

Sinclair Unit No. 9: EOR Report 2017

Overview

Note: Vermilion Energy has assumed operatorship of Sinclair Unit No.9 through the acquisition of Red River Oil Inc. effective Feb 15, 2018. Within the 2017 EOR Report, operations undertaken by Red River in 2017 will be reported as so.

The Sinclair Unit No. 9 waterflood is a one section (30-007-29W1), one pattern flood within the Bakken Three Forks formation operated by Red River Oil Inc. ("Red River" or the "Company"). The pattern consists of seven horizontal wellbores oriented north-south and spaced at 185-300m. Three injectors are located at 00/13-30, 00/14-30 and 00/15-30 while four producers are located at 02/14-30, 02/15-30, 00/16-30 and 02/16-30. There is one abandoned vertical well at 11-30. Figure 1 below is a Unit map showing the wellbore layout.

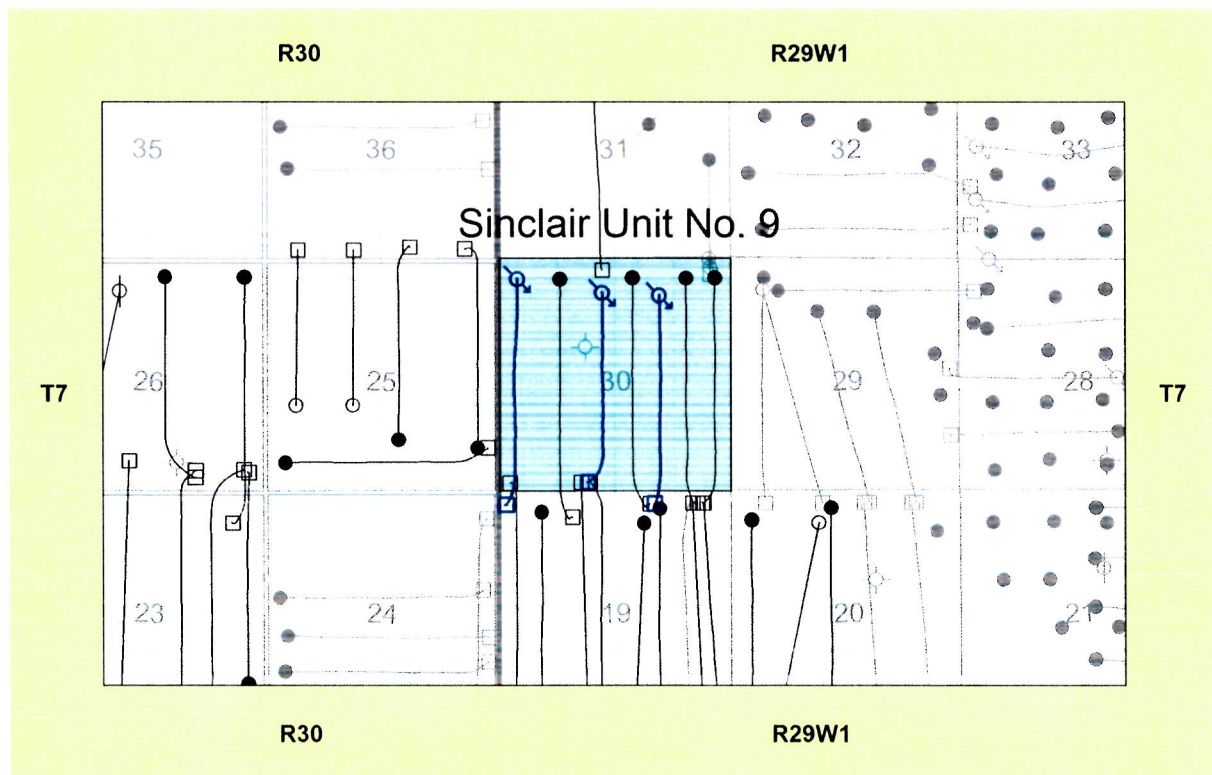


Figure 1: Sinclair Unit No. 9 Map

The main productive zones within the Three Forks in section 30-007-29W1 are the Upper Devonian Lyleton A Dolomitic Siltstone member and the overlying Mississippian Middle

Bakken Siltstone member. Horizontal wells in section 30 have undulated through both the Three Forks Lyleton A Member and the Bakken Siltstones over the length of the laterals. Red River estimates that original-oil-in-place for Unit No. 9 is $1,212 \times 10^3 \text{m}^3$ (7,629 mstb). Current recovery to date is $30.3 \times 10^3 \text{m}^3$ (190 mstb) or 2.5% of the OOIP. Primary recovery was originally estimated to recover 3.1% based on 4 wells per section and 5.5% with infill drilling. An incremental 10-15% secondary recovery is expected, bringing the total estimated recovery factor to 15-20%.

Performance Discussion

Performance results to date in the Sinclair Unit No. 9 flood have been positive. The pattern has observed relatively stable total fluid production while maintaining stable oil-cuts throughout the year. Overall Unit WOR for the year averaged 5.03, bringing the cumulative Unit WOR to 3.73 at year end. A yearly average VRR of 1.61 helped increase the Unit cumulative VRR to 0.60 at year end. Figure 2 in appendix A illustrates the overall pattern performance in graphical and tabular format. Appendix A, Table 1 illustrates the overall pool performance, both monthly and cumulatively, in tabular format. Appendix A also includes individual injection well profiles and monthly average injection pressures.

73(1) (a-c)(f) Production and Injection Data

The requested data referred to in clauses 1(a) to (c) and (f) of subsection 73(1) of the Oil and Gas Act (C.C.S.M. c. 034) is attached in appendix A as follows:

1. Figure 2: Monthly produced fluids and ratios in graphical and tabular format
2. Table 1: Monthly and cumulative produced fluids and ratios in tabular format
3. Individual injection well rate and pressure profiles:
 - a. 100/13-30
 - b. 100/14-30
 - c. 100/14-30
4. Table 2: Monthly average injection rate and pressure data

73(1) (d) Reservoir Pressure Surveys

There were no pressure surveys executed in Unit No. 9 in 2017.

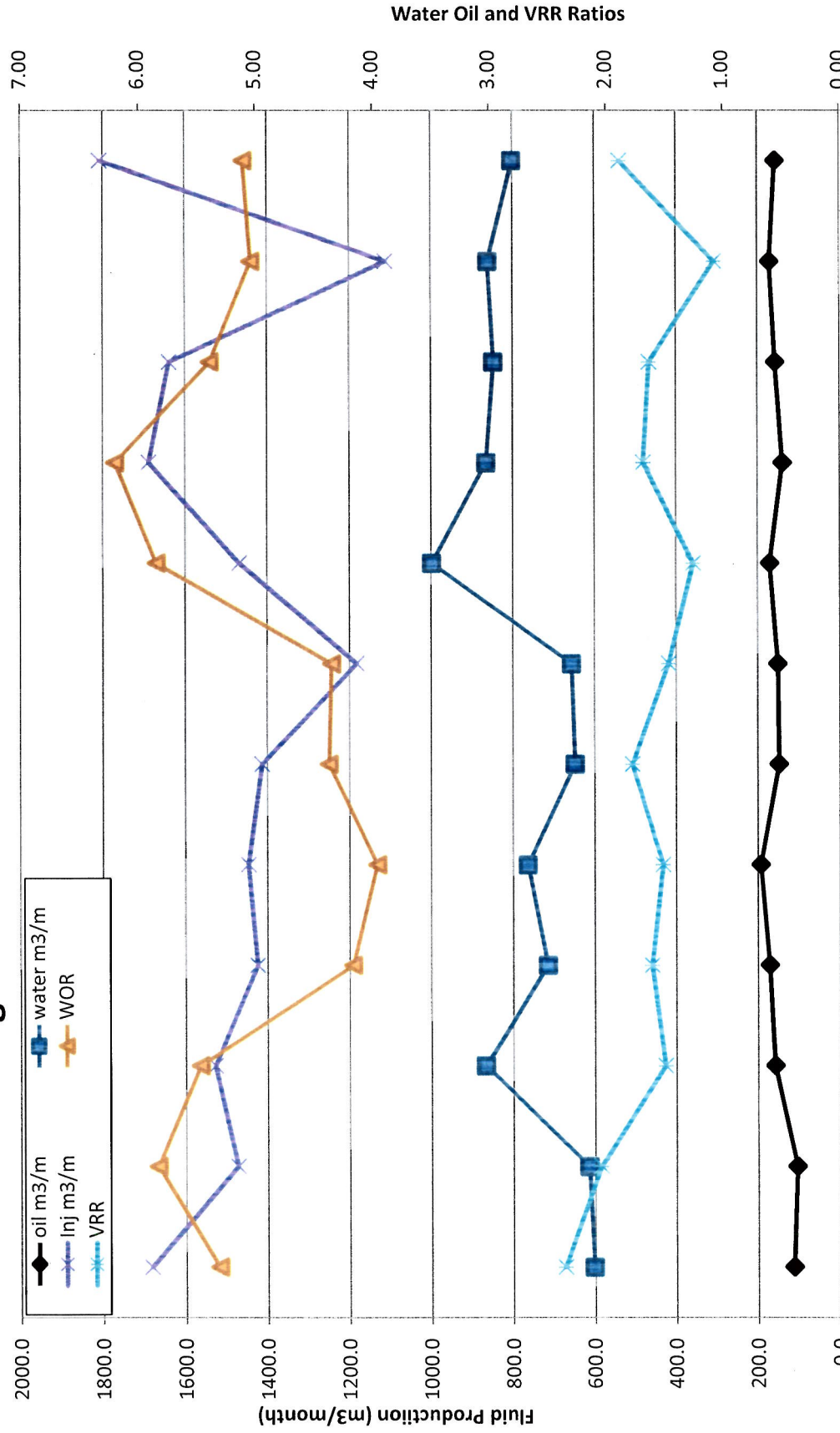
73(1) (e) Well Servicing

Other than routine pump changes there were no servicing operations completed within Unit No. 9 in 2017.

73(1) (g) Injection Fluid Quality Control and Treatment

Injection fluid for Sinclair Unit No. 9 is sourced from the Manville formation in the 100/15-18-007-29W1 water source well. The 15-18 well is on the same lease as the 15-18 injection facility and is pipeline connected. At the 15-18 facility the water is pumped through a filtration skid where it completes three stages of filtration. The primary filter stage is a 1-micron nominal bag filter, secondary is a 1-micron absolute bag filter and a tertiary 0.5-micron polisher cartridge filter. After the water is filtered it enters the injection pipeline system via a positive displacement pump. The surface injection pressure is limited to 6,300 kpa. All water is treated with scale and biocide inhibitors prior to being injected into Unit No. 9.

Figure 2: Sinclair Unit #9 Produced Fluids



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
oil m3/m	113.3	105.2	158.1	171.3	192.6	148.0	150.7	170.7	139.4	157.0	170.7	157.0
water m3/m	601.8	613.8	865.6	713.8	762.3	647.1	655.7	997.9	864.0	845.9	860.0	801.0
Inj m3/m	1682.4	1471.7	1527.7	1423.6	1446.0	1412.6	1181.6	1467.5	1688.5	1638.4	1110.6	1808.2
WOR	5.31	5.83	5.47	4.17	3.96	4.37	4.35	5.85	6.20	5.39	5.04	5.10
VRR	2.35	2.05	1.49	1.61	1.51	1.78	1.47	1.26	1.68	1.63	1.08	1.89

Table 1: Sinclair Unit #9 Produced Fluids

2017 Oil Production m3/month	Prior CTD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017	CTD
Unit #9 Total Production	28434.8	113.3	105.2	158.1	171.3	192.6	148.0	150.7	170.7	139.4	157.0	170.7	157.0	1833.8	30268.6

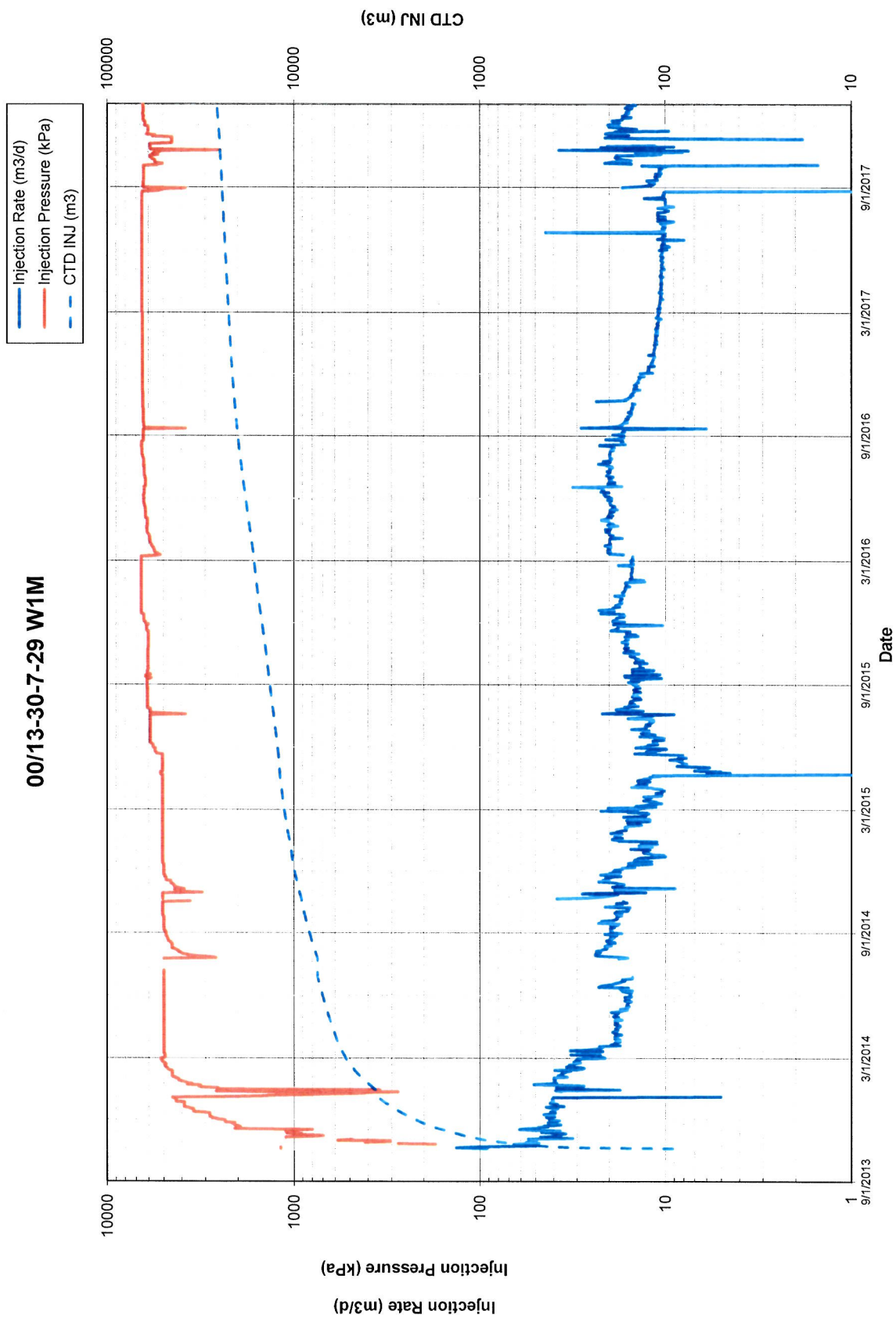
2017 Water Production m3/month	Prior CTD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017	CTD
Unit #9 Total Production	103671.5	601.8	613.8	865.6	713.8	762.3	647.1	655.7	997.9	864.0	845.9	860.0	801.0	9228.8	112900.3

Unit #9 WOR	3.65	5.31	5.83	5.47	4.17	3.96	4.37	4.35	5.85	6.20	5.39	5.04	5.10	5.03	3.73
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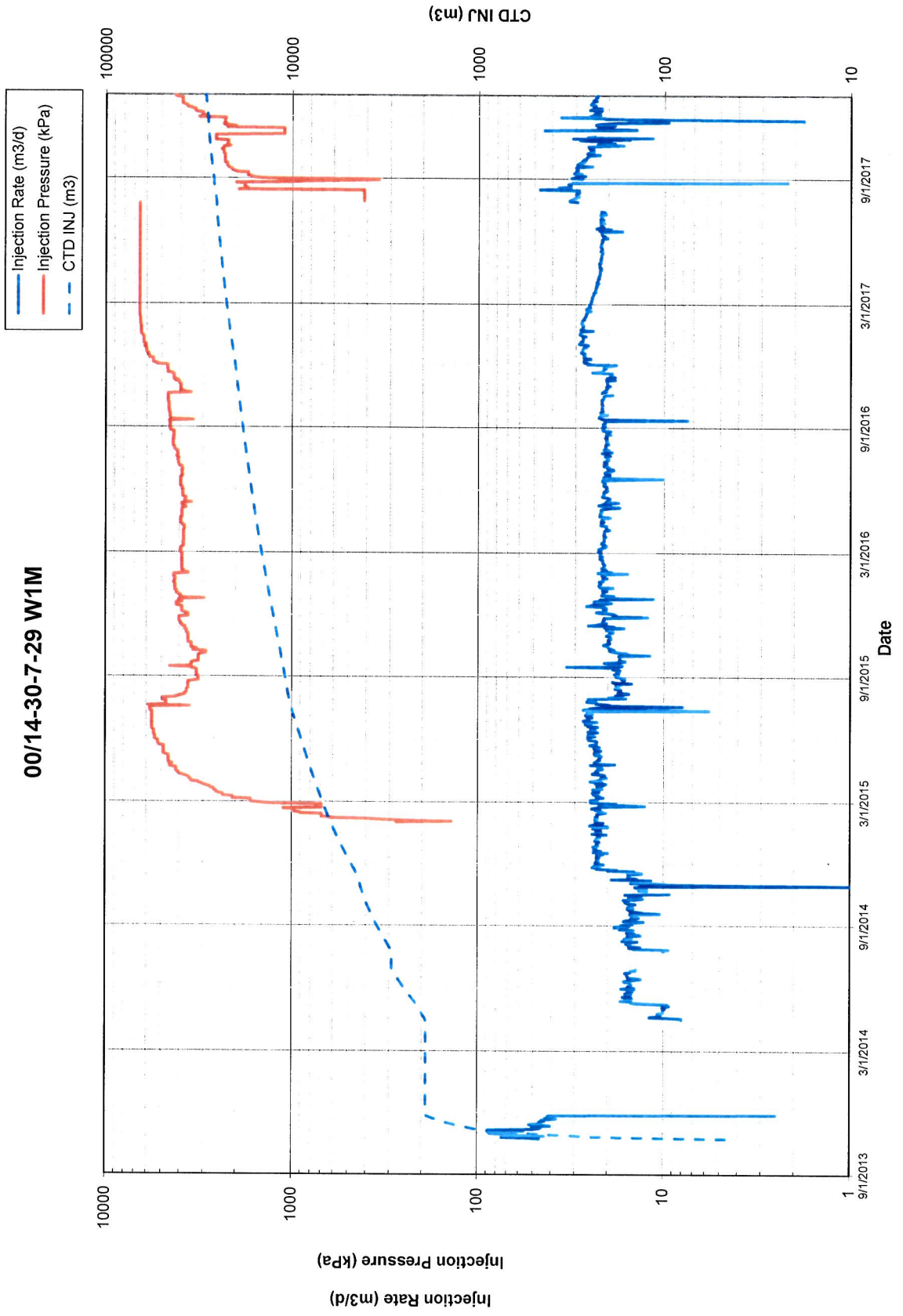
2017 Water Injection m3/month	Prior CTD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017	CTD
Unit #9 Injection	67720.6	1682.4	1471.7	1527.7	1423.6	1446.0	1412.6	1181.6	1467.5	1688.5	1638.4	1110.6	1808.2	17858.8	85579.4

Unit #9 VRR	0.51	2.35	2.05	1.49	1.61	1.51	1.78	1.47	1.26	1.68	1.63	1.08	1.89	1.61	0.60
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00/13-30-7-29 W1M



00/14-30-7-29 W1M



00/15-30-7-29 W1M

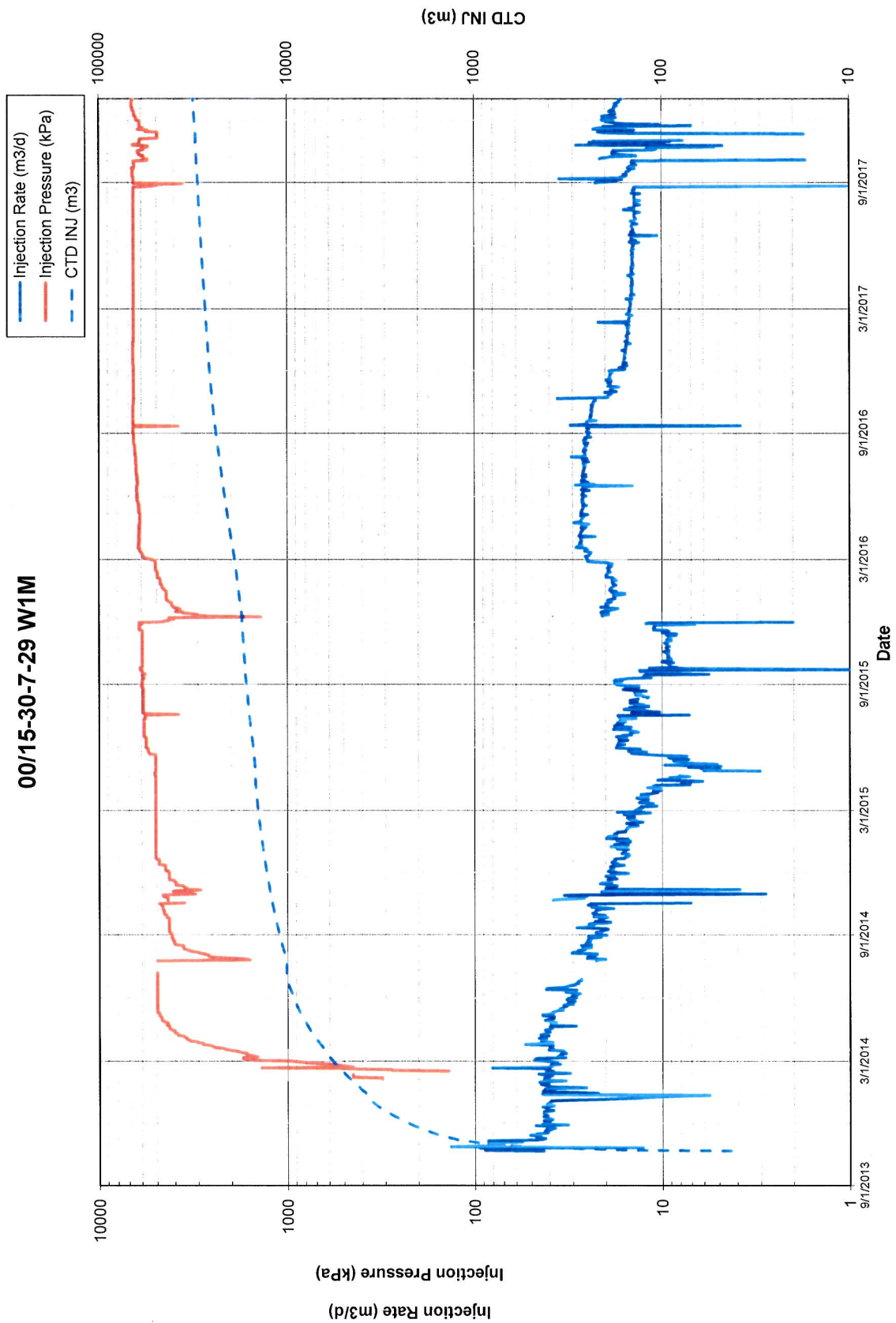


Table 2: Sinclair Unit #9 Monthly Average Injection Data

2015 Monthly Averages	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
00/13-30 Injection Rate (m3/d)	11.3	11.0	10.7	10.5	10.4	11.3	10.2	8.8	11.4	15.0	11.6	16.6
00/13-30 Injection Pressure (kPa)	6447	6447	6480	6481	6481	6481	6481	6210	6355	5542	5462	6359
00/14-30 Injection Rate (m3/d)	27.7	26.4	24.0	22.5	21.9	21.5	13.8	26.5	28.7	23.6	13.7	23.7
00/14-30 Injection Pressure (kPa)	6325	6528	6550	6550	6550	6550	5534	964	2042	2340	1959	3430
00/15-30 Injection Rate (m3/d)	15.3	15.2	14.6	14.5	14.3	14.2	14.0	12.0	16.2	14.3	11.7	18.0
00/15-30 Injection Pressure (kPa)	6563	6550	6550	6550	6550	6550	6550	6265	6560	5981	5619	6550