 4.1.1 OOCI 55 Moniton Woll Cosing Tolly					
	OCI 55 Monitor Well Casing Tally					
Individual			Well Casing			
Lengths (ft)		ow GL)	Туре			
21	0	21	Solid Steel Solid Steel			
21.07	21					
34.7	42.07		Solid Steel			
35.11	76.77		Solid Steel			
34.71	111.88		Solid Steel			
34.88	146.59		Solid Steel			
34.97	181.47		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		Solid Steel			
34.7	393.77		Solid Steel			
35.65	428.47		Solid Steel			
17.65	464.12		Solid Steel			
5.1	481.77		Solid Steel			
5.15	486.87		Solid Steel			
34.55	492.02	526.57	Solid Steel Slotted Steel			
10	526.57	536.57	Slotted Steel			
5	536.57	541.57	Slotted Steel			
35.24	541.57		Solid Steel			
34.45	576.81	611.26	Solid Steel			
35.05	611.26		Solid Steel			
36.57	646.31		Solid Steel			
2.05	682.88		Solid Steel			
2.08	684.93	687.01	Solid Steel			
4.98	687.01	691.99	Slotted Steel			
9.75	691.99		Slotted Steel			
21.11	701.74	722.85	Solid Steel			
21.5	722.85		Solid Steel			
10.01	744.35		Slotted Steel			
19.1	754.36		Solid Steel			
4.98	773.46		Solid Steel			
9.7	778.44		Slotted Steel			
36.41	788.14		Solid Steel			
35.38	824.55		Solid Steel			
35.71	859.93		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		Slotted Steel			
34.22	975.68	1009.9	Solid Steel			
19.55	1009.9		Slotted Steel			
19.43	1029.45		Slotted Steel			
11.33	1048.88		Solid Steel			
14.6	1060.21	1074.81	Solid Steel			

Table 4.1.1

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.

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		5", 0.02" Slotted Stainless Steel Casing
541.57	687.01		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

 TABLE 4.1.2

 POCI 55 Monitor Well Casing Summary Description

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.

Toel 55 Montor Wei Annual Space Completions				
Depth Interva	l (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		

TABLE 4.2.1 POCI 55 Monitor Well Annular Space Completions

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:

Cement Bond (CBL)
 Collar Locator (CCL)
 Gamma Ray (GR)
 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.

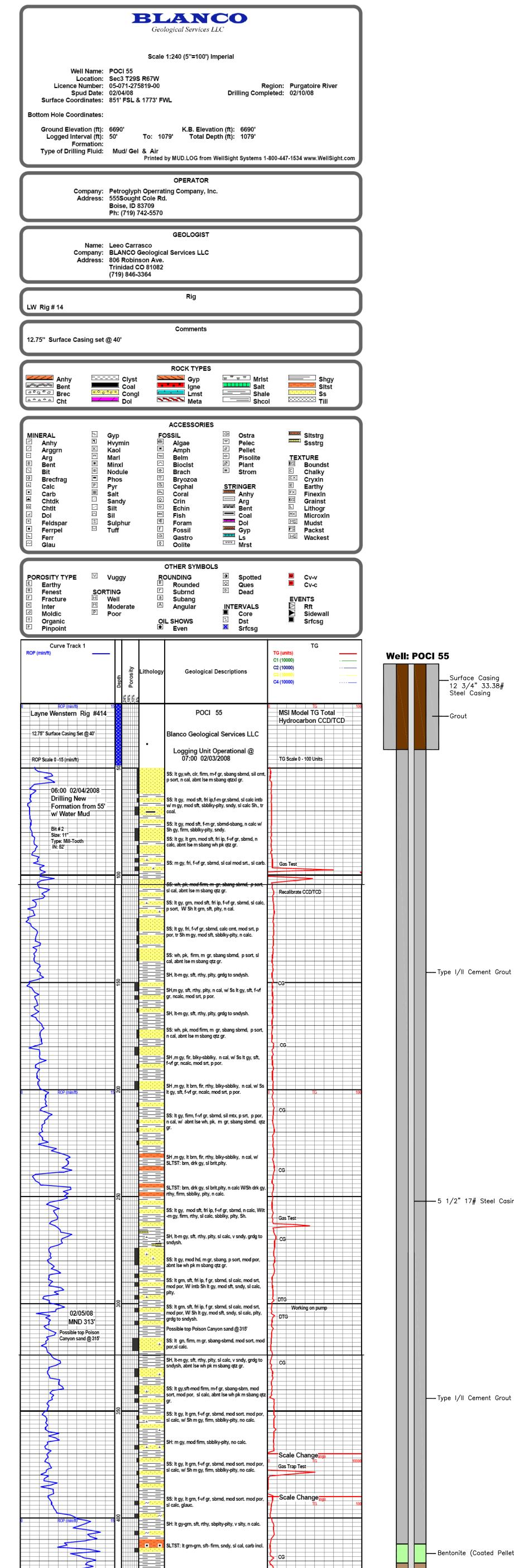
5.2 COLLAR LOCATOR (CCL)

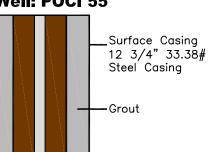
The CCL log is generated by the use of two magnets that produce a signal proportional to the thickness of iron within the casing. This provides the ability to check the casing tally and placement within the well by identifying casing collars and the slotted casing.

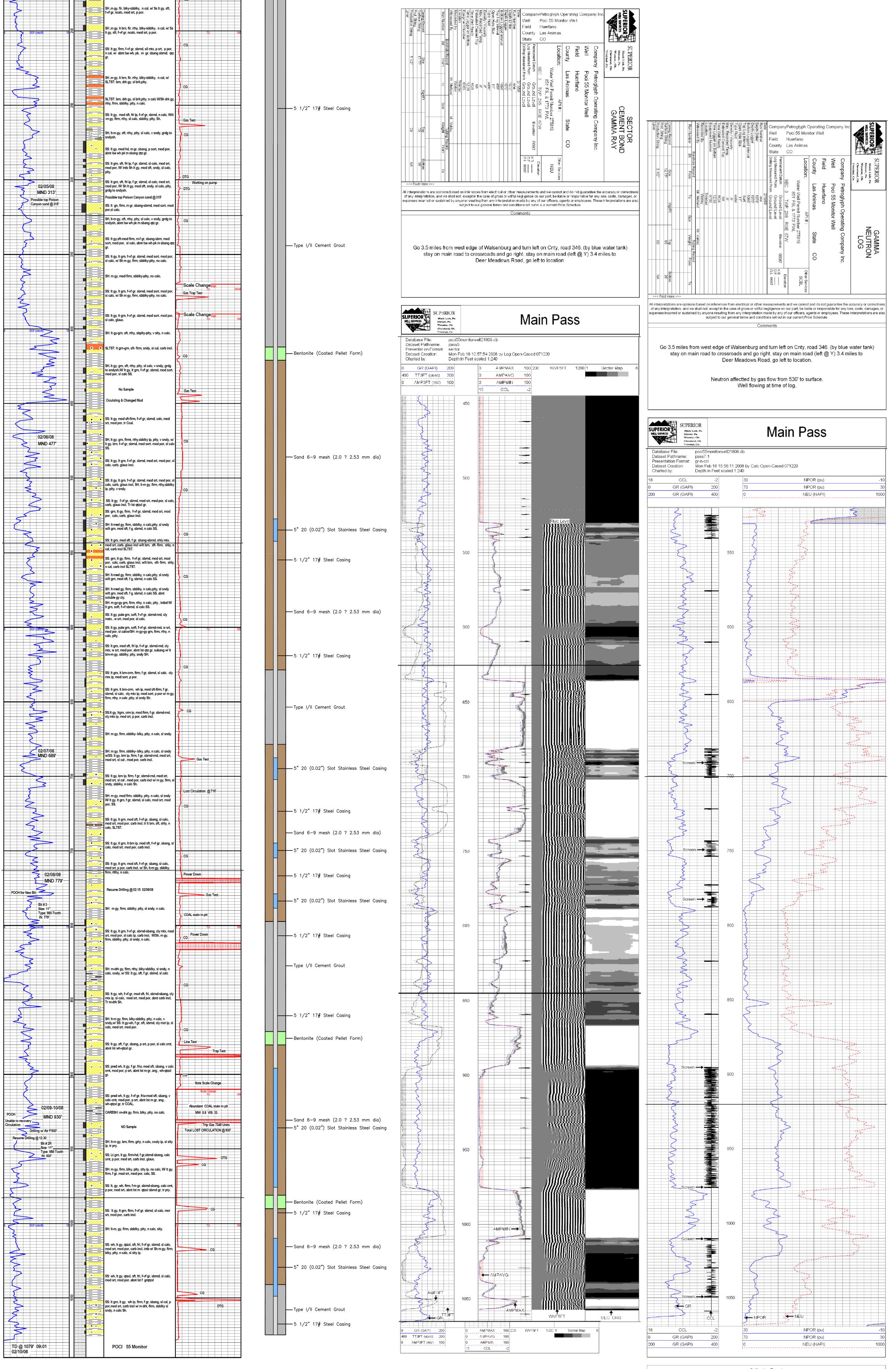
5.3 GEOPHYSICAL LOG EVALUATION

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.







Database File: Dataset Pathname: Dataset Creation:	et Pathname: pass7.1			
		Neutron Calib	ration Report	
Serial Nur Tool Mode Performed	el:	Titan T Thu May 08 1	1:16:24 2003	
Calibrator	Value:	1200	NAPI	
Calibrator	Reading:	1700	cps	
Sensitivity	c:	1	NAPI/cps	
		Gamma Ray Ca	ibration Report	
Serial Nur Tool Mode		Slimhole 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 ¹/₄ 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.

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 D 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 3:1:2 36:22 J2 3:1:48 67:7 J3 3:1:2:2 98:92 J4 3:1:2:2 98:92 J4 3:1:2:2 2:2:3:96 J4 3:1:2:2 2:2:3:96 J4 3:1:2:5 2:3:5:5:1:1 J9 3:1:1:2:5 2:3:5:5:1:1 J1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:1:	POCI 55 Molition Wen Completion Interval 1 Testing Tubing Tany			
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 98.92 J5 31.33 161.47 J6 31.27 192.74 J7 31.35 285.46 J9 31.35 286.46 J10 31.05 31.75 J11 31.3 348.81 J12 31.35 442.48 J13 31.2 411.13 J14 31.35 536.78			9 - 1048.9	
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				
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 98.92 J4 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 31.2 441.43 J14 31.35 536.78 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				
Packer CL To top of assembly7J1+ 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 31.22 411.13 J14 31.35 442.48 J15 31.75 505.43 J16 31.7 505.43 J17 31.35 536.78 J18 31.1 567.88 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 31.44 817.36 J29 31.44 911.26				
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 31.16 692.73 J23 31 723.73 J24 31.16 <td>ID</td> <td>Joint Lengths (ft)</td> <td>Packer Center Line Set Depth (ft)</td>	ID	Joint Lengths (ft)	Packer Center Line Set Depth (ft)	
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 31.22 411.13 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 J20 31.05 630.38 J21 31.2 661.58 J22 31.15 692.73 J23 31.33 723.73 J26 31.33 786.22 J26 31.44 817.36 J27 31.25 879.86 J29 31.4 911.26		7		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		32.22*	36.22	
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 31.11 567.88 J19 31.45 599.33 J20 31.05 630.38 J21 31.2 661.58 J22 31.15 692.73 J23 31.16 754.89 J24 31.25 848.61 J28 31.25 879.86 J29 31.44 911.26				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			98.92	
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $		31.33	161.47	
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		31.27	192.74	
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				
J1031.05317.51J1131.3348.81J1231.12379.93J1331.2411.13J1431.35442.48J1531.25473.73J1631.7505.43J1731.35536.78J1831.1567.88J1931.45599.33J2031.05630.38J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.25879.86J2931.4911.26	J8	31.15	255.11	
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 31.33 786.22 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		31.35	286.46	
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		31.05	317.51	
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	J11	31.3	348.81	
J1431.35442.48J1531.25473.73J1631.7505.43J1731.35536.78J1831.1567.88J1931.45599.33J2031.05630.38J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.4911.26	J12	31.12	379.93	
J1531.25473.73J1631.7505.43J1731.35536.78J1831.1567.88J1931.45599.33J2031.05630.38J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.4911.26	J13	••••=		
J1631.7505.43J1731.35536.78J1831.1567.88J1931.45599.33J2031.05630.38J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.4911.26	J14	31.35	442.48	
J1731.35536.78J1831.1567.88J1931.45599.33J2031.05630.38J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.4911.26	J15	31.25	473.73	
J1831.1567.88J1931.45599.33J2031.05630.38J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.4911.26	J16	31.7	505.43	
J1931.45599.33J2031.05630.38J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.4911.26	J17	31.35	536.78	
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	J18			
J2131.2661.58J2231.15692.73J2331723.73J2431.16754.89J2531.33786.22J2631.14817.36J2731.25848.61J2831.25879.86J2931.4911.26	J19	31.45	599.33	
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	J20	31.05	630.38	
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	J21	31.2	661.58	
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	J22	31.15	692.73	
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	J23	31	723.73	
J26 31.14 817.36 J27 31.25 848.61 J28 31.25 879.86 J29 31.4 911.26	J24	31.16	754.89	
J27 31.25 848.61 J28 31.25 879.86 J29 31.4 911.26	J25	31.33	786.22	
J28 31.25 879.86 J29 31.4 911.26	J26	31.14	817.36	
J29 31.4 911.26	J27	31.25	848.61	
	J28	31.25	879.86	
J30 31.2 942.46	J29	31.4		
012.10	J30	31.2	942.46	
J31 31.13 973.59	J31	31.13		
Pups 18.45 992.04	Pups	18.45	992.04	

 TABLE 6.1.1

 POCI 55 Monitor Well Completion Interval 1 Testing Tubing Tally

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.

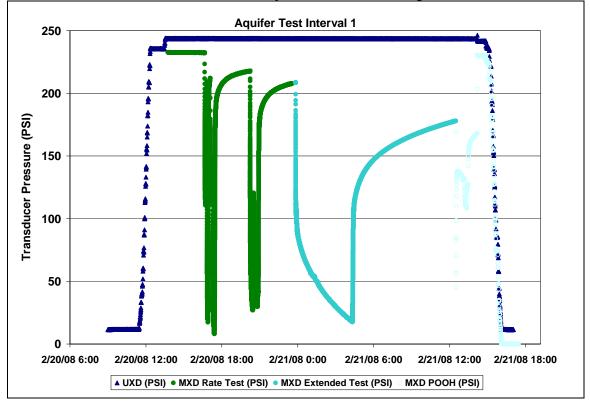


FIGURE 6-1 POCI 55 Monitor Well Completion Interval 1 Testing Pressures

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).

	Aquifer Test Interval 1								
Date Time CH ₄ (% Vol) H ₂ S (ppm) O ₂ (% Vol) CO (ppm) Measurement Locati									
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			

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

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 $1\frac{1}{2}$ inch tubing separating the packers.

		etion Interval 2 Testin	ng Tubing Tally						
	g Tubing Tally Bottom								
	om Top of Casing = 5	30.8 ft							
Top of Pipe String		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							
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							
J24	31.16	900.96							
J25	31.33	932.29							
J26	31.14	963.43	818.16						
J27	31.25	994.68							

TABLE	6.2.1
-------	-------

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 ¹/₄ 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.

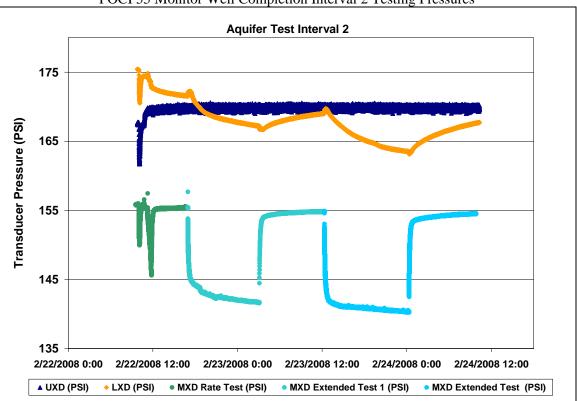


FIGURE 6-2 POCI 55 Monitor Well Completion Interval 2 Testing Pressures

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.

Aguifer Test Interval 2											
Date											
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					

 TABLE 6.2.2

 POCI 55 Monitor Well Completion Interval 2 Testing Gas Monitoring

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.

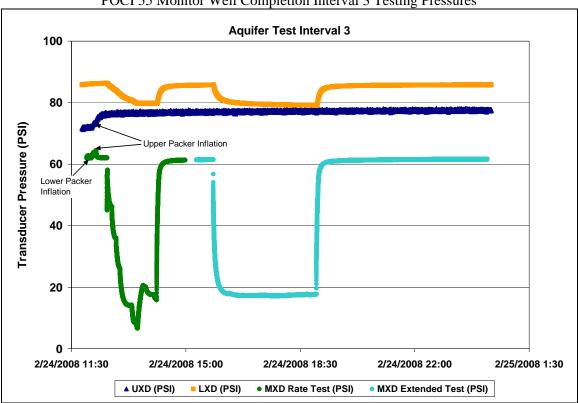
POCI 55 Mor	nitor Well Completion	on Interval 3 Testing	Tubing Tally
POCI 55 Test String Tul			<u> </u>
Open Hole DTW from T			
Top of Pipe String Abov		4	
*Transducers Placed at		654 feet	
ID	Joint Lengths (ft)	LP CL Set Depth (ft)	UP CL Set Depth (ft)
LP CL to bottom	8	-4	
LP CL to top	4.4	0.4	
j1	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

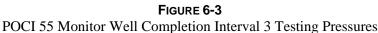
TABLE 6.3.1

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.





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.

	Aquifer Test Interval 3								
Date	Date Time CH ₄ (% Vol) H ₂ S (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			

 TABLE 6.3.2

 POCI 55 Monitor Well Completion Interval 2 Testing Gas Monitoring

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.

		etion Interval 4 Testir	ng Tubing Tally							
POCI 55 Test String	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							

DOCI 55 Monitor Wall C	maintion Intom	vol 4 Testine Typing

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 ¹/₄ 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.

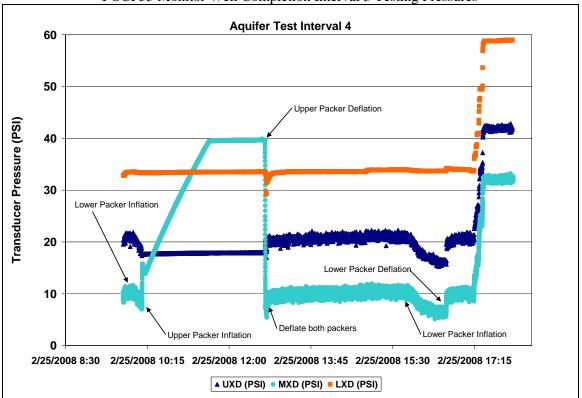


FIGURE 6-4 POCI 55 Monitor Well Completion Interval 3 Testing Pressures

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.

	Aquifer Test Interval 1										
Date	Time	Turbidity	Temperature (Celcius)	SpC	pН	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										
	Temperature										
Date	Time	Turbidity	(Celcius)	SpC	рН	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					
				Aquife	r Test Interval	3					
Date	Time	Turbidity	Temperature (Celcius)	SpC	рН	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					

 TABLE 6.5.1

 POCI 55 Monitor Well Water Quality Parameters

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 μ g/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.

	1 OCI 55 Molitor Wen Dissorved 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			

 TABLE 6.5.2

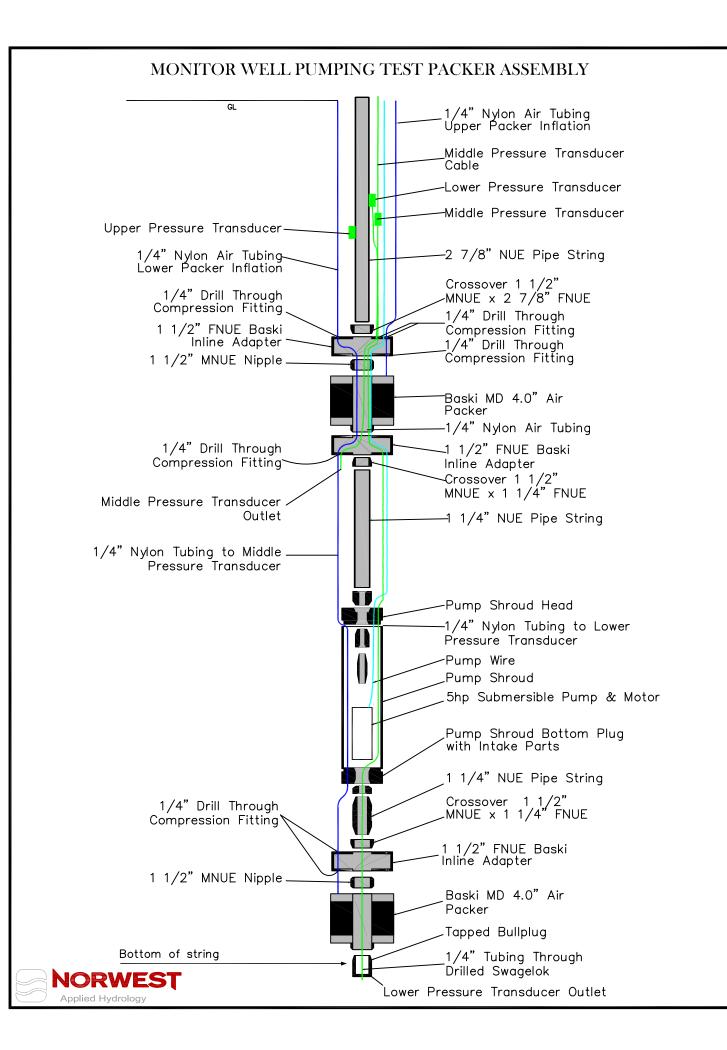
 POCI 55 Monitor Well Dissolved Gas Results

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.



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

			V	Vell Name:PC	DCI 55 MON	ITOR WEL	L		a de la composition de la comp	
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Formatio	on :				Weather:		• • • • • • • • • • • • • • • • • • •			
Rig Comp	any	:			Rig Name:					
Daily Co	ost:		\$0	Cum D	HC:	\$0	Total Well	Cost:	\$0	
n y antiger	Ang kang sa				Operations					
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21:30 2	.50	13	Stand by for cement to o		n. reng - 14.7 ib	s per gai approx	uuwii amulas.	40	40	NIH
Total: 17.0	0		· · · · · · · · · · · · · · · · · · ·							
		-		y D	aily Summary					
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Rig Comp	any	• • • •	Layne Christ	ensen	Rig Name:		Layne Christe	nsen Rig #	405	
Daily Co	ost:		\$15,000	Cum D	HC:	\$15,000	Total Well	Cost:	\$15,00	00
					Operations					
Start Hr	s (Code		1	Remarks			Start Depth	End Depth	Run
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7:00 17	.00	02	Drill Cut surface casing	off at GL. Weld 12 3	3/4" flange. Bolt o	n diverter head &	& diverter pipe.	40	40	NIH
-			Tag cement @ 27' drill c	out. Wait stand by f	or 2 hrs for Geo to	arrive. Sack cu				
Total: 24.0			pump, Thin back mud to	0.0.0#, 31 VIS. Drill	out 13 of cement					

			W	ell	Nai	me:PC	CI 55	MONI		VEI	1	- Converting and		<u></u>	
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Activity Date :	2/6/200	8 Day	/s Fro	om Sp	oud :	4		Depth:	68	39 Ft	24 Hr.	Foota	ge Mad	e :	209 F I
Formation :		<u> </u>						ather:							
Rig Company :		Layne	Christ	tense				lame:	L	L			nsen Ri		
Daily Cost:	\$	15 ,863				Cum DI			\$64,224		Tota	al Wel	I Cost:	\$	64,224
	<u> </u>						Operati	ons			the second s	Ç KAC			
	ode						Remark s	s ann a bhailtean an	-# % * [*]				Start D	epth End I	Depth Run
24.00 0	D2 Drill from	n 480' to 6	89' 15	5 units	s of ga	s were n	oted @ 60	00'.				· · · · · · · · · · · · · · · · · · ·	480	68	39 NIH
Total: 24.00															
the first the second		1. 191. Q.				٨	Aud Prop	erties			e, ile me me	Na 19 19			
Depth Time	Wt In Wt C	Dut Vis	PV	YP	(Gels	FL	HTFL	FC	HTH	-C 3-	Solid	Water	Oil	Sand
	0.00 9.4	0 35	0	0	C	0/0/0	0.0	0.0	0	0.0	0 0	0.0%	0.0%	0.0%	0.0%
MBT pH	Pm Pf	Mf	CI		Ċa	ES	Pon	n Lim	e Total	Sal.	CaCl2	E	DTA C	/W Ratio	Mud Loss
0.0 0.00 0	0.00 0.00	0.00	0		0	0	0.00	0.0	0 0)	0	0	.00		0
Water Loss LC		FL Tem	p				Remar	ks							
0 0.0		0													
		Dut Vis	PV	YP	1000 <u>, 1</u> 000, 100	Gels	FL	HTFL	FC	HTF	dille dille diller ;	Solid	Water		Sand
	0.00 8.8		0	0	0	/0/0	0.0	0.0	0	0.0		0.0%	0.0%	0.0%	0.0%
2	Pm Pf	Mf	CI		Ca	ES	Pon		Alland Marie Store	Sal.	CaCl2	E	DTA C	/W Ratio	Mud Loss
	0.00 0.00	0.00	0		0	0	0.00		0 0		0	0	.00		0
Water Loss LCI		FL Tem	p				Remar	<u>(s</u>			<u> </u>	<u></u>			
0 0.0		0				. <u>.</u>	<u> </u>								
	Wt In Wt C		PV	YP	···	Gels	FL	HTFL	FC	HTF	2	Solid	Water	94. The second	Sand
	0.00 8.8		0	0		/0/0	0.0	0.0	0	0.0).0%	0.0%	0.0%	0.0%
and the second	Pm Pf	Mf		4	Ca	ES	Pon		i a an a sintan		CaCl2		al yddir y yddir y 100	/W Ratio	Mud Loss
in the second	0.00 0.00	0.00	0		0	0	0.00		0 0		0	0	.00		0
Water Loss LCI	194 (A)	FL Tem	P	<u>in sin i</u>			Remarl	(S	in in the						i in sur an
0 0.0		0					<u> </u>		T						
	Wt In Wt C	247	PV	YP		Gels	FL	HTFL	FC		r gana za z zan.	Solid	Water	tille gans - v	Sand
	0.00 8.9	اس و و و و و و و و و و و و و و و و و و و	0	0		/0/0	0.0	0.0).0%	0.0%	0.0%	0.0%
	Pm Pf	Mf	CI		Ca	ES	Pon		end		CaCl2		···· ······ ···· · ··· ·	VV Ratio	Mud Loss
	0.00 0.00	0.00	0		0	0	0.00		0 0	<u> </u>	0		.00		0
Water Loss LCI		IFL Tem	р ———				Remar	(S			ىر يېرى مەركى مە بىر يېرىي مەركى م				<u></u>
				VD		5.1.			I FO			Na 1947	1 107-1-		
	Wt In Wt C		PV 0	YP 0		Gels	FL	HTFL	FC 0			Solid	Water		Sand
	0.00 9.0 Pm Pf	0 35 Mf				10/0	0.0	0.0		0.0	CaCl2).0%			0.0%
	0.00 0.00	0.00	0		Ca 0	ES 0	Por							VV Ratio	Mud Loss
0.0 0.00 0 Water Loss LCI		FL Tem			$\overline{}$		0.0(0 1 0			<u> </u>	.00		<u> </u>
0 0.0		0		<u>nin mit </u>		atio fillo i	Reman	13	an ann ann ann ann an ann an an an an an	<u>in in M</u>	<u>te Alle Alle</u> , di	<u>نائد, ممتر ،</u>			<u> San dina dina di</u>
	Wt In [Wt C		PV	YP		Sels	FL	HTFL	FC	Тнт		Solid	Water	Oil	Sand
	0.00 9.1		0	0		/0/0	0.0	0.0	0	0.0).0%	0.0%		0.0%
	Pm Pf	Mf			Ca	ES	Pon	·			CaCl2				Mud Loss
	0.00 0.00	0.00	0	+	0		0.00				0		.00		0
Water Loss LCI		FL Tem			-		Remark				-		<u></u>	19. La	<u> </u>
0 0.0		0		<u>,</u>		<u>Alfan Alfan - an</u>		. <u> </u>	adar Mille 3	<u></u>			<u> </u>	<u></u>	<u>. 1944 - 1944 - 1944 - 1944 -</u> 1
	Wt In Wt C		PV	YP	1.0	Gels	FL	HTFL	FC	HTF	E T S	Solid	Water	Oil	Sand
VLIECIAI STRAE I			0	0		/0/0	0.0	0.0		0.0		0.0%	0.0%		0.0%
	0.00 1 9 3							1 0.0		1 0.0			1	1 3.370	
619 15:20	0.00 9.3 Pm Pf						Pon	1 lim	e Total	Sal	CaCl2	EL EL	DTA IC	W Ratio	Mud Loss
619 15:20 MBT pH	Pm Pf	Mf			Ca 0	ES	Pon 0.00			100 AUG 1	CaCl2 0		1997 - C. 1997 -	/W Ratio	Mud Loss
619 15:20 MBT pH	Pm Pf 0.00 0.00		CI 0		Ca 0		Pon 0.00 Remarl	0.0		100 AUG 1			DTA C .00	/W Ratio	

			٧	Vell	Na	me:PO	CI 55	MONI	TC	RW	ELI					<u></u>	<u> </u>
Field Name:	RA	TON				S/T/R		3/298/6	7W			Cou	nty,Stal	e:	HU	ERFAN	O, CO
Operator:	YPH OPER	ATING C	OMP	Loca	ation	Desc:	F	RRR Lot	55)			Distri	ct:	(COLORA	DO
Depth Time	Wt In Wt 0	Dut Vis	PV	ΥP		Gels	FL	HTFL		FC	НТ	FC	Solid	We	iter	Oil	Sand
629 17:00	0.00 8.9	0 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	F'om	So./*****?.(0000.		Total S	Sal.	CaCl	n 200. Simme 3	DTA	O/V	V Ratio	Mud Loss
0.0 0.00	0.00 0.00	0.00	0		0	0	C.00		0	0		0	0	.00			0
	CM ECD	FL Tem	p			<u> </u>	Rem ark	S									there is a first of the second s
	0.0 0.0	0				* •	<u> </u>										
Depth Time		Dut Vis	PV	YP	S. 2000C. V	Gels	FL	HTFL		FC	6 816 - 54	FC	Solid	Wa	. 200.	Oil	Sand
645 18:40	0.00 8.9		0	0	_	0/0/0	0.0	0.0		0		00	0.0%	0.0		0.0%	0.0%
MBT pH	Pm Pf	Mf	<u>Cl</u>		Ca	ES	Pom			Total S	Sal.	CaCl		DTA	10/	V Ratio	Mud Loss
0.0 0.00	0.00 0.00	0.00	0		0		0.00			0		0	0	.00	<u> </u>	Arrest Francisco Prances	0
and the second second	CM ECD	FL Tem	<u> </u>				Remark	S	<u>. 19</u>			<u> 1961 - 1964</u>	<u> </u>	1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100 - 1100			
	0.0 0.0	0				<u></u>	L		1-50				0.11	1100			
Depth Time		Dut Vis	PV	YP	8.00.6 (9.000);	Gels	FL	HTFL		FC	20. <u>.</u>	FC	Solid	Wa	n Same	Oil	Sand 0.0%
359 20:10	0.00 8.9	0 40 Mf	0 Cl	0	L	0/0/0	0.0 Pom	0.0 Lim	Ļ	0 Total S		00 CaCl	0.0%	0.0 DTA		0.0%	Mud Loss
MBT pH 0.0 0.00	Pm Pf 0.00 0.00	0.00			Ca 0	ES 0	0.00			101a1 3	sai.			.00	10/1	v Raliu	0
	CM ECD	FL Tem		_1_	<u> </u>		Remark		<u>v 1</u>	0	1	<u> </u>	<u> </u>		<u> </u>		<u> </u>
			<u>– 14</u>				IN EITIGI K	<u>></u>		<u> </u>		<u></u>		alle com		<u></u>	
Depth Time	Wt In Wt (PV I	YP		Gels	FL T	HTFL		FC	HT	FC	Solid	Wa	ter	Oil	Sand
670 22:00	0.00 8.9	1980	0	0		0/0/0	0.0	0.0	\square	0		00	0.0%	0.0	7. 00000	0.0%	0.0%
MBT pH	Pm Pf	Mf			Са	ES	Pom		el	Total S		CaCl		DTA			Mud Loss
0.0 0.00	0.00 0.00	0.00	0	-	0	0	0.00	0.0	A	0		0	Sec. 15 - 51-51	.00		<u></u>	0
	CM ECD	IFL Tem	p				Remark	s				n i Sang Ing Dana Ingana			Staal		
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.0 0.0	0	1		T												
Depth Time	Wt In Wt (Dut Vis	PV	YP		Gels	FL	HTFL		FC	Н	FC	Solid	Wa	iter	Oil	Sand
689 0:00	0.00 8.9	40	0	0		0/0/0	0.0	0.0	Τ	0	0.	00	0.0%	0.0)%	0.0%	0.0%
MBT pH	Pm Pf	Mf	CI		Ca	ES	Pcm	Ĺ	e	Total S	Sal.	CaCl	2 E	DTA	OA	N Ratio	Mud Loss
0.0 0.00	0.00 0.00	0.00	0		0	0	0.00	0.0	0	0		0	C	00.00			0
Water Loss L	CM ECD	FL Tem	р				Remark	ís									
0 0	0.0 0.0	0															

3/13/2008

			W	ell N	ame:	PO	CI 55 I	MONI	TO	RW	EL	L					
Field Name:	RATO	ON			S/T/F			3/295/67					ty,Stat	e:	HU	ERFAN	0. CO
 I down in the fight providency despine 	PH OPERAT	TING CO		ocatic	n Desc			RRR Lot					Distri			COLORA	
						Dai	ly Sum	mary				• •					
Activity Date :	2/7/2008	Davs	s From	Spuc	1: 5		Current		Γ	765	Ft	24 Hr.	Foota	ae Ma	ade :		76 F
Formation :							Weat	2 VIII # 2 2 2 2 2 1 1 1 1 1						90			
Fig Company :		Layne C	hriste	nsen			Rig Na					Layne (hriste	nsen	Ria #	# 405	
Daily Cost:		,102		T	Cum			· · · · · · · · · · · · · · · · · · ·	571,3	326			al Wel				71,326
	* / ·	,			- Uun		o. Operatio			020				000	•	<u> </u>	1,020
Start Hrs Co	de						marks	115					<u></u>	Start	Dont	h End D	epth Run
	2 Drill from 6	2001 to 70	CE1 A4	7601	<u>.</u>										<u> </u>	76	
	0 Ran surve		00. AL	760 W	e lost ap	prox		nua/H2O	mix.						89 65	76	
	6 Replace b	•	Dulla	1 1 5 0	20.4- 20	000		-+ 2001 -	66 h - 1	14	A.44.a.		.i. d	_			
13:30 5.50 0	the rest of			u 15,00	JU to 20,	000 6	over to' tir	'st 300' o	оа по	ttom.	Aner	r that rota	itea	<u> </u>	65	76	5 NIH
19:00 5.00 0	6 PU & GIH			tooth	bit sn# C	HIG	HM52140	68. #18	jets	cir & r	eam	going in	o well	7	65	76	5 NIH
	bore.																
otal: 24.00								7					n derdret in C	1013		·	
	ALLA DAN C	<u></u>				Mi	ud Prope		<u> </u>				<u>~ ·· ·</u>	1.4.2	7	~"	
	Nt In Wt Ou	- /////////////////////////////////////		(P	Gels		FL	HTFL	2 0.000 (D)	=C		2.74	Solid	Wa	· · · · ·	Oil	Sand
	0.00 9.40	35	-	0	0/0/0		0.0	0.0		0			0.0%	0.0		0.0%	0.0%
	1.03 (2000) -		CI	Ca		ES	Pom		111-1	otal 8	sal.	CaCl2	······ · V&/ · · · ·	DTA	0/V	V Ratio	Mud Loss
		0.00	0	0		0	0.30			0		0	00	.00			0
Water Loss LCN		LTemp					Remark	S						<u></u>			nage service and an
0 0.0		0							1		1.01						The states of th
in the second	Nt In Wt Ou	- in the second		/P	Gels		FL	HTFL		-C	- 5-2 -		Solid	Wa	- 200000	Oil	Sand
	0.00 9.00	36	-	0	0/0/0		0.0	0.0		0			0.0%	0.0		0.0%	0.0%
			CI	Ca		ES	Pom		****************	otal S	Sal.	CaCl2		DTA	0/V	V Ratio	Mud Loss
		0.00	0	0		0	0.00		0	0		0	0	.00	<u> </u>		0
Water Loss LCM		LTemp)				Remark	S				saisaanan					madalar a
0 0.0		0	<u> </u>		<u> </u>								<u></u>	1			
	Nt In Wt Ou			/P	Gels		FL	HTFL	-	=C			Solid	Wa		Oil	Sand
	0.00 9.10	40	-	0	0/0/0		0.0	0.0		0			0.0%	0.0		0.0%	0.0%
		• • • • • • • • • • • • • • • • • • • •	CI	Ca	100 B	ES	Pom	······	harde de de	fotal S	Sal.	CaCl2		DTA	0/V	V Ratio	Mud Loss
		0.00	0	0		0	0.00		0	0		0	0	.00			0
Water Loss LCN		L Temp)			·	Remark	S	() sinter o		чүз 						
0 0.0		0									2002						
	Nt In Wt Ou				Gels		FL	HTFL		-C	4000 UT		Solid		ter	Oil	Sand
	0.00 9.10		-	0	0/0/0		0.0	0.0		0			0.0%	0.0		0.0%	0.0%
			Cl	Ca		ES	Pom			otal S	Sal.	CaCl2	and had hill an in a	DTA	0/V	V Ratio	Mud Loss
مطيعه والمستعد ومساح			0	0		0	0.00		0	0		0	0	.00		····	0
Water Loss LCM		LTemp	1				Remark	S	<u>iinaa</u>		22						
0 0.0		0									8887 s	مى يىتمى		00 000 A A-			- Managanta
	Nt In Wt Ou			(P	Gels		FL	HTFL		-C	10000 - 20 100 - 1	V * * * * * * * * * * * * * *	Solid	Wa		Oil	Sand
	0.00 9 .10	37		0	0/0/0	L	0.0	0.0		0			0.0%	0.0		0.0%	0.0%
14.5 1.7 A A A A A A A A A A A A A A A A A A A			Cl	Ca		ES	Pom			otal S	Sal.	CaCl2	- A.L C.S.C.	DTA	O/V	V Ratio	Mud Loss
have a second		0.00	0	0		0	0.00		0	0		0	0	.00			0
Water Loss LCM		LTemp	9				Remark	S				in a second s			n hidh an .		
0 0.0		0							-			FFO 1	0.11.1	1.4.4		<u></u>	
	Nt In Wt Ou			/P	Gels		FL	HTFL		-C			Solid	Wa		Oil	Sand
	0.00 9.10	37		0	0/0/0		0.0	0.0		0			0.0%	0.0		0.0%	0.0%
		11.12	CI	Ca		ES	Pom			Total S	sal.	CaCl2			0/V	v Ratio	Mud Loss
		0.00	0	0		0	0.00			0		0	0	.00	<u> </u>	2 vg1	0
Water Loss LCI		L Temp)	áta j			Remark	······	1.000		1965 - Millionaine						addingen, or Art Million, a maard
0 0.0	0.0	0	1	1			Lost 4" d	ot pit vo	lume	э.							

					V	Vell	Nan	ne:PO	CI 55 I	MONIT	OR W	EL	L	No. of Concerning Street, 17	<u></u>		
Field	Name	:	RA	TON			S	S/T/R	3	3/29S/67V	V		Col	inty,State	∋:	HUERFA	NO, CO
0	perator	_YPH	OPER,	ATING	COMP	Loca	tion [Desc:	R	RRR Lot 5	5			Distric	t:	COLO	RADO
Depth	Time	Wt Ir	ר Wt C	Dut V	s PV	ΥP	Ċ	Sels	FL	HTFL	FC	HI	FC	Solid	Wa	ter Oil	Sand
765	10:00	0.00	9.2	0 4	1 0	0	0	/0/0	0.0	0.0	0	0	.00	0.0%	0.0	% 0.0%	6 0.0%
MBT	pН	Pm	Pf	Mf	Cl		Са	ES	Pom	Lime	Total S	Sal.	CaC	I2 EC)TA	O/W Rati	o Mud Loss
0.0	0.00	0.00	0.00	0.00	0		0	0	0.00	0.00	0		0	0.	00		0
V/ater l	_oss L	CM	ECD	FLTe	emp				Remark	S							
0		0.0	0.0	0													

				W	/ell	Nan	ne:PC	OCI 55 I	MONI	OR	WEI	L					
Field Name:	<u> </u>	RA	TON	l			/T/R		3/295/67				inty,Stat	e: HL	JERFAN	O, CO)
Operator:	LYPH	OPER/	TING C	OMP	Loca	tion D	esc:		RRR Lot				Distric		COLORA		
										_		1				_	
							Da	ily Sum									
Activity Date :		2/8/2008	3 Day	/s Fror	n Sp	ud :	6	Current			930 Ft	24 H	r. Foota	ge Made		16	65 Ft
Formation :								Weat									
Fig Company	: T		Layne	Christe	enser			Rig Na						nsen Rig			
Daily Cost:		\$	15,930			(Cum DH	IC:	\$	87,25	6	T.	otal Wel	I Cost:	\$	87,256	3
						ine Line		Operatio	ns			an a Airtí					399 - 1
Start Hrs (Code						R	emarks						Start Dep	th End D	epth	Run
0:00 2.50	02	Replace	Bit GIH	with bi	t#3s	sn # C	HIGHM5	521406E wi	ith # 18 je	ts. Re	amed	to TIH w	ith new	765	76	5	NIH
2:30 14.50	02	Drill fron	n 765' to 9					t 160 bbls / lls). No luc					Jmp 320	765	93	0	NIH
17:00 7.00	39		String. F						okrogum	ng one	anation	-		930	93	0	NIH
Total: 24.00													· •				
							N	lud Prope	rties								
Depth Time	Wtl	n Wt C	out Vis	PV	YP	G	iels	FL	HTFL	FC		ITFC	Solid	Water	Oil	Sa	and
765 1:00	0.0		c.	0	0	0/	/0/0	0.0	0.0	0		0.00	0.0%	0.0%	0.0%	1000	0%
MBT pH	Pm	Pf	Mf	CI	T	Ca	ES	Pom	Lime	Tot	al Sal	. CaC	12 EI		V Ratio	Mud	Loss
0.0 0.00	0.00	0.00	0.00	0	A0.0	0	0	0.00			0	0		.00		0	2.0
	СМ		FL Tem	p		1.00		Remark			- Sent a		<u>-</u> -				
	0.0	0.0	0		Sec. (* .)				-								<u></u>
Depth Time	Wti		ut Vis	PV	YP	G	iels	FL T	HTFL	FC		ITFC	Solid	Water	Oil	Sa	and
779 2:10	0.0	0.07		0	0	2677 -	/0/0	0.0	0.0	0		0.00	0.0%	0.0%	0.0%		0%
MBT pH	Pm	Pf	Mf	CI	الستي	Ca	ES			Tot	al Sal				V Ratio		
0.0 0.00		0.00	0.00	0		0	0	0.00			0	0		.00		0	
Water Loss L	СМ		FL Tem	p	Ci i i i i i i i i i i i i i i i i i i		<u> </u>	Remark	s	and the second	: 200	1		i laga i	1.030		
	0.0	0.0	0				<u> </u>								<u></u>		
Depth Time	Wti	n Wt C	out Vis	PV	YP	G	iels	FL	HTFL	FC	ŀ	ITFC	Solid	Water	Oil	Sa	and
300 4:30	0.0	1.12		0	0	0,	/0/0	0.0	0.0	0		0.00	0.0%	0.0%	0.0%	0.0	0%
MBT pH	Pm	Pf	Mf	CI	T	Са	ES	Pom	Lime	Tot	al Sal	. CaC	12 El		V Ratio	Mud	Loss
0.0 0.00	0.00	0.00	0.00	0		0	o	0.00	·····	1.22	0	0	0	.00	 Andrease Andrease 	0	
Water Loss L	см Г	ECD	FL Tem	p			<u> </u>	Remark	s	in a second	900 						dang, ing Againg s
0 0	0.0	0.0	0									10-000 (00 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100			<u></u>		
Depth Time	Wt I	n Wt C	out Vis	PV	YP	- C	iels	FL	HTFL	FC	H	ITFC	Solid	Water	Oil	Sa	and
350 9:54	0.0	3 8.9	0 36	0	0	0/	/0/0	0.0	0.0	0		0.00	0.0%	0.0%	0.0%	0.0	0%
MBT pH	Pm	Pf	Mf	CI	T	Ca	ES	Pom	Lime	Tot	al Sal	. CaC	12 EI		V Ratio	Mud	Loss
0.0 0.00	0.00	0.00	0.00	0		0	o	0.00	0.00)	0	0	0	.00		0	5
Water Loss L			FL Tem		0.0			Remark						<u>_</u>			
	0.0	0.0	0	• • • • • • • • • • • • • • • • • • • •			<u> </u>		<u> </u>	<u>wgar (1819</u>					e		
Lepth Time		n Wt C		PV	YP	G	iels	FL	HTFL	FC	H	ITFC	Solid	Water	Oil	Sa	and
307 14:30	0.0			0	0		/0/0	0.0	0.0	0		0.00	0.0%	0.0%	0.0%	362 mm. 198	0%
MBT pH	Pm		Mf	CI	_	Ca	ES	Pom			al Sal				N Ratio		
0.0 0.00	1000332 101	0.00	0.00	0	120.02	0	0	0.00		/	0	0		.00		0	
V/ater Loss	СМ	ECD	FLTem				<u> </u>	Remark									
	0.0	0.0	0					1								· ·	
Depth Time	Wt		Dut Vis		YP		els	FL	HTFL	FC		ITFC	Solid	Water	Oil		and
930 17:00	0.0			0	0	0,	/0/0	0.0	0.0	0		0.00	0.0%	0.0%	0.0%		0%
MBT pH	Pm	20 March 1997	Mf	CI		Ca	ES	Pom		_	al Sal				N Ratio		
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Field Name	201 - C	RATON		S/T/R	2	3/295/67			unty,Stat		RFANO,	
Operato	а ^р урн	OPERATING	S COMP/L	ocation Desc		RRR Lot	55		Distric	ot. Co	OLORADO)
					Daily Sum	nmary						
Activity Date	:	2/9/2008 E	Days Fron	n Spud : 7	Current	Depth :	930	Ft 24 H	Ir. Foota	ge Made :	1	C
Formation :						ther:				<u> </u>	3 4	
Rig Company	i :	Layr	e Christe	nsen	RigN		<u>.</u>	Layne	e Christe	nsen Rig #	405	
Daily Cost:		\$14,430)	Cum			01,686			I Cost:		686
		te de la companya de	Carlor Carlor Carlos		Operatio	ons	the property	e de he se l		an sa	1. a. 16 4	R 1
Start Hrs	Code				Remarks			<u></u>		Start Depth	End Dept	ו R
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		@ 04:30.										
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6:00 3.00	44		ot tremmie	pipe trailer in.	Falley & C(IH.	Stop.				930	930	
9:00 3.00	24	Wait on order.								930	930	N
12:00 1.00	06			of tremmie pipe						930	930	\downarrow
13:00 1.00	23			s of fresh H2O i		Tlush mud	prior to dr	ill with air.		930	930	\downarrow
14:00 5.00 19:00 5.00	20	Welding Exter				4 /011 0000	\ <u>#</u>			930	930	<u>ا ۲</u>
13.00 5.00		RIH w/ bit. GIH 930'.	n w/ rerun	II UI[#∠&X0\	vers, 16 ca 5	1/2° X 2000	H COllars a	ina 15 ea	שיים איט	930	930	
Total: 24.00			,		······································				· · ·	J		
		ting the second se			Mud Prope	erties						340
epth Time	Wt	In Wt Out Vi	is PV	YP Gels	FL	HTFL	FC T	HTFC	Solid	Water		Sar
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Activity Date Formation :	÷ 2	0.0 0 2/10/2008 C	Days From	1 Spud : 8	Daily Sum Current Wea	mary Depth : ther:	1080	Ft[24 ⊦	Ir. Foota	ge Made :		150
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Field	d Nam	e:	RA	TON			S/T/R:		8/295/67				nty,Stat	te:	HUE	RFANC), CO
0	perato	or:_YP	H OPER	ATING	COMP	Locatio	on Desc:	F	RR Lot	55			Distri	ct:	Ċ	OLORAI	20
							Ľ	Daily Sum	mary								
Activit	ty Date	;	2/11/20	08 Da	ys Fro	m Spuc	1: 9	Current	Depth :	108	0 Ft	24 H	r. Foota	ige Ma	ade :		0 F
	nation							Weat				<u></u>	<u></u>	<u> </u>			<u> </u>
Rig Co	ompan	y :		Layne	Christ	tensen	 .	Rig N	ame:			Layne	Christe	ensen	Rig #	405	
Dail	y Cost		\$	39, 261			Cum E	DHC:	\$1	43,677		Tc	tal Wel	I Cost		\$16	52,488
	an and and							Operatio	ns								
Start	Hrs	Code	,					Remark s						Start	Depth	End De	pth Run
0:00	9.00	12	Run Ca	sing GIF	l placir	ng screer	n, casing &	central zers	per Norw	est. Lan	d cas	ing floa	t valve	1(080	1080	NIH
								e along side								• 	k
9:00	2.50					-		1/2" casing &							080	1080	
11:30	1.00	12						nt mix 6 sks ea its tremm			o calc	chlorid	e.	10	080	1080) NIH
12:30	5.50	13		tand by fo							··			10	080	1080) NIF
18:00	1.50	43	Run wir	e line tag	@ 104	0' w/ wir	e line.							10	080	1080) NIF
19:30	1.50	08	Wait Ri	g time W	ire line	broke a	bracket or	rig while pu	lling out.					10	080	1080	NIH
21:00	1.00	24	Pump S	and Pun	1p 1 30	000 # sk	of 6-9 sand	d tag thru tre	mmie pipe	e @ 990'	(Tren	nmie Ta	illey =	10	080	1080) NIH
22:00	2.00	24	1990'). F	Pull & LD	2 ea jts	s of trem	nie pipe ≈	60'. Bottom	of treemi	e window	/ is @	930'.				L 1000	
22.00								tenite tablet 4 more 50# I					of 7 ea		080	1080) NIH
			buckets								0 101						
Total:	24.00																
	and and				a sila si			Mud Frope	rties						an ta t		
Depth	Time	Wt	In Wt 🤇	Dut Vis	PV	YP	Gels	FL	HTFL	FC	Η٦	(FC	Solid	Wa	ter	Oil	Sand
1080	1:00				0	0	0/0/0	00	0.0	0	0	.00	0.0%	0.0	%	0.0%	0.0%
MBT	pH	6000 - 600° -	A1000	Mf	CI	Ca	ES ES	S Pom	Lime	Total	Sal.	CaCl	2 El	DTA	0/W	Ratio I	Mud Loss
0.0	0.0	0.0 0.0		0.00	0	0	0	0.00	0.00	0		0		.00			0

Remarks

ECD FL Temp

0

0.0

Water Loss LCM

0.0

0

	-			<u></u>	v	Vell	Nam	ne:PC)CI 5	5 M	ONIT	OR V	VFL	L				<u></u>	
Field	l Name		RATO	N				/T/R			295/67				inty,Sta	ite:	HUE	ERFANO,	СО
			OPERATI		OMP	Loca	tion D	esc:		RR	R Lot	55			Distr	ict:	_C(OLORAD	0
								Di	aily Su	mm	ary								
Activit	y Date	: 2	2/12/2008	Day	s Fro	m Sp	ud :	10	Curre			108	0 Ft	24 H	r. Foot	age M	ade :		0 Ft
Form	nation :			_					We	eathe	er:								
Rig Co	mpany	1:0	Li	ayne (Christ	ense	n		Rig	Nan	ne:			Layne	Christ	ensen	Rig #	405	
Daily	y Cost:		\$19,	490			(Cum Dł	HC:		\$1	63,167		T	otal We	ell Cos	t:	\$181	,978
	an di			rijāj - raj. Statur	gan ini marina dan				Opera	tion	s								
Start	Hrs	Code						F	Remarks	5			i i i i i i i i i i i i i i i i i i i		Maria - Salara	Star	Depth	End Dep	th Run
0:00	2.00	24	Stand by fo	r bento	nite to	o hydr	ate.		<u> </u>	<u></u>	<u></u>					1	080	1080	NIH
2:00	2.00	24	Pour Sand	Mix H2	20 & 9	sand.	Pump	3000 #':	s of sand	d, tag	at 900'	Mix &	pump	500 #'s	s more &	1	080	1080	NIH
			tag at 880'.															1 4000	
4:00	2.00	24	Pour Bento											-			080	1080	NIH
6:00	1.67	13	Called cem		_					_	. Ceme	nt on loc	cation	@ 7:40).		080	1080	NIH
7:40	1.17	12	Pump ceme				ment.	Plug 8/	'0' to 79	7'.						_	080	1080	
8:50	6.17	13	Wait on cer					0750 //					0.07	71 0 1		_	080	1080	NIH
15:00	2.50	43	Tag cemen with 3/4 of I													1	080	1080	
17:30	2.50	01	RU Air Line													1	080	1080	NIF
L			663'. Pum																
20:00	2.00	13	Called cem													' 1	080	1080	<u>NI⊢</u>
			hole & 55 c 196 gals fre						21:30. F	ump	24.7 CI	cement	Siurry	. Dispi	ace w/				
22:00	2.00	13	Wait on cer													1	080	1080	NIF
Total:	24.01													•					
	37.5								Aud Pro	perti	es							27, 282	
Depth	Time	Wt	n Wt Out	Vis	PV	YP	G	Bels	FI_	<u>ا</u>]	HTFL	FC	H	TFC	Solid	Wa	iter	Oil	Sand
1080	1:00	0.0	0 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 N	/lf	CI		Ca	ES		om	Lime	Total	Sal.	CaC	12 E	DTA	0/w	Ratio M	lud Loss
0.0	0.00	0.00	0.00 0.	00	0		0	0		00	0.00	C)	0		0.00			0
Water I	Loss	LCM	ECD FL	Temp	5				Rema	arks			1. 	ing the second			and the second second		and the second second
0		0.0	0.0	0					7										

		Well Nar	ne:PC	DCI 55	MONIT	OR WE	LL					
Field Name:	RATON		S/T/R		3/29S/67V			nty,Stat	e: HI	JERFAN	IO, C	;0
Operator	YPH OPERATING	COMP Location	Desc:	F	RRR Lot 5	5		Distric	ct:	COLOR	ADO	
			Da	aily Sum	mary							
Activity Date :	2/13/2008 D	ays From Spud :	11	Current	Depth :	1080	-t 24 H	r. Foota	ge Made	:		0 F't
Formation :				V/eat	ther:							
Rig Company :		e Christensen		Rig N	ame:				nsen Rig	# 405		
Daily Cost:	\$25,990)	Cum DI	HC:	\$18	39,157	To To	otal Wel	l Cost:	\$2	207,9)68
				Operatio	ns							
Start Hrs C	ode		F	Remarks					Start Dep	oth End D	epth	Run
0:00 4.00	13 Wait on cement	t.							1080	10	30	NIH
4:00 0.50	43 Tag cement @	628'. Cement is 40	If lower t	han calcula	ated.				1080	10	30	NIH
4:30 2.50	24 Wait on orders	& for cement to arriv	ve on loc	ation.					1080	10	30	NIH
7:00 1.00		29 sks cement 6 gp Cement down @ 7:4		C thru trim	mie pipe. I	Pump 144	gals fresh	H2O	1080	10	30	NIH
8:00 6.00	13 Wait on cement		+0.	<u> </u>		·· <u>·</u> ·····			1080	10	80	
14:00 1.00	43 Tag Attemp to 526'.	tag cement with trim	nmie pipe	. No luck.	Trimmie is	s @ 527', t	op of scre	en is at	1080	10	30	NIH
15:00 1.00	24 Wait on string li	ine. String would no luck tagging cemen		Got hung u	up at 225'.	Ran water	measurin	g tape	1080	10	30	NIF
16:00 5.50	24 Pump sand app	prox 750 # sand scre	enout. F	Pull up 35'.	Wait. Go	dn. Tag sa	and @ 510	'. RU	1080	10	30	NIF
	500 #'s of sand. flowing @ 19:50 sand @ 430.67'	to 515'. Trimmie pip , wash sand dn. Re 0. Attempt to tag sa '. Pump sand Pum 000 # 6-9 sand tag (turns out nd . Pun p approx	of annulas	19:40. Mi ump appro	ud H2O mi x 500 # of i	x Return q 6-9 sand.	uit Tag				
21:30 2.50		PU & GIH w/ 540' of) min. Retag @ 410		P open end	led. Ran ii	n side 5 1/2	2" casing.	Blow	1080	108	30	NIF
Total: 24.00		Thin: Ttetag @ 410	•						<u> </u>			
			Ν	Aud Prope	rties				- Jan			
Depth Time	Wt In Wt Out Vis	s PV YP (Gels	FI_	HTFL	FC	HTFC	Solid	Water	Oil	ि	Sand
1080 1:00	0.00 9.40 35	50000	0/0/0	0.0	0.0	0	0.00	0.0%	0.0%	0.0%		0.0%
	Pm Pf Mf	CI Ca	ES	Pom	Lime	Total Sa	I. CaC	2 E	DTA O/	W Ratio	Muc	Loss
ساسيد والمستعينيين والمستعين	0.00 0.00 0.00	0 0	0	0.00		0	0	0	.00			0
Water Loss LC		mp		Remark	S			800 C			199 ali	
0 0.	0 0.0 0											

	N N	Vell Name:PC	OCI 55 MO	ONITO	JR WE	ELL					
Field Name:	RATON	S/T/R:		9S/67W			unty,Sta	ate:	HUE	RFANO	, CO
	PH OPERATING COMP	20142 · · · · · · · · · · · · · · · · · · ·		R Lot 55		1	Dist			DLORAD	
					_						
			aily Summa								
Activity Date :	2/14/2008 Days Fro	om Spud : 12	Current De		1080 F	-t 24 F	Ir. Foot	age Ma	de :	<u> </u>	<u>0 Ft</u>
Formation :			V/eathe								
Rig Company :	Layne Chris		Rig Nam					ensen F			
Daily Cost:	\$18,510	Cum DI			07,667		otal W	ell Cost:		\$22	.6,478
			Operations	3							
	de		Remarks						<u>ann a</u>	End De	and the second
0:00 1.00 4	3 POOH with 540' of DP							10		1080	
1:00 4.00 2	4 Dump 7 ea 50 # bucket cement @ 2:00 order 1			r hydratio	on from 40	10' - 400	. Called	1 10	80	1080	NIH
5:00 2.00 1	2 Cement on location @	5:00. Pump cement	fill anr ulas fro	om 400' te	o surface	with 179	sks of	10	80	1080) NI⊢
7:00 12.00 1	type III cement 6 gpsk 3 Wait for cement to cure				=			10	80	1080	
	6 Run drill pipe. GIH with					· · · · · ·			80	1080	
	6 Trip up to 810'. No luci		· · · · · · · · · · · · · · · · · · ·						80	1080	
	6 Trip up to 610'. No luck				<u> </u>				80	1080	NIF
23:00 1.00 0	6 Trip out with all 4 1/2"							10	80	1080) NIF
Total: 24.00		·····				·····					
			Mud Propertie	es					(e) (f) (f) (f) (f) (f) (f) (f) (f) (f) (f		
Depth Time	Nt In Wt Out Vis PV	YP Gels		ITFL	FC	HTFC	Solic	Wat	er	Oil	Sand
status	0.00 9.40 35 0	0 0/0/0		0.0	0	0.00				0.0%	0.0%
				0.0	0 1	0.00	0.0%	1 0.0	/0	0.070	
	Pm Pf Mf Cl	Ca ES	Pom	Lime	Total Sa						
MBT pH 1	Pm Pf Mf Cl 0.00 0.00 0.00 0										Mud Loss
MBT pH 1	0.00 0.00 0.00 0	Ca ES	Pom	Lime	Total Sa	al. Ca		EDTA			Mud Loss
MBT pH 1 0.0 0.00 0	0.00 0.00 0.00 0 M ECD FL Temp	Ca ES	Pom 0.00	Lime	Total Sa	al. Ca		EDTA			Mud Loss
MBT pH I 0.0 0.00 C Water Loss LCI	0.00 0.00 0.00 0 M ECD FL Temp	Ca ES 0 0	Pom 0.00 Remarks	Lime 0.00	Total Sa	al. Ca		EDTA			Mud Loss
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0	0.00 0.00 0.00 0 M ECD FL Temp 0 0 0.0 0 0	Ca ES 0 0 Da	Pom 0.00 Remarks aily Summ	Lime 0.00 ary	Total Sa			EDTA 0.00	o/w		Mud Loss 0
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date :	0.00 0.00 0.00 0 M ECD FL Temp 0 0 0.0 0 0	Ca ES 0 0	Pom 0.00 Rernarks aily Summ Cur ent De	Lime 0.00 ary epth :	Total Sa			EDTA	o/w		Mud Loss 0
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date : Formation :	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days Free	Ca ES 0 0	Pom D.00 Rernarks aily Summ Cur ent De Veathe	Lime 0.00 ary epth :	Total Sa	al. Ca(0 Ft 24	Hr. Foo	EDTA 0.00	O/W	Ratio N	Mud Loss 0
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date . Formation . Rig Company .	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chris	Ca ES 0 0 Date: Da	Pom 0.00 Rernarks aily Summ Cur ent De Veathe Rig Nam	Lime 0.00 ary ppth : pr: ne:	Total Sa 0 1080 I	al. Ca(0 Ft 24 f Layn	Hr. Foo	EDTA 0.00 tage Ma	O/W de : Rig #	Ratio N 405	Mud Loss 0 0 0 =
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date : Formation :	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days Free	Ca ES 0 0	Pom 0.00 Remarks aily Summ Current De Veathe Rig Nam HC:	Lime 0.00 ary pth : pr: he: \$22	Total Sa	al. Ca(0 Ft 24 f Layn	Hr. Foo	EDTA 0.00	O/W de : Rig #	Ratio N 405	Mud Loss 0
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date : - Formation : - Rig Company : - Daily Cost: -	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days Free Layne Chris \$17,490	Ca ES 0 0 Da Da Da Da Da Da Da Da Da Da Da Da Da	Pom 0.00 Rernarks aily Summ Cur ent De Veathe Rig Nam IC: Operations	Lime 0.00 ary pth : pr: he: \$22	Total Sa 0 1080 I	al. Ca(0 Ft 24 f Layn	Hr. Foo	EDTA 0.00 tage Ma tensen F ell Cost:	O/W	Ratio 	Mud Loss 0 0 = 0 = 13,968
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date :	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chris \$17,490 de	Ca ES 0 0 Da Da Da Da Da Da Da Da Da Da Da Da Da	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks	Lime 0.00 ary epth : er: \$22	Total Sa 0 1080 I 25,157	al. Ca(0 Ft 24 Layn	Hr. Foo e Christ	EDTA 0.00 tage Ma tensen F ell Cost: Start I	O/W de : Rig #	Ratio 	Mud Loss 0 0 = 13,968 pth Run
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date :	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chris \$17,490 Change over tools from	Ca ES 0 0 Da Da Da Da Da Da Da Da Da Da Da Da Da	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks	Lime 0.00 ary epth : er: \$22	Total Sa 0 1080 I 25,157	al. Ca(0 Ft 24 Layn	Hr. Foo e Christ	EDTA 0.00 tage Ma tensen F ell Cost: Start I	O/W	Ratio 	Mud Loss 0 0 = 13,968 pth Run
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date : Formation : Rig Company : Daily Cost: Start Hrs Cc 0:00 1.50 0	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days Free Layne Chris \$17,490 0 6 Change over tools from cement @ 1035'.	Ca ES 0 0	Pom 0.00 Rernarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH	Lime 0.00 ary epth : er: \$22	Total Sa 0 1080 I 25,157	al. Ca(0 Ft 24 Layn	Hr. Foo e Christ	EDTA 0.00 tage Ma tensen F ell Cost: Start I	O/W de : Rig # Depth	Ratio 	Mud Loss 0 0 == 13,968 pth Run 0 NIH
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date - Formation - Rig Company - Daily Cost: - Start Hrs Cc 0:00 1.50 0	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days Free Layne Chris \$17,490 Adde 6 Change over tools from cement @ 1035'.	Ca ES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 13 tensen Cum Di 0 Cum Di 0 4 1/2" to 2 7/8" trime to develop well from	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH 1034'.	Lime 0.00 ary opth: or: he: \$22 s	Total Sa 0 1080 I 25,157	al. Ca(0 Ft 24 Layn	Hr. Foo e Christ	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10	O/W de : Rig # Depth	Ratio 405 244 End De 1080	Mud Loss 0 0 = 13,968 pth Run NIH NIH
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date . Formation . Rig Company : . Daily Cost: . Start Hrs Cc 0:00 1.50 . 12:00 1.50 .	0.00 0.00 0.00 0 M ECD FL Temp 0 0 0.0 0 0 2/15/2008 Days From Layne Chriss 17,490 Start 2,490 Start 2,490 1035'. 6 Change over tools from cement @ 1035'. 1035'. 4 Clean well bore. Airlift 1035'.	Ca ES 0 0	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH 1034'.	Lime 0.00 ary opth: or: he: \$22 s	Total Sa 0 1080 I 25,157	al. Ca(0 Ft 24 Layn	Hr. Foo e Christ	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10	O/W de : Rig # Depth 80 80	Ratio N 405 End De 1080	Mud Loss 0 0 = 0 = 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 14,000 14,0000000000
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date . Formation . Rig Company . Daily Cost: . Start Hrs Cc 0:00 1.50 0 1:30 10.50 2 13:30 2.50 2	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chriss \$17,490 6 Change over tools from cement @ 1035'. 4 Clean well bore. Airlift 5 Pull Tbg POOH w/ 103 4 RD Layne's diverter & tools 5 Run Tbg with KR Fishir	Ca ES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH 1034 ¹ . pipe laid all dr loc. F:U 5 1/2	Lime 0.00 ary epth : er: sr: sr: sr: sr: sr: sr: sr: sr: sr: s	Total Sa 0 1080 I 25,157 7/8" trimmi	al. Ca(0 Ft 24 f Layn e pipe. 1 diverter 8	Hr. Foo e Chris otal W	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10 10	O/W de: Rig # Depth 80 80 80 80	Ratio M 405 \$24 End De 1080 1080	Mud Loss 0 0 = 0 = 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 13,968 14,0110000000000
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date . Formation . Rig Company . Daily Cost: . Start Hrs Cc 0:00 1.50 . 12:00 1.50 . 13:30 2.50 .	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chriss \$17,490 6 Change over tools from cement @ 1035'. 4 Clean well bore. Airlift 5 Run Tbg with KR Fishir booie line. GIH w/ 4 3/-	Ca ES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH 1034 ¹ . pipe laid all dr loc. F:U 5 1/2	Lime 0.00 ary epth : er: sr: sr: sr: sr: sr: sr: sr: sr: sr: s	Total Sa 0 1080 I 25,157 7/8" trimmi	al. Ca(0 Ft 24 f Layn e pipe. 1 diverter 8	Hr. Foo e Chris otal W	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10 10 10	O/W de: Rig # Depth 80 80 80 80	Ratio M 405 \$24 End De 1080 1080 1080	Mud Loss 0 0 = 0 = 13,968 13,968 13,968 13,968 13,968 13,968
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Water Loss LCI 0 0.0 Water Loss LCI 0 0.0 Activity Date : Formation : F Rig Company : Daily Cost: Daily Cost: Start Hrs Cc 0:00 1.50 0 1:30 10.50 2 13:30 2.50 2 16:00 5.00 3	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chriss \$17,490 ode 6 Change over tools from cement @ 1035'. 4 Clean well bore. Airlift 5 Pull Tbg POOH w/ 103 4 RD Layne's diverter & t 5 Run Tbg with KR Fishir booie line. GIH w/ 4 3/- 1035' to 1072'.	Ca ES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH 1034 ¹ . pipe laid all dr loc. F:U 5 1/2	Lime 0.00 ary epth : er: sr: sr: sr: sr: sr: sr: sr: sr: sr: s	Total Sa 0 1080 I 25,157 7/8" trimmi	al. Ca(0 Ft 24 f Layn e pipe. 1 diverter 8	Hr. Foo e Chris otal W	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10 10 10 10	O/W de : Rig # Depth 80 80 80 80 80 80	Ratio N 405 End De 1080 1080 1080 1080	Mud Loss 0 0 0 0 13,968 pth NIH
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Water Loss LCI 0 0.0 Activity Date : Formation : Rig Company : Daily Cost: Start Hrs Cc 0:00 1.50 0 1:30 10.50 2 13:30 2.50 2 16:00 5.00 3 21:00 3.00 2	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chriss \$17,490 6 Change over tools from cement @ 1035'. 4 Clean well bore. Airlift 5 Run Tbg with KR Fishir booie line. GIH w/ 4 3/-	Ca ES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH 1034 ¹ . pipe laid all dr loc. F:U 5 1/2	Lime 0.00 ary epth : er: sr: sr: sr: sr: sr: sr: sr: sr: sr: s	Total Sa 0 1080 I 25,157 7/8" trimmi	al. Ca(0 Ft 24 f Layn e pipe. 1 diverter 8	Hr. Foo e Chris otal W	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10 10 10 10	O/W de: Rig # Depth 80 80 80 80	Ratio M 405 \$24 End De 1080 1080 1080	Mud Loss 0 0 0 0 13,968 pth NIH
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date . Formation . Rig Company . Daily Cost: . Start Hrs Cc 0:00 1.50 0 1:30 10.50 2 13:30 2.50 2 16:00 5.00 3	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chriss \$17,490 ode 6 Change over tools from cement @ 1035'. 4 Clean well bore. Airlift 5 Pull Tbg POOH w/ 103 4 RD Layne's diverter & t 5 Run Tbg with KR Fishir booie line. GIH w/ 4 3/- 1035' to 1072'.	Ca ES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Pom 0.00 Remarks aily Summ Cur ent De Veathe Rig Nam HC: Operations Remarks mie pipe. GIH 1034'. pipe laid all dr loc. F.U 5 1/2 3 1/2" collars =	Lime 0.00 ary epth : r: fr: fr: fr: fr: fr: fr: fr: fr: fr:	Total Sa 0 1080 I 25,157 7/8" trimmi	al. Ca(0 Ft 24 f Layn e pipe. 1 diverter 8	Hr. Foo e Chris otal W	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10 10 10 10 10 10 10	O/W de : Rig # Depth 80 80 80 80 80	Ratio N 405 End De 1080 1080 1080 1080	Mud Loss 0 0 0 0 0 13,968 pth NIH
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.00 0 Water Loss LCI 0 0.00 0 Activity Date . . Formation . . Rig Company . . Daily Cost: . . Start Hrs Cc 0:00 1.50 . . 11:30 10.50 . . 12:00 1.50 . . 13:30 2.50 . . 21:00 3.00 . . Total: 24.00 . .	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From Layne Chris \$17,490 Adde Change over tools from cement @ 1035'. 4 Clean well bore. Airlift 5 Run Tbg with KR Fishir booie line. GIH w/ 4 3/- 1035' to 1072'. 4 Clean well bore.	Ca ES 0 0 0 Da Da Da Da Da Da Da Da Da Da Da Da Da	Pom 0.00 Rernarks aily Summ Cur ent De Veathe Rig Nam IC: Operations Remarks mie pipe. GIH 1034'. pipe laid all dr loc. F:U 5 1/2 3 1/2" collars =	Lime 0.00 ary epth : r: sr: sr: sr: sr: sr: sr: sr: sr: sr:	Total Sa 0 1080 I 25,157 7/8" trimmi ad flange 3. Drill 37'	al. CaC 0 Ft 24 H Layn e pipe. 1 diverter & of cemer	Hr. Foo e Chriss otal W ag	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10 10 10 10 10 10 10 10	O/W de : Rig # Depth 80 80 80 80 80	Ratio N A05 \$24 End De 1080 1080 1080 1080 1080	Mud Loss 0
MBT pH I 0.0 0.00 0 Water Loss LCI 0 0.0 Activity Date: - Formation: - Rig Company: - Daily Cost: - Start Hrs Cc 0:00 1.50 0 1:30 10.50 2 13:30 2.50 2 16:00 5.00 3 21:00 3.00 2 Total: 24.00 -	0.00 0.00 0.00 0 M ECD FL Temp 0 0.0 0 2/15/2008 Days From State	Ca ES 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Pom 0.00 Rernarks aily Summ Cur ent De Veathe Rig Nam IC: Operations Remarks mie pipe. GIH 1034'. pipe laid all dr loc. F:U 5 1/2 3 1/2" collars = Mud Propertie	Lime 0.00 ary epth: er: se: \$22 s 1 with 2 7 \$22 s 1 with 2 7 \$22 s 1 with 2 7 \$22 s 1 with 2 7 \$22 s	Total Sa 0 1080 I 25,157 7/8" trimmi ead flange s. Drill 37'	al. Ca(0 The pipe. T diverter & of cemer	In the second se	EDTA 0.00 tage Ma tensen F ell Cost: Start 1 10 10 10 10 10 10 10 10 10 1	O/W de : Rig # Depth 80 80 80 80 80 80 80 80 80 80 80 80 80	Ratio N A05 \$24 End De 1080 1080 1080 1080 1080 1080 01080	Mud Loss 0 0 0 0 0 13,968 pth NIH Sand
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		W	ell Nam	ne:PC	CI 55 I	MONIT	OR W	ELL	-					
Field Name:	RATON			/T/R:		/295/67\				y,State	e: H	UERFAI	10, C	0
Operator: 1	PH OPERATIN	IG COMP	ocation D	esc:	F	RR Lot	55			Distric	100.07	COLOR		
				Da	ily Sum	mary								
Activity Date :	2/16/2008	Days Fron	n Spud :	14	Current	Depth :	1080	Ft	24 Hr.	Foota	ge Made	:		0 F
Formation :					W/eat	her:					-			
Rig Company :	La	yne Christe	nsen		Rig Na			L	.ayne C	hriste	nsen Rig	; # 405		
Daily Cost:	\$3,66	60		Cum D⊦	łC:	\$2	28,817	· · · · · · · · · · · · · · · · · · ·	Tota	al Well	Cost:	\$	247,6	28
a stranger and the stranger					Operatio	ns							dir. Uv	
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6:00 9.00 0	1 RDMO Final	l Report									1080	10	080	NIH
	4 Travel										1080	10	080	NIH
Total: 19.00	· · · · · · · · · · · · · · · · · · ·													
					lud Prope									
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Vater Loss LCI		Temp			Remark	S				. Kan				
0 0.0	0.0	0												
				Da	ily Sum	mary								
Activity Date :	2/18/2008	Days Fron	n Spud :	16	Currient	Depth :	1080) Ft	24 Hr.	Foota	ge Made	9:		0 F
Formation :	•••••				W'eat	her:								
Rig Company :	La	yne Christe	nsen		Rig Na	ame:		L	.ayne C	Christe	nsen Rig	j # 4 05		
Daily Cost:	\$6,01	10	6	Cum D⊦	IC:	\$2	34,827		Tota	al Well	Cost:	\$	253,6	38
					Operatio	ns				-3.5				
Start Hrs Co	de			R	temarks						Start De	pth End I	Depth	Run
9:30 7.00 1	1 Cement Bond		rior wire lin	e on loca	ation (?) 11	:30. Ran	cement b	ond lo	ng and	cased	1080	10	80	NIH
	hole neutron	log.												
Total: 7.00														

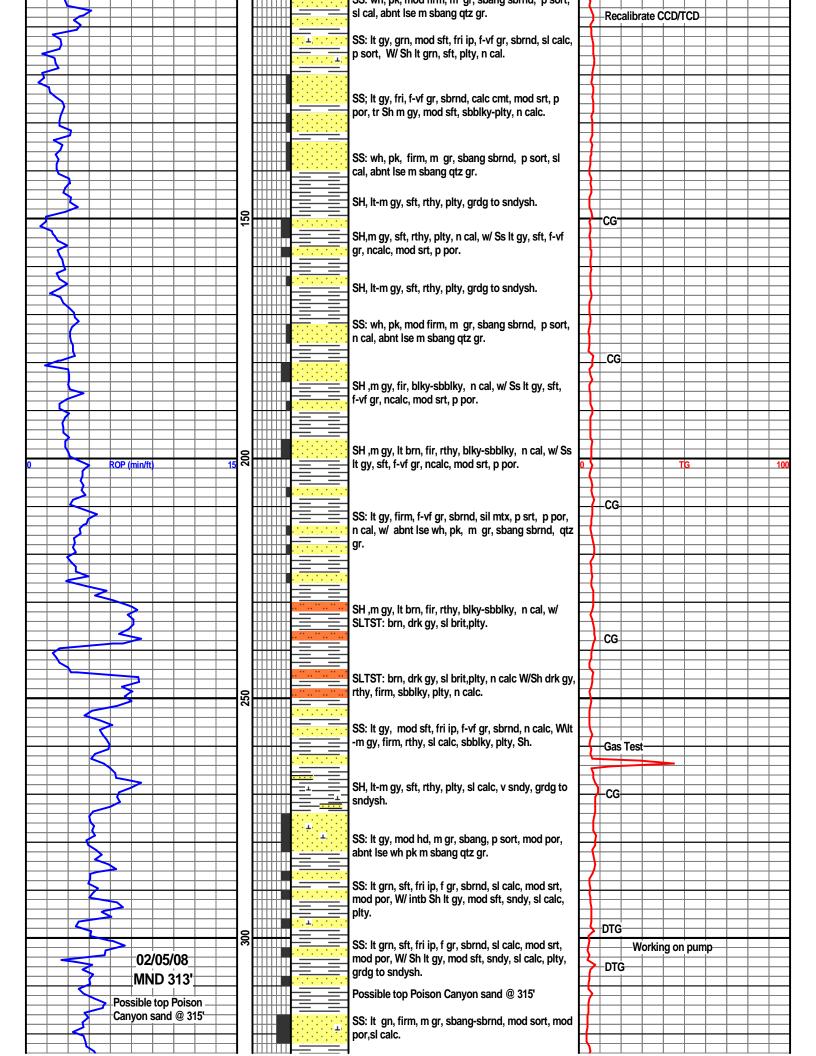
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Formation N	lame Current W	ell Top Subs	sea Datum Ref We	ll Top E	lec Top		Comm	ents	
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DateIn	Setting Depth	Jts Run	Туре	Casing Size	Weight	Grade	MINID	HoleDiam	TD
2/11/2008	1074.81	48	5. Production	5.5	17	LS	0	11	1080

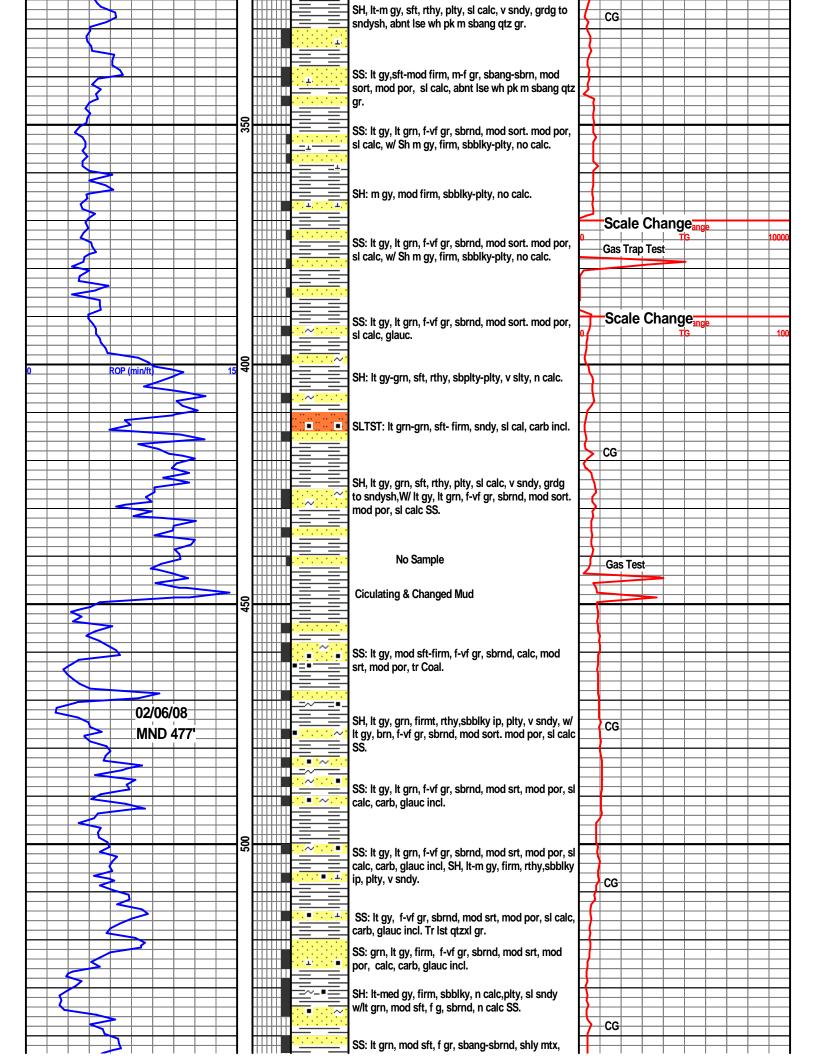
APPENDIX B

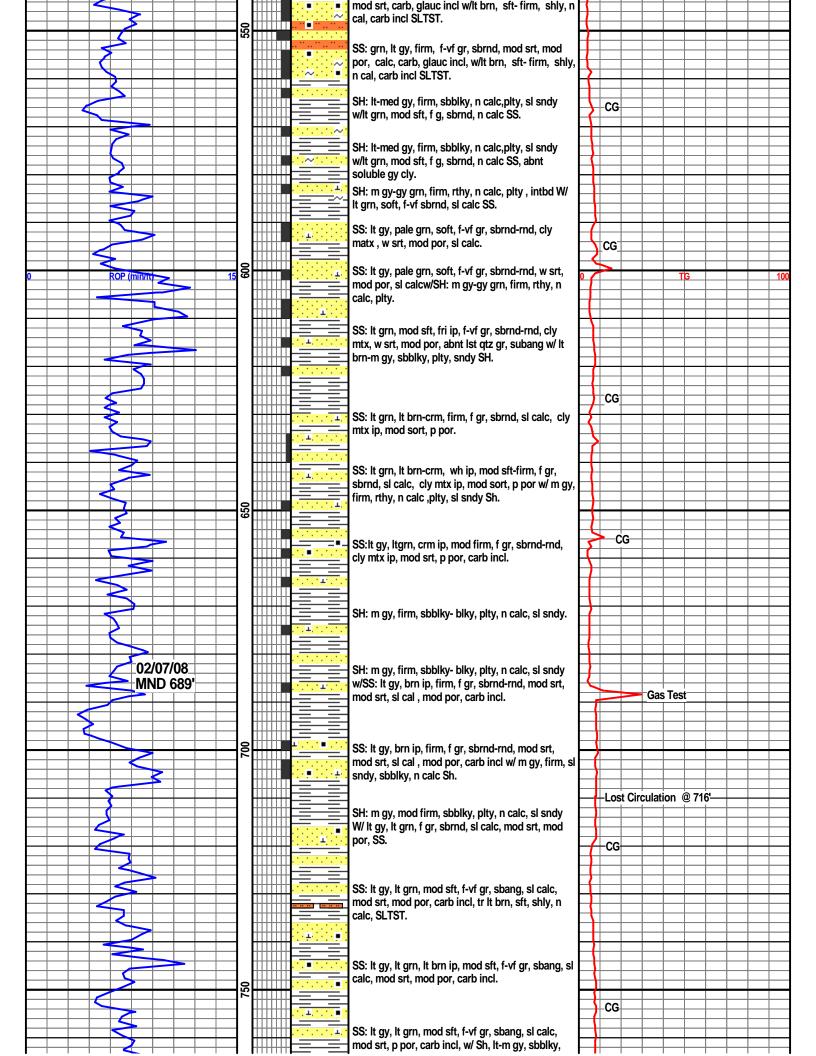
Geophysical Log Reports

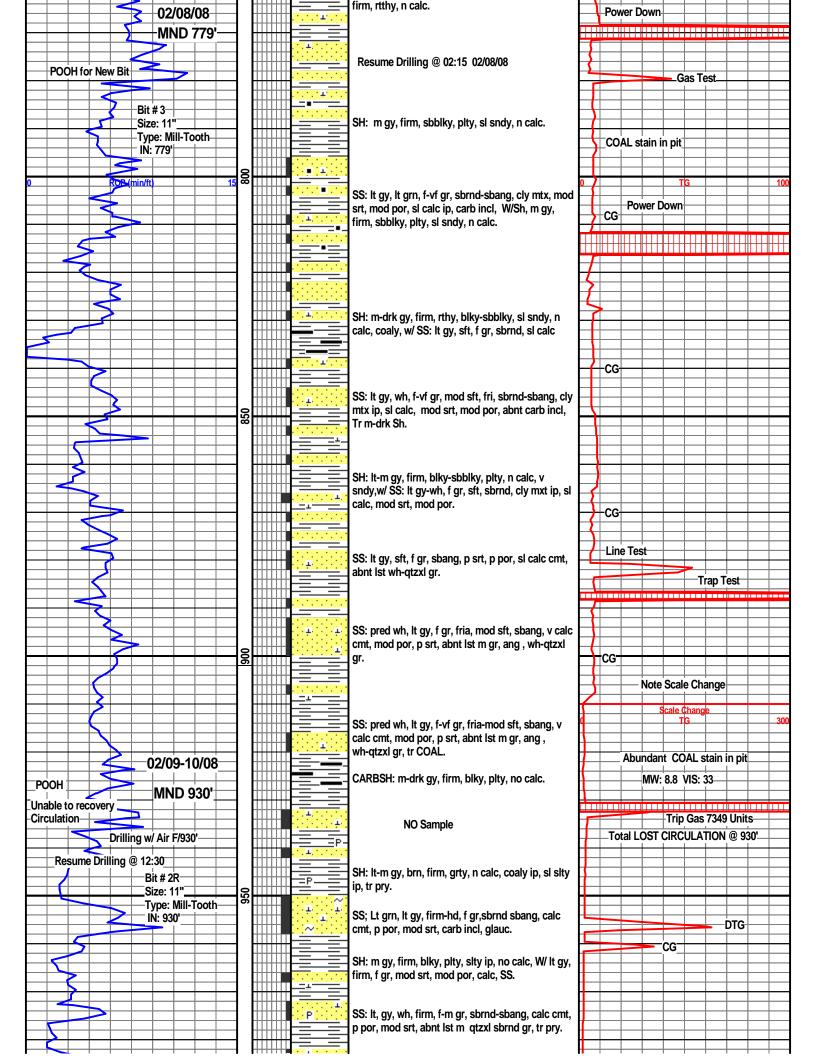
	BLANCO Geological Services LLC	
	Scale 1:240 (5"=100') Imperial	
Licence Number: Spud Date:	Sec3 T29S R67W 05-071-275819-00 Regio	n: Purgatoire River d: 02/10/08
Bottom Hole Coordinates:		
Ground Elevation (ft): Logged Interval (ft): Formation: Type of Drilling Fluid:	50' To: 1079' Total Depth (ft): 1079'	
	Printed by MUD.LOG from WellSight Systems 1-800-	447-1534 www.WellSight.com
	OPERATOR Petroglyph Operrating Company, Inc. 555Sought Cole Rd. Boise, ID 83709 Ph: (719) 742-5570	
Company:	GEOLOGIST Leeo Carrasco BLANCO Geological Services LLC 806 Robinson Ave. Trinidad CO 81082 (719) 846-3364	
LW Rig # 14	Rig	
12.75" Surface Casing set	Comments @ 40'	
Anhy Anhy Bent Bent Brec Anhy Brec Cht	ROCK TYPES Clyst Gyp Coal Igne Congl Lmst Dol Meta	Shgy Sltst Ss State Till

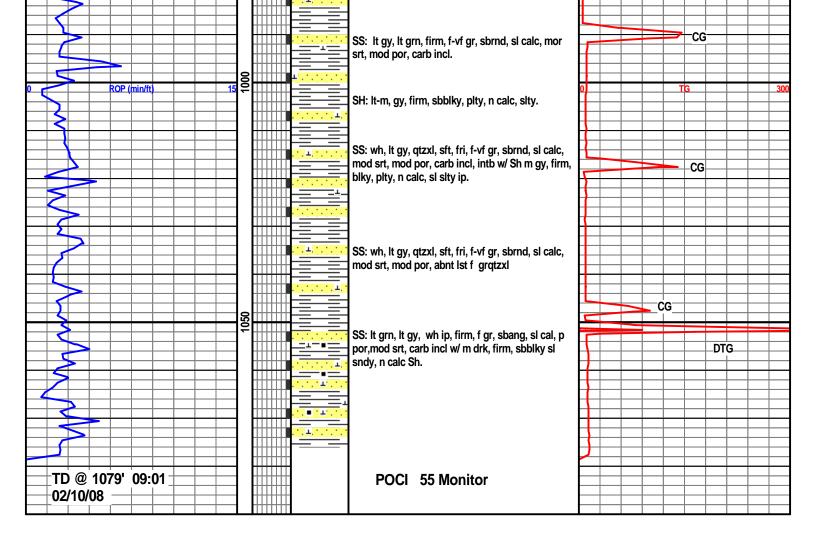
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E Earthy Fenest SORTII F Fracture	IG Enderate A construction of the second sec	Subrnd Dead Subang	 ■ Cv-v ■ Cv-c EVENTS ■ Rft ● Sidewall ■ Srfcsg
Curve Track 1 ROP (min/ft)	Lithology	Geological Descriptions	TG TG (units)
ROP (min/ft) 1 Layne Wenstern Rig #414	24%	POCI 55	MSI Model TG Total Hydrocarbon CCD/TCD
12.75" Surface Casing Set @ 40		Blanco Geological Services LLC	
ROP Scale 0 -15 (min/ft)	•	Logging Unit Operational @ 07:00 02/03/2008	
	22	SS: It gy,wh, clr, firm, m-f gr, sbang sbrnd, sil cmt, p sort, n cal, abnt lse m sbang qtzxl gr.	
> 06:00 02/04/2008 Drilling New Formation from 55' w/ Water Mud		SS: It 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.	
Bit #2		SS: It gy, mod sft, f-m gr, sbrnd-sbang, n calc w/ Sh gy, firm, sbblky-plty, sndy.	
Size: 11"			
Type: Mill-Tooth IN: 52		SS: It gy, It grn, mod sft, fri ip, f-vf gr, sbrnd, n calc, abnt Ise m sbang wh pk qtz gr.	







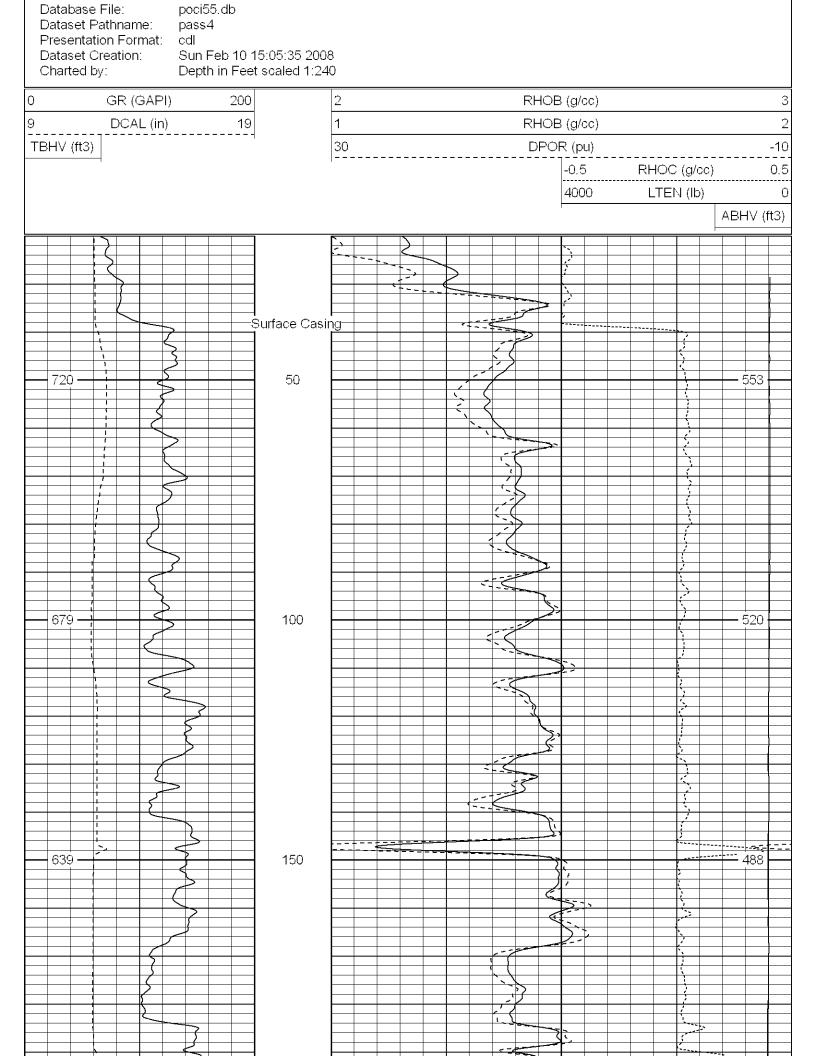


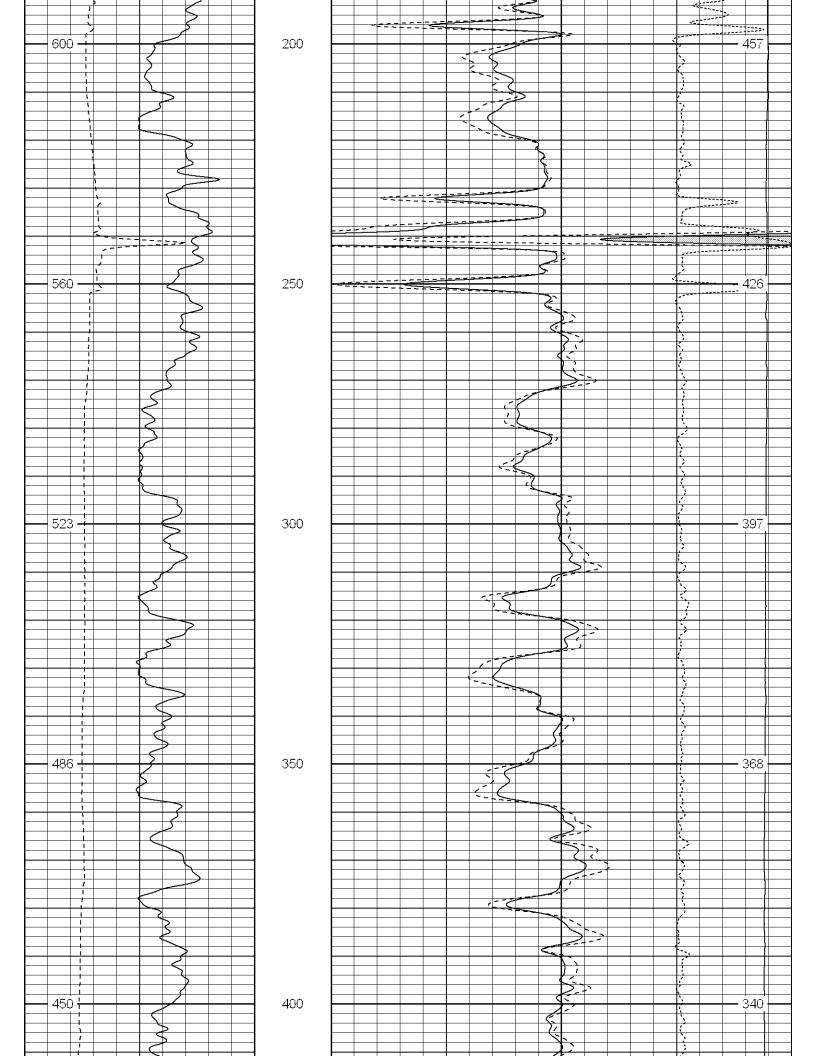


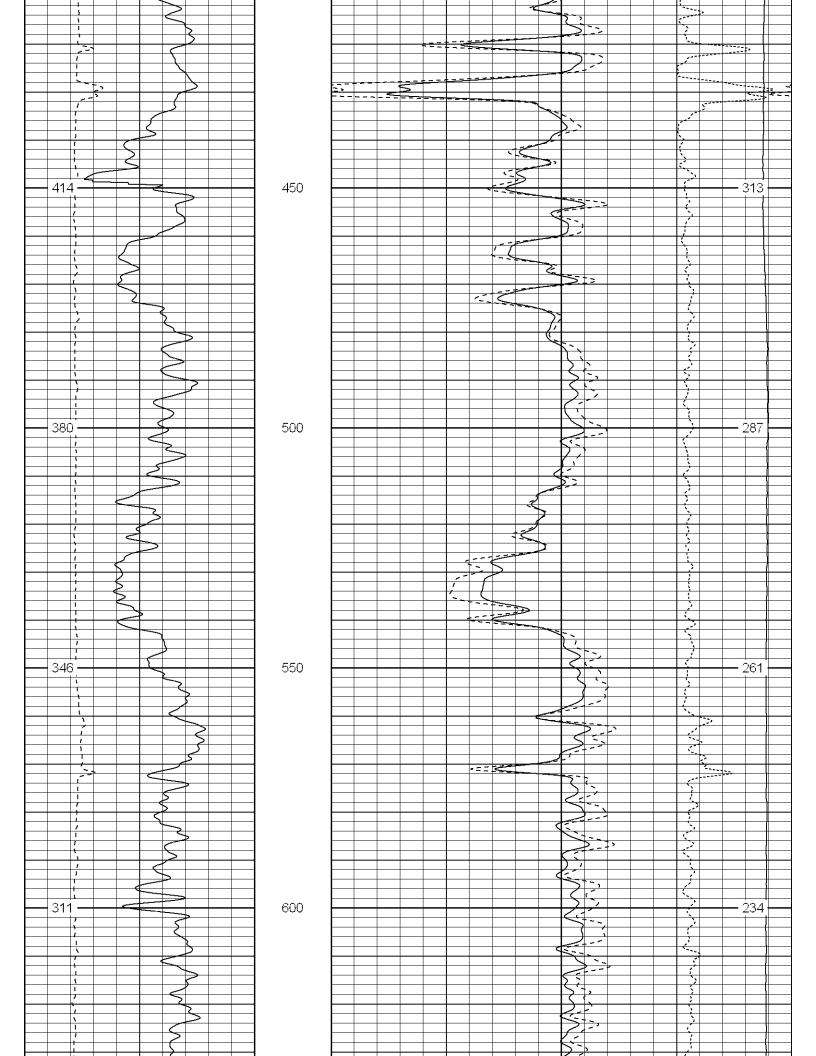
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Well	County Hue	Huerfano State Col	Colorado	le or re ents oi	rd. 3 (left	
onitor	Location:	API#:	Other Services	∋ liab rs, ag	ng. ity. rd.	_
troglyph ci 55 M irgatoire ierfano ilorado	Wate	Water Well Permit Number 275819 851' FSL & 1773' FWL	<u>s:</u>	r part, bi ur officei	Casir on Cr main	
Pc Pu Hu	SEC	3 TWP 29S RGE 67W	Elevation	n oui of oi	/2" eft (on	
Company Well Field County State	Permanent Datum Log Measured From Drilling Measured From	Ground Level Elevation 6690' Ground Level n Ground Level)' K.B. D.F.	jligence o	sity Pre For 5 1 I turn I It. stay Go lef	Л
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Run Number		One		illful tion conc	ate ga or	
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Top Log Interval		Surface Casing		of gi ny ii	√ (als ds	
Casing Driller		12.75" @ 40'		ise m a	BH W	
Casing Logger Rit Size		14"		e ca g fro	AE of ssre	
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Density / Viscosity				cept res	ec	
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Time Logger on Bottom	а	1:15 p.m.	200	ons etat		
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Witnessed By	Mr.	Mr. Tom Melland		All i of		
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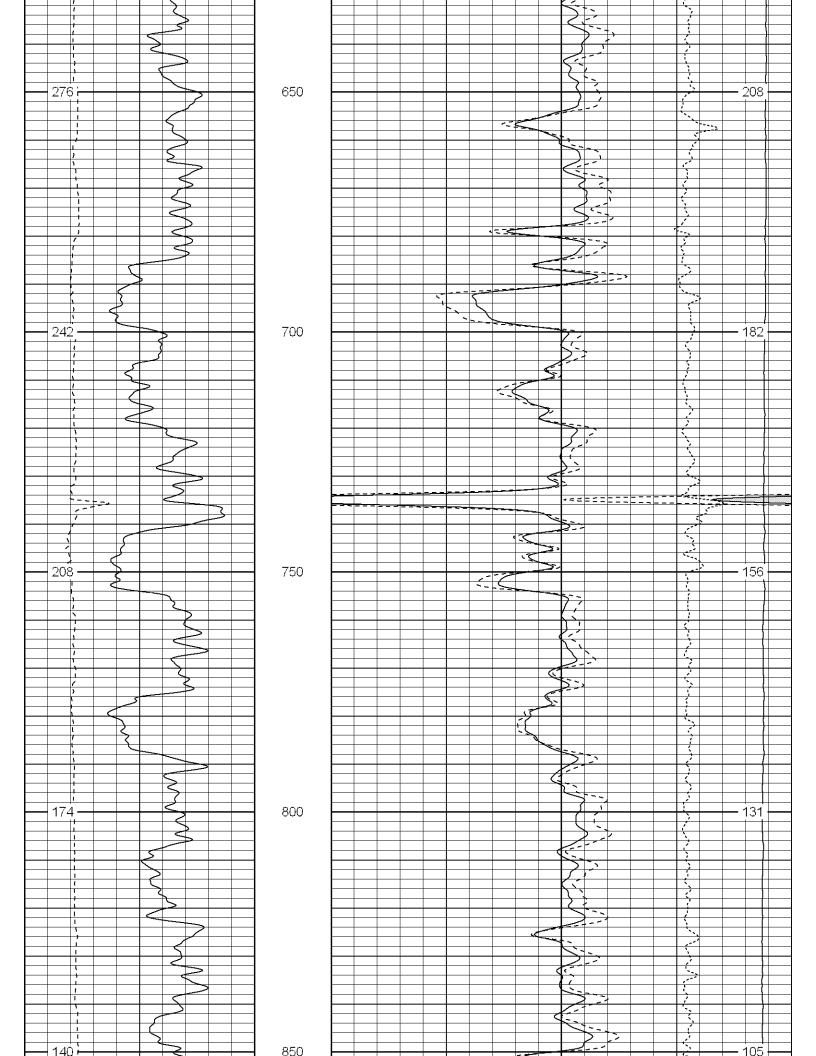
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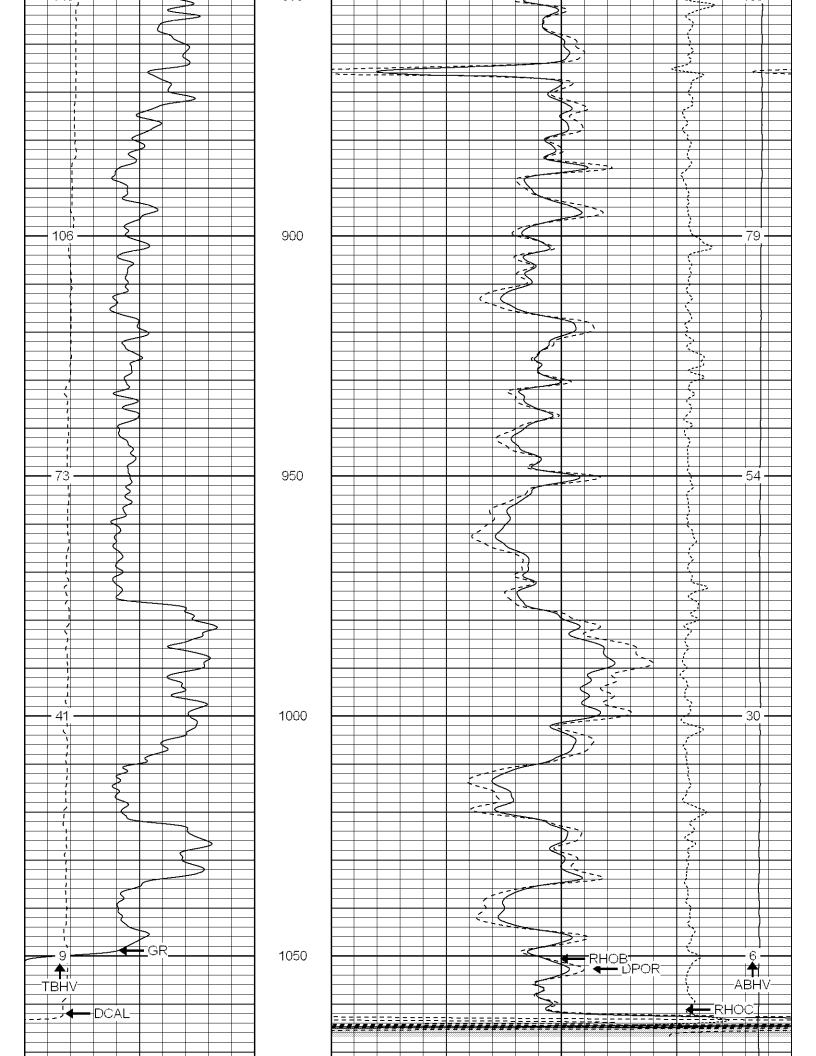
Main Pass

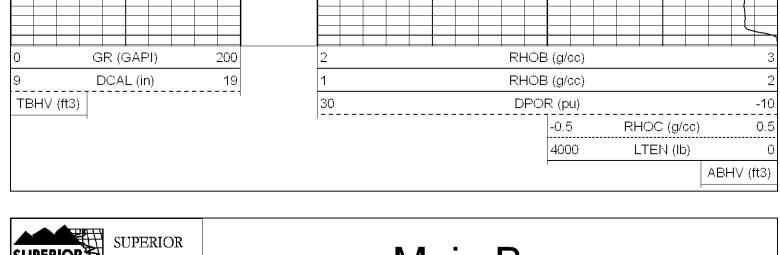


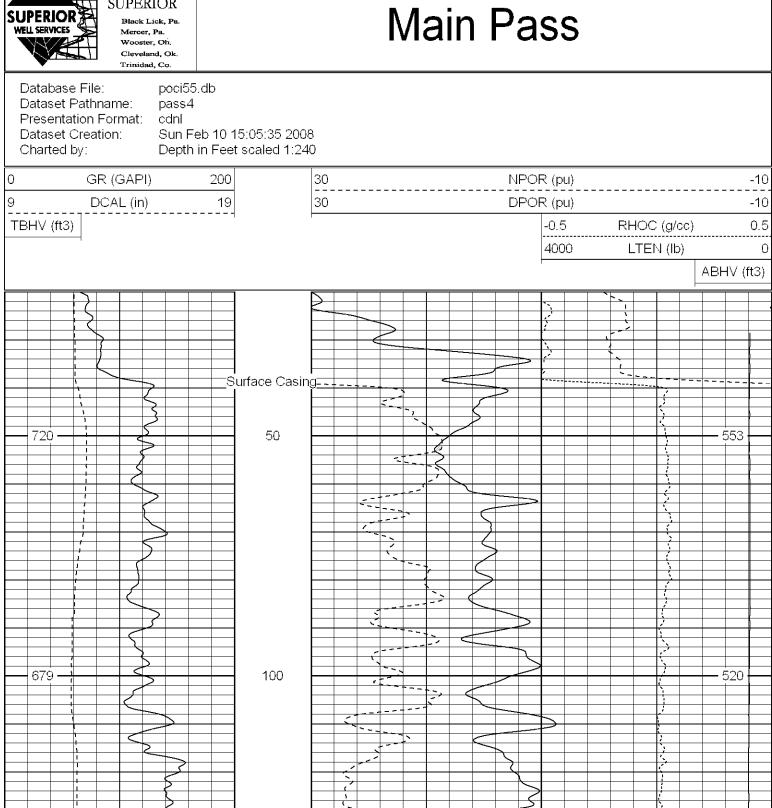


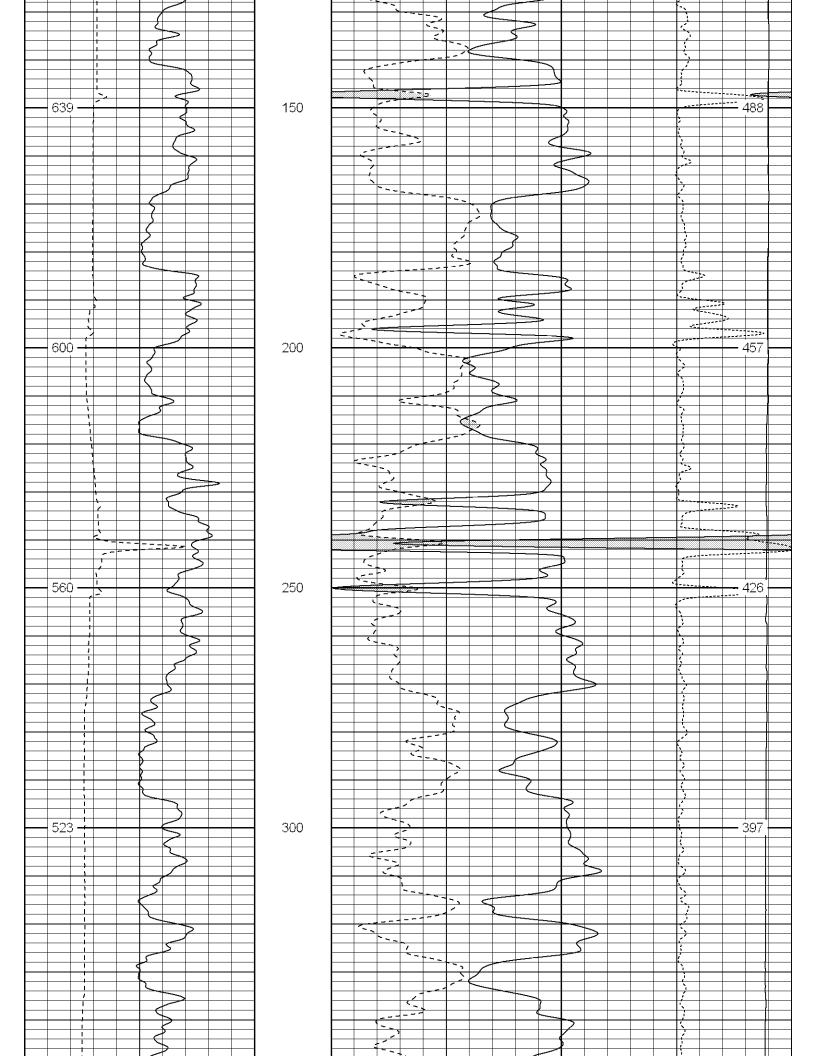


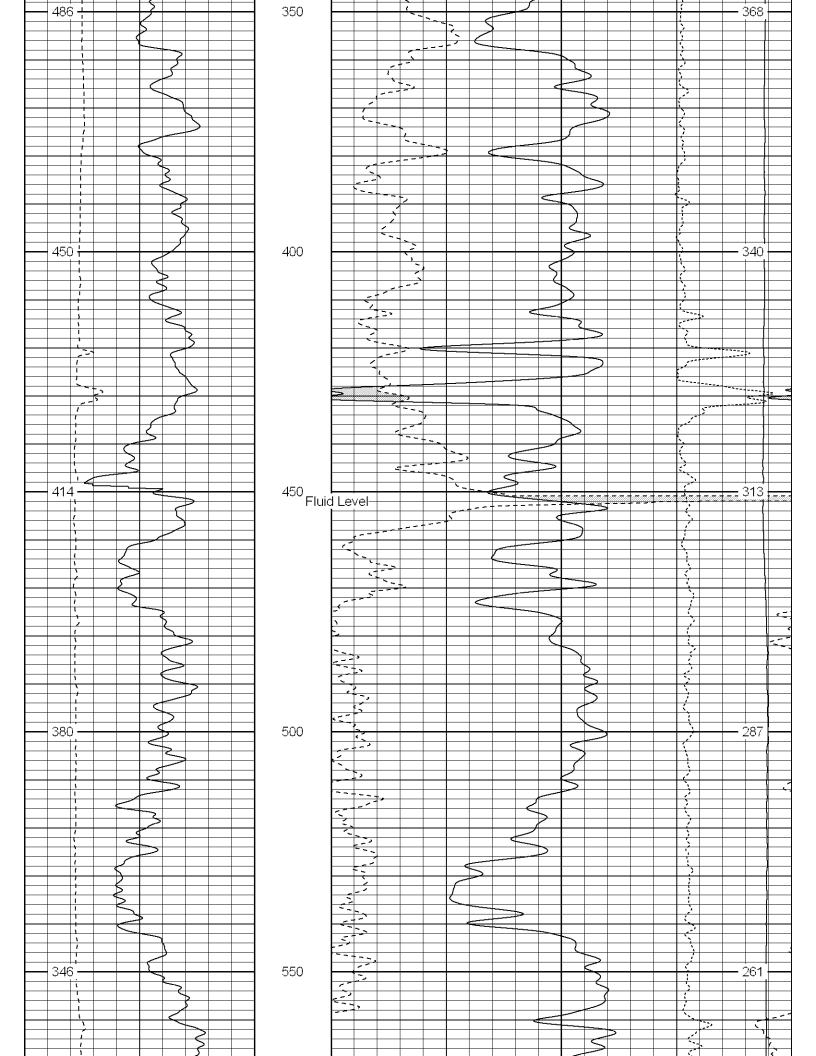


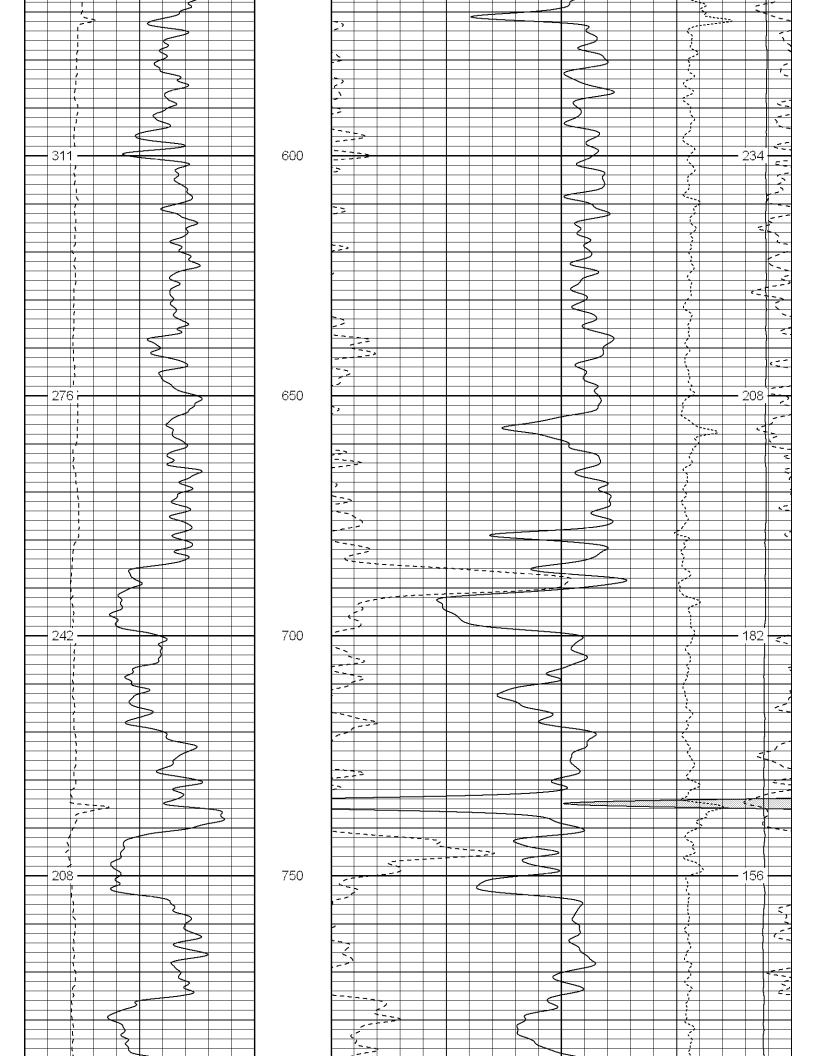


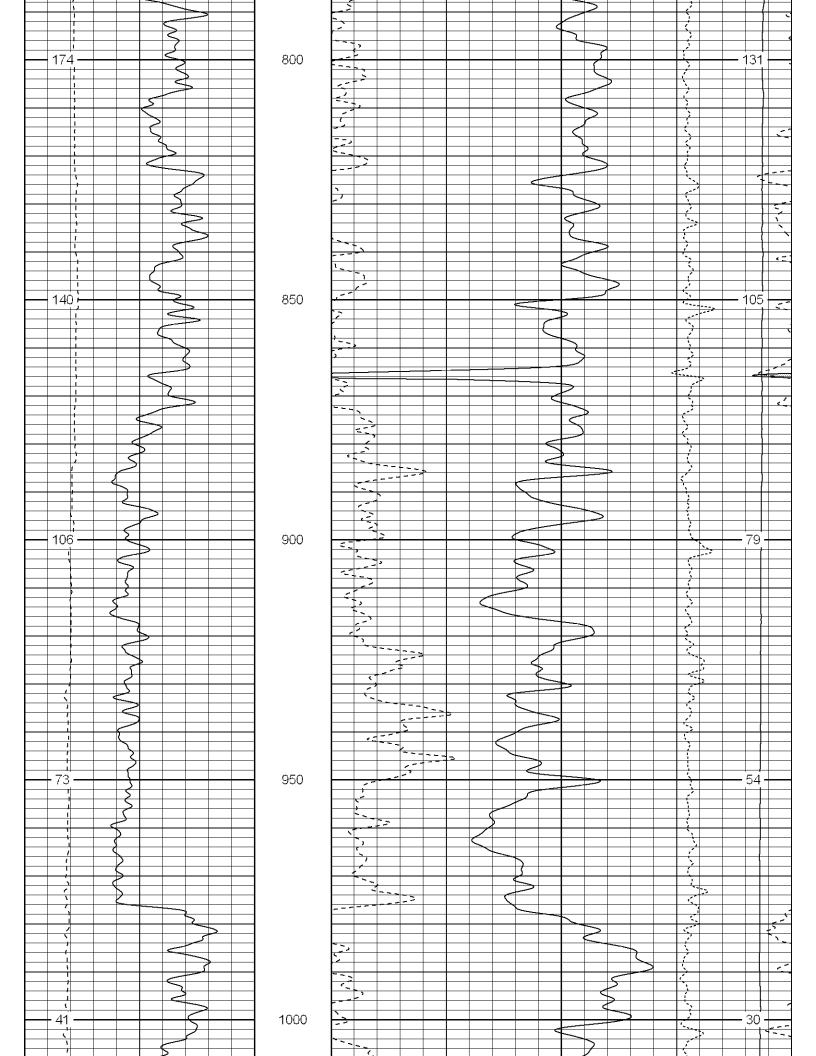


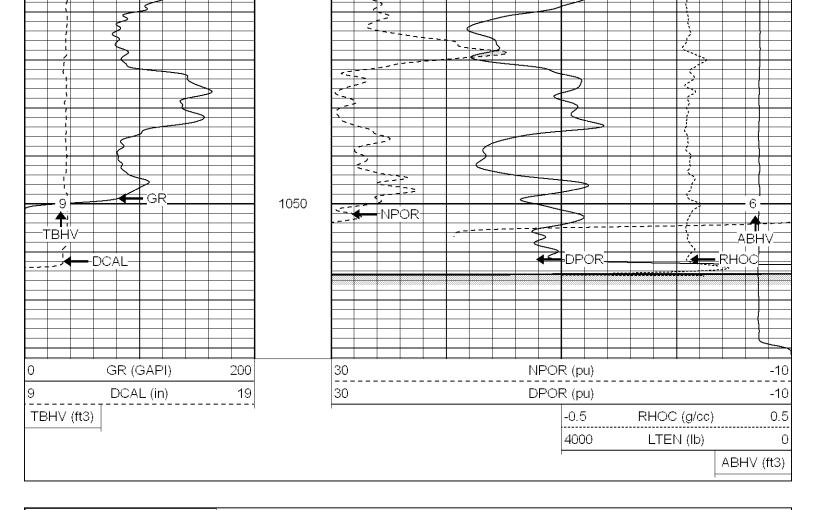


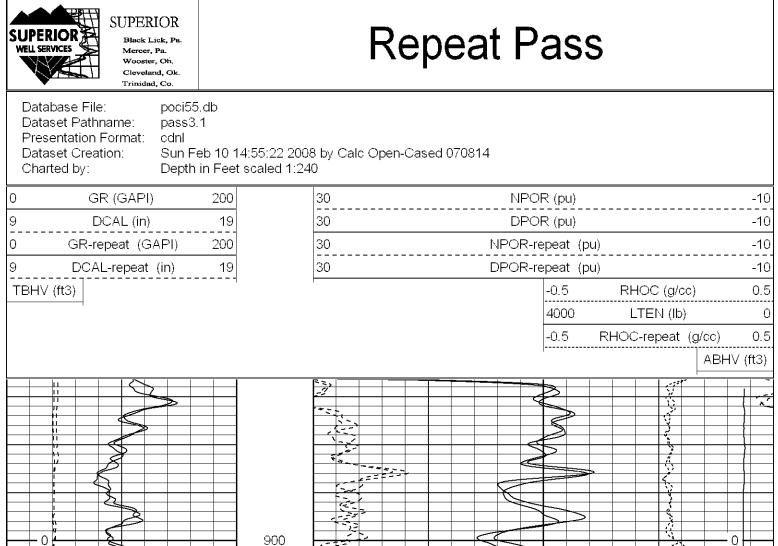


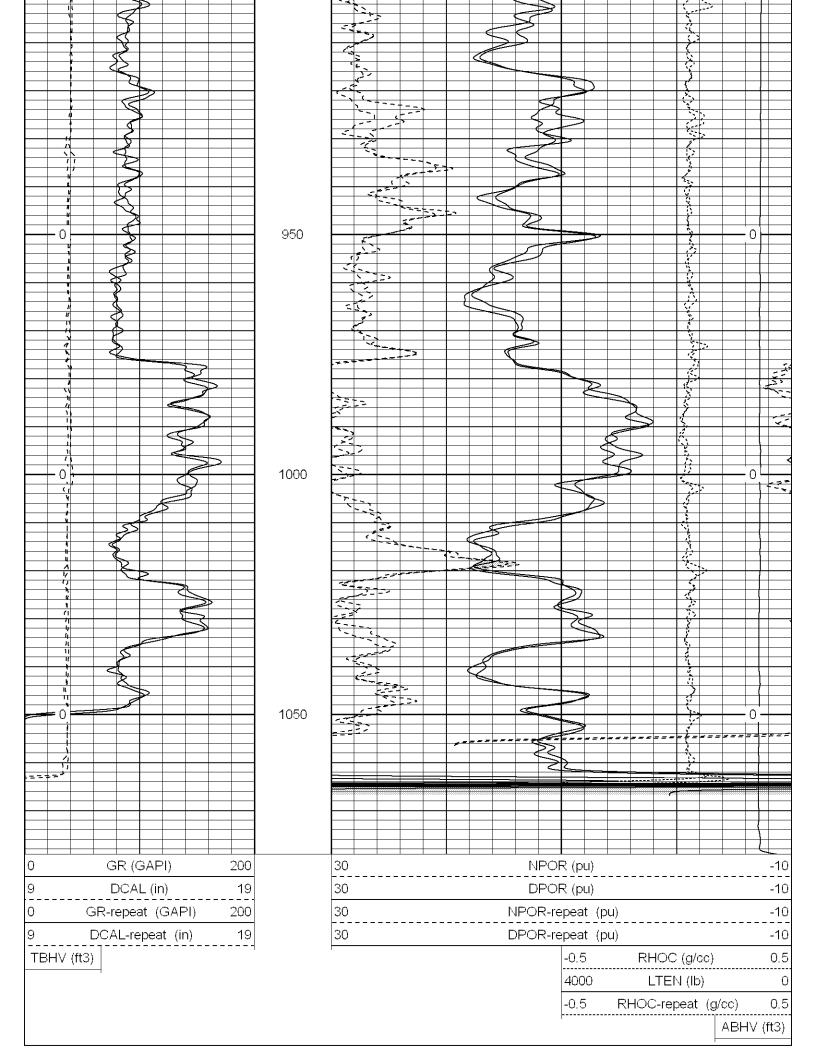












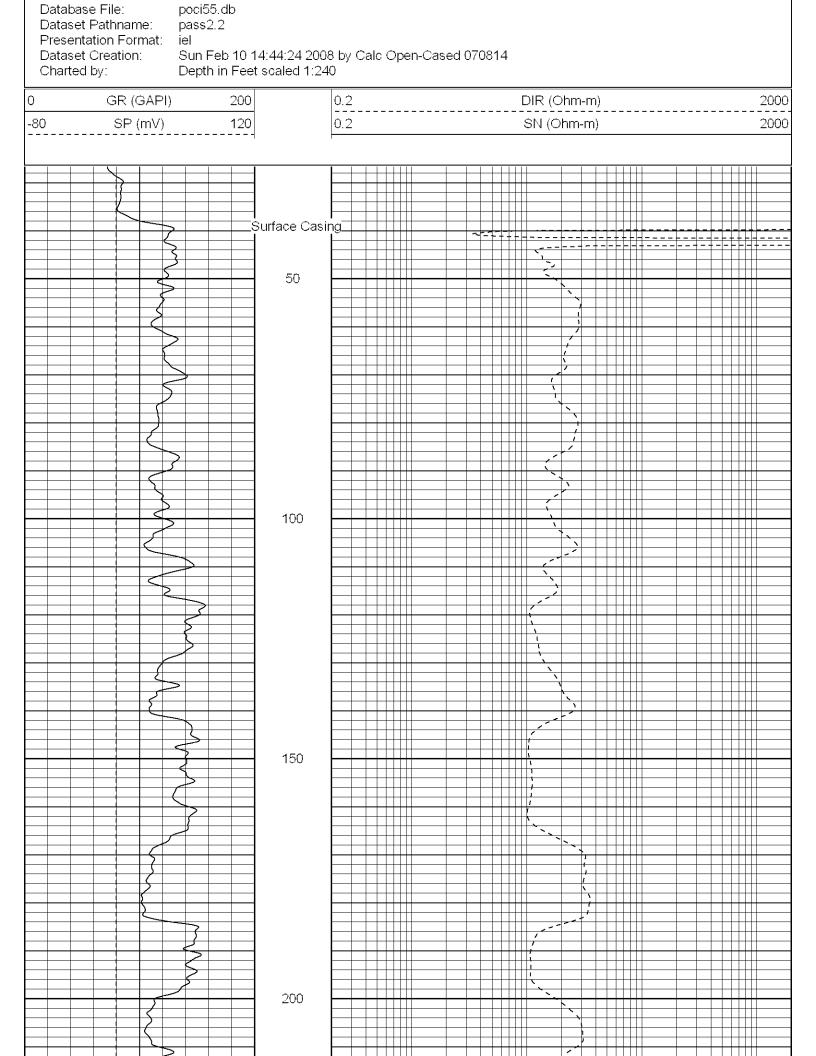
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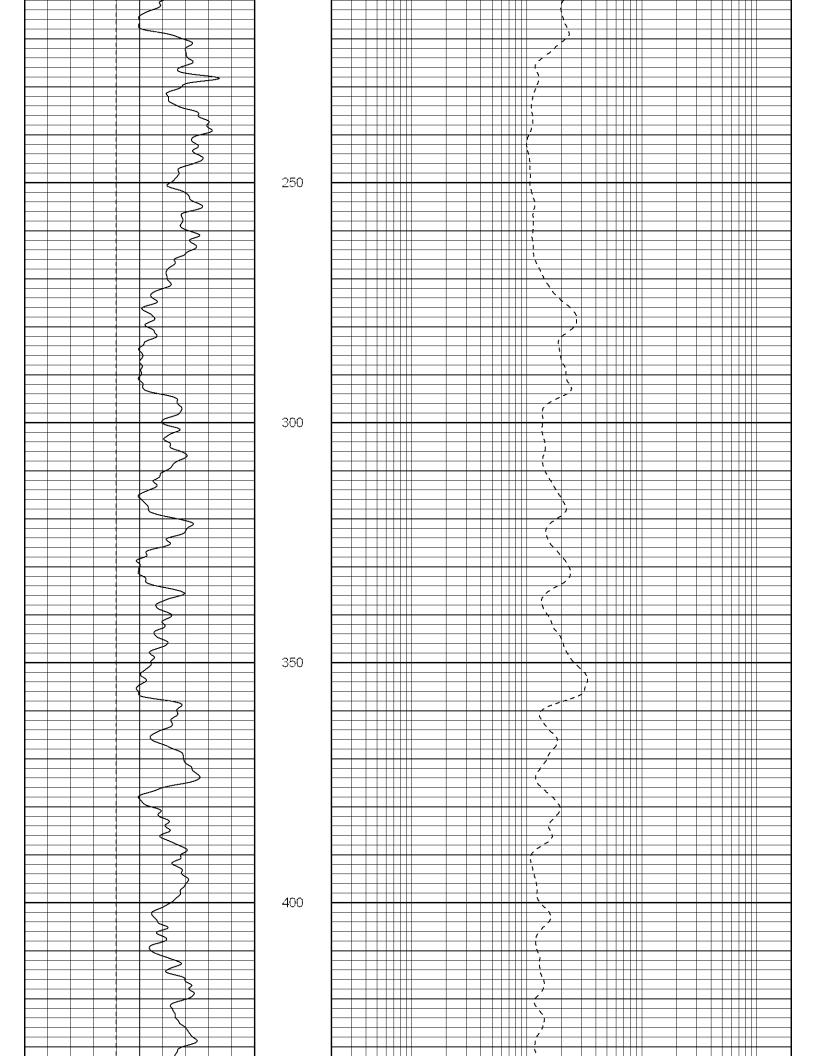
Tool Model: Performed:	2.75POH Fri Feb 01 08:19:3	5 2008
Calibrator Value:	1.0	GAPI
Background Reading: Calibrator Reading:	0.0 1.0	cps cps
Sensitivity:	0.8000	GAPI/cps

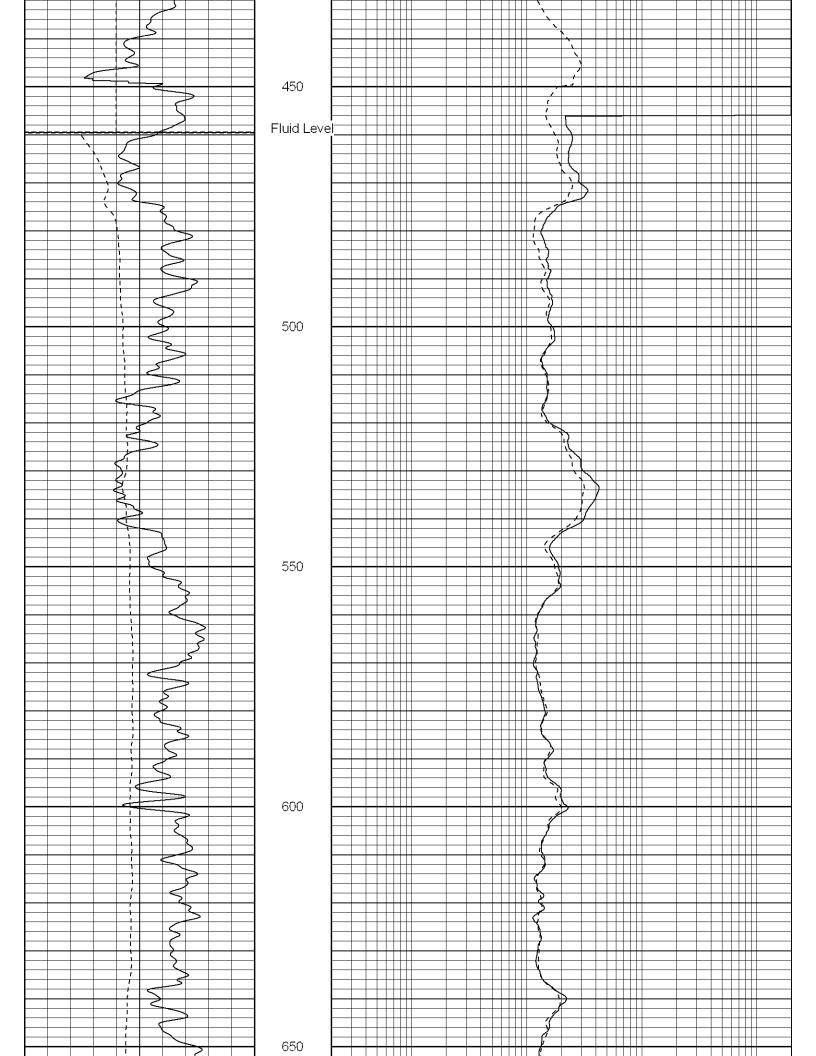
Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	29.58	п П	None	0.75	1.50	5.00
		-	GR-2.75POH (801) Probe	3.73	2.75	43.00
NEU	24.04		NEU-2.75POH (802) Probe Epithermal	4.75	2.75	58.00
LSD DCAL SSD	16.21 15.94 15.69		CDL-2.75POH (902) Probe	8.43	2.75	106.00
DIC	6.24 —		——IEL-Probe (040903)	13.46	2.75	93.00
SP SN	2.25 1.71					
		Dataset: Total Length: Total Weight: O.D.	poci55.db: field/well/run1/pass1 31.11 ft 305.00 lb 2.75 in			

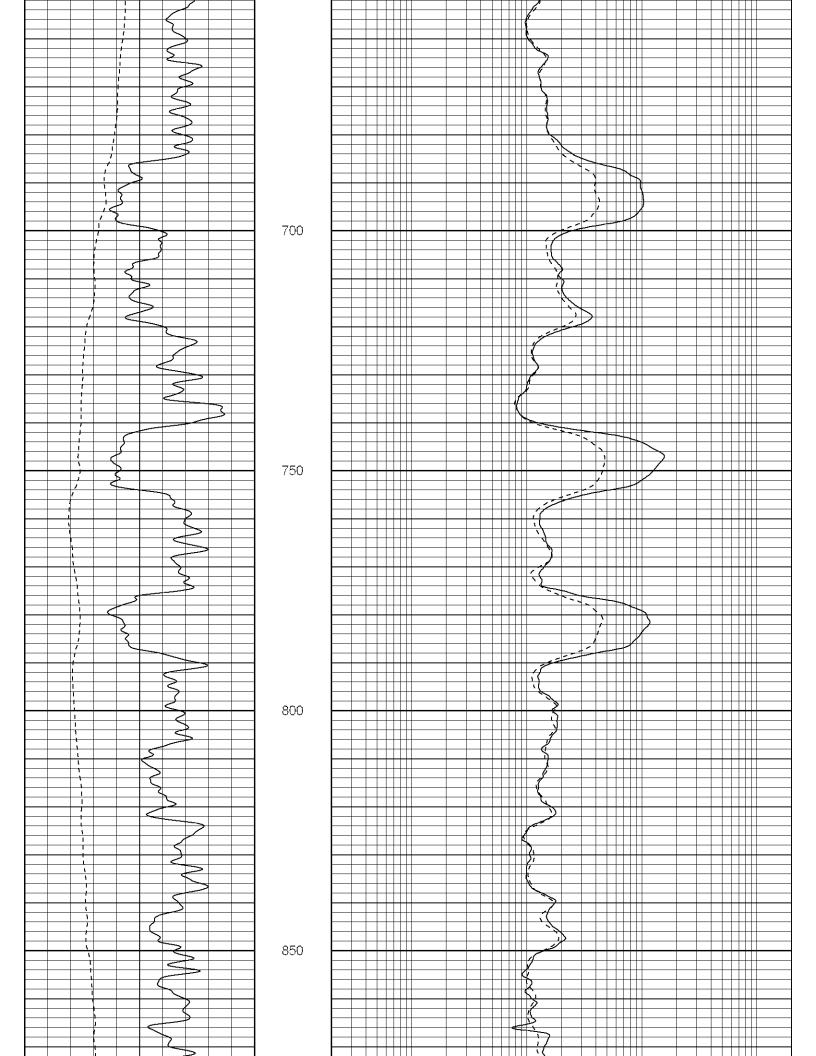
A S		e					A1	v viu iesseu iby
		exp	All i of			r Tom Mollond		Mitneecod By
PE		en	nte an			- Smith		Renninded Rv
ER		se	ərp y ii			Trinidad		Location
	G	s ir	ret nte			T0701		Equipment Number
	0	ncu	ati rpr			72 DEG F	emperature	Maximum Recorded Temperature
		rre	ons eta			1:15 p.m.	3	Time Logger on Bottom
		do	tior			9:45 a.m.	ed	Time Circulation Stopped
		r su	eo n,a				-	кт @ вні
PE Blac Mero		usta	nd					Source of Rmt / Rmc
k Li		ine	we			#		Kmc@Meas.Temp
ck, :		d b	sha					Rmt @ Meas. Lemp
		iy a	all r					Rm @ Meas. Temp
			not,					Source of Sample
			ex					priving Loss
			cep					Density / viscosity
			ot ir					Type Figure II Figure
	05		n th			Water		Type Fluid in Hole
	ss		ie (11"		Bit Size
	ro		cas			39'		Casing Logger
	ad		se o			12.75" @ 40'		Casing Driller
	ls		of g			Surface Casing		Top Log Interval
	a		ros			1077'		Bottom Logged Interval
	nd		s o			1079'		Depth Logger
	g	nd c	r wi			1079'		Depth Driller
	0	con	illfu			One		Run Number
	riç	diti	ıl n			2-10-00		
	ļh	ior	eg			3		
M	l turi t. sta Go l	de by a ns set o ients	lligenc	D.F G.L. 6690'			Log Measured From Drilling Measured From	Comp Well Field Count State
8	ay		e o		Elevation 6690'	Ground Level	Permanent Datum	
ì	or		n o	Elevation	BE 67W	3 TWP 29S RGE 67W	SEC	P P F
n	n n		ur p		τ Γ	2		oci urç lue
	nair		bart, b	cdl	er 275819 \\\/I	Water Well Permit Number 275819 851' ESL & 1773' EMI	Wat	oglyp i 55 M gatoire rfano prado
D	rd.		e lial	Other Services		API#:	Location:	onito
a	(1		ole c	Colorado	Clare	IUCIAIO		or W
S			r re			54000		-
S			espon			Purgatoire River	Field Pu	Com
	• •		sible			Poci oo Monitor Veii	vvell Po	bany
		es	e fo					/ In
		. Thes	or any⊺		ng Company Inc	Company Petroglyph Operating Company Inc.	Company Pe	c.
		e in	loss					
	ater tank) s to	terpretations are	curacy or correcti s, costs, damages		SINGLE INDUCTION LOG	_	SUPERIOR Black Lick, Pa. Mercer, Pa. Wooster, Oh. Cleveland, Ok. Trinidad. Co.	SUPERIOR SWELL SERVICES
		also	s, or)			H KEE

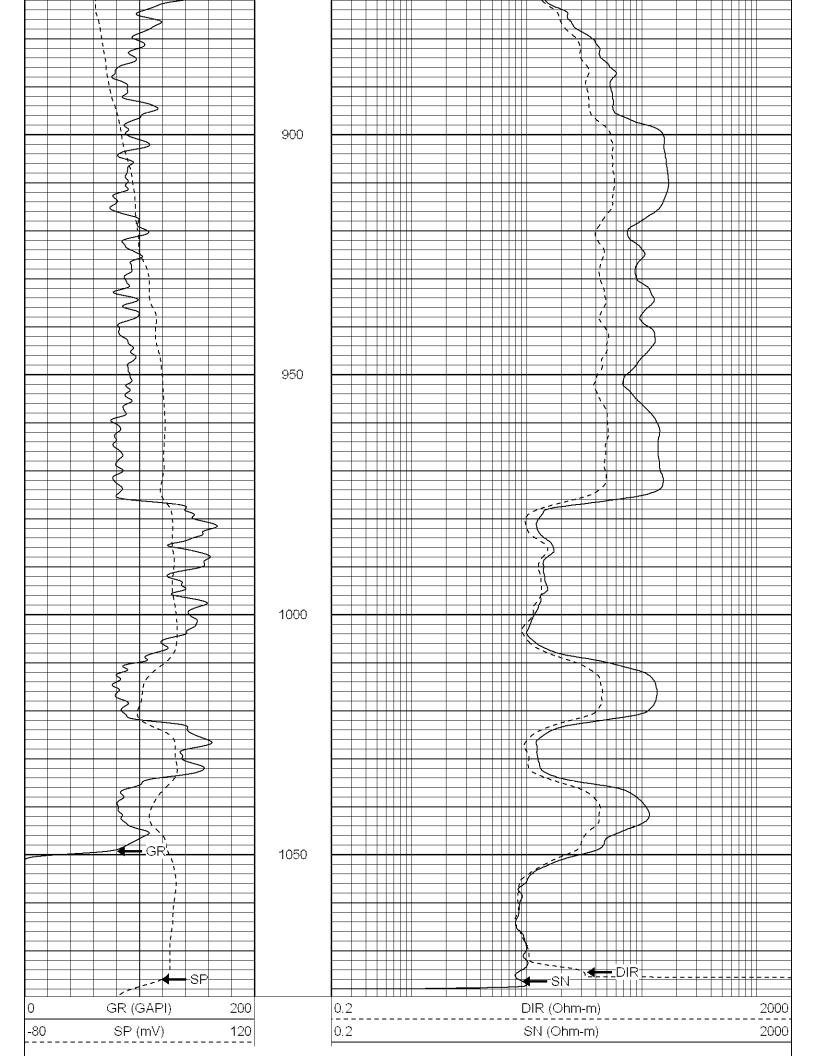
Wooster, Oh. Cleveland, Ok. Trinidad, Co.



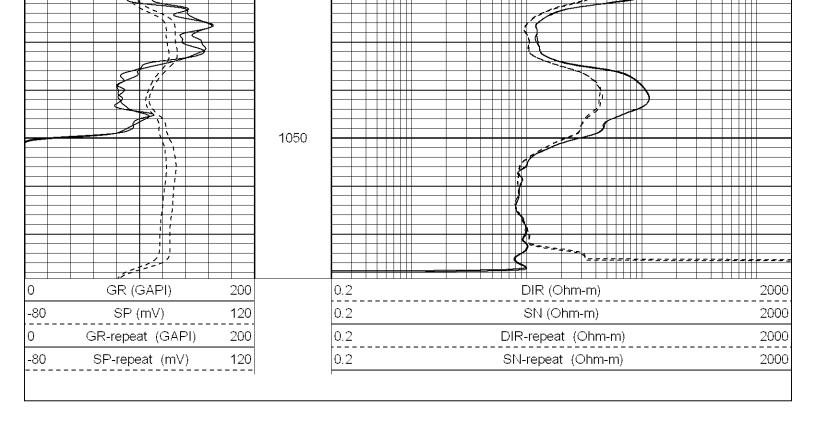








SUPEI WELL SEE	2 Linder Liter, I a.		Repeat Pass	>
Data Pres Data		1.1	3 by Calc Open-Cased 070814 0	
0	GR (GAPI)	200	0.2 DIR (Ohm-m)	2000
-80	SP (mV)	120	0.2 SN (Ohm-m)	2000
0	GR-repeat (GAPI)	200	0.2 DIR-repeat (Ohm-r	
-80 	SP-repeat (mV)	120	0.2 SN-repeat (Ohm-n	n) 2000
				S
		900		
		950		
		>		
		^		
		> 1000		
	5 m			



Database File: poci55.db Dataset Pathname: pass1 Dataset Creation: Sun Feb 10 12:51:37 2008 b	Calibration Report by Log Open-Cased 07081	14	
Ind	uction Tool Calibration Re	port	
Serial Number: Tool Model: Downhole Cal Performed: Surface Cal Performed:	040903 Probe Fri Feb 01 16:21:08 Fri Feb 01 12:36:59		
Surface Calibration: Conductivity Reference: Conductivity Reading: Internal Reference: Conductivity Reference: Conductivity Reading:	Air 0.000 -0.045 Zero 0.000 0.012	Loop 500.000 0.654 Cal 500.000 0.653	mmho V mmho V
Downhole Calibration: Conductivity Reference: Conductivity Reading: Short Normal Reference: Short Normal Reading:	Internal Zero -1.440 -1.554 0.000 0.007	Internal Cal 499.433 499.247 20.000 0.214	mmho V Ohm-m V
Results: Loop Conductivity: Downhole Correction: Short Normal Resistivity:	Gain 715.585 1.000 75.774	Offset 32.201 0.115 -4.000	
Compe	nsated Density Calibration	n Report	
Serial-Model: Source / Verifier: Master Calibration Perform	/	75POH an 31 13:50:50 2008	
Master Calibration			

Density

Far Detector Near Detector

Magnesium Aluminum	1.710 2.590	g/cc g/cc	 1164.05 207.67		575.44 288.30	cps cps
	Spine Angle =	68.15	Density/Spine	Ratio =	= 0.474	
	Size		Reading			
Small Ring Large Ring	8.35 17.00	in in	2.15 4.64	V V		
		Neut	ron Calibration Report			
Serial Number: Tool Model: Performed:		802 2.75I Fri F	POH eb 01 09:47:24 2008			
Calibrator Value	e:	1	NAPI			
Calibrator Read	ing:	1	cps			
Sensitivity:		1	NAPI/cps			
		Gamma	a Ray Calibration Report			
Serial Number: Tool Model: Performed:		801 2.75I Fri F	POH eb 01 08:19:35 2008			
Calibrator Value):	1.0	GAPI			
Background Rea Calibrator Read		0.0 1.0	cps cps			
Sensitivity:		0.80	00 GAPI/cps			

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	29.58	— <u> </u>	None	0.75	1.50	5.00
		-	–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
LSD	16.21		CDL-2.75POH (902) Probe	8.43	2.75	106.00
DCAL SSD	15.94 15.69		_			
DIC	6.24		——IEL-Probe (040903)	13.46	2.75	93.00
SP	2.25					

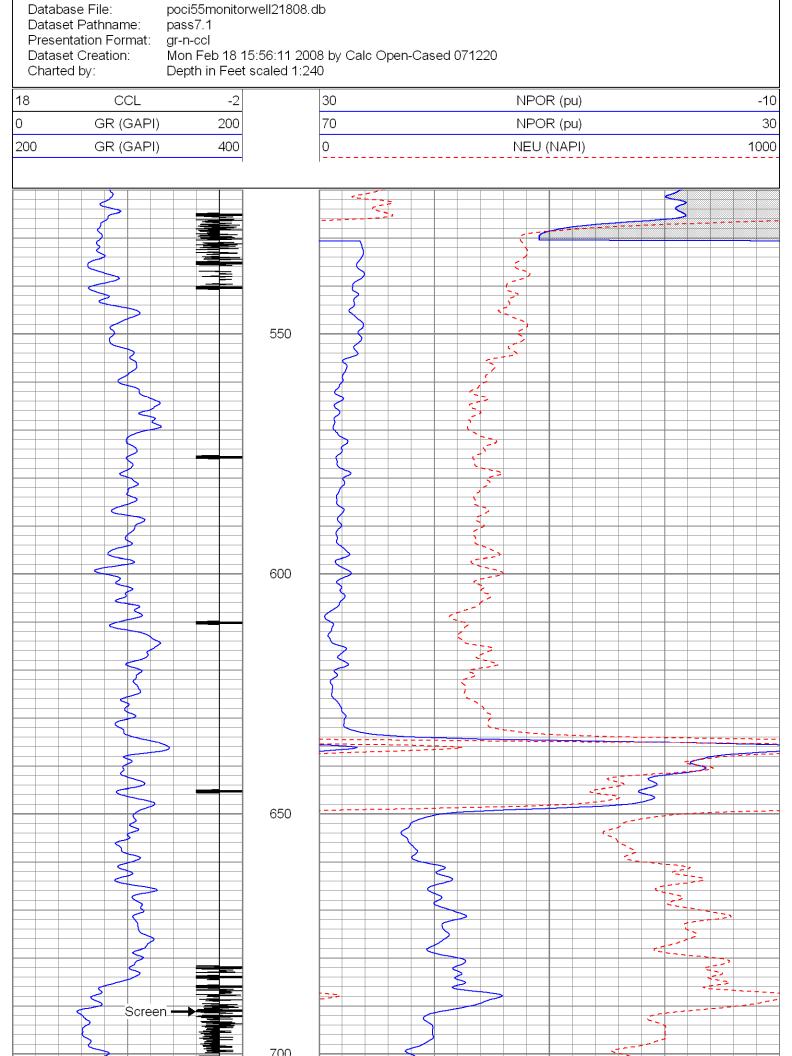
SN	1.71				
		Dataset: Total Length: Total Weight: O.D.	poci55.db: field/well/run1/pass1 31.11 ft 305.00 lb 2.75 in		

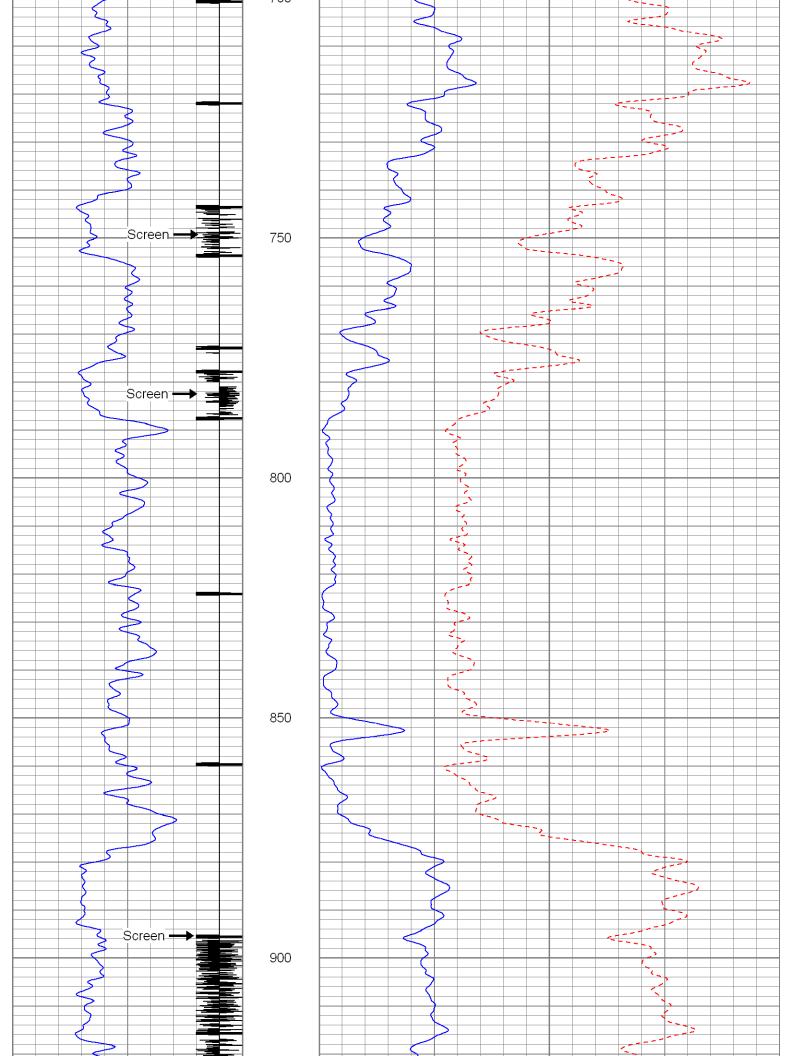
Liner	Surface String		Run Number Bit	Witnessed By Bor	Recorded By	Location	Equipment Number	Time I onner on Rottor	Estimated Cement Top	Max. Recorded Temp.	Tensity / Vierneity	Open Hole Size	Top Log Interval	Bottom Logged Interval	Depth Logger	Depth Driller	Run Number	Date	Well Fielc Cour State	l nty ə	P H	oci 55 uerfano as Anir	Mon ว			Comp	any Inc	SUPERIOR WELL SERVICES
5 1/2"	12.75"	Size	t From	Borehole Record				3						<u></u>					Log Measured From Drilling Measured From	Permanent Datum	S	5	Location:	County	Field	Well	Company	SUPERIOR Black Lick, Pa. Mercer, Pa. Wooster, Oh. Cleveland, Ok. Trinidad, Co.
			То	Mr. Melland	Worley	Trinidad	0703	12:30	NA	<i>III</i>	/// Walei	11" wotor	Surf.	1066'	1070'	1079'	one	2/18/08	rom Ground Leve d From Ground Leve		SEC 3 TWP	Water Well Permit Number 275819 851' FSL & 1773' FWL		Las Animas	Huerfano	Poci 55 Monitor Well	Petroglyph Operating Company Inc.	
			Size	Mr															Level Level	Level	TWP 29S RGE	Well Permit Number 2 851' FSL & 1773' FWL	API # :			nitor Well	Operating	E o
00	00	Top	Weight	Mr. valdez Tubing Record	-															Elevation 6	67W	75819		State C			Company	GAMMA NEUTRON LOG
	(J)		From	cord														_	G.E.	6690' K.B.			Oth	СО			Inc.	~
		ere >>>	5																6690'		Elevation	UCB F	Other Services					
All interp of any i	oretati nterp	ions ar retatio	e opinio 1, and w	e sha	all i	not, anyc	exc one	ept resi	in th ultin	ne c g fro	ase om	e of g any	gro int	ss (erp	or \ ret	villf atic col	ul n i ndi	neg ma tior	gligen de by ns set	ce o any out	n ou of o	r part, b	e liat rs, ag	ole or re gents c	espon r emp	sible fo loyees	or any lo	iccuracy or correctness ss, costs, damages, or interpretations are also
C								-	ros	ssr	oa	lds	а	nc	l g	g : jo	ar rię	nd gh	t. st	ı le ay	on		roa	ad (le			blue 3.4 mi	water tank) les to
							Ν	eu	itrc	n a	aff				-	-			low at tin			530' ti og.	0 5	urfac	e.			

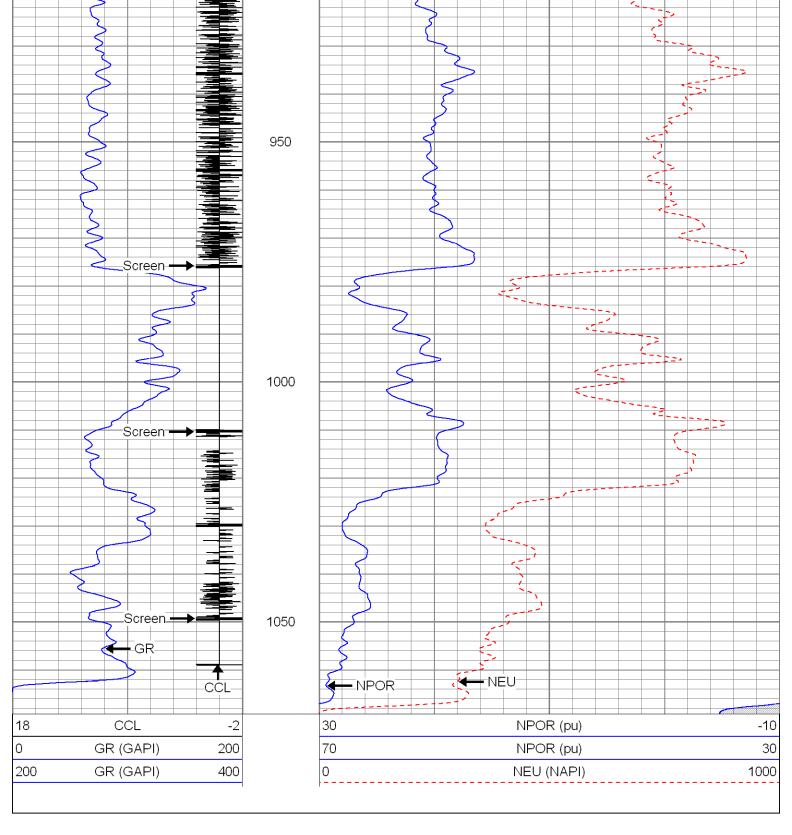


SUPERIOR Black Lick, Pa. Mercer, Pa. Wooster, Oh. Cleveland, Ok. Trinidad, Co.

Main Pass







		libration Report	
Database File: Dataset Pathname:	poci55monitorwell21808.db pass7.1		
Dataset Creation:	Mon Feb 18 15:56:11 2008 by Calc	Open-Cased 071220	
	Neutror	n Calibration Report	
Serial Nun	mber: Titan		
Tool Mode	el: T		
Performed	d: Thu Ma	ay 08 11:16:24 2003	
Calibrator	Value: 1200	NAPI	
Calibrator	Pooding: 1700	000	

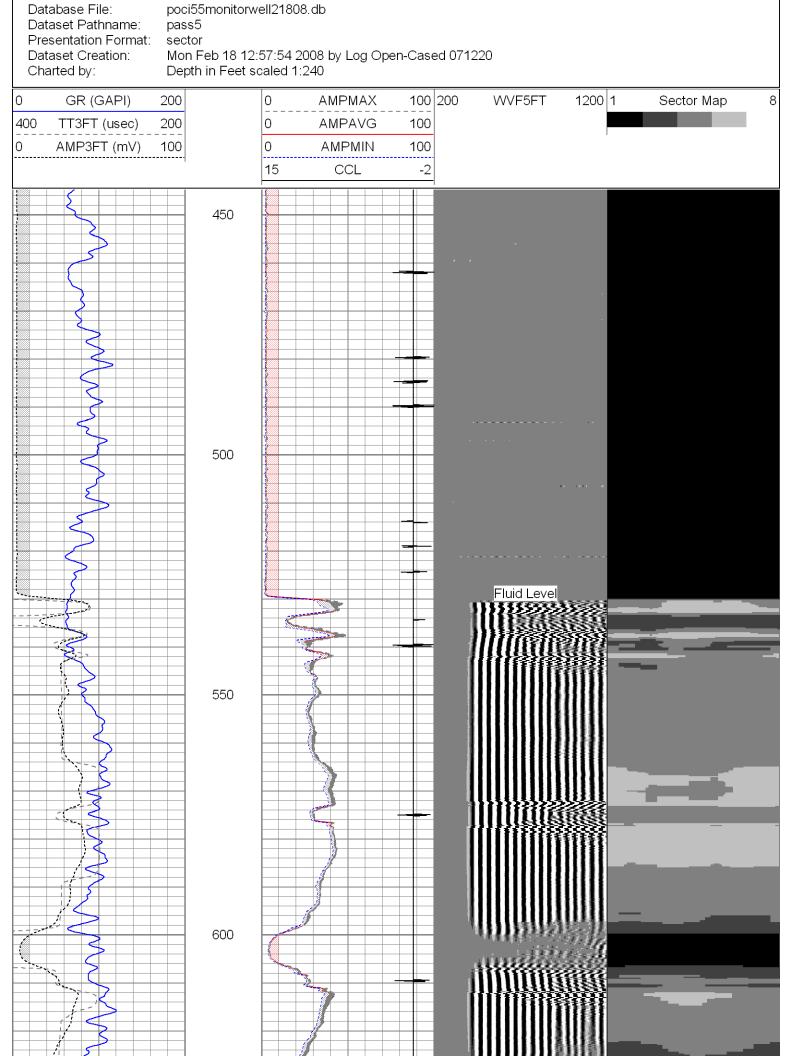
	1700	ops	
Sensitivity:	1	NAPI/cps	
	Gamma Ray Ca	libration Report	
Serial Number: Tool Model: Performed:	Slimhole SH Mon Feb 18 1	3:28:53 2008	
Calibrator Value:	1.0	GAPI	
Background Reading: Calibrator Reading:	0.0 1.0	cps cps	
Sensitivity:	1.2000	GAPI/cps	

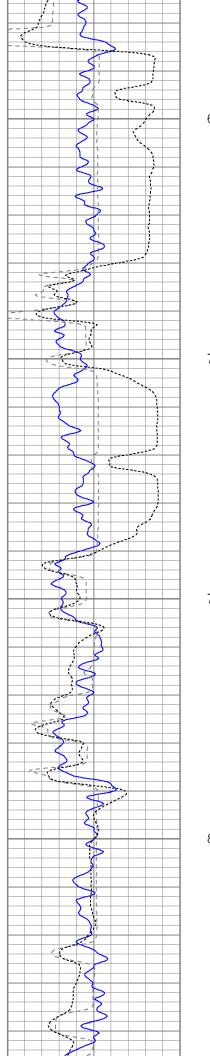
	expe	All inf of a									Ű	Liner
	nses	terpi ny ir		NA		00			12"	5 1/2"	rina	Prot. String Production String
	s in	reta nter		39'		8			75"	12.7		Surface String
	curre	ation preta		Bottom		Тор	/Ft	Wgt/Ft	e	Size	d _	Casing Record
	ed or su	s are or ation, ar	;>>>									
	staine	nd we	To		From	Weight Fro	Size	То	From			Run Number
	ed b	sha)))))))))))))))))))))	Mr. Valdez		Mr. Melland				Witnessed By
	y ai	ll n						Worley				Recorded By
		ot,						Trinidad				Location
		exc						0703			umber	Equipment Number
		ep.						12:30		3	on Botto	Time Logger on Bottom
		t in						ROA			adv	Esumated Cement Top
		the									ed Temp	Max. Recorded Temp.
		cas						111			osity	Density / Viscosity
		se o						water				Type Fluid
		of gi						11			Ze	Open Hole Size
		ros						450'			<u>≺</u> 2	Top I og Interval
		ss (1066'		<u>a</u>	ed Interv	Bottom Logged Interval
		or v						1070'				Depth Logger
	со	villf						1079'				Depth Driller
	ndi	ul						one				Run Number
	itio	ne						2/18/08				Date
		gliger	90	G.L. 6690			Level	om Ground Leve	asured From	Drilling Measured From	Cou Stat	Con Wel Fiel
2	t out	ice c		К. В.	6690'	Elevation	Leve		Datum	Permanent Datum	•	I
		n ou	ition	Elevation		3E 67W	TWP 29S RGE	ω	SEC		La C	Ρ
		r par				N∟	851' FSL & 1773' FWL	851' FSL .			as A O	
		t, be	Ċ	NEU		r 275819	nit Numbei	Water Well Permit Number 275819	Wate		nim	55 N
		e liab	ervices	Other Services			API # :		n:	Location:	nas	∕lon
	jents o ce Sch	le or r			CO	State	0,	Las Animas		County		perat itor W
		espon						Huerfano	노	Field		
		sible f				Ξ	nitor Wel	Poci 55 Monitor Well	Po	Well		Comp
	s. These	or any lo			y Inc.	Petroglyph Operating Company Inc.	Operatin	∍troglyph		Company		any Inc
	interpretations are also	iccuracy or correctness ss, costs, damages, or			RAY	SECTOR CEMENT BOND GAMMA RAY	с С П	L	IOR i.i.ek, Pa. Pa. Pa. r, Oh. nd, Ok. 1, Co.	SUPERIOR Black Lick, Pa Mercer, Pa. Wooster, Oh. Cleveland, Ok. Trinidad, Co.		SUPERIOR WELL SERVICES
1	'							-				

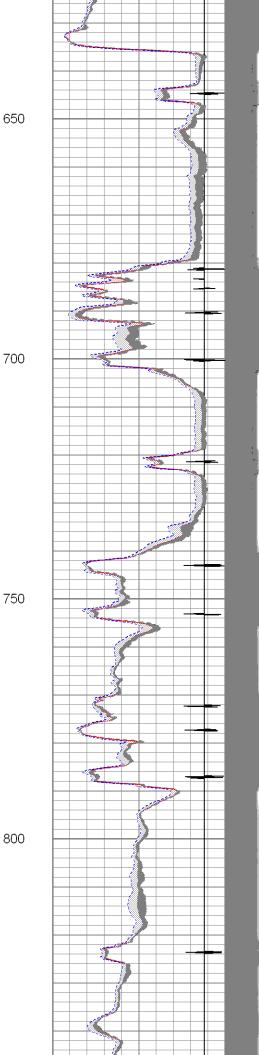


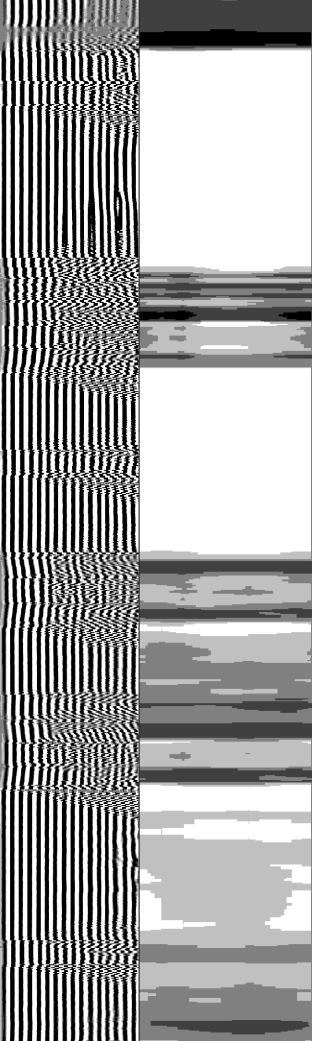
SUPERIOR Black Lick, Pa. Mercer, Pa. Wooster, Oh. Cleveland, Ok. Trinidad, Co.

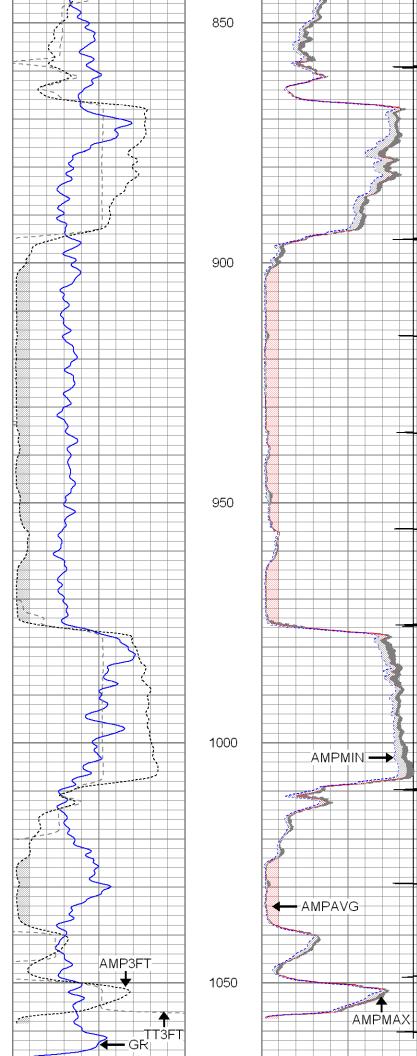
Main Pass

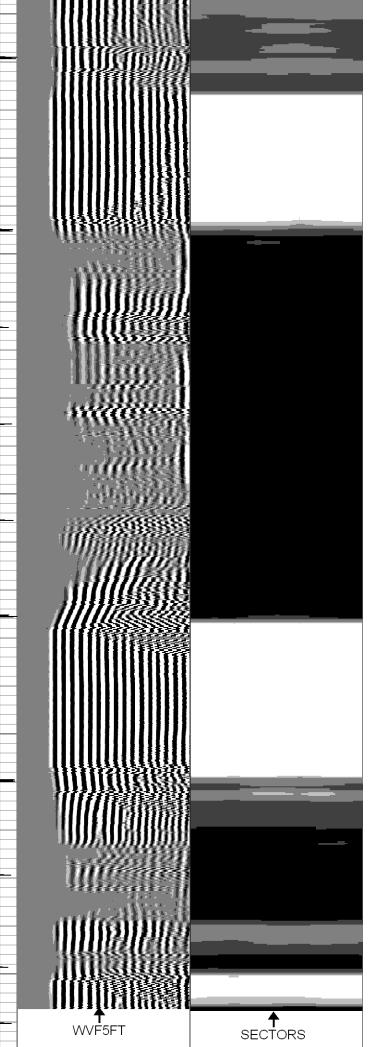




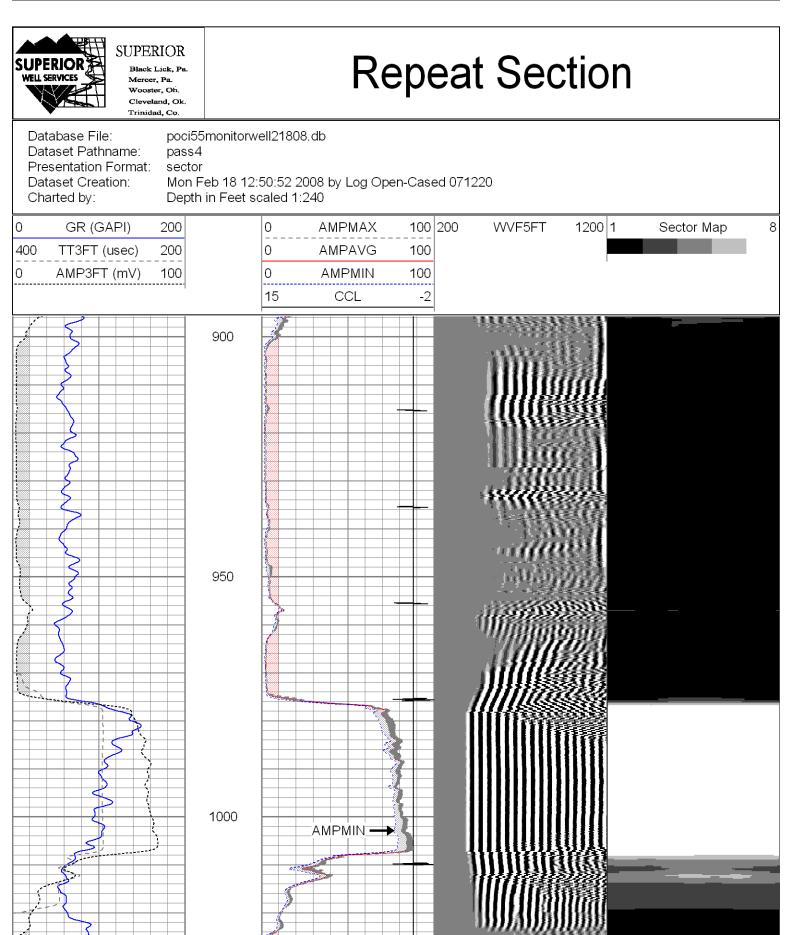








						-				
0	GR (GAPI)	200	0	AMPMAX	100	200	WVF5FT	1200	1 Sector Map	8
400	TT3FT (usec)	200	0	AMPAVG	100					
0	AMP3FT (mV)	100	0	AMPMIN	100					
		1	15	CCL	-2					
						-1				



GR GR AMP3FT ¹⁰⁵⁰		- AMPAVG					
				↑ 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				

		on Report							
Database File: poci55monitor Dataset Pathname: pass4	well21808.db								
	2:50:52 2008 by Log Open-	Cased 071220							
	Gamma Ray Ca	alibration Report							
Serial Number:	Slimhole								
Tool Model:		42.05 2000							
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 Diamet	er: 5.500	in							
Calibration Depth:	669.827	ft							
Master Calibration, perform	med Mon Feb 18 12:25:07	2008:							
Rav	v (v) C	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 : POC	55 MONIT	OR WEI		
Prospect:	· ·		······································		AFE #:	42567
Sec/Twp/Rge:	· · · · · · · · · · · · · · · · · · ·	3 / 29S / 67W			AFE Total:	\$210,465
API #:	275819	Field:	RAT	ON	This AFE Cost:	\$253,638
Work Type:	Completion	County, St.:	HUERFA	NO, CO	Tot Assoc AFE's:	\$253,638
Operator:	PH OPERATING COM	Supervisor:			Phone:	
roduction Current/	Expected Oil:	0/0	Gas:	0/0	Water:	0/0

	a daga sa		Wellw	ork Details					
Date :	2/20/2008	Days:	1	DC :	\$0	CCC:	\$0	CWC:	\$253,638
Activity:		Test	i vi Alter	Rig Name:	Layne (Christense	n Rig # 40)5	
Daily Re	port Summary :								
Daily	Report Detail:	Rig crew and hydro	ologist Konrad	d Quast on loca	tion at 7:0	0.			
		GIH with submersible Set packer at 992' an Conduct pump rate to Konrad conducted p	id inflate to 33 est and set pu	30 psig. Gages a ump rate at 5 gp	at 984'. m. Releas	ed rig crev	v at 21:00		
		down to FBHP of 17 RKI GX2003 gas more	psig. Pumped	I 1378 gailons o	f water. N	o gas flow	visible. N	o gas dete	cted with
Date :	2/21/2008	Days:	2		\$0		\$0	CWC:	\$253,638
Activity:		Test		Rig Name:	Layne (Christense	n Rig # 40)5	· · · · · ·
Section 2. Security	port Summary :		_		<u>nin ca</u>				
Daily	Report Detail:	Pressure build up Decided to stop build 13:00 Pump 387 gal 14:00 Rig crew on loc 17:00 BH test assem spaced 145 ft center at 20:00	l up. lons of water cation and sta bly on bank. / of packer to c	and then grab s art to POOH. Re Add pressure tra center of packer	ample for leased pa andducer a :. GIH with	analysis. cker and p and packer test asser	ressure w to test as nbly and o	vent to 230 ssembly. I one jt of tu	psig. Packers bing. SDFN
		Pressure summary: 1 1378 gallons in 4.5 h 178 psig and climblin Pressure above pack	rs. BHP wher ig very slowly	n pump stopped	17 psig. F	Pressure bi	uild up for	7.5 hrs. w	ith FBHP a
Date :	2/22/2008	Days:	3	DC :	\$0	CCC:	\$0	CWC:	\$253,638
ctivity:		Test		Rig Name:	Layne (Christense	n Rig # 40)5	
-	port Summary :		- <u>.</u> .						
	Report Detail:	7:00 GIH with dow 9:30 Start pump and 10:30 Inflate packers 156 psig. 11:15 Perform pump saw 2" WC differentia 11:50 for pressure to 17:00 Start pump tes of pumping. IBHP 15 3:05 (2/23/05) Shut p	d fill tubing wi s, lower packe p rate test: 4. al of gas flow; recover. st. Pump rate 6 psig pump o	th water. er to 340 psig, t 7 gom for 5 min ; 14.5 gpm for 8 14.5 to 13.5 gp down and maint	op packer .; 7.8 gpm min. Pum m. Slight g ainged 14	to 260 psig for 8 min; ped total o gas spike a 0 psig duri	g. BHP be 10 gpm fo f 318 galle at start. No ng pump	ofore and a or 11 min. ons. Stopp o gas flow test.	fter inflation at this time bed pump a during mos

		Well	Name : POCI	55 MONI	TOR WEL	L.			
Prospect:							AFE #:	42	2567
Sec/Twp/Rge:			3 / 29S / 67W			in the second	AFE Total:	\$21	0,465
API #:	2758	319	Field:	RA	ON	This	AFE Cost:	\$25	53,638
Work Type:	Compl	etion	County, St.:	HUERFA	NO, CO	Tot As	ssoc AFE's:	\$25	53,638
Operator:	PH OPERA	TING COM	Supervisor:	F		Second Constants	Phone:		
Production Current/	Expected (Dil:	0/0	Gas:	0/0		Water:	0/0	0

Date :	2/23/2008	Days:	4	* ·	DC :	\$0	CCC:	\$0	CWC:	\$253,638
Activity:	· · · · · · · · · · · · · · · · · · ·	Test		Fig N	Vame:	Layne C	nristenser	n Rig # 4	05	
Daily Re	port Summary :									
Daily	Report Detail:	7:00 Interva	al between 896 a	nd 976 buil	lding up u	ntil 12:20.	FBHP 15	6.		
		hrs, 10,550 ga	ump to test same allons. 3) /shut pump do			•				np for 12
Date :	2/24/2008	Days:	5		DC :	\$0	CCC:	\$0	CWC:	\$253,638
Activity:		Test		Fig N	Name:	Layne Cl	nristenser	n Rig # 4	05	
Daily Re	eport Summary :									
Daily I	Report Detail:		ire build up in 89 ild up. FBHP 15							
		Perform pump 15:50 Start pu	inflated to 175 j p rate test 17.5 g imp test IBHP 6 imp down. Start	pm 61.5 psig. P	ressure st	abilizing a				at 658'.
Date :	2/25/2008	Days:	6		DC :	\$0	CCC:	\$0	CWC:	\$253,638
Activity:		Test		Fig N	Vame:	Layne C	nristenser	n Rig # 4	05	
Daily Re	eport Summary :									
Daily	Report Detail:	8:50 Stop	pressure build up	o. Deflate p	ackers. Ll	D 6 jts. PU	12' pup.	Set top p	acker at 51	8' and lowe
		inflated to 170 to 28 psig. ind	', isolating 527' t) psig, upper pac licating gas pres	ker inflated	l to 110 ps	sig. Press	ure starte	dincreas	sing immedi	ately from
		measurement tubing to incre	stall tubing head at surface. Star ase head on pu <u>POOH</u> with test	ted pump b mp. Start pi	vell to pac ut would r ump but w	k off annul not pump.	us and al Released	low annu lower pa	lar gas flow	, Ided 3 jts
Date :	2/26/2008	measurement tubing to incre testing. Start Days:	at surface. Star ase head on pu	ted pump b mp. Start pi	vell to pac ut would r ump but w	k off annul not pump. rould not p \$0	us and al Released ump wate	low annu lower pa er. Decid \$0	lar gas flow acker and ac led to conclu	, Ided 3 jts
Activity:		measurement tubing to incre testing. Start	at surface. Star ease head on pu POOH with test	ted pump b mp. Start p equipment.	vell to pac ut would r ump but w	k off annul not pump. rould not p \$0	us and al Released ump wate	low annu lower pa er. Decid \$0	lar gas flow acker and ac led to conclu	dded 3 jts ude well
Activity:	2/26/2008 eport Summary :	measurement tubing to incre testing. Start Days: Test	at surface. Star ease head on pu POOH with test 7	ted pump b mp. Start pr equipment. Rig N	vell to pac ut would r ump but w DC : Name:	k off annul not pump. rould not p \$0 Layne Cl	us and al Released ump wate CCC: nristenser	low annu lower pa er. Decid \$0 n Rig # 4	alar gas flow acker and ac led to conclu CWC: 05	dded 3 jts ude well \$253,638
		measurement tubing to incre testing. Start Days: Test	at surface. Star ease head on pu POOH with test	ted pump b mp. Start pr equipment. Rig N	vell to pac ut would r ump but w DC : Name:	k off annul not pump. rould not p \$0 Layne Cl	us and al Released ump wate CCC: nristenser	low annu lower pa er. Decid \$0 n Rig # 4	alar gas flow acker and ac led to conclu CWC: 05	dded 3 jts ude well \$253,638
Activity: Daily Re Daily I	eport Summary : Report Detail:	measurement tubing to incre testing. Start Days: Test POOH and survey.	at surface. Star ease head on pu POOH with test 7	ted pump b mp. Start p equipment. Rig N ent. RDMO	vell to pac ut would r ump but w]DC :] Jame: Layne Ch	k off annul not pump. I rould not p \$0 Layne Cl ristensen I	us and al Released ump wate [CCC:] nristenser Rig 405. L	low annu lower pa er. Decid \$0 n Rig # 4 .ayne Ch	alar gas flow acker and ac led to conclu CWC: 05 aristensen ra	dded 3 jts ude well \$253,638 an camera
Activity: Daily Re	eport Summary :	measurement tubing to incre testing. Start Days: Test POOH and	at surface. Star ease head on pu POOH with test 7	ted pump b mp. Start p equipment. Rig N ent. RDMO	vell to pac ut would r ump but w DC : Name:	k off annul not pump. rould not p \$0 Layne Cl	us and al Released ump wate CCC: nristenser	low annu lower pa er. Decid \$0 n Rig # 4 .ayne Ch	alar gas flow acker and ac led to conclu CWC: 05	dded 3 jts ude well \$253,638

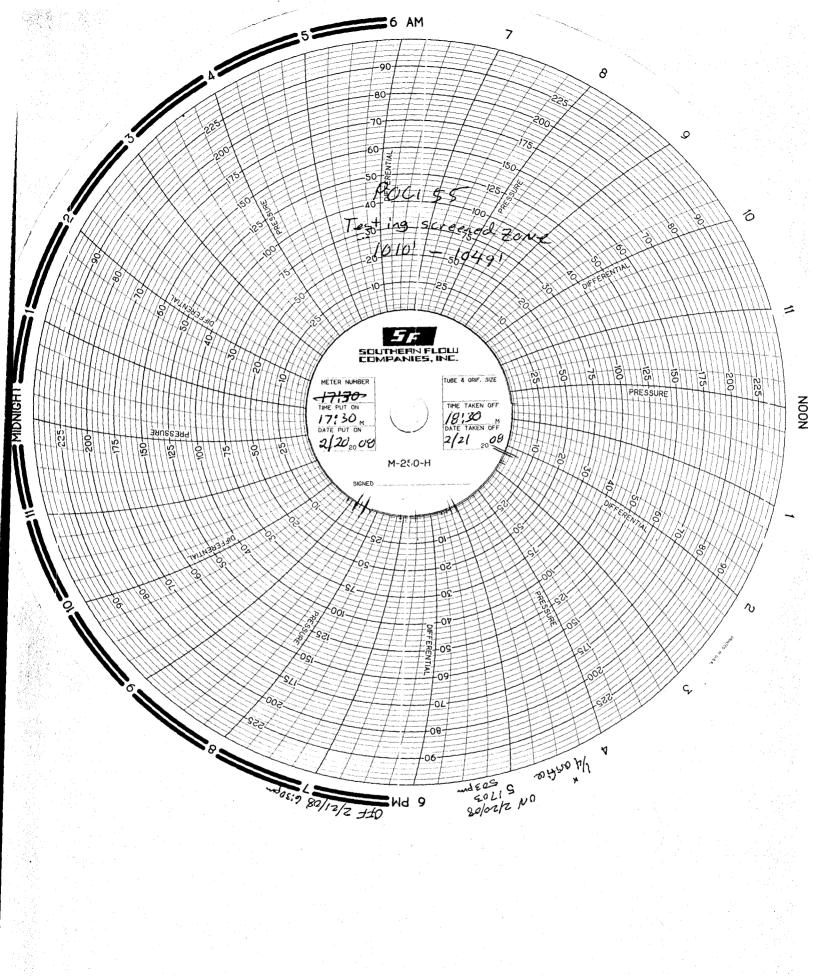
APPENDIX D

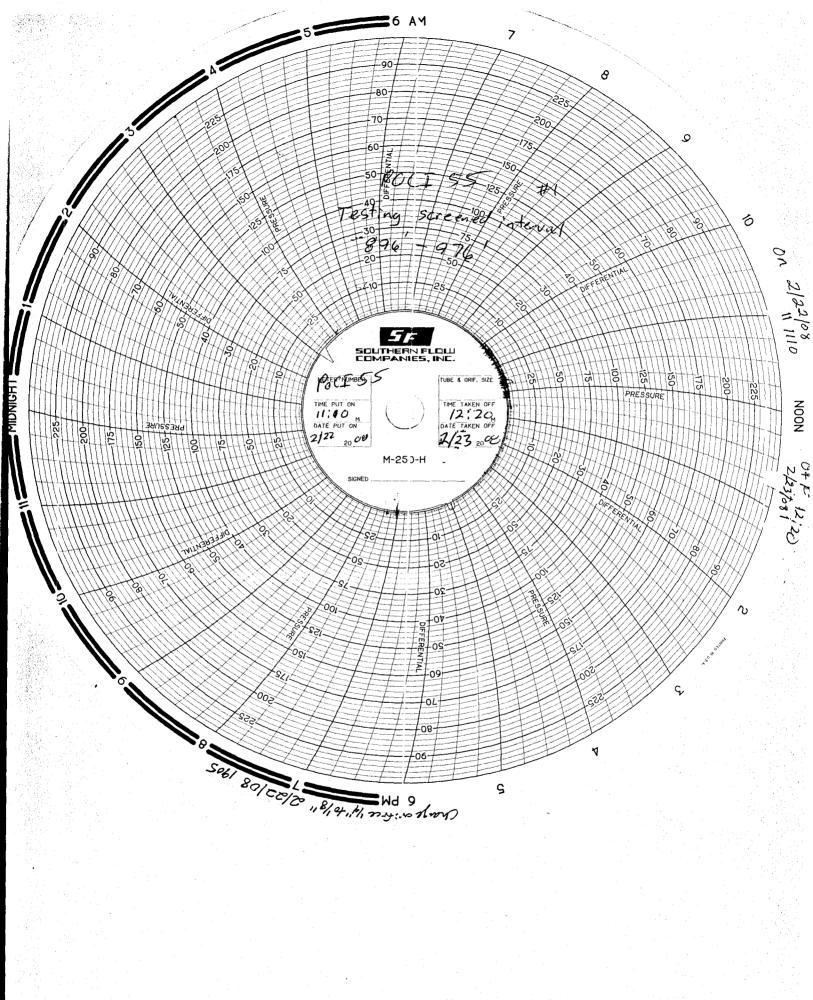
Testing Flow Rates and Notes

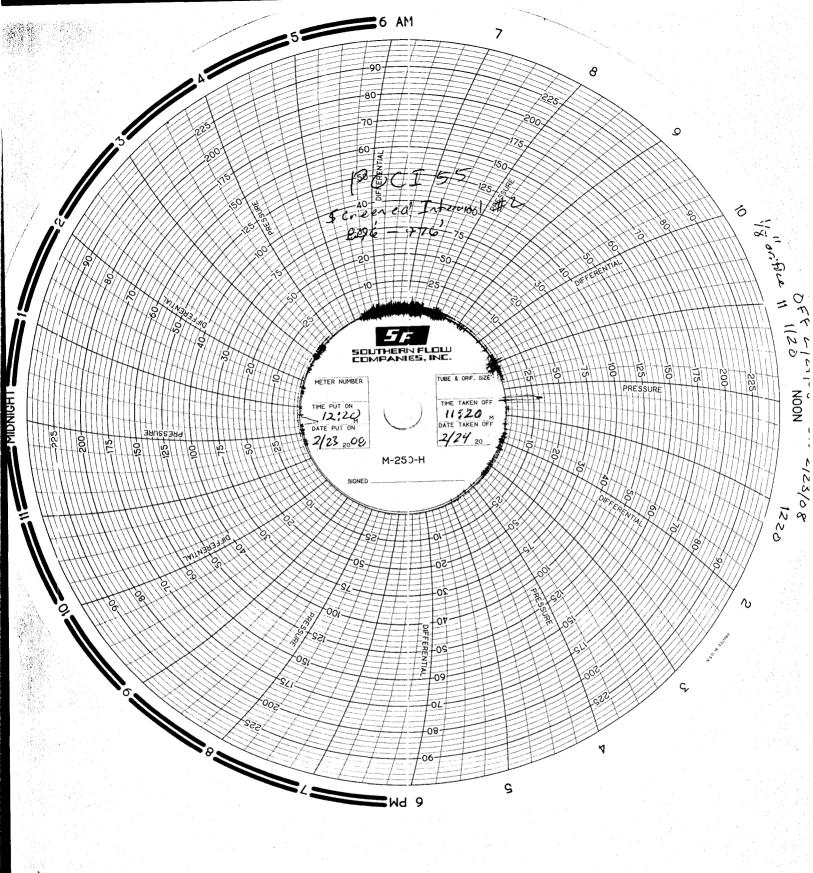
		Flow Rate In	Flow Rate Out	Total	Total	UP presssure		
	Time 14:15	(gpm)	(gpm)	Gallons In 0	Gallons Out	(psi) 330	(psi)	Comments Inflate Packer
20/08 20/08 20/08	16:48							Pump On Pump Off. Need to switch pump leads. Pump On
20/08 20/08	16:55	5.8						Pump of after filling tsting tubing to surface. Pump On
20/08 20/08	17:17 17:19	12.5 10.4						Increased flow rate Decreased flow rate
20/08 20/08 20/08	17:22 17:25 20:15	10.2		140				Pump off and alllow zone to recover. Pump on for extended test.
20/08 20/08 20/08	20:13 20:18 20:21	9.4		67				r drip on for extended test.
20/08 20/08	20:24 20:27	9.0 3.3		88				Decreased flow rate; too much drawdown.
20/08 20/08	20:29 20:54	4.3						Set to 6 gpm for final extended test Pump off and allow zone to recover.
20/08 20/08 20/08	23:51 23:53 20:57	5.9 5.9 5.8		276 285 310				Pump on for extended test. Flow Total Started at 276
21/08 21/08	0:02	5.6		341 350				
21/08 21/08	0:07 0:15	5.6 5.5		366 411		330		No gas recorded on Barton from separator
21/08	0:30	5.4 5.2	5.7 5.6	493 652 732	160 326			Flow out of separator now recording.
21/08 21/08 21/08	1:15 1:30 1:54	5.1 5.1 5.1	5.5 5.3 5.1	810 931	412 492 618			Barton reading zero from separator. RKI casing above packer $CH_4 = 100\%$ vo
21/08	3:03	4.9	5.3	1277	980			RKI on casing above packer $CH_4 = 100\%$ volume
21/08 21/08 21/08	4:00 4:20 12:30	4.8 5.1 2.4	5.0	1558 1378 0	1278	330 330		RKI on casing above packer CH ₄ = 100% volume Pump Off Pump of to pump and callect WO comple
21/08 21/08 21/08	13:00 13:30	2.4		387		330		Pump on to purge and collect WQ sample Collected WQ sample Pump Off. Total Gallons Pumped = 1,765
	13:51					330 Aquifer	Test Interval 2	Defalte packer
Date	Time	Flow Rate In (gpm)	Flow Rate Out (gpm)	Total Gallons In	Total Gallons Out	UP presssure		Comments
22/08 22/08	10:01 10:08			0	0			Pump on to fill test tubing to surface. Pump off to fix stuck valve.
22/08 22/08	10:10 10:11	15.0						Pump on to fill test tubing to surface. Water to surface; Pump off
22/08 22/08 22/08	10:33 10:41 10:46					260	280 340	Inflate Lower Packer Partially. Out of nitrogen. Switch bottles. Finish Inflating Lower Packer Inflate Upper Packer
22/08	10:50	4.6		0	0	270	340	Packers holding pressure Pump on for rate test
22/08 22/08	11:19 11:21	4.7 4.7		21				
22/08 22/08	11:22 11:26	7.8		57				
22/08 22/08 22/08	11:30 11:31 11:37	7.8 10.5 10.5		88 107 166				Barton recording ~2-3 mcf/day
22/08	11:37 11:41 11:48	10.5 15.0 14.5		219 308				Increased flow rate Valve is fully open. Will pump at maximum.
22/08 22/08	11:49 11:50			318		270		Pump Off. Barton recorder back to zero. Allow zone to recover before starting extended test.
22/08	16:55 16:59	16.0		12		270		Packers holding pressure Pump on for extended test
22/08	17:01 17:05 17:08	15.3 14.5 14.3		29 91 138				Barton recording ~2-3 mcf/day
22/08	17:13 17:15	14.3 14.3	16.6	154 180	45			
22/08	17:19 17:25	14.1 13.5	16.3 16.3	235 320	105 197			Barton recording zero gas flow. RKI reading ambient air on separator vent. Barton recording zero gas flow. RKI reading ambient air on separator vent.
22/08	18:00 18:30	13.9 13.3	16.6 13.9	796 1190	820 1263	270	340	Packers holding pressure
22/08 22/08	18:43 19:00	13.8 13.8	13.2 13.6	1375 1600	1440 1658			Barton recording zero gas flow. RKI reading trace CH_4 and CO on separator v RKI reading trace CH_4 and CO on separator vent.
22/08 22/08	19:05 21:00	13.7	14.2	3252	3318			Collected WQ parameters. Barton recording zero gas flow. Barton recording zero gas flow. RKI reading trace CH ₄ and CO on separator v
22/08 22/08	22:00 23:00	13.5 13.4	13.8 13.6	4102 4920	4181 5018			
23/08 23/08	0:00	13.5 13.3	13.8 13.7	5730 6535	5838 6652			
23/08 23/08	3:00 3:05			6749 6749	8322 8504			Pump off due to tenical problem. Allow zone to recover.
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 tra CH ₄ , H ₅ S and CO
23/08 23/08 23/08	12:30		14.3		130	210	340	Collect WQ parameters. Barton recording zero gas flow.
23/08 23/08	13:20 13:21		15.5		772			Bucket test 5 gal in 18 sec = 16.7 gpm. Second bucket test 5 gal in 18 sec = 16.7 gpm.
23/08 23/08	13:24 13:26	15.9 15.8	13.8	8 39	860			Inlet fow meter working again.
								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. a
23/08	14:09	13.5	14.1	476	1415			H ₂ S = 4.5 ppm Packers holding pressure. Barton recording zero gas flow. RKI measuring trac
	15:00 15:10 18:00	13.9	15.0 14.6	1159 3828	2148 4835	270	340 340	CH4, H2S and CO on separator vent. Collected WQ parameters. RKI measuring trace CH4, H2S and CO on separator vent.
	18:05	14.6	14.6	4642	5727	270	340	Collected WQ parameters. Barton recoding zero gas flow. RKI measuring trace CH4, H2S and CO on separator vent.
23/08 23/08	19:05 20:00	12.8	14.5	5382	6596			Collected WQ parameters. RKI measuring trace CH4, H2S and CO on separator vent.
23/08	20:05					270	340	Collected WQ parameters. RKI on casing above packer CH ₄ = 100% volume. Barton recording zero gas flow. RKI measuring trace CH4, H2S and CO on
	22:00 22:05	14.6	14.6	7082	8357			separator vent. Collected WQ parameters.
24/08	0:00	16.5	14.4	0021	10197	270	240	Collected water quality parameters and sample 'MMW (849-995)' Barton recording zero gas flow. RKI measuring trace CH4, H2S and CO on construct water
24/08 24/08 24/08	0:05 0:21 11:00	16.5	14.4	9021 9286	10187 10549	270	340 340	separator vent. Pump Off Pressure recovered to 154 psi; good recovery.
24/08 24/08	11:02					210	010	Deflate lower packer Deflate lower packer
24/08	11:20						Test Interval 3	Pull out six tubing joints
Date	Time	Flow Rate In (gpm)	Flow Rate Out (gpm)	Total Gallons In	Total Gallons Out	UP presssure (psi)	LP Pressure (psi)	Comments
24/08	12:07 12:15					170	240	Inflate Lower Packer Inflate Upper Packer
24/08	12:26 12:36 12:37	5.7		0	0	175	240	Packers holding pressure Pump on for rate test
24/08	12:37 12:39 12:42	5.7 5.6 5.7		11 28				
24/08 24/08	12:45 12:49	5.8 9.7		47 85				
24/08 24/08	12:51 12:53	9.6 9.6		104 118				Inservers rate on descriptions level
	12:55 12:58	13.0 13.5 17.0		152 190 N/A				Increase rate as drawdown levels off. Pressure leveling off at 25.5 psi. Increase rate as drawdown levels off.
	13:02	17.0		250 284				
24/08 24/08		17.9 17.2		340 394				Barton recording zero gas flow.
24/08 24/08 24/08 24/08 24/08	13:07 13:10	17.3		460				Well is recovering; opened valve full open; ~9.5 psi of head left.
24/08 24/08 24/08 24/08 24/08 24/08 24/08	13:07 13:10 13:14 13:20	15.0		<u> </u>				Reduce flow; pressure only 6 psi and dropping.
24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08	13:07 13:10 13:14 13:20 13:25 13:32	15.0 17.0 15.0		700				Barton recording zero gas flow. RKI gas meeter reading ambient air. Open valve to increase flow rate. No increase.
24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08	13:07 13:10 13:14 13:20 13:25	15.0 17.0		798 860				
24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08	13:07 13:10 13:14 13:20 13:25 13:32 13:34 13:38	15.0 17.0 15.0 14.9 15.2				175	240	RKI on casing above upper packer reading CH ₄ = 100% vol
24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08	13:07 13:10 13:14 13:20 13:25 13:32 13:34 13:38 13:42 13:48 13:54 13:54 14:07 15:51	15.0 17.0 15.0 14.9 15.2 15.5 15.6 15.4 17.5		860 1103 1315 0	1097	175	240	
24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08 24/08	13:07 13:10 13:14 13:20 13:25 13:32 13:34 13:38 13:34 13:38 13:54 13:54 13:55 13:57 15:57 16:18	15.0 17.0 15.0 14.9 15.2 15.5 15.6 15.4 15.4 17.5 17.2 17.4		860 1103 1315 0 110 478		175 175 170	240	RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure.
224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08 224/08	13:07 13:10 13:14 13:20 13:25 13:32 13:34 13:34 13:34 13:34 13:34 13:42 13:48 13:51 13:51 15:57 16:18 16:59 17:27	15.0 17.0 15.0 14.9 15.2 15.5 15.6 15.4 17.5 17.2	15.4	860 1103 1315 0 110	1097			RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air.
24/08 24/08	13:07 13:10 13:14 13:20 13:25 13:32 13:34 13:38 13:42 13:48 13:54 13:54 13:55 13:57 15:57 16:18 16:59 17:27 17:57 18:00	15.0 17.0 15.0 15.2 15.5 15.6 15.4 17.5 17.2 17.4 17.6 17.3	15.4	860 1103 1315 0 110 478 1195				RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure.
224/08 24	13:07 13:10 13:14 13:20 13:22 13:32 13:34 13:34 13:34 13:34 13:34 13:54 13:54 13:555	15.0 17.0 15.0 15.2 15.5 15.6 15.4 17.5 17.2 17.4 17.6	15.4	860 1103 1315 0 110 478				RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters.
24/08 24/08	13:07 13:10 13:14 13:20 13:25 13:32 13:34 13:34 13:34 13:54 13:54 13:55 13:55 13:55 15:51 15:57 16:18 16:59 17:27 15:57 16:18 16:59 17:27 17:57 18:00 18:36 18:36 18:36 18:36 19:00	15.0 17.0 15.0 15.2 15.5 15.6 15.4 17.5 17.2 17.4 17.6 17.3		860 1103 1315 0 110 478 1195 2928	1952 3357			RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading achieves LEL.
24/08 224/08 225/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08 25/08	13:07 13:10 13:14 13:20 13:25 13:32 13:34 13:34 13:34 13:54 13:54 13:54 13:54 13:54 14:07 15:51 15:57 16:18 16:59 17:27 16:59 17:27 17:57 18:00 18:36 18:37 18:45	15.0 17.0 15.0 15.2 15.5 15.6 15.4 17.5 17.2 17.4 17.6 17.3		860 1103 1315 0 110 478 1195	1952			RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters.
24/08 22/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08 20/08	13:07 13:10 13:14 13:20 13:22 13:23 13:24 13:25 13:38 13:42 13:38 13:34 13:38 13:34 13:38 13:42 13:38 13:42 13:38 13:42 13:43 13:51 15:57 16:18 16:59 17:27 17:57 18:00 18:37 18:36 19:00 9:20 3:51	15.0 17.0 15.0 15.2 15.5 15.6 15.4 17.5 17.2 17.4 17.6 17.3	14.4	860 1103 1315 0 110 478 1195 2928	1952 3357	170	240	RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters. Collect WQ parameters and sample 'MMW (687-788)' Pump Off. Test ended due to well recovering at maximum pumping rate Deflate Upper Packer. Deflate Lower Packer. Puli out isx tubing joints and add 12 feet of pup joints
24/08 25/08 25/08 25/08 25/08 25/08	13:07 13:10 13:14 13:20 13:25 13:32 13:32 13:32 13:32 13:34 13:34 13:34 13:34 13:34 13:34 13:34 13:54 13:57 15:57 17:57 18:59 17:27 18:59 17:27 18:00 19:20 19:00 19:20 9:01 9:25 Time	15.0 17.0 15.0 15.2 15.5 15.6 15.4 17.5 17.2 17.4 17.6 17.3	14.4 LP Pressure (psi)	860 1103 1315 0 110 478 478 1195 2928 3336	1952 3357 3724	170	240	RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters. Collect WQ parameters and sample 'MMW (687-788)' Pump Off. Test ended due to well recovering at maximum pumping rate Deflate Upper Packer. Deflate Lower Packer. Deflate Lower Packer.
24/08 22/08 22/08	13:07 13:10 13:14 13:20 13:25 13:32 13:32 13:32 13:34 13:34 13:34 13:42 13:42 13:42 13:44 13:42 13:44 13:55 13:44 13:55 13:42 13:45 13:45 13:45 14:07 17:57 16:18 13:45 14:07 17:57 16:18 13:45 14:07 17:57 16:18 13:45 14:07 17:57 16:18 13:45 14:07 17:57 16:18 14:07 17:57 17:57 16:18 14:07 17:57 17:57 17:57 17:57 17:57 19:00 19:25 19:00 19:25 19:56 10:00	15.0 17.0 15.0 14.9 15.2 15.5 15.6 15.4 17.5 17.2 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.0 17.0 17.0 17.0 17.0 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 17.2 17.2 17.2 17.2 17.2 17.2 17.2 17.3 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.2 17.7	14.4 LP Pressure (psi) 170	860 1103 1315 0 110 478 1195 2928 3336 1nflate Lowee Inflate Lowee Inflate Lowee	1952 3357 3724 rr Packer.	170	240	RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters. Collect WQ parameters and sample 'MMW (687-788)' Pump Off. Test ended due to well recovering at maximum pumping rate Deflate Lupper Packer. Deflate Lupper Packer. Pull out six tubing joints and add 12 feet of pup joints
24/08 25/08 25/08	13:07 13:10 13:11 13:20 13:21 13:22 13:32 13:32 13:32 13:34 13:32 13:34 13:32 13:34 13:38 13:38 13:38 13:38 13:38 13:38 13:38 13:38 13:38 13:38 13:38 13:38 13:42 13:54 14:07 17:27 18:36 18:37 18:36 19:00 9:25 7:me 9:56 10:08 10:04 10:56	15.0 17.0 15.0 15.2 15.5 15.6 15.4 17.5 17.2 17.4 17.6 17.3 17.7 17.7	14.4 LP Pressure (psi)	860 1103 1315 0 110 478 1195 2928 2928 3336 Inflate Lowe Inflate Upper Packers hol	1952 3357 3724 r Packer. r Packer.	170	240 240 240 Fest Interval 4	RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters. Collect WQ parameters and sample 'MMW (687-788)' Pump Off. Test ended due to well recovering at maximum pumping rate Deflate Lupper Packer. Deflate Lupper Packer. Pull out six tubing joints and add 12 feet of pup joints
24/08 25/08 25/08	13:07 13:10 13:11 13:20 13:21 13:22 13:24 13:32 13:32 13:34 13:32 13:34 13:38 13:34 13:38 13:34 13:38 13:34 13:38 13:34 13:38 13:42 13:48 13:54 14:07 15:51 15:57 18:00 18:37 18:37 18:30 9:01 9:25 9:25 9:56 10:08 9:556 10:42	15.0 17.0 15.0 14.9 15.2 15.5 15.6 15.4 17.5 17.2 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.0 17.0 17.0 17.0 17.0 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 17.2 17.2 17.2 17.2 17.2 17.2 17.2 17.3 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.2 17.7	14.4 LP Pressure (psi) 170	860 1103 1315 0 178 478 1195 2928 2928 3336 3336 107 107 107 107 107 107 107 107	1952 3357 3724 3724 r Packer. do flow or pres vers to setup v	170 170 170 170 Aquifer	240 240 240 Test Interval 4	RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters. Collect WQ parameters and sample 'MMW (687-788)' Pump Off. Test ended due to well recovering at maximumm pumping rate Deflate Upper Packer. Pull out six tubing joints and add 12 feet of pup joints Comments
24/08 25/08 25/08	13:07 13:10 13:11 13:20 13:21 13:22 13:23 13:24 13:32 13:32 13:32 13:32 13:32 13:32 13:32 13:32 13:32 13:32 13:32 13:32 13:32 13:38 13:48 13:54 14:07 15:51 16:59 17:27 17:27 18:00 18:36 18:30 18:30 18:30 9:20 9:21 9:22 9:25 9:26 9:27 10:38 10:42 10:57 10:57 10:58 10:59 10:50 10:52 10:52	15.0 17.0 15.0 14.9 15.2 15.5 15.6 15.4 17.5 17.2 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.7 17.0 17.0 17.0 17.0 17.0 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 15.5 17.2 17.2 17.2 17.2 17.2 17.2 17.2 17.3 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.5 17.2 17.7	14.4 LP Pressure (psi) 170 170	860 1103 1315 0 110 478 2928 2928 3336 3336 101 195 2928 195 2928 195 2928 195 2928 195 2928 195 2928 195 2928 29	1952 3357 3724 3724 in Packer. io flow or pres kers to setup v Packer. No flow or pres	170 170 170 Aquifer '	240 240 240 Test Interval 4 be gas locked. 4 with only a lor be gas locked.	RKI on casing above upper packer reading CH ₄ = 100% vol Pump Off. Allow zone to recover for extended test. Pump on for extended test. Flow meter on separator outlet not zeroed. Packers holding pressure. Barton recording zero gas flow. RKI gas meeter reading ambient air. Barton recording zero gas flow. RKI gas meeter reading CH ₄ = 20% LEL. Collect WQ parameters. Collect WQ parameters and sample 'MMW (687-788)' Pump Off. Test ended due to well recovering at maximum pumping rate Deflate Upper Packer. Deflate Lower Packer. Pull out six tubing joints and add 12 feet of pup joints Comments wer packer.

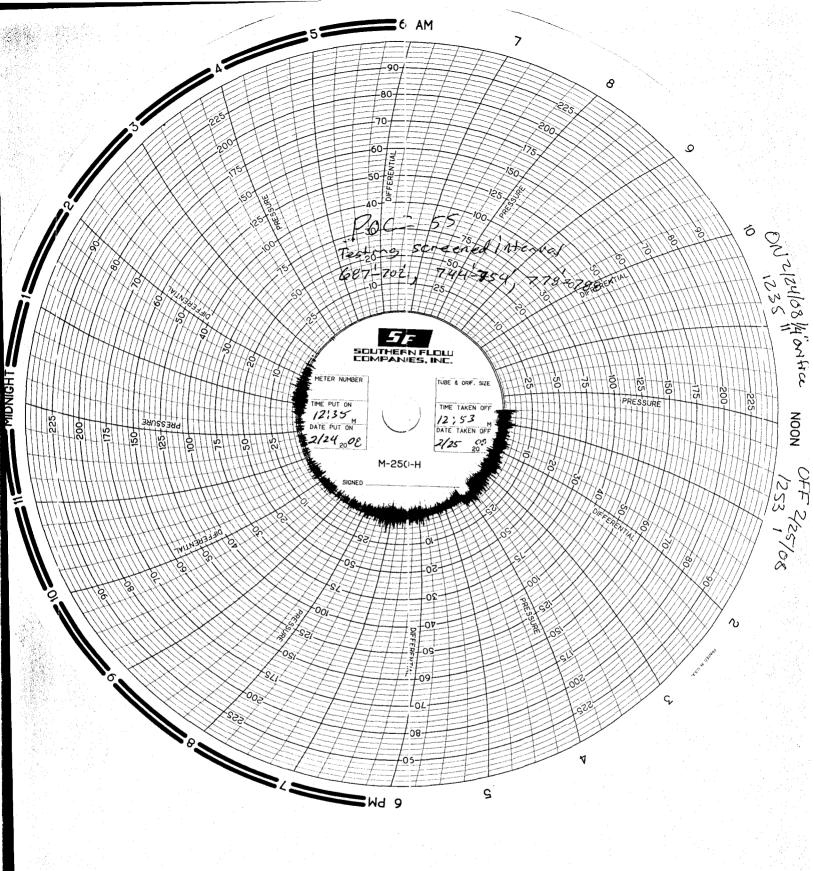
APPENDIX E

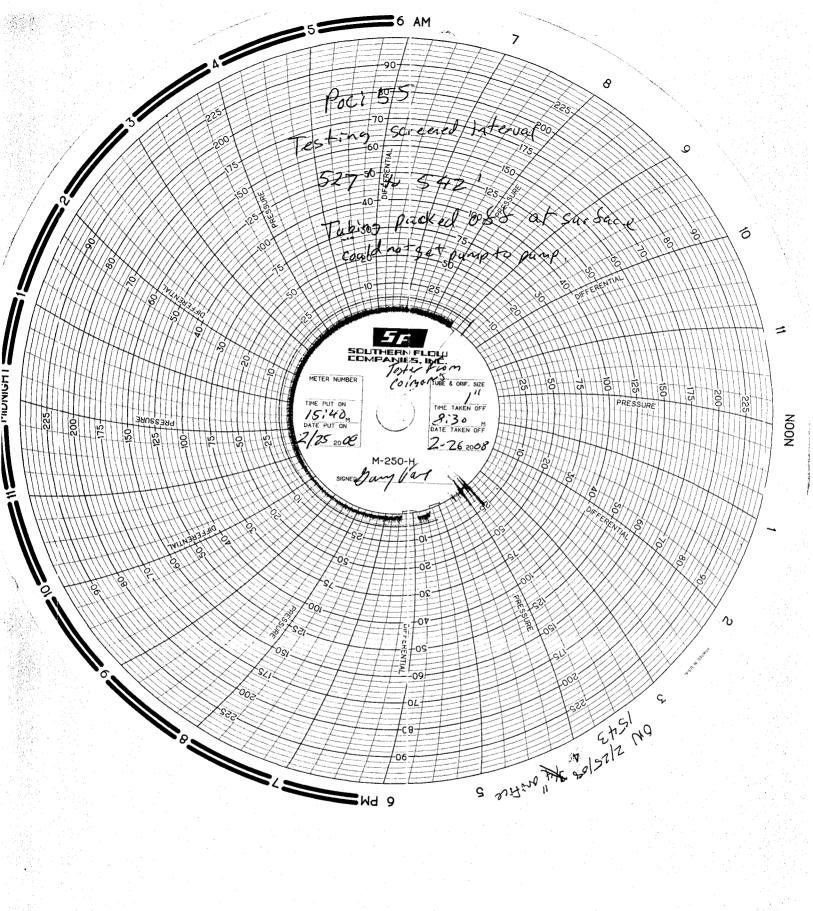
Barton Gas Flow Recorder Charts











APPENDIX F

Evergreen Analytical Laboratory Water Quality Results

WORK ORDER Summary

Rpt To: Tom Melland Petroglyph Energy

P.O. Box 979

La Veta, CO 81055 (719) 742-5570

Evergreen Analytical, Inc.

08-1122

Email To: Tmelland@petroglyphenergy.com

2/22/08 10:44:55 AM

QC Level: Level I+

Client Project ID: Petroglyph CBM wells

\square onte

Comments:										
Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Test Code	Test Name	Hold MS	SW	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	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		EI	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	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
08-1122-011	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	PH_W	Discharge Water pH			3/07/08	2/21/08
08-1122-011	MMW (1009-1048)	Groundwater	2/21/08 1300	2/22/08	TDS_W	Total Dissolved Solids (TDS)			3/07/08	2/28/08
08-1122-011	08-1122-011 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

** Important Note: See reverse side hereof for terms and conditions. Relinquisted by: (Signature) Date/Time Add 2/21/09 Add 30 Ad	MMW (1207-1048) 2/21/08 1350 14	Mail Invoice to 10 Dox 974 Vetragium Attn Tom Melland Address PD Dox 974 Vetragium City La Veta State CD Zip 81055 Tel # 7197425570Fax # 719742551 Project ID# Patragiuph CBM wells PO Ougle 8948 Sampler Konvrad Quee 8948 Sampler Konvrad Quee 51 NOTE: Identify Known Hazards Below SAMPLE DATE IDENTIFICATION SAMPLED TIME No. of Containers	CLIENT INFORMATION Mail Original Report to: Pettregity th Energy Attn Ten Melland State CD Zip Side City La Veta State CD Zip Side Tel # 719 742 5570Fax # 719 742 5571 E-mail REPORT ALSO BY D FAX MIPDF BEDD REPORT CHROMATOGRAMS D YES 11
ignature) Date/Time Relinquished by: (Signature)	A B C D C D C D C D C D C D C V V V V V V V	1) Dinking Water or 2) Discharge Water or 3) Ground Water (circle one) MATHY Soil / Solid / Air / Gas Dil/Sludge / Wipe 300.0 Anions by TC Fluoride 200.8 / I regulated AIKaliaity 504.1 EDB/DBCP S24.2 VOA TKS R5KSOP-175 M Total Sulfide Total Sulfide Sulfide Sister of the sulfide Sulfide Soil / Sister of the sulfide Sulfide Soil / Solid / Air / Gas Sulfide Soil / Sulfide Sulfide Soil / Sister of the sulfide Sulfide Soil / Sister of the sulfide Sulfide Sister of the sulfide Sulfide Sister of the sulfide Sulfide Sister of the sulfid	TODY RECORD / ANALYTICAL Evergreen Analytical Labor 4036 Youngfield St. Mheat Fidge, Color (303) 425-685 (877) 737-4521 FAX (303) 425-685
Date/Time Received by: (Signature) Date/Time Date/Time Date/Time 2/22/8	I I	VISIS) For Laboratory Use Only WO. # /) Ý-1/22 BOF.# COS (0) COS (0) COS (0) CHTC COS (0) CHTC CHTC COS (0) CHTC CH	SERVICES AGREEMENT ** Page 1 of 1 atory Inc. Report Results by: (Date)* ado 80033 Standard 2 working weeks 20 4 UST Analyses per Fee Schedule 0 • Rush: less than 24 hrs, 150% 1 - 2 work days, 100% • Subject to surcharge & exceptions noted in fee schedule. *Subject to surcharge & exceptions noted in fee schedule.

Evergreen Analytical, Inc.

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

CASE NARRATIVE

200

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

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

Mathad, E300.0

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

Dran Mathad

ANIONS BY IC

Methoa: E300.0	Prep Mietnou:				
Date Prepared: 2/22/08 Date Analyzed: 2/22/08 1315	Dilution Factor: 1 Method Blank: METHOD BLANK 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	

Analyst

Approved

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

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.

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 Lab Sample ID: Sample Matrix:	08-1122 08-1122-01 Groundwater	
	ALKALINITY	Bron Mothod		
Method: SM2320B		Prep Method:		
Date Prepared: 2/26/08	Lab File ID: 70 Mathad Blanks MDL K		tion Factor: 1 Fraction ID: 08-	1122 ALD
Date Analyzed: 2/26/08 Analytes	Method Blank: MBLK 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 Date Analyzed: 2/26/08	Lab File ID: 16 Method Blank: MBLK		tion Factor: 1 Fraction ID: 08-	-1122-01B
Analytes	CAS Number	Result	LQL	Units
Fluoride	16984-48-8	8.6 *	0.20	mg/L
Method: SM 4500H+ B Comments: This is a field parameter with a Date Prepared: 2/22/08 Date Analyzed: 2/22/08 1110	15min. holding time.		tion Factor: 1 Fraction ID: 08-	-1122-011
Analytes	CAS Number	Result	LQL	Units
рН		9.91 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: 70 Method Blank: MBLK		tion Factor: 1 Fraction ID: 08-	-1122-01H
Analytes	CAS Number	Result	LQL	Units
Total Sulfide		U	0.50	mg/L
Analyst		Appro	ved	
Qualifiers: B - Analyte detected in the associated f E - Extrapolated value. Value exceeds c H - Sample analysis exceeded analytica J - Indicates an estimated value when t S - Spike Recovery outside accepted in U - Compound analyzed for but not det X - See case narrative	alibration range al holding time he compound is detected, but is below the LC mits		ns: NA - Not Applical LQL - Lower Quan Surr - Surrogate	
	amination Level (MCL), TCLP limit, or if MCL.	Print C	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 weDate Collected:2/21/08 1300Date Received:2/22/08	11s	Lab Work Order Lab Sample ID: Sample Matrix:	08-1122 08-1122-01 Groundwater	
Method: SM 2540C	TOTAL DISSOLVED SO	LIDS (TDS) Prep Method	:	
Date Prepared: 2/25/08 Date Analyzed: 2/25/08 Analytes	Lab File ID: 75 Method Blank: MBLK CAS Number		ution Factor: 1 Fraction ID: 08-112 LQL	2-011 Units
Total Dissolved Solids		416	10.0	mg/L
Method: SM 2540 D	TOTAL SUSPENDED SC	DLIDS (TSS) Prep Method	:	
Date Prepared: 2/25/08 Date Analyzed: 2/25/08 Analytes	Lab File ID: 58 Method Blank: MBLK CAS Number	200	ntion Factor: 1 Fraction ID: 08-112 LQL	2-011 Units
Total Suspended Solids	·····	17.3	5.0	mg/L

Total Suspended Solids

Analyst

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.

Approved

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

Print Date: 2/28/2008

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

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

Method: E200.8

Lab Work Order08-1122Lab Sample ID:08-1122-01Sample Matrix:Groundwater

TOTAL METALS

Prep Method: E200.8

Date Prepared: 2/28/08 Date Analyzed: 2/28/08	Lab File ID: 080228A Method Blank: MB-1484	.,B\036SMPL.D 48	Dilution Factor: 1 Lab Fraction ID: 08-1	122-01C
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	744()-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

Analyst

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result E - Extrapolated value. Value exceeds calibration range

II - 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

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

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

Lab Work Order08-1122Lab Sample ID:08-1122-01Sample Matrix:Groundwater

Method: E245.1	MERCURY, DRINKING WATER Prep Method: E245.1				
Date Prepared: 2/29/08 Date Analyzed: 2/29/08	Lab File ID: 022908w Method Blank: MB-14861		tion Factor: 1 Fraction ID: 08-1	122-01C	
Analytes	CAS Number	Result	LQL	Units	
Mercury	7439-97-6	U	0.00010	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 II - 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 (1009-104	8)	Lab Work	Order: 08-11	22	
Client Project ID: Petroglyph CBM		Lab Sample	e ID: 08-11	22-01E	
Date Collected: 2/21/2008		Sample Ma	trix: Grour	ndwater	
Date Received: 2/22/2008		Lab File ID:	: 037.D	037.D MB-14851	
Date Prepared: 2/28/2008		Method Bla	ank: MB-1		
Date Analyzed: 2/28/2008		Prep Facto	r: 0.057		
Percent Moisture: NA		Dilution Fa	ctor: 1.00	1.00	
Method: E504.1 Prep Method: E504.1	EDB/DBCP			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

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.

V Approved

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

Client Sample ID: NMW (1009-1049) Client Project ID: Petroglyph CBM wells Date Collected: 2/21/2008 Sample Matrix: Groundwater	(303) 425-6021	
Prep Method: ES24.2 Units: µ Analytes CAS Number Result LQL Benzene 7143-2 U 0.50 Bromodentorenethane 74.97.5 U 0.50 Bromodentorenethane 75.27.4 U 0.50 Bromodentorenethane 75.25.2 U 0.20 Bromomentane 74.83.9 U 0.50 Bromomentane 74.83.9 U 0.50 Bromomentane 74.83.9 U 0.50 Bromomentane 74.83.9 U 0.50 Chlorobenzane 104.51.8 U 0.50 Chlorobenzane 108.90-7 U 0.50 Chlorobenzane 108.90-7 U 0.50 Chlorobenzane 74.87.3 U 0.50 Chlorobenzane 74.87.3 U 0.50 Chlorobenzane 74.87.3 U 0.50 Dibromochloromethane 74.95.3 U 0.50 1.2-Dichlorobenzane 75.71.8	s Lab Sample ID: Sample Matrix: Lab File ID: Method Blank: Prep Factor:	mple ID: 08-1122-01F Matrix: Groundwater e ID: \VOA40304\1701017.D Blank: MB4030408a actor: 1.000
Frey Preturbul: LSAF.2 Analytes CAS Number Result LQL Bername 1143-2 U 0.50 Bromoshleromethane 74.97.5 U 0.50 Bromoshleromethane 75.27.4 U 0.50 Bromostichloromethane 75.27.4 U 0.50 Bromostichloromethane 75.27.4 U 0.50 Bromostichloromethane 74.83.9 U 0.50 Bromostichloromethane 74.83.9 U 0.50 Scaluptionization 0.89.07 U 0.50 Carbon tetrachloride 56.23.5 U 0.50 Chlorostratene 108.90.7 U 0.50 Chlorostratene 106.43.4 U 0.50 Chlorostrane 74.97.3 U 0.50 Chlorostrane 74.97.3 U 0.50 Dibromoshlorosthane 74.43.1 U 0.50 1.3.Dichlorosthane 73.43.3 U 0.50 1.3.Dichlorosthane	VOLATILE COMPOUNDS	
AnalytesCAS NumberResultLQLBernzne71-43-2U0.50Bromochloromethane74-97-5U0.50Bromochloromethane74-97-5U0.50Bromochloromethane74-97-5U0.50Bromochloromethane74-83-9U0.50Bromochloromethane74-83-9U0.50Bromochloromethane74-83-9U0.50Bromochloromethane74-83-9U0.50n-Batylbenzene104-51-8U0.50Scellattylbenzene98.06-6U0.50Chlorobetzene108-90-7U0.50Chlorobetzene108-90-7U0.50Chlorobetzene108-90-7U0.50Chlorobetnane75.00-3U0.50Chlorobetnane74-87.3U0.50Chlorobetnane74-87.3U0.50Chlorobetnane74-87.3U0.50Chlorobetzene106-43-4U0.50Dibromochloromethane74-95.3U0.50Dibromochloromethane75-01-1U0.501,4Dichlorobetzene75-31-8U0.501,1-Dichloromethane75-31-8U0.501,1-Dichloromethane75-31-8U0.501,1-Dichloromethane75-31-8U0.501,1-Dichloromethane75-35-4U0.501,2-Dichloromethane75-35-4U0.501,2-Dichloromethane75-35-4U		Units: µg/L
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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 i,1-Dichloropropene 10061-01-5 U 0.50 trans-1,3-Dichloropropene 10061-02-6 U 0.50 trans-1,3-Dichloropropene 542-75-6 U 0.50 1,3-Dichloropropene 542-75-6 U 0.50 Ethylbenzene 100-41-4 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	78-87-5 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 p-Isopropyltoluene 99-87-6 U 0.50 Methylene chloride 75-09-2 U 0.50	142-28-9 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	590-20-7 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	A CARACTER AND	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		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		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		0,50
Hexachlorobutadiene 87-68-3 U 0.50 Isopropylhenzene 98-82-8 U 0.50 p-Isopropylholuene 99-87-6 U 0.50 Methylene chloride 75-09-2 U 0.50		
Isopropylenzene 98-82-8 U 0.50 p-Isopropyltoluene 99-87-6 U 0.50 Methylene chloride 75-09-2 U 0.50		
p-Isopropyltoluene 99-87-6 U 0.50 Methylene chloride 75-09-2 U 0.50		
Methylene chloride75-09-2U0.500.500.500.50		
	-	
		1 An
Analyst / Approved		Approved
		Qualifiers: U - Analyte not detected at or above the

B - Analyte detected in the Method Blank, value not subtracted from result

E - Extrapolated value. Value exceeds calibration range II - 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.

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: 3/5/2008

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

		(303) 423	-0021	
Client Sample ID: Client Project ID: Date Collected: Date Received: Date Prepared: Date Analyzed: Percent Moisturc:	MMW (1009-1048) Petroglyph CBM wells 2/21/2008 2/22/2008 3/4/2008 3/4/2008 NA		Lab Work Order: Lab Sample ID: Sample Matrix: Lab File ID: Method Blank: Prep Factor: Dilution Factor:	08-1122 08-1122-01F Groundwater \VOA40304\1701017.D MB4030408a 1.000 1.00
Method: E524. Prep Method:		VOLATILE COM	POUNDS	Units: µg/L
Analytes		CAS Number	Result	LQL

n-Propylbenzene	103-65-1	U	0.50
••	100-42-5	U	0.50
Styrene		U	0.50
1,1,1,2-Tetrachloroethane	630-20-6	_	0.50
1,1,2,2-Tetrachloroethane	79-34-5	U	
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

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.

Approved U

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: 3/5/2008

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

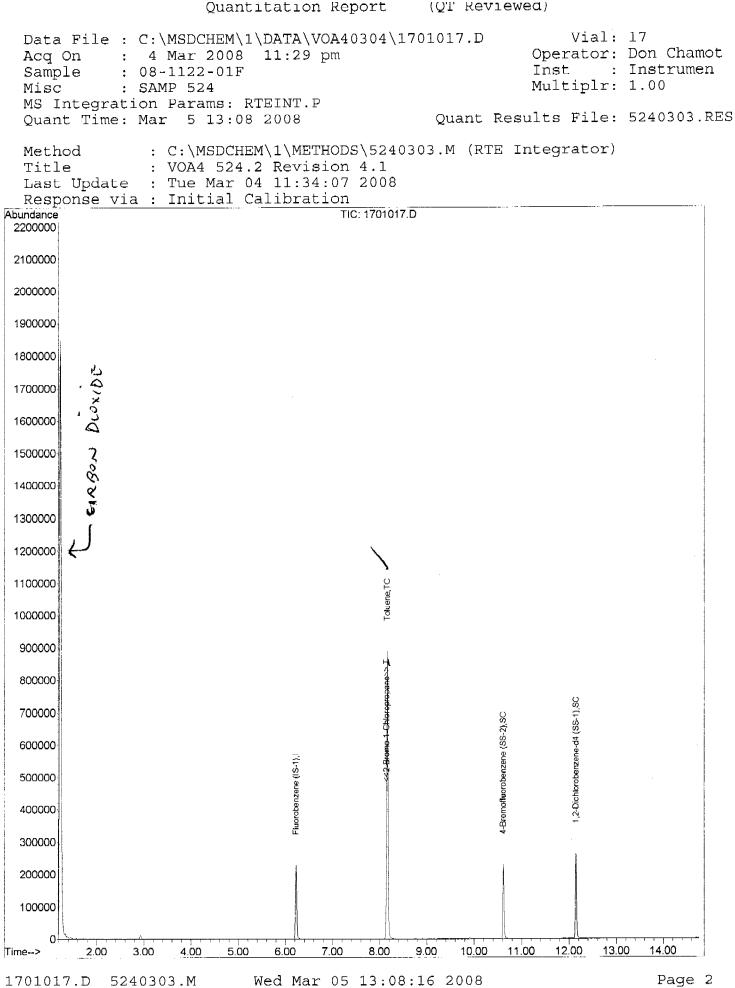
TIC Top Hit nameRT EstConc Units Response--Internal Standard---Carbon dioxide1.2348.8 ug/l441019016.224517125.0

NO OTHER TICN DETECTED un 3/7/08

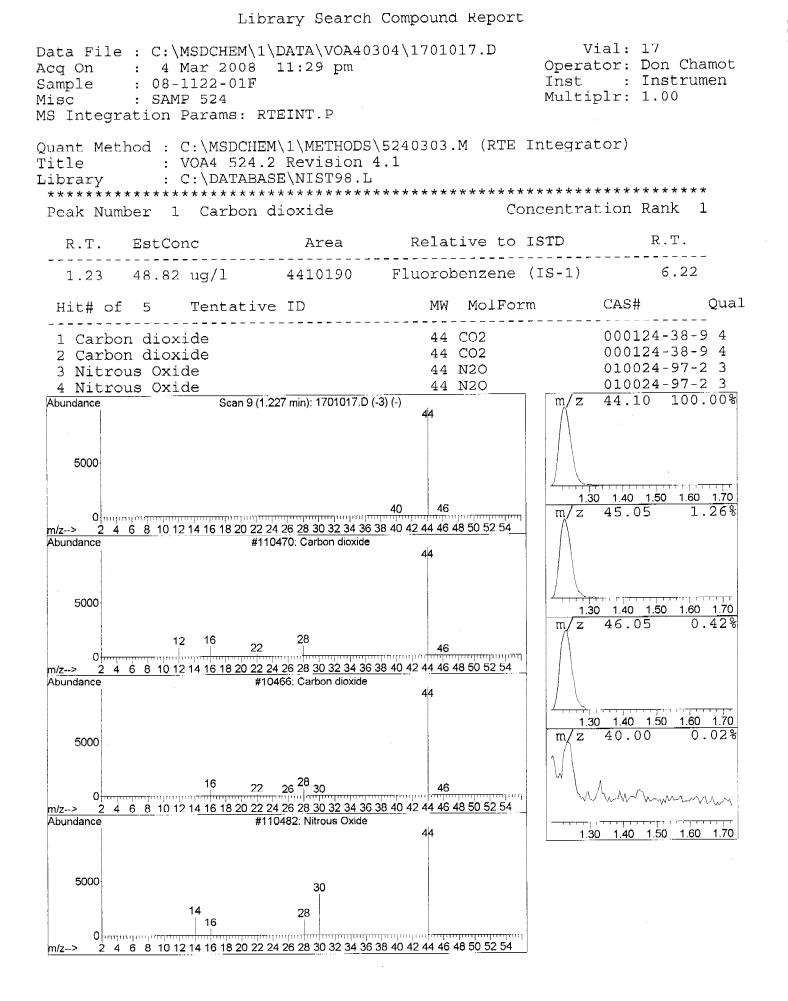
1701017.D 5240303.M

Thu Mar 06 10:54:59 2008

Page 6



Fage 2 3(1768 - 75-



Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

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

Prep Method: RSKSOP175M	KSKSUT-1/5W	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

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.

Approved

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: 3/4/08

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.	

Client Project ID: Petroglyph CBM wells

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Date: 25-Feb-08

ANALYTICAL QC SUMMARY REPORT

TestCode: ANIONS_W

Sample ID: METHOD BLANK	SampType: MBLK	TestCode	FestCode: ANIONS_W	Run ID: IC-DX120_080222A	120_080222	q		Prep Date: 2/22/08	Units: mg/L	μL
	Batch ID: R37352	TestNo: E300.0	E300.0	File(D)			Ana	Analysis Date: 2/22/08	SeqNo: 659311	3311
Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD RPDLimit Qual	Qual
Chloride	c	0.50								
Nitrite-N	c	0.0040								
Bromide	C	0.050								
Nitrate-N	с	0.010								
Sulfate	c	0.50								
Sample ID: LCS ALLT218024	SampType: LCS	TestCode	TestCode: ANIONS_W	Run ID: IC-DX120_080222A	120_080222	₽		Prep Date: 2/22/08	Units: mg/L	
	Batch ID: R37352	TestNo	TestNc; E300.0	FileID:			Ana	Analysis Date: 2/22/08	SeqNo: 659310	9310
Analyte	Result	LOL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	Limit HighLimit RPD Ref Val	%RPD RPDLimit Qual	Qual
Chloride	18.73	1.0	20	0	93.7	06	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	06	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:
 - spine recovery onsare acceptance mass Extrapolated value, value exceeds calibration range. 	J - Analyte detected below quantitation limits	U - Not detected at or above the Reporting Limit
$X \cdot See case narrativ$	B - Analyte detected	R - RPD outside acc

le acceptance limits excled in the associated Method Blank lytical holding time exceeded rative

Qualifiers:	Total Alkalinity	Analyte	Sample ID LCS	Total Alkalinity	Analyte	Sample ID MBLK	Work Order: Client Project	Evergreen
 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. 	98.81	Result	SampType: LCS Batch ID: R37391	C	Result	K SampType: MBLK Batch ID: R37391	Work Order: 08-1122 Client Project ID: Petroglyph CBM wells	Evergreen Analytical, Inc.
range.	თ 0	LQL SPH	TestCode: ALK_WGRP TestNo: SM2320B	5.0	LQL SP+	TestCode: ALK_WGRP TestNo: SM2320B		
 R - RPD outside acceptance limits B - Analyte detected in the associated Method Blank H - Prep or analytical holding time exceeded X - See case narrative 	100	SPK value SPK Ref Val	Run ID: FileID:		SPK value SPK Ref Val			
ce limits e associated Method . ling time exceeded	8. 8.	%REC L	ALK_080226A 48		%REC L	Run ID: ALK_080226A FileID: 47	A	
Blank	g	owLimit			.ow∟imit High	:	NALYT	
	100	HighLimit RPD Ref Val	Prep Date: 2/26/2008 Analysis Date: 2/26/2008		Low⊔imit HighLimit RPD Ref Val	Prep Date: 2/26/2008 Analysis Date: 2/26/2008	NALYTICAL QC SUMMARY REPORT TestCode: ALK_WGRP	
	0	%RPD RPDLimit	008 Units: mg/L CaCO3 108 SeqNo: 660219		%RPD RPDLimit	08 Units: mg/L CaCO3 08 SeqNo: 660218	MARY REPO K_WGRP	Date: 28-Feb-08
		Qual	. CaCO3 19		Qual	. CaCO3 18	RT	

Qualifiers:	Fluoride	Analyte	Sample ID LCS	Fluoride	Analyte	Sample ID MBLK	Work Order: Client Project ID
 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. 	9.7	Result	SampType: LCS Batch ID: R37385	C	Result	SampType: MBLK Batch ID: R37385	Work Order: 08-1122 Client Project ID: Petroglyph CBM wells
ເໝາຍູອ	0.20	LOL SP	TestCode: F_W TestNo: SM 4500-F C	0.20	LQL SP	TestCode: F_W TestNo: SM 4500-F C	
 R - RPD outside accept B - Analyte detected in H - Prep or analyticat X - See case narrative 	10	SPK value SPF	т		SPK value SPF	_	
 R - RPD outside acceptance limits B - Analyte detected in the associated Method Blank H - Prep or analytical holding time exceeded X - See case narrative 	· 0	SPK Ref Val	Run ID: F_080226A FileID: 2		SPK Ref Val	Run ID: F_080226A FileID: 1	
its ciated Method me exceeded	97	%REC L	226A		%REC L	26A	5
Blank	ŝ	LowLimit HighLimit			LowLimit H		ANALY
	105	ighLimit RF	Prej Analysi		HighLimit RPD Ref Val	Prep Analysi	TICAL Test
	0	RPD Ref Val	Prep Date: 2/26/2008 Analysis Date: 2/26/2008		D Ref Val	Prep Date: 2/26/2008 Analysis Date: 2/26/2008	ALYTICAL QC SUMMARY REPORT TestCode: F_W
	0	%RPD F		-	%RPD F		MARY
		RPDLimit Qual	Units: mg/L SeqNc: 660121		RPDLimit Qual	Units: mg/L SeqNo: 660120	REPORT
,]	ł	L		I j

Work Order: 08-1122 Client Project ID: Petroglyph CBM wells	2 yph CBM wells					ANAL	TICA	ANALYTICAL QC SUMMARY REPORT TestCode: PH_W	MARY	REP
Sample ID LCS-R37337	SampType: LCS	TestCode: PH_W	∴PH_W	Run ID:	PH_080222A			Prep Date: 2/22/2008		Units: pH Units
	Batch ID: R37337	TestNo	TestNo: SM 4500H+ B	B FileID:			Ana	Analysis Date: 2/22/2008		SeqNo: 659151
Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	%RPD RPDLimit
рH	7.98	1.00	8	0	99.8	99.3	100.7	0	0	
Qualifiers: U - Not det J - Analyte S - Spike R E - Extrac	 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. 	aimit Is S	R - RPD outside accep B - Analyte detected in H - Prep or analytical 1 Y - See rease narrative	R - RPD outside acceptance limits B - Analyte detected in the associated Method H - Prep or analytical holding time exceeded	nits ociated Metho ime exceeded	od Blank	-			

LCS Stamp i ype: LCS Testicode: SULF_W Kind Dir KEACI_0802Z1B Prop Date: Prop Date: Result Result LQL SPK value SPK Ref Val %REC CowLimit HighLimit RPD Ref Val e 2.7 0.50 2.46 0 110 70 130	Work Order: 08-1122 Client Project ID: Petroglyph CBM wells Sample ID MBLK SampType: Analyte Batch ID: Total Sulfide Total Sulfide		TestCode: SULF_W TestNo: SM 4500 LQL SPK vait	sstCode: SULF_W F TestNo: SM 4500-S C/ LQL SPK value SP	Run ID: FileID:	REACT_080227B 68 al %REC		YTICA T Anal HighLimit		UMMAR SULF_W 27/2008 27/2008 27/2008	RY REPOR Units: mg/L SeqNo: 660574 PD RPDLimit Q
ID LCS SampType: LCS TestCode: SULF_W Run ID: RACT_0802278 Batch ID: R37421 TestNo: SM 4500-S C/ FileID: 69 Result LOL SPK value SPK Rel Val %REC LowLimit HghU Jride 2.7 0.50 2.46 0 110 70 1	Total Sulfide		0.50								
Result LOL SPK vale SPK Far Val V/REC LowLinit HighLinit RPD Ref V Jride 2.7 0.50 2.46 0 110 70 130	Sample ID LCS	SampType: LCS Batch ID: R37421	TestCode: TestNo:	SULF_W SM 4500-S C	Run ID: FileID:	ACT_080227E	ũ	Anal	⁹ rep Date: 2/ ysis Date: 2/	2/27/2008 2/27/2008	Units: mg/L SeqNo: 660575
27 0.50 2.46 0 110 70 130	Analyte	Result	LOL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	PD RPDLimit
	Total Sulfide	2.7	0.50	. <u>.</u> 26	0	. 110	70	130	0		0

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	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 value SPK Ref Val %REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual

Total Suspended Solids

299

0 0

300

Ò

99.7

90

110

0

0

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Inc.

Work Order: 08-1122

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Client Project ID: Petroglyph CBM wells

Date: 04-Mar-08

ANALYTICAL QC SUMMARY REPORT

BatchID: 14848

C	Evergreen
•	Analytical,
	Inc.

Client Project ID: Petroglyph CBM wells

Date: 29-Feb-08

ANALYTICAL QC SUMMARY REPORT

TestCode: 504

		1	•	3							
Sample ID: MB-14831	Batch ID: MBLN	Testlode: 504		Run ID: ECD/_U8U228A	080228A		· -	Prep Date: 2/28/2008		Units: jug/L	5
	Batch ID: 14851	TestNo: E504.1	E504.1	FileID: 029.D			Anal	Analysis Date: 2/28/2008		SeqNo: 661130	30
Analyte	Result	LOL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dibromo-3-chloropropane	: c	0.020									
1,2-Dibromoethane	c	0.010									
Sample ID: LCS-14851	SampType: LCS	TestCode: 504	504	Run (D: ECD7_	ECD7_080228A		Ŧ	Prep Date: 2/28/2008	/2008	Units: µg/L	
	Batch ID: 14851	TestNo: E504.1	E504.1	FileID: 030.D			Ana	Analysis Date: 2/28/2008		SeqNo: 661131	31
Analyte	Result	LOL	SPK value	SPK Ref Val	%REC	LowLimit	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	Q	0		
Sample ID: LCS-14851-2	SampType: LCS	TestCode: 504	504	Run ID: ECD7_080228A	080228A		-	Prep Date: 2/28/2008	/2008	Units: µg/L	
	Batch ID: 14851	TestNo: E504.1	E504.1	FileID: 031.D			Ana	Analysis Date: 2/28/2008		SeqNo: 661132	32
Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD	R PDLimit	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	504	Run ID: ECD7_080228A	080228A		-	Prep Date: 2/28/2008	/2008	Units: µg/L	
	Batch ID: 14851	TestNo: E504.1	E504.1	FileID: 033.D			Ana	Analysis Date: 2/28/2008		SeqNo: 661134	34
Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD	RPDLimit Qual	Qual
1,2-Dibromo-3-chloropropane	1.059	0.020	-	0	106	65	135	0	0		
1,2-Dibromoethane	1.079	0.010	–	0	108	65	125	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

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ytical,	
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Vork Order: 08-1122

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

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

		its itated Method Blank me exceeded	 RPD outside acceptance limits B - Analyte detected in the associated Method Blank Frep or analytical holding time exceeded Y - See case narrative 	R - RPD c B - Analy H - Prep o X - See ca	imit s ation range.	 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. 	Qualifiers: U - Not de J - Analyte S - Spike I E - Extrap
					0.50	C	, 3-Dichloropropane
					0.50	C	1,2-Dichloropropane
					0.50	Ч	trans-1,2-Dichloroethene
					0.50	C	cis-1,2-Dichloroethene
					0.50	U	1,1-Dichloroethene
					0.50	C	1,2-Dichloroethane
					0.50	c	1,1-Dichloroethane
					0.50	c	Dichlorodifluoromethane
					0.50	Ċ	1,4-Dichlorobenzene
					0.50	c	1,3-Dichlorobenzene
					0.50	c	1,2-Dichlorobenzene
					0.50	C	Dibromomethane
					0.50	U	Dibromochloromethane
					0,50	c	4-Chlorololuene
					0,50	c	2-Chlorotoluene
					0.50	c	Chloromethane
					0.50	C	Chloroform
					0.50	C	Chloroethane
					0.50	¢	Chlorobenzene
					0.50	c	Carbon tetrachloride
					0.50	C	t-Butylbenzene
					0.50	c	sec-Butybenzene
					0.50	Ċ	n-Butylbenzene
					0.50	C	Bromomethane
					0.50	c	Bromoform
					0.50	C	Bromodichloromethane
					0.50	c	Bromochloromethane
					0,50	L	Bromobenzene
					0. 50	C	Benzene
%RPD RPDLimit Qual	HighLimit RPD Ref Val	%REC LowLimit	SPK Ref Val	SPK value	רסר	Result	Analyte
SeqNo: 662567	Analysis Date: 3/4/2008	FileID: WOA40304\0501005.D	FiletD: WOA4	TestNo: E524.2	TestNo	Batch ID: R37558	
Units: µg/L	Prep Date: 3/4/2008	VOA-4_080304A	Run ID: VOA-4	2: 524	TestCode: 524	SampType: MBLK	Sample ID: MB4030408a

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

TestCode: 524

Sample ID: MB4030408a	SampType: MBLK	TestCode: 524	Ä	Run ID: VOA-4_080304A	À	Prep Date: 3/4/2008	_	Units: µg/L	
	Batch ID: R37558	TestNo: E524.2	524.2	FileID: WOA40304\0501005.D	01005.D	Analysis Date: 3/4/2008	Sec	SeqNo: 662567	-
Analyte	Result	LQL S	SPK value	SPK Ref Val %REC	C LowLimit	HighLimit RPD Ref Val	%RPD R	RPDLimit C	Qual
2,2-Dichloropropane	C	0.50							
1,1-Dichloropropene	<i>–</i>	0.50							
cis-1,3-Dichloropropene	L	0.50							
trans-1,3-Dichloropropene	c	0.50							
Ethylbenzene	L	0.50							
Hexachlorobutadiene	Ċ	0.50							
Isopropylbenzene	Ċ	0,50							
p-IsopropyItoluene	C	0.50							
Methylene chloride	c	0.50							
Naphthalene	C	0.50							
n-Propylbenzene	c	0.50							
Styrene	c	0.50							
1,1,1,2-Tetrachloroethane	c	0.50							
1,1,2,2-Tetrachloroethane	c	0.50							
Tetrachloroethene	U	0.50							
Toluene	c	0.50							
1,2,3-Trichlorobenzene	C	0.50							
1,2,4-Trichlorobenzene	C	0.50							
1,1,1-Trichloroethane	c	0.50							
1,1,2-Trichloroethane	U	0.50							
Trichloroethene	C	0.50							
Trichlorofluoromethane	c	0.50							
1,2,3-Trichtoropropane	c	0.50							
1,2,4-Trimethylbenzene	с	0.50							
1,3,5-Trimethylbenzene	C	0.50							
Vinyl chloride	C	0.50							
m,p-Xylene	C	0.50							
o-Xylene	c	0.50							
1,3-Dichloropropene	-	0.50							
Xylenes, Total	C	0.50							
Total THM (Summation of above)		0.50							
Qualifiers: U - Not detec J - Analyte d S - Spike Rec	 U - Not detected at or above the Reporting Limit J - Analyte detected below quantitation limits S - Spike Recovery outside acceptance limits 	Ē.	R - RPD out B - Analyte o H - Prep or a	R - RPD outside acceptance limits B - Analyte detected in the associated Method Blank H - Prep or analytical holding time exceeded	hod Blank led				
			<pre></pre>	0	1				

E - Extrapolated value, value exceeds calibration range.

X - See case narrative

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

TestCode: 524

HighLir	Prep Date: 3/4/2008 Analysis Date: 3/4/2008 nit RPD Ref Val	Units: µg/L SeqNo: 662567 %RPD RPDLimit Qual
HighLir	ysis Date: 3/ 4/2008 RPD Ref Val	SeqNo: 6625(RPDLimit
HighLimit	RPD Ref Val	RPDLimit
70 130 130	0	00
	Prep Date: 3/4/2008	Units: µg/L
Ana	lysis Date: 3/4/2008	SeqNo: 662568
	RPD Ref Val	%RPD RPDLimit Qual
	0	0
	0	0
70 130	0	0
70 130	0	0
70 130	0	0
70 130	Ō	o
70 130	¢	0
70 130	Q	0
70 130	0	0
70 130	0	0
70 130	0	0
70 130	0	0
70 130	0	0
70 130	0	0
70 130	0	, 0
70 130	0	0
70 130	0	0
70 130	0	Ð
70 130	0	D
70 130	0	Ð
70 130	0	0
70 130	0	O
70 130	0	0
70 130	0	D
	Limit Hightin 70 1 70 1 70 1 70 1 70 1 70 1 70 1 70 1	Prep Date: Analysis Date: HighLimit RPD Ref 130 130 130 130 130 130 130 130 130 130

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

TestCode: 524

	Samp yee. LCS	lestCode: 524	024		VUA4 USUSU4A			Prep Date: 3/4/2008	C8	Units: Jug/L
		TestNo:	TestNo: E524.2		40304\06010)06.D	Ana		80	SeqNo: 662568
Analyte	Result	נמר	SPK vaiue	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit Qual
1,1-Dichloroethene	4.9	0,50	ப	0	86	6	130	0	0	
cis-1,2-Dichloroethene	4.85	0.50	თ	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	თ	0	102	70	130	0	0	
2,2-Dichloropropane	4.56	0.50	сл	0	91.2	70	130	0	0	
1,1-Dichloropropene	4.76	0.50	сл	0	95.2	70	130	0	0	
cis-1,3-Dichloropropene	4.69	0.50	5	Ō	93.8	70	130	0	0	
trans-1,3-Dichloropropene	4,63	0.50	5	¢	92.6	70	130	0	0	
Ethylbenzene	5,23	0.50	5	0	105	70	130	0	0	
Hexachlorobutadiene	5.12	0.50	J.	0	102	70	130	0	0	
Isopropylbenzene	4.67	0.50	сл	0	93.4	70	130	0	0	
p-(sopropy)toluene	4,92	0.50	сл	0	98.4	70	130	0	0	
Methylene chloride	4.64	0.50	сл	o	92.8	70	130	0	0	
Naphthalene	5.24	0.50	IJ	0	105	70	130	0	0	
n-Propylbenzene	5.17	0.50	ŋ	0	103	70	130	0	0	
Styrene	5.31	0.50	л	0	106	70	130	0	0	
1,1,1,2-Tetrachloroethane	4.95	0.50	л	0	<u>66</u>	70	130	0	0	
1,1,2,2-Tetrachloroethane	5.2	0.50	ហ	0	104	70	130	0	0	
Tetrachloroethene	5.01	0.50	ហ	D	100	70	130	0	0	
Toluene	5.02	0.50	л л	0	100	70	130	0	0	
1,2,3-Trichlorobenzene	5.08	0.50	л л	0	102	70	130	0	0	
1,2,4-Trichlorobenzene	4.96	0.50	თ	0	99 .2	70	130	0	0	
1,1,1-Trichloroethane	4.54	0.50	л Сл	o	90.8	70	130	0	0	
1,1,2-Trichloroethane	4,99	0.50	ហ	0	99.8	70	130	0	0	
Trichloroethene	4.97	0.50	сл	0	99.4	70	130	0	0	
Trichlorofluoromethane	4.8	0.50	сл	0	96	70	130	0	0	
1,2,3-Trichloropropane	5.2	0,50	л	0	104	70	130	0	0	
1,2,4-Trimethylbenzene	5.28	0,50	ហ	0	106	70	130	0	0	
1,3,5-Trimethylbenzene	5.23	0.50	л	0	105	70	130	0	0	
Vinyl chloride	5.59	0.50	ហ	0	112	70	130	Ō	0	
Qualifiers: U - Not d	U - Not detected at or above the Reporting Limit J - Analyte detected below quantitation limits	ni-	R - RPD o B - Analyt	R - RPD outside acceptance limits B - Analyte detected in the associated Method Blank	nits ociated Method	d Blank				

Work Order:
08-1122
0

Client Project ID: Petroglyph CBM wells

ANALYTICAL QC SUMMARY REPORT

TestCode: 524

SampType: LCS	TestCode	: 524		4_080304A					Units: µg/L	
Batch ID: R37558	TestNo	: E524.2	FileID: WOA	40304\06010	06.D	Ana	lysis Date: 3/4/2008		SeqNo: 6625	68
Result	וסר	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
10.13	0.50	10	0	101	70	130	0	0		
5.19	0.50	თ	0	104	70	130	0	0		
9.32	0.50	10	0	93.2	70	130	0	0		
15.32	0.50	1ំភ	0	102	70	130	0	0		
ve) 19.7	0.50	20	0	98.5	70	130	0	0		
Surr: 1,2-Dichlorobenzene-d4 5.15	0	ហ	0	103	70	130	ō	0		
Surr: 4-Bromofluorobenzene 5.21	0	ப	O	104	70	130	o	0		
SampType: LCSD	TestCode	524	Run ID: VOA-	4_080304A			Prep Date: 3/4/2008		Units: µg/L	
Batch ID: R37558	TestNo	: E524.2	fileid: Woa	40304\21010	21.D	Ana	alysis Date: 3/5/2008	••	SeqNo: 6625	82
Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4.47	0.50	5	o	89.4	70	130	4.96	10.4	30	
4.42	0.50	л	0	88.4	70	130	5.13	14.9	30	
4.36	0.50	л	o	87.2	70	130	4.91	11.9	30	
4.66	0.50	ŋ	ο	93.2	70	130	5.09	8.82	30	
4.2	0.50	5	0	84	70	130	4.76	12.5	പ	
5.53	0.50	σ	D	111	70	130	6.43	15.1	30	
4.42	0.50	σ	ο	88,4	70	130	5.13	14.9	<u>у</u>	
4.43	0.50	IJ IJ	0	88.6	70	130	5.04	12.9	ы	
4.45	0.50	ហ	o	89	70	130	5.12	14.0	ы	
4.37	0.50	ហ	o	87.4	70	130	4.65	6.21	30	
4,41	0.50	ហ	ο	88.2	70	130	5,06	13.7	ප	
3.94	0.50	ហ	ο	78.8	70	130	4,41	11.3	ല്ല	
4.61	0.50	сл	ο	92.2	70	130	4,91	6.30	ප	
4.19	0.50	J	0	83.8	70	130	4,16	0.719	ജ	
4.58	0.50	л	0	91.6	70	130	5.24	13.4	ജ	
4.31	0.50	л л	0	86.2	70	130	5.01	15.0	30	
4.32	0.50	ŋ	0	86.4	70	130	4.94	13,4	30	
4.37	0.50	თ	0	87.4	70	130	4.85	10.4	30	
4.28	0.50	თ	0	85.6	70	130	თ	15.5	30	
	Sample ID: LCS4030408a SampType: LCS Batch ID: R37568 Batch ID: R37568 Analyte Result 10.13 n.p-Xylene 5.19 5.19 o.Xylenes, Total 15.32 15.32 Total THM (Summation of above) 19.7 5.15 Surr: 1.2-Dichlorobenzene-d4 5.15 Surr: 4.Bromofluorobenzene-d4 5.15 Surr: 4.Bromofluorobenzene 5.21 Batch ID: LCSD4030408a SampType: LCSD Batch ID: R37568 Sample ID: LCSD4030408a SampType: Sample ID: LCSD4030408a SampType: Sample ID: LCSD4030408a SampType: Batch ID: R37568 Batch ID: R37568 Barpene 4.47 Bromochloromethane 4.42 Bromochloromethane 4.42 Bromochloromethane 4.42 Bromochloromethane 4.43 Bromochloromethane 4.43 Bromochloromethane 4.43 Bromochloromethane 4.43 Chloroform 4.43 Chloroform 4.58 Bromochloromethane 4.33 Ch	SampType: LCS Te Batch ID: R37558 Result 10.13 5.19 9.32 15.32 19.7 5.15 5.21 SampType: LCSD Te Batch ID: R37558 A4.47 4.42 4.466 4.66 4.66 4.42 4.43 4.43 4.43 4.43 4.43 4.43 4.43	SampType: LCS TestCode: 524 Batch ID: R37558 TestNo: E53 Result LQL SP 10.13 0.50 5.19 0.50 9.32 0.50 15.32 0.50 19.7 0.50 0 5.21 0 SampType: LCSD TestCode: 5.24 Batch ID: R37558 TestCode: 5.24 Batch ID: R37558 TestNo: E53 Batch ID: R37558 TestNo: E53 A447 0.50 4.42 0.50 4.42 0.50 4.42 0.50 4.43 0.50 0.50 0.50 4.45 0.50 0.50 0.50 4.45 0.50 0.50 0.50 4.45 0.50 0.50 0.50 4.45 0.50 0.50 0.50 4.45 0.50 0.50 0.50 4.58 0.50 0	SampType: LCS TestCode: 524 P Batch ID: R37558 TestINo: E524.2 Result LQL SPK value SPK 10.13 0.50 10 5.19 0.50 10 5.19 5.19 5.10 5.10 5.10 5.10 10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.10 5.52 10 5.52 10 5.52 10 5.52 10 5.53 5.53 5.53 5.53 5.53 5.53 5.53 5.53 5.53 5.53 5.53 5.55	SampType: LCS TestCode: 524 Batch ID: R37558 TestNo:: E53 Result LQL SP 10.13 0.50 5.19 0.50 9.32 0.50 15.32 0.50 19.7 0.50 0 5.21 0 SampType: LCSD TestCode: 5.42 Batch ID: R37558 TestCode: 5.42 Batch ID: R37558 TestNo:: E53 Batch ID: R37553 0.50 4.42 0.50 4.42 0.50 4.42 0.50 4.42 0.50 4.43 0.50 4.43 0.50 4.43 0.50 4.43 0.50 4.45 0.50 4.55 0.50 5.53 0.50 5.53 0.50 5.55 5.55 0.50 5.55 0.50 5.55 5.55 5.55 5.55 5.55 5.55 5.55 5.55 5.55 5.55 5.55 5.55<	SampType: LCS TestCode: S24 Run ID: VOA_008010460 (1006) Result LQL SPK value SPK Ref Val SPK Ref Val $%$ REC Low/J 10.13 0.50 10 0 101 0.50 10 0.00 101 5.19 0.50 10 0 101 0.50 10 0.50 10.10 0.50 10.10 0.50 10.2 0.00 10.2 0.50 10.2 0.101 10.2 0.50 10.2 0.00 10.2 0.50 10.2 0.50 10.2 0.50 10.2 0.50 10.2 0.50 10.2 0.50 10.2 0.50 10.3 0.50 5 0 10.3 0.50 5 0.50 10.5 10.2 10.5 1	SampType LCs TestCode: $\mathbb{SZ4}$ Run ID: VAL_DEB3MA EVAL_DEB3MA Batch ID: R37568 TestNo:: ES24.2 FileID: VVALA00304060F100E.J Result LOL SPK value SPK Ref Val \mathbb{SPK} General and	SampType: LCS TestCode: S24. Run ID: VOA4_080304 Prep Date. Prep Date. Bach ID: R3758 TestNo: ES24.2 FIeD: VOA4_08030406 VIO IOI Analysis Date. Prep Date. Bach ID: R3758 LQL SPK rei IV SPRC LowImit HighLimit RPD Ref 10:13 0.50 10 0 101 70 130 130 5:19 0.50 20 0 102 70 130 130 130 130 5:19 0.50 10 70 130 130 130 130 5:10 0 10:1 VOA4_080304 70 130 130 130 5:51 0 70 130 70 130 70 130 70 130 70 130 70 130 70 130 70 130 70 130 70 130 40 70 130 4	SampType LCS TestCode: SAN Run ID: VOAL_0803VA Frep Date: SH2000 Batch ID: R3758 TestCode: SEX Frep: VOAL_0803VA Frep: Voalues Prep: Date: SH2000 Result LOL SPK Ref Value SPK Ref Value SPK Ref Value Voalues Voalues Date: SH2000 SUPPD 1013 0.50 10 0 101 70 130 0	SampType LCS TeslCod: S24 Fund. UAIL Spent bits: Prep Date: MAXON MAXON<

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

TestCode: 524

, Te	stCode: 52	54 54 5	Run ID: VOA	4_080304A		۵۵ _	vrep Date: 3/4/2008	n	Conto: pg/L
			SPK Ref Val	%RFC	owl imit	Hinhl imit			RPDI imit Oual
	0.50	сп	•	86.2	70	130	4.93	13.4	ઝ
	0.50	ሪካ	0	84.6	70	130	4.8B	14.3	3
	0.50	Сл	0	86.6	70	130	4.88	11.9	30
	0.50	сл	0	87.6	70	130	4.56	4.03	30
	0.50	თ	0	85.4	70	130	4.68	9.16	30
	0.50	رت ا	0	92.4	70	130	4,9	л .88	30
	0.50	Cī:	0	90.6	70	130	4.85	6.82	30
	0.50	ch	0	89.4	70	130	4.64	3.73	30
	0.50	ሪካ	0	87.8	70	130	4.77	8. 3 0	30
	0.50	ሪካ	0	06	70	130	5.12	12.9	ЗО
	0,50	сл	0	80.8	70	130	4.56	12.1	30
	0.50	5	0	68	70	130	4.76	6.73	Э
	0.50	თ	0	84	70	130	4.69	11.0	යු
	0.50	5	0	81.4	70	130	4.63	12.9	ප
	0.50	თ	¢	91	70	130	5.23	13.9	පු
	0.50	сл	0	86.6	70	130	5.12	16.7	8
	0.50	σı	0	81.4	70	130	4.67	13.7	8
	0.50	сл	0	85.2	70	130	4.92	14.4	З
	0.50	сл	0	86.4	70	130	4.64	7.14	8
	0.50	5	0	88.6	70	130	5.24	16.8	30
	0.50	5	0	88.4	70	130	5.17	15.6	30
	0.50	5	0	92.2	70	130	5.31	14.1	පු
	0.50	თ	o	86.8	70	130	4.95	13.1	в
	0.50	сл	0	68	70	130	5.2	15.5	Э
	0.50	сл	0	86.8	70	130	5.01	14.3	в
	0.50	сл	0	89.4	70	130	5.02	11.6	30
4.3	0.50	сл	0	86	70	130	5.08	16.6	ප
	0.50	сл	0	84.6	70	130	4.96	15.9	ප
4.31	0.50	თ	0	86.2	70	130	4.54	5.20	30
	0.50	თ	0	86 .6	70	130	4.99	14.2	ප
4 5R	0.50	сл	0	91.6	70	130	4.97	8.17	ප
		TestCode: 5 1 CQL 1 CQL	TestCode: 524 TestNo: E524.2 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.	TestNo: E524.2 1.QL SPK value SP 0.50 0	TestNo: E524.2 1.QL SPK value SP 0.50 0	TestLode SPK value SPK Ref Val %REC Lout SPK Ref Val %REC Lout 0.50 5 0 86.2 0 86.6 0 85.4 0 86.6 0 85.4 0 86.6 0 86.8 0	Instructioner SPK value SPK Ref Val %REC Low/Limit HighLir LQL SPK value SPK Ref Val %REC Low/Limit HighLir 0.50 5 0 86.2 70 1 0.50 5 0 86.6 70 1 0.50 5 0 86.6 70 1 0.50 5 0 86.6 70 1 0.50 5 0 86.4 70 1 0.50 5 0 89.4 70 1 0.50 5 0 89.4 70 1 0.50 5 0 89.4 70 1 0.50 5 0 89.4 70 1 1 0.50 5 0 89.4 70 1 1 0.50 5 0 89.4 70 1 1 0.50 5 0 88.4	Instruction SPA Hum ID: VDA4_ usuarya Preputation Pr	Testivo ESA: Field: WOL4, WA4304/21010Z1J Frequencies Frequencies Serve frequencie

Work Order: 08-1122 Client Project ID: Petroglyph CBM wells	n CBM wells					ANAL	YTICA	ALYTICAL QC SUMMARY REPORT TestCode: 524	1ARY	REPOR	T
Sample ID: LCSD4030408a	Samp [†] ype: LCSD	TestCode: 524	524	Run ID: VOA-4_080304A	080304A			Prep Date: 3/4/2008		Units: µg/L	
	Batch ID: R37558	TestNo	TestNo: E524.2	FileID: \VOA40304\2101021.D	0304\21010	21.D	Ana	Analysis Date: 3/5/2008	S	SeqNo: 662582	
Analyte	Result	LOL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit Qual	E
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	o	88,6	70	130	5.2	16.0	<u>ю</u>	
1,2,4-Trimethylbenzene	4.63	0.50	თ	0	92.6	70	130	5.28	13.1	පු	
1,3,5-Trimethylbenzene	4.53	0.50	თ	0	90.6	70	130	5.23	14.3	90	
Vinyl chloride	5.07	0.50	Ե Մ1	0	101 2	5 7	າ ສິ	5.59	9.76	3 8	
m,p-Xylene o-Xvlene	8.83 4.52	0.50	5 U	0 0	90.4	7 2	130	10.13 5.19	13.8	පි	
1,3-Dichloropropene	8.27	0.50	10	0	82.7	70	130	9.32	11.9	8	
Xylenes, Total	13.35	0.50	15	0	68	70	130	15.32	13.7	в	
Total THM (Summation of above)	17.79	0.50	20	0	68	70	130	19.7	10.2	ЭС	
Surr: 1,2-Dichtorobenzene-d4	4.71	0	თ	0	94.2	70	130	0	0	0	
Surr: 4-Bromofluorobenzene	4.92	0	ሪካ	0	98,4	70	130	0	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

Clinet Duniant ID: Detrogly	wh CRNA malle							,			
CHCHE I TOJACE DE A VEROBIJ DA CONTA RELIS	ури слата тепа						В	BatchID: GAS	GAS030408		
Sample ID: GB030408	SampType: MBLK	TestCode: MEEP	MEEP_W	Run ID: FID4_0	FID4_080304A			Prep Date: 3/4/08		Units: mg/L	1 - 1
	Batch ID: GAS030408	TestNo	TestNo: RSKSOP175	FileID: GAS0304004	304004		Ana	Analysis Date: 3/4/08	(A	SeqNo: 662138	138
Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ethane	U	0.0016							-		
Ethene	C	0.0024									
Methane	C	0.00080									
Sample ID: LCS030408	SampType: LCS	TestCode	TestCode: MEEP_W	Run ID: FID4_	FID4_080304A		-	Prep Date: 3/4/08		Units: mg/L	
	Batch ID: GAS030408	TestNo	TestNo: RSKSOP175	FileID: GAS0304005	304005		Ana	Analysis Date: 3/4/08	(0)	SeqNo: 662139	139
Analyle	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Ethane	1.081	0.016	0.9548	D	113	70	130	0	0		
Ethene	1.114	0.024	0.8913	Ģ	125	70	140	0	o		
Methane	0.5722	0.0080	0.5094	Đ	112	70	130	0	0		
Sample ID: LCSD030408	SampType: LCSD	TestCode	TestCode: MEEP_W	Run ID: FID4_080304A	080304A			Prep Date: 3/4/08		Units: mg/L	
·	Batch ID: GAS030408	TestNo	TestNo: RSKSOP175	FileID: GAS0304006	304006		Ana	Analysis Date: 3/4/08	(0)	SeqNo: 662140	140
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	Q	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	TestCode: MEEP_W	Run ID: FID4_	FID4_080304A			Prep Date: 3/4/08		Units: mg/L	r
	Batch ID: GAS030408	TestNo	TestNo: RSKSOP175	FileID: GAS0304013	304013		Ana	Analysis Date: 3/4/08	(0)	SeqNo: 662132	132
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	Ð	Ō		
Qualifiers: U - Not det J - Analyte S - Spike R E - Extrapo	 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. 	t n range.	R - RPI B - Ana H - Prej X - See	R - RPD outside acceptance limits B - Analyte detected in the associated Method H - Prep or analytical holding time exceeded X - See case narrative	limits sociated Meth g time exceede	nod Blank					

Evergreen Analytical, Inc.

Date: 04-Mar-08

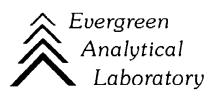
Work Order: 08-1122

Work Order: 08-1122 Client Project JD: Petroglyph CBM wells	1 CBM wells					ANAL	YTICA B	S	MARY	(REPORT
7								BatchID: GAt	GAS030408	
-	Batch ID: GAS030408	TestNo	TestNo: RSKSOP175	FileID: GAS0304014	04014		Ana	Analysis Date: 3/4/08		SeqNo: 662133
Analyte	Result	LOL .	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	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
Mathana	0 5884	00000	0 500 4	0 0001 53	*	70	100		000	20
Methane	0.5664	0.0080	0,5094	0.002153	111	70	130	0.5648	0.289	30
			·							
			1							
Qualifiers: U - Not detected	U - Not detected at or above the Reporting Limit	-	R - RPD	R - RPD outside acceptance limits	mits					

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

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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,

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Carl Smits / Kaprie Hollman Technical Director of Chemical Analysis

La Ve (719)	La Veta, CO 81055 (719) 742-5570					QC Level: Level I+	1[+		
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
08-1189-011	MMW (849-995)	Water	2/24/08 0000	2/26/08	PH_W	Discharge Water pH		3/11/08	2/24/08
08-1189-011	MMW (849-995)	Water	2/24/08 0000	2/26/08	TDS_W	Total Dissolved Solids (TDS)		3/11/08	3/02/08
08-1189-011	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	7/74/08 1845	2/26/08	* W_NOINS_W	300.0: Anions by IC		3/11/08	2/26/08

001

08-1189

2/26/08 4:06:15 PM

Client Project ID:

Rpt To: Tom Melland Petroglyph Energy P.C. Box 979

WORK ORDER Summary

Email To: Tmelland@petroglyphenergy.com

Evergreen Analytical, Inc.

P.O. Box 979					Cliant Dyniant ID:		
La Veta. CO 81055							
(719) 742-5570					QC Level: Level 1	-4-	
08-1189-021 MMW (687-788)	Water	2/24/08 1845	2/26/08	PH_W	Discharge Water pH		3/11/08
	Water	2/24/08 1845	2/26/08	TDS_W	Total Dissolved Solids (TDS)		
08-1189-021 MMW (687-788)				-		[3/11/08
Client Project ID: QC Level: Level I+ 2/24/08 1845 2/26/08 PH_W Discharge Water pH I 3/1	Client Project ID: QC Level: Level I+ 2/26/08 PH_W Discharge Water pH 2/1	Client Project ID: QC Level: Level I+ PH_W Discharge Water pH []] 3/1	Client Project ID: QC Level: Level I+ Discharge Water pH	ct ID: Level I+	1/2	2/26/ 3/11/08	

Relinquished by: (Signature) Date/Time 2/25/65	Instructions	Attn 101 Mellow Address PO Bax 979 City (a Vet a State CO Zip 5/055 Tel # 719 742 5570 Fax # 719 742 5571 P.O. Quote 8745 Sampler Karve Quote 8745 SAMPLE DATE IDENTIFICATION SAMPLED TIME MMW (667 - 755) 2/24/08/845 2/24/08/845	eponto: Petra Mellow D Bax 979 Veta 979 Petroslyph
See reverse side for Terms and Conditions. Date/Time 2/25/06 3:45en 2/and 1/1/1 2-25-08	Sample Fraction	Image: Second state of the se	IAIN OF CUSTO Yph Enersy State CO Zip 81055 742 SSJI E-mail HM
Anions: Chloride, N Date/Time Relinquished by: (Si b: 45 Jaw Va		Herbieidee 515.4 RSkOP - 175M X Carbamates 531.4. Total X Carbamates 533. Floride X Carbamates 543. Floride X Carbamates 543. Floride X Diquat 549.2 X Anions (Circle below) 300.0 by 1c X Cyanide 4500 CNF	
itrite, Nitrate, Nitrite + Nitrate, Sulfate, Fluoride (Circle) gnature) Date/Time Received by: (Signature)			ES AGREEMENT*
Tircle) Tree Date/Time 2 26/8 3 30	200-8 TP + 242-1	use only W.O. # $\int g \cdot g \cdot g$ B.O.F. # C/S (0) C(12) / UrS Temp. *CC(12) / UrS Temp. *CC(12) / Co NA Seals Present Y/ O NA Samples Pres O / N / NA Headspace Y / O / NA By \mathcal{N} / \mathcal{N} / NA	the second seco

Client Project ID: Lab Order: 08-1189

CASE NARRATIVE

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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 (849-9 Client Project ID: Date Collected: 2/24/2008 Date Received: 2/26/2008 Date Prepared: 3/5/2008 Date Analyzed: 3/5/2008 Percent Moisture: NA	95)	Lab Work Order: Lab Sample ID: Sample Matrix: Lab File ID: Method Blank: Prep Factor: Dilution Factor:	08-1189 08-1189-01A Water 1701017.D MB6030508 1.000 1.00
Method: E524.2	VOLATILE COMPOU	NDS	Units: µg/L
Prep Method: E524.2		Danult	· -
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>U</u>	0.50
Bromomethane	74-83-9	U	0.50
Butylbenzene	104-51-8	U	0.50
ec-Butylbenzene	135-98-8	U	0.50
-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> </u>	0.50
4-Chlorotoluene	106-43-4	Ŭ	0.50
Dibromochloromethane	124-48-1	U	0.50
Dibromomethane	74-95-3	U	0,50
,2-Dichlorobenzene	95-50-1	U	0.50
,3-Dichlorobenzene	541-73-1	U	0,50
,4-Dichlorobenzene	106-46-7	U	0.50
Dichlorodifluoromethane	75-71-8	U	0.50
,1-Dichloroethane	75-34-3	U	0.50
,2-Dichloroethane	107-06-2	U	0.50
,1-Dichloroethene	75-35-4	U	0.50
sis-1,2-Dichloroethene	156-59-2	U	0.50
rans-1,2-Dichloroethene	156-60-5	U	0.50
.2-Dichloropropane	78-87-5	U	0.50
,3-Dichloropropane	142-28-9	U	0.50
2,2-Dichloropropane	590-20-7	U	0.50
,1-Dichloropropene	563-58-6	U	0.50
sis-1,3-Dichloropropene	10061-01-5	U	0.50
rans-1,3-Dichloropropene	10061-02-6	Ŭ	0.50
1,3-Dichloropropene	542-75-6	Ŭ	0.50
Ethylbenzene	100-41-4	U	0.50
Iexachlorobutadiene	87-68-3	U	0.50
sopropylbenzene	98-82-8	U	0.50
sopropyldenzene >-Isopropyltoluene	99-87-6	U	0.50
Aethylene chloride	75-09-2	U	0.50
•	91-20-3	υĴ	0.50
Naphthalene	×		
	Sec.	_ ~~	•••
	Analyst	Арр	roved
Qualifiers: See case narrative for a	discussion	Qualifier	s: U - Analyte not detected at or above the
E - Extrapolated value.Val H - Prep or Analytical hole S - Spike Recovery outside		Definition	reporting limit J - Estimated value below the LQL s: NA - Not Applicable LQL - Lower Quantitation Limit
X - See case narrative * -Value exceeded the Max compound is undetected, L	ximum Contamination Level (MCL), TCLP limit, or i .QL exceeds MCL.	f	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

		<u>````````````````````````````````</u>		
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
ter and the second s				

Method: E524.2

VOLATILE COMPOUNDS

Prep Method: E524.2	VOLATILE COM	rounds	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
Frichloroethene	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
n,p-Xylene	1330-20-7	U	0.50
-Xylene	95-47-6	U	0.50
Xylenes, Total	1330-20-7	U	0.50
Total THM (Summation of above)		Ŭ	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

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.

Approved

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 Rfdge, Colorado 80033-3862 (303) 425-6021				
Client Sample ID: MMW (687-788) Client Project ID: Date Collected: 2/24/2008 Date Received: 2/26/2008 Date Prepared: 3/5/2008 Date Analyzed: 3/5/2008 Percent Moisture: NA		Lab Work Order: Lab Sample ID; Sample Matrix: Lab File ID: Method Blank: Prep Factor: Dilution Factor:	08-1189 08-1189-02A Water 1801018.D MB6030508 1.000 1.00	
Method: E524.2	VOLATILE COM	IPOUNDS		
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	υ	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 U U	0.50	
1,4-Dichlorobenzene Dichlorodifluoromethane	106-46-7		0.50	
1.1-Dichloroethane	75-71-8	U	0.50	
1,2-Dichloroethane	75-34-3	U	0.50	
1,1-Dichloroethene	107-06-2 75-35-4	U U	0.50 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	Ŭ	0.50	
Ethylbenzene	100-41-4	Ū	0.50	

<Analyst

Qualifiers: See case narrative for a discussion

Hexachlorobutadiene

Isopropylbenzene

p-Isopropyltoluene

Methylene chloride

Naphthalene

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.

87-68-3

98-82-8

99-87-6

75-09-2

91-20-3

Approved

U

U

U

U

U

Qualifiers: U - Analyte not detected at or above the reporting limit

J - Estimated value below the LQL

0.50

0.50

0.50

0.50

0.50

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 Course ID.	NR RW (697 799)		X 1 X 1 0 4	0.0.1180
Client Project ID: Date Collected: Date Received: Date Prepared: Date Analyzed:	MMW (687-788) 2/24/2008 2/26/2008 3/5/2008 3/5/2008 NA		Lab Work Order: Lab Sample ID: Sample Matrix: Lab File ID: Method Blank: Prep Factor: Dilution Factor:	08-1189 08-1189-02A Water 1801018.D MJ36030508 1.000 1.00
Method: E524.2		VOLATILE COM	POUNDS	
Prep Method: E	524,2			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-Tetrachlorocthane	e	630-20-6	U	0.50
1,1,2,2-Tetrachlorocthand	e	79-34-5	υ	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
p-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-Dichlorobenz	ene-d4	2199-69-1	99 Q	C Limits: 70-130 %REC
Surr: 4-Bromofluorobe	nzene	460-00-4	99 Q	C Limits: 70-130 %REC

Analyst

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.

Approved

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

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:	08-1189-01	1B
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 Prep Method: E504.1	EDB/DBCP			
Analytes	CAS Number	Result MI		Units: µg/L LQL
1,2-Dibromo-3-chloropropane	96-12-8	U 0.0	02	0.02
1,2-Dibromoethane	106-93-4	U 0.0	01	0.01

Analyst

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.

Approved

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

600

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

		- · · · · ·				
Client Sample ID: MMW (687-788)		Lab Work	Order: 08-11	89		
Client Project ID:		Lab Sampl	e ID: 08-11	89-02B		
Date Collected: 2/24/2008		Sample Ma	trix: Water	Water		
Date Received: 2/26/2008		Lab File II): 051.D			
Date Prepared: 2/28/2008		Method Bl	ank: MB-1	4851		
Date Analyzed: 2/28/2008		Prep Facto	r: 0.057			
Percent Moisture: NA		Dilution Fa	ictor: 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

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.

Approved

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

4036 Youngfield Street, Whcat 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

Method: E200.8

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

TOTAL METALS

Prep Method: E200.8

Date Prepared: 2/28/08 Date Analyzed: 2/28/08	Lab File ID: Method Blank:	080228A.B\038SMPL.D MB-14848	Dilution Factor: D Lab Fraction ID: (l)8-1189-01C
Analytes	CAS Numbe	r Result	LQI	L Units
Antimony	7440-36-0	U	0,0020	0 mg/L
Arsenic	7440-38-2	0.0206	0.0020	0 mg/L
Barium	7440-39-3	0.304	0.010	0 mg/L
Beryllium	7440-41-7	U	0.0010	0 mg/L
Boron	7440-42-8	U	0,20	0 mg/L
Cadmium	7440-43-9	U	0,00050	0 mg/L
Calcium	7440-70-2	7.56	0,40	0 mg/L
Chromium	7440-47-3	0.00862	0.0022	0 mg/L
Copper	7440-50-8	U	0.0100	0 mg/L
Iron	7439-89-6	5.59	0.200	0 mg/L,
Lead	7439-92-1	0.00409	0.00100	0 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	5 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	
Zinc	7440-66-6	0.0833	0.00500) 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

- 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

H - Sample analysis exceeded analytical holding time

J - Indicates an estimated value when the compound is detected, but is below the LQL

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

Method: E245.1	MERCURY, DRINKING V	VATER 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

Analyst

Approved

Definitions: NA - Not Applicable J.QL - Lower Quantitation Limit Surr - Surrogate

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result E - Extrapolated value. Value exceeds calibration range

II - 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.

Print Date: 3/4/08

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

TOTAL METALS

Lab File ID:

080228A.B\039SMPL.D

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

Method: E200.8

Date Prepared: 2/28/08

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

Prep Method: E200.8

08-1189-02

Dilution Factor:

1

Date Analyzed: 2/28/08 Method Blank: MB-14848 Lab Fraction ID: 08-1189-02C Analytes CAS Number Result LQL Units Antimony 7440-36-0 U 0.00200 mg/L 0,00200 mg/L Arsenic 7440-38-2 0.0209 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 7440-50-8 0.0100 Copper U mg/L 5.49 Iron 0.200 mg/L 7439-89-6 7439-92-1 0.00569 0.00100 Lead mg/L Magnesium 7439-95-4 0.0500 1.22 mg/L 0.117 Manganese 7439-96-5 0.00500 mg/L 7439-98-7 0.0126 0.00500 Molybdenum mg/L Nickel 7440-02-0 U 0,0100 mg/L Potassium 7440-09-7 2.64mg/L 0.125 Selenium 7782-49-2 U 0.00200 mg/L Silver U 7440-22-4 0.000200 mg/L 7440-23-5 122 0,500 Sodium mg/L Strontium 7440-24-6 0.205 0.0980 mg/L Thallium 7440-28-0 U 0.00100 mg/L 7440-66-6 0.142 0.00500 mg/L

Zinc

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 LOL
- 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.

Print Date: 3/4/08

 \odot a (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		ttion Factor: 1 Fraction ID: 08-1	89-02C	
Analytes	CAS Number	Result	LQL	Units	
Mercury	7439-97-6	U	0.00010	mg/L	

Analyst

Ult

Approved

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result E - Extrapolated value. Value exceeds calibration range

II - 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

	(303) 425-0021			
Client Sample ID:MMW (849-995)Client Project ID:Date Collected:2/24/08 0000Date Received:2/26/08		Lab Work Order Lab Sample ID: Sample Matrix:	08-1189 08-1189-01 Water	
Mathad, SM2220P	ALKALINITY	Deves Marthau		· ·
Method: SM2320B		Prep Method	:	
Date Prepared: 2/29/08 Date Analyzed: 2/29/08	Lab File ID: 58 Method Blank: MBLK		ition Factor: 1 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		tion Factor: 1 Fraction ID: 08-	-1189-01G
Analytes	CAS Number	Result	LQL	Units
Fluoride	16984-48-8	6.3 *	0.20	mg/L
Method: SM 4500H+ B Comments: This is a field parameter with Date Prepared: 2/26/08 Date Analyzed: 2/26/08 1610 Analytes	n a 15min. holding time. CAS Number		tion Factor: 1 Fraction ID: 08- LQL	1189-01I Units
рН		9.64 H	1.00	pH Units
Method: SM 4500-S C/F	TOTAL SULFIDE	Prep Method:		
Date Prepared: 2/27/08 Date Analyzed: 2/27/08	Lab File ID: 71 Method Blank: MBLK		tion Factor: 1 Fraction ID: 08-	1189-01F
Analytes	CAS Number	Result	LQL	Units
Total Sulfide		2.5	0.50	mg/L
S - Spike Recovery outside accepted U - Compound analyzed for but not o X - See case narrative * -Value exceeded the Maximum Col	s calibration range cal holding time the compound is detected, but is below the LQ limits letected ntamination Level (MCL), TCLP limit, or if		ved ns: NA - Not Applicab LQL - Lower Quan Surr - Surrogate	
compound is undetected, LQL exceed	is MCL.	Print D	ate: 2/29/2008	

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

_	MMW (849-995) 2/24/08 0000 2/26/08	···	Lab Work Order Lab Sample ID: Sample Matrix:	08-1189 08-1189-01 Water	
Method: SM 254	40C	TOTAL DISSOLVED S	OLIDS (TDS) Prep Method	l:	
Date Prepared: 2/2 Date Analyzed: 2/2 Analytes		Lab File ID: 72 Method Blank: MBLK CAS Number		ution Factor: 1 5 Fraction ID: 08-1 LQL	189-01I Units
Total Dissolved Sol	lids		492	10.0	mg/L
Method: SM 254	10 D	TOTAL SUSPENDED S	OLIDS (TSS) Prep Method	:	
Date Prepared: 2/2 Date Analyzed: 2/2		Lab File ID: 7 Method Blank: MBLK	Lab	ution Factor: 1 Fraction ID: 08-1	
Analytes		CAS Number	Result	LQL	Units
Total Suspended So	lids		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

016

Print Date: 2/29/2008

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 O Lab Sample 1 Sample Matr	ĺD;	08-1189 08-1189-02 Water	
Method: SM2320B	ALKALINITY	Prep Met	hod:		
Date Prepared: 2/29/08 Date Analyzed: 2/29/08	Lab File ID: 59 Method Blank: MBLK		 Dilut	tion Factor: 1 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
Method: SM 4500-F C	FLUORIDE	Prep Met	- hod·		
Datc Prepared: 2/28/08 Datc Analyzed: 2/28/08	Lab File ID: 67 Method Blank: MBLK		Diluti	ion Factor: 1 Fraction ID: 08-	1189-02G
Analytes	CAS Number	Result	_	LQL	Units
Fluoride	16984-48-8	6.7 *		0.20	mg/L
Method: SM 4500H+ B Comments: This is a field parameter with Date Prepared: 2/26/08 Date Analyzed: 2/26/08 1610	DISCHARGE WATER	Prep Meth	- Diluti	on Factor: 1	
Analytes	CAS Number	Result	lad f	raction ID: 08-3 LQL	
pH	·······	10.81 H		1.00	Units pH Units
Method: SM 4500-S C/F	TOTAL SULFIDE	Prep Meth	od:		· · · · · · · · · · · · · · · · · · ·
Date Prepared: 2/27/08 Date Analyzed: 2/27/08	Lab File ID: 72 Method Blank: MBLK			on Factor: 1 raction ID: 08-1	189-02F
Analytes	CAS Number	Result		LQL	Units
Total Sulfide		U		0.50	mg/L
Analyst	· · · · ·		prove		
S - Spike Recovery outside accopted li U - Compound analyzed for but not de X - See case narrative	calibration range al holding time the compound is detected, but is below the LQI mits steeted amination Level (MCL). TCLP limit, or if	L Defin	iltions:	NA - Not Applicable LQL - Lower Quanti Surr - Surrogate	

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

Result

87.8

Method: SM 2540C	TOTAL DISSOLVED SOL	IDS (TDS) Prep Method:	
Date Prepared: 2/28/08 Date Analyzed: 2/28/08 Analytes	Lab File ID: 73 Method Blank: MBLK CAS Number		on Factor: 1 raction ID: 08-1189-02I
Total Dissolved Solids		476	LQL Units 10.0 mg/L
Method: SM 2540 D	TOTAL SUSPENDED SOL	IDS (TSS) Prep Method:	
Date Prepared: 2/28/08 Date Analyzed: 2/28/08	Lab File ID: 8 Method Blank: MBLK		on Factor: 1 raction ID: 08-1189-02I

CAS Number

Analytes

Total Suspended Solids

Analyst

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result

 \boldsymbol{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.

Approved

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

LQL

5.0

Units

mg/L

Print Date: 2/29/2008

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-175N	M HEADSPACE	
Prep Method: RSKSOP175M Analytes	CAS Number	Result	Units: mg/L LQL
Ethane	74-84-0	0.0021	0.0016
Ethene	74-85-1	U	0.0024

Analyst

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.

Approved

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

Units: mg/L

LQL

0,0080

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:			08-1189-01E
Date Collected:	2/24/08		Water
Date Received:	2/26/08	-	GAS0229017
Date Prepared:	2/29/08		GB022908
Date Analyzed:	2/29/08		1.000
Percent Moisture	NA	¹ .	10,00

Result

3.4

Method: RSKSOP175M **RSKSOP-175M HEADSPACE** Prep Method: RSKSOP175M Analytes CAS Number Methane 74-82-8

Analyst

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.

Approved

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

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		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 Ų 0.0024

Analyst

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, I.QL exceeds MCL.

Approved

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

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862

(303) 425-6021

Method: RSKS		RSKSOP-175M HEADSPACE	
Percent Moisture	NA	Dilution Factor:	10.00
Date Analyzed:	2/29/08	Prep Factor:	1.000
Date Prepared:	2/29/08	Method Blank:	GB022908
Date Received:	2/26/08	Lab File ID:	GAS0229020
	2/24/08	Sample Matrix:	Water
Client Project ID: Date Collected:		Lab Sample ID:	08-1189-02E
	: MMW (687-788)	Lab Work Order	08-1189
CI II + C			· · · · · · · · · · · · · · · · · · ·

Analytes	CAS Number	Result	Units: mg/L LQL
Methane	74-82-8	3.8	0.0080

Analyst

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.

Approved

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

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

Method: E300.0

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

Prep Method:

ANIONS BY IC

	· · · · · · ·		
Method Blank: METHO	D BLANK	Dilution Factor: 1 Lab Fraction ID: 08-1	189-01H
CAS Number	Result	LQL	Units
7647-14-5	14.8	0,50	mg/L
	0.0157 H	0.0040	mg/L
7647-15-6	0.157	0.050	mg/L
	U H	0.010	mg/L
Method Blank: METHO	D BLANK	Dilution Factor: 5 Lab Fraction ID: 08-11	89-01H
CAS Number	Result	LQL	Units
7778-80-2	73.5	2.5	mg/L
	CAS Number 7647-14-5 7647-15-6 Method Blank: METHON CAS Number	7647-14-5 14.8 0.0157 H 0.157 7647-15-6 0.157 UH UH Method Blank: METHOD BLANK CAS Number Result 000000000000000000000000000000000000	Method Blank: METHOD BLANK Lab Fraction ID: 08-1. CAS Number Result LQL 7647-14-5 14.8 0.50 0.0157 H 0.0040 7647-15-6 0.157 0.050 UH 0.010 Method Blank: METHOD BLANK Dilution Factor: 5 Lab Fraction ID: 08-11 CAS Number Result LQL

Analyst

Approved

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

E - Extrapolated value. Value exceeds calibration range II - Sample analysis exceeded analytical holding time

Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result

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.

Print Date: 2/28/08

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

	Prep Me	ethod:	
Method Blank: METHO	D BLANK	Dilution Factor: 1 Lab Fraction ID: 08-1	189-02H
CAS Number	Result	LQL	Units
7647-14-5	16.4	0.50	mg/L
	0.00837	0.0040	mg/L
7647-15-6	0.192	0.050	mg/L
• ••••••••••••••••••••••••••••••••••••	U	0.010	mg/L
Method Blank: METHO	D BLANK	Dilution Factor: 5 Lab Fraction ID: 08-1	189-02H
CAS Number	Result	LQL	Units
7778-80-2	74.4	2.5	mg/L
	CAS Number 7647-14-5 7647-15-6 Method Blank: METHO CAS Number	Method Blank: METHOD BLANK CAS Number Result 7647-14-5 16.4 0.00837 0.192 7647-15-6 0.192 U U Method Blank: METHOD BLANK CAS Number Result	Method Blank: METHOD BLANK Lab Fraction ID: 08-1 CAS Number Result LQL 7647-14-5 16.4 0.50 0.00837 0.0040 7647-15-6 0.192 0.050 U 0.010 Method Blank: METHOD BLANK Dilution Factor: 5 Lab Fraction ID: 08-1 CAS Number Result LQL

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

- 8 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

024

Print Date: 2/28/08



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

					Client Project ID:				
La veta, CO 61033 (719) 742-5570					QC Level: Level I+	Ŧ			
Comments:									
Sample ID Client Sample ID	e ID Matrix	Collection Date	Date Received	Test Code	Test Name	Hold 1	MS	Date Due	Hold Time
08-1189-01A MMW (849-995)		2/24/08 0000	2/26/08	524 *	524.2: Standard List	1		3/11/08	3/09/08
08-1189-01A MMW (849-995)	5) 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)	5) Water	2/24/08 0000	2/26/08	504 *	504: Standard List		1, 11	3/11/08	3/09/08
08-1189-01C MMW (849-995)	5) 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)	5) Water	2/24/08 0000	2/26/08	245.1_DK.W	245.1: Mercury, Drinking Water			3/11/08	3/23/08
08-1189-01D MMW (849-995)	5) Water	2/24/08 0000	2/26/08	ALK_WGRP *	Alkalinity			3/11/08	3/09/08
08-1189-01E MMW (849-995)	5) Water	2/24/08 0000	2/26/08	MEEP_W *	RSK175M: MEE			3/11/08	3/09/08
08-1189-01F MMW (849-995)	5) Water	2/24/08 0000	2/26/08	SULF_W	Total Sulfide			3/11/08	3/02/08
08-1189-01G MMW (849-995)	5) Water	2/24/08 0000	2/26/08	F_W	Fluoride	[_]		3/11/08	3/23/08
08-1189-01H MMW (849-995)	5) Water	2/24/08 0000	2/26/08	ANIONS_W *	300.0: Anions by IC			3/11/08	2/26/08
08-1189-011 MMW (849-995)	5) Water	2/24/08 0000	2/26/08	PH_W	Discharge Water pH	Ľ.		3/11/08	2/24/08
08-1189-011 MMW (849-995)	5) Water	2/24/08 0000	2/26/08	TDS_W	Total Dissolved Solids (TDS)	····.	َ نِـــاً ا	3/11/08	3/02/08
08-1189-011 MMW (849-995)	5) 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)	8) 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)	8) 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)	8) Water	2/24/08 1845	2/26/08	504 *	504: Standard List		Ľ.,	3/11/08	3/09/08
08-1189-02C MMW (687-788)	8) Water	2/24/08 1845	2/26/08	200.8_TR *	200.8: Total Metals		<u> </u>	3/11/08	8/22/08
08-1189-02C MMW (687-788)	8) 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)	8) Water	2/24/08 1845	2/26/08	ALK_WGRP *	Alkalinity	 i		3/11/08	3/09/08
08-1189-02E MMW (687-788)	8) Water	2/24/08 1845	2/26/08	MEEP_W *	RSK175M: MEE			3/11/08	3/09/08
08-1189-02F MMW (687-788)	8) Water	2/24/08 1845	2/26/08	SULF_W	Total Sulfide	 المساعدة ا	[_]	3/11/08	3/02/08
Definitions: * - Test Code has a Select List	s a Select List								Page 1 of 2

Definitions: Test Code has a Select List

Page 1 of 2

001

WORK ORDER Summary **Evergreen Analytical, Inc.**

Email To: Tmelland@petroglyphenergy.com

Rpt To: Tom Melland Petroglyph Energy P.O. Box 979

3/13/2008 3:14:08 PM

08-1189

Client Project ID:

Page
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1

Definitions: * - Test Code has a Select List

WORK ORDER Summary	nmary	Everg	green A	Evergreen Analytical, It	nc.			80	08-1189
Rpt To: Tom Melland	Email To:	Email To: Tmelland@petroglyphenergy.com	lyphenergy.con						
Petroglyph Energy								3/13/2008	3/13/2008 3:14:08 PM
P.O. Box 979					Client Project ID:	-			
La Veta, CO 81055						•			
(719) 742-5570					QC Level: Level [+	+			
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
08-1189-021 MMW (687-788)	Water	2/24/08 1845	2/26/08	PH_W	Discharge Water pH		üJ	3/11/08	2/24/08

08-1189-021 MMW (687-788)

Water Water

2/24/08 1845 2/24/08 1845

2/26/08 2/26/08

Total Suspended Solids (TSS) Total Dissolved Solids (TDS)

:____

3/02/08 3/02/08

[]] 1

3/11/08 3/11/08

TDS_W TSS

08-1189-02I

MMW (687-788)

002

Shea Greiner

From: Sent: To: Cc: Subject: Shea Greiner Thursday, March 13, 2008 3:14 PM Carl Smits; Jeremy Dechant; Nat Oppedal; Tami Buchner Patty McClellan; Kelly O'Brien 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

Data Path : C:\msdchem\1\DATA\VOA60305\\ Data File : 1701017.D Acq On : 5 Mar 2008 8:29 pmm Operator : Don Chamott MMW (849-995) Sample : <u>08-1189-01AA</u> Misc : SAMP 5244 ALS Vial : 17 Sample Multiplier: 11 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 |--Internal Standard---| TIC Top Hit name RT EstConc Units Response # RT Resp Conc _____

5240305.M Fri Mar 14 09:06:05 2008

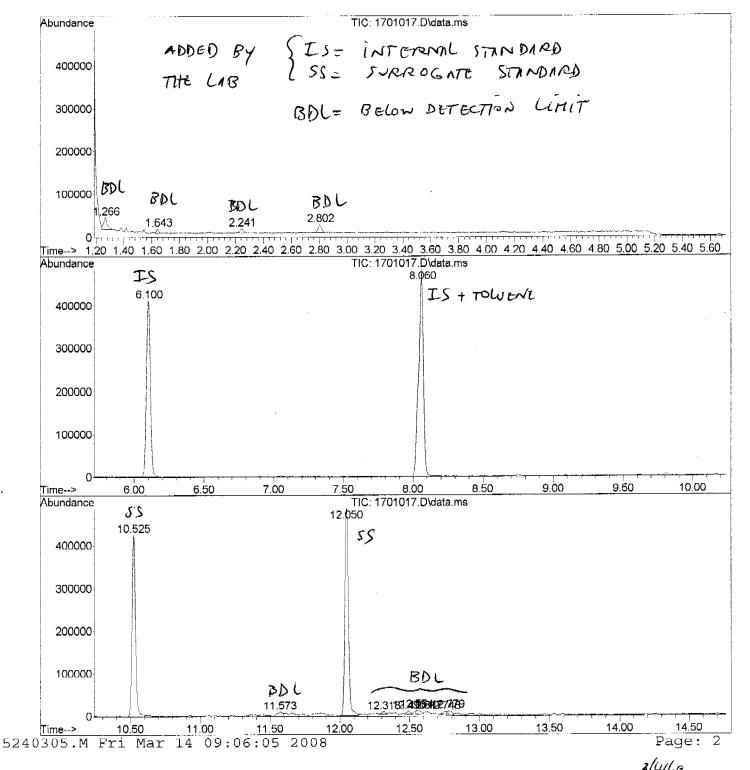
Page: 3

2/14/08

```
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
```



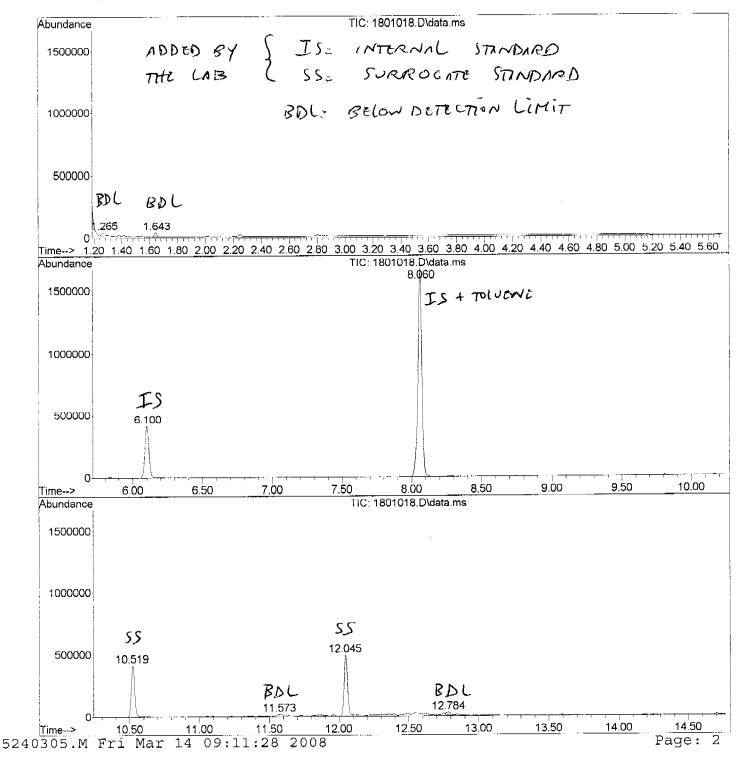
Data Path : C:\msdchem\1\DATA\VOA60305\\ Data File : 1801018.D Acq On : 5 Mar 2008 9:04 pmm Operator : Don Chamott Sample : 08-1189-02AA Misc : SAMP 5244 ALS Vial : 18 Sample Multiplier: 11 Quant Method : C:\msdchem\1\METHODS\5240305.MM Quant Title : VOA4 524.2 Revision 4.11 TIC Library : C:\Database\NIST98.LL TIC Integration Parameters: LSCINT.PP TIC Top Hit name RT EstConc Units Response $\begin{vmatrix} --Internal Standard---\\ \# RT Resp Conc \end{vmatrix}$

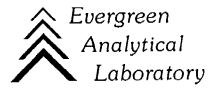
5240305.M Fri Mar 14 09:11:28 2008

```
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
```





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,

l hunte

Carl Smits Technical Director of Chemical Analysis