

**Viriden Roselea Unit #2**  
**2018 Annual EOR Report**

## **Executive Summary**

In 2018 oil production in the Virden Roselea Unit #2 (VRU #2) averaged 45.8 m<sup>3</sup>/d (288 bbl/d) totaling 16.7 e<sup>3</sup>m<sup>3</sup> (104.9 mbbbl). Annual production stayed flat from 2017 to 2018, this is using yearly averages. Using December 2017 to December 2018 the unit had a decline of 22%. By the end of 2018 cumulative oil production from the VRU #2 was 1,231 e<sup>3</sup>m<sup>3</sup> (7.7 mmbbl). The original forecasted recovery was 270 e<sup>3</sup>m<sup>3</sup> (1.7 mmbbl) on primary recovery and 730 e<sup>3</sup>m<sup>3</sup> (4.6 mmbbl) total primary plus secondary recovery. It should be noted that the pool was expanded slightly after the original waterflood forecast was made; however, the waterflood has made a tremendous increase to the ultimate oil recovery and has exceeded the original expectations. That said, the unit is still at a low recovery and there is still potential to improve the performance and gain incremental reserves.

In December 2018 there were 38 producing oil wells and 8 water injectors active in the unit. In 2018, one dual leg horizontal well was drilled.

## Discussion

The VRU #2 has been under waterflood since 1966, seven years after first production from the pool in 1959. Water injection increased the oil production rate from  $\sim 60 \text{ m}^3/\text{d}$  ( $\sim 377 \text{ bbl/d}$ ) to  $\sim 150 \text{ m}^3/\text{d}$  ( $944 \text{ bbl/d}$ ), equivalent to peak production from the field. Expected ultimate oil recovery was increased by more than four times by the waterflood.

Prior to the operatorship transferring to Corex Resources very little additional development had taken place in the unit. From 1997- 2002, four horizontal wells were drilled in the unit, all with poor results. In 2013, a very successful Virden well was drilled in the unit. 2014 was very active: six horizontal wells, a disposal well, and a vertical producer were drilled and 5 vertical recompletes in the Whitewater formation were executed successfully. In 2015, one well in the Virden formation was drilled. In 2015, a poor producer, 103/16-05-011-25W1/00 was converted to injection. Currently, the pattern is being monitored for response, and some response has been seen. This is the first well to have been converted to injection since 1971. At the end of 2016 all of the old pipelines in the unit had been replaced, allowing for us to effectively set injection targets. The unit is mainly laid out in 5-spot patterns; however, there are some areas in the unit that have seen little to no waterflood support, mainly on the west side of the unit. There is the possibility of completing the remaining 5-spot patterns, but it was deemed more efficient to implement a horizontal-horizontal waterflood after drilling infill wells. This unit has a low recovery factor and has poor sweep efficiency. Changing the established patterns should help to recover incremental reserves, as at this point in time, there is a lot of water cycling. The water injection rate was  $818 \text{ m}^3/\text{d}$  ( $5,144 \text{ bbl/d}$ ) in 2018 and the producing WOR was  $26.5 \text{ m}^3/\text{m}^3$ . The injected water at VRU #2 is not filtered or treated in any way.

Significant events in 2018 are as follows:

- October 2018, drill the 102/05-31-010-25W1/00 horizontal well in the Scallion/Oolites formation.
- October 2018, abandon the 100/10-06-011-25W1/00 vertical injection well.

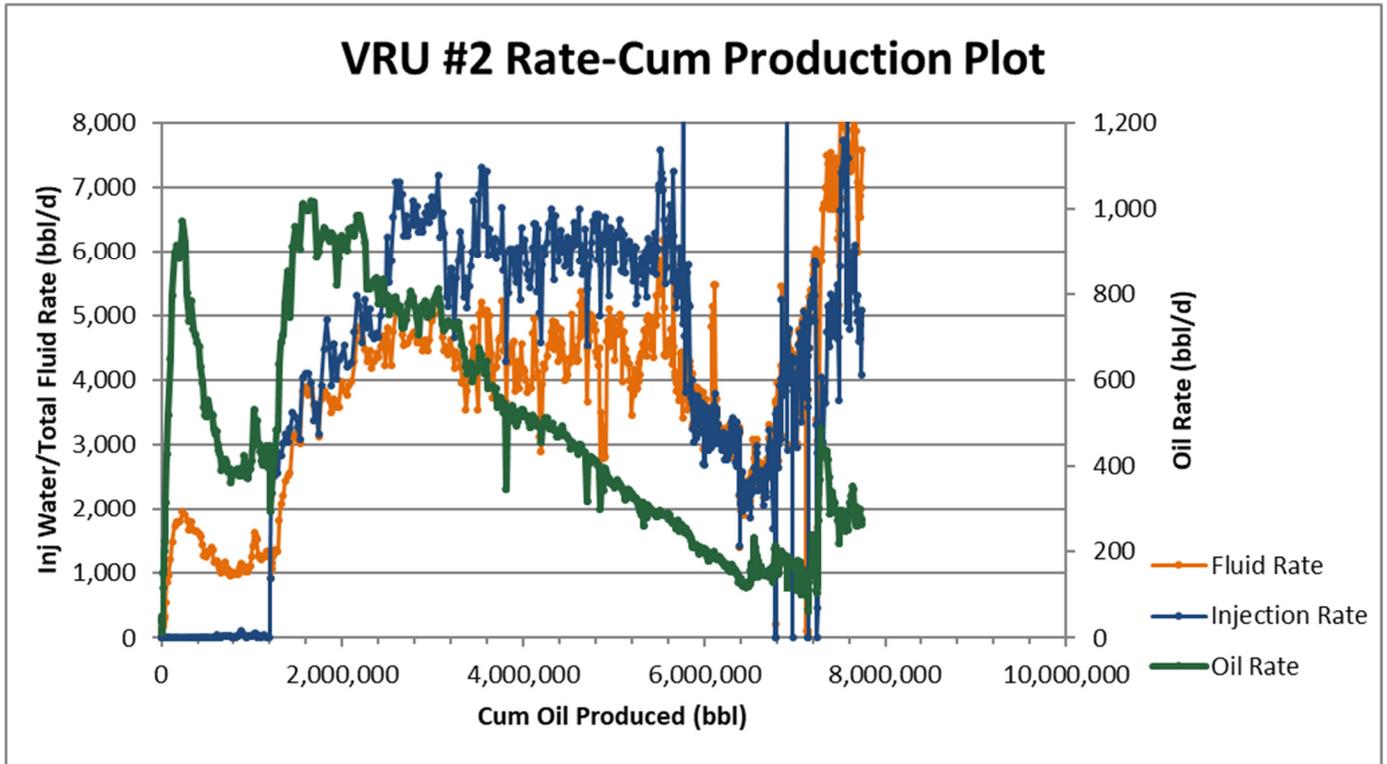
It is important to note that publicly available production data does not include contribution from the newly drilled wells. Volumes quoted, and unit graphs presented are based on public production data augmented with proprietary data, and consequently should accurately reflect all wells. The pattern data within the tables

below is based solely on publicly available production data and therefore missing some production volumes. These tables will be updated in subsequent progress reports.

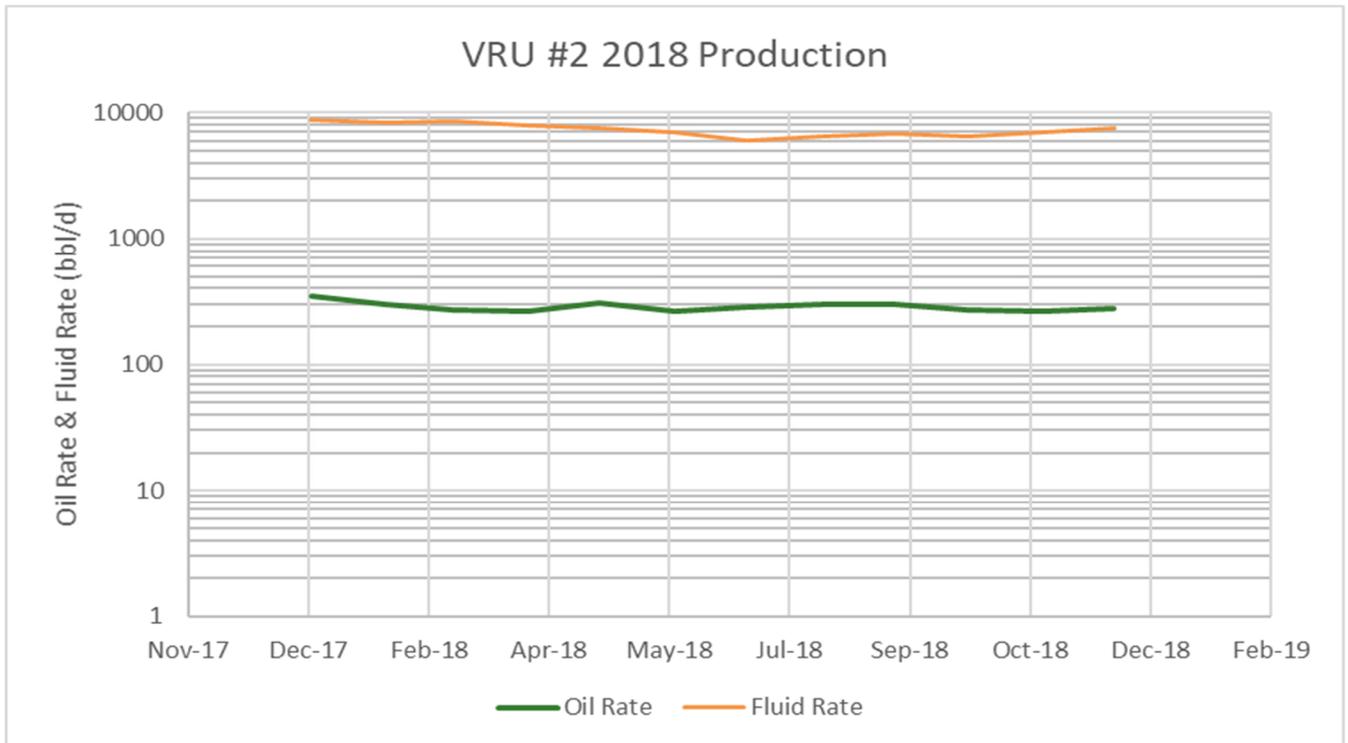
In the composite rate – cumulative oil plot below, waterflood response is clearly demonstrated at a cumulative oil production of 200 e<sup>3</sup>m<sup>3</sup> (1.25 MMbbl).

Detailed production, injection, voidage tables and plots for the total unit and each injection pattern are at the end of this report.

## VRU #2 – Rate vs Cum Oil Production



## VRU #2 – Rate vs Time



## 2018 Reservoir Pressure Surveys

Unit	UWI	License	Test Type	Date of Pressure	Duration of SI (days)	Datum BHP (kPaa)
VRU #2	102/05-31-010-25W1/00	10966	BH BU	2018-10-15	6	6,778
VRU #2	100/09-36-010-26W1/00	1779	FL Shot	2018-07-26		6,663
VRU #2	100/11-05-011-25W1/00	2042	FL Shot	2018-07-26		4,049
VRU #2	100/01-07-011-25W1/00	1814	FL Shot	2018-07-26		6,188
VRU #2	100/06-07-011-25W1/00	2487	FL Shot	2018-07-26		2,951
VRU #2	100/16-01-011-26W1/00	2239	FL Shot	2018-07-26		2,305
VRU #2	100/08-12-011-26W1/00	2311	FL Shot	2018-07-26		5,496

In 2018, seven pressures were taken. The average of this pressure survey is around 4,900 kPa, however, it is unlikely that this is representative of the average unit pressure. Past surveys have consistently indicated that the unit is over pressured. Some injection wells have been shut-in to reduce the pressure in the unit, and the disposal well has allowed Corex to attempt to balance the flood by setting injection targets, lowering the overall pressure of the pool. Therefore, a reduction in pressure may be plausible within the unit, however, it would not be as low as the 4,900 kPa that this survey would indicate. The pool is still over pressured as vertical wells even far away from injection have high pressure and suspended wells can hold fluid to surface for years. It is hoped that the high pressure will help improve production in the new producers. We may also need to reconsider the previous notion that a significant portion of the injected water has gone out of zone. The water still may have gone out of zone, resulting in poor sweep efficiency and the overall low recovery in the unit, but it did not appear to entirely leave the system and has therefore pressured up the unit.

Pressures taken from 2010 and 2011 ranged from 6,000 kPaa to 11,218 kPaa. The pressures for VRU #2 taken over the years are very variable resulting in a large array of pressures and uncertainty in the average pool pressure. As the pressures vary with area, and possibly by formation, it is unlikely we will be able to record consistent pressures. As the voidage replacement ratio (VRR) has been less than one for the year so we may see a decline in the unit pressure. However, individual patterns have been over injecting or under injecting resulting in variable pressures by pattern.

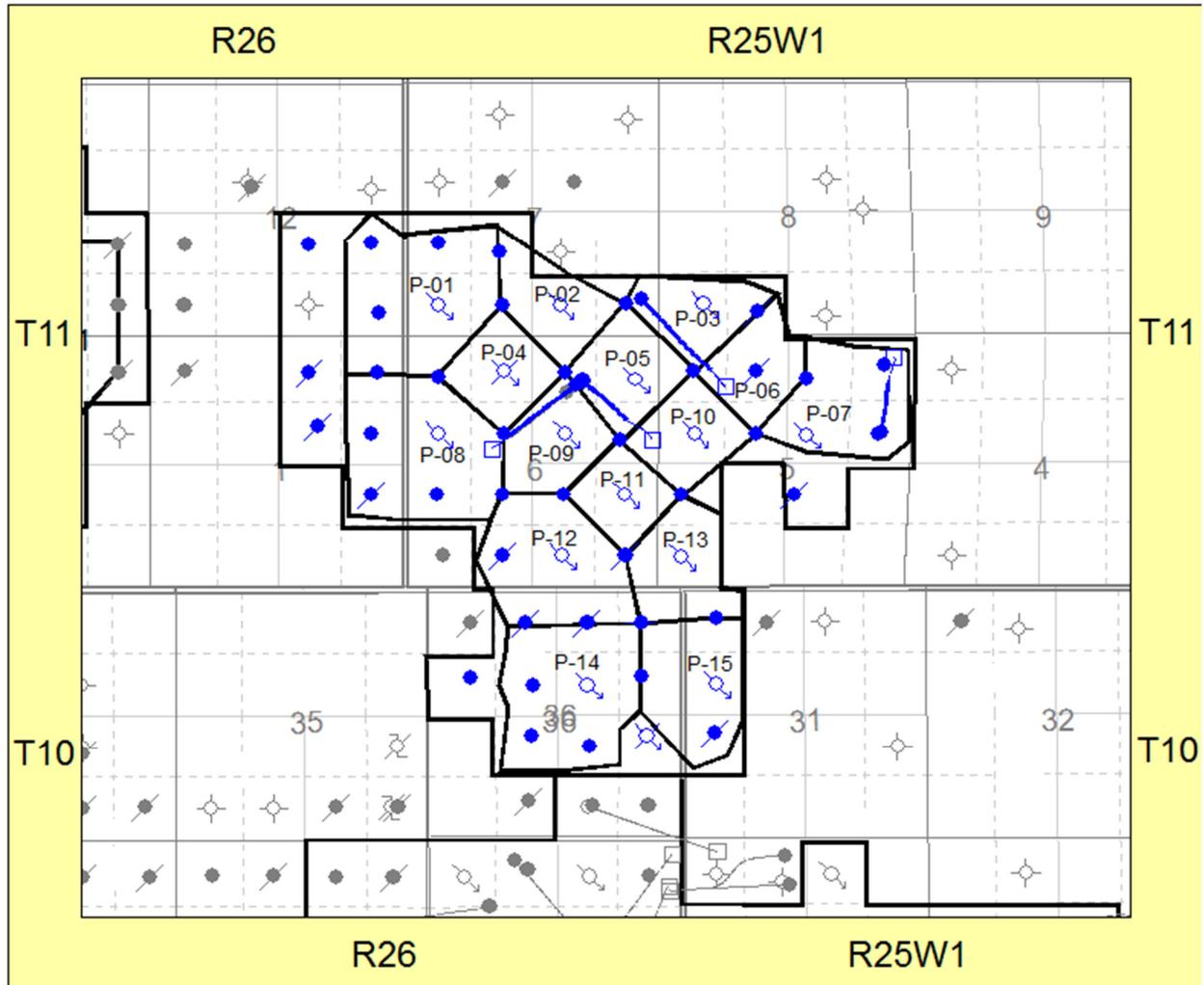
The VRR in 2018 varied from 0.55 to 0.70 for a maximum. Currently, the disposal well is taking large volumes of water, enabling us to balance the flood in other areas. It is hoped that the ability to balance the patterns will result in improved sweep efficiency. The cumulative VRR at year end dropped slightly to 1.06, this number is misleading, as

while the cumulative VRR within the unit is close to 1.0 there is a large discrepancy based on a pattern basis, with some patterns being significantly over or under injected in. An oil formation volume factor of  $1.06 \text{ m}^3/\text{m}^3$  and a water formation volume factor of  $1.04 \text{ m}^3/\text{m}^3$  were used in the VRR calculations.

## 2018 Well Servicing

UWI	Unit	Licence	Operation	Date	Objective
HEADER REPLACEMENT	VRU#2	FF17VIR004	Header Repair	2018-01-31	
102/03-07-011-25W1/00	VRU#2	10677	Pump Repair	2018-02-09	
103/05-31-010-25W1/00	VRU#2	10967	Equip & Tie-In	2018-03-01	
100/13-06-011-25W1/00	VRU#2	002238	Pump Repair	2018-04-09	
102/08-12-011-26W1/00	VRU#2	9819	Pump Repair	2018-06-11	
102/02-07-011-25W1/00	VRU#2	10676	Pump Repair	2018-06-21	
100/05-06-011-25W1/00	VRU#2	001770	Pump Repair	2018-06-26	
HEAT TRACE & INSULATE	VRU#2	RM18VIR016	Major Surface R&M	2018-07-31	
CATHODIC	VRU#2	RM18VIR007	Cathodic	2018-10-04	
CATHODIC	VRU#2	RM18VIR006	Cathodic	2018-10-05	
102/05-31-010-25W1/00	VRU#2	10966	Initial Completion	2018-10-15	SCALLION / OOLITES
100/10-06-011-25W1/00	VRU#2	001785	Abandon Well	2018-10-22	
103/09-05-011-25W1/00	VRU#2	10026	Pump Repair	2018-12-12	

# Waterflood Pattern Map

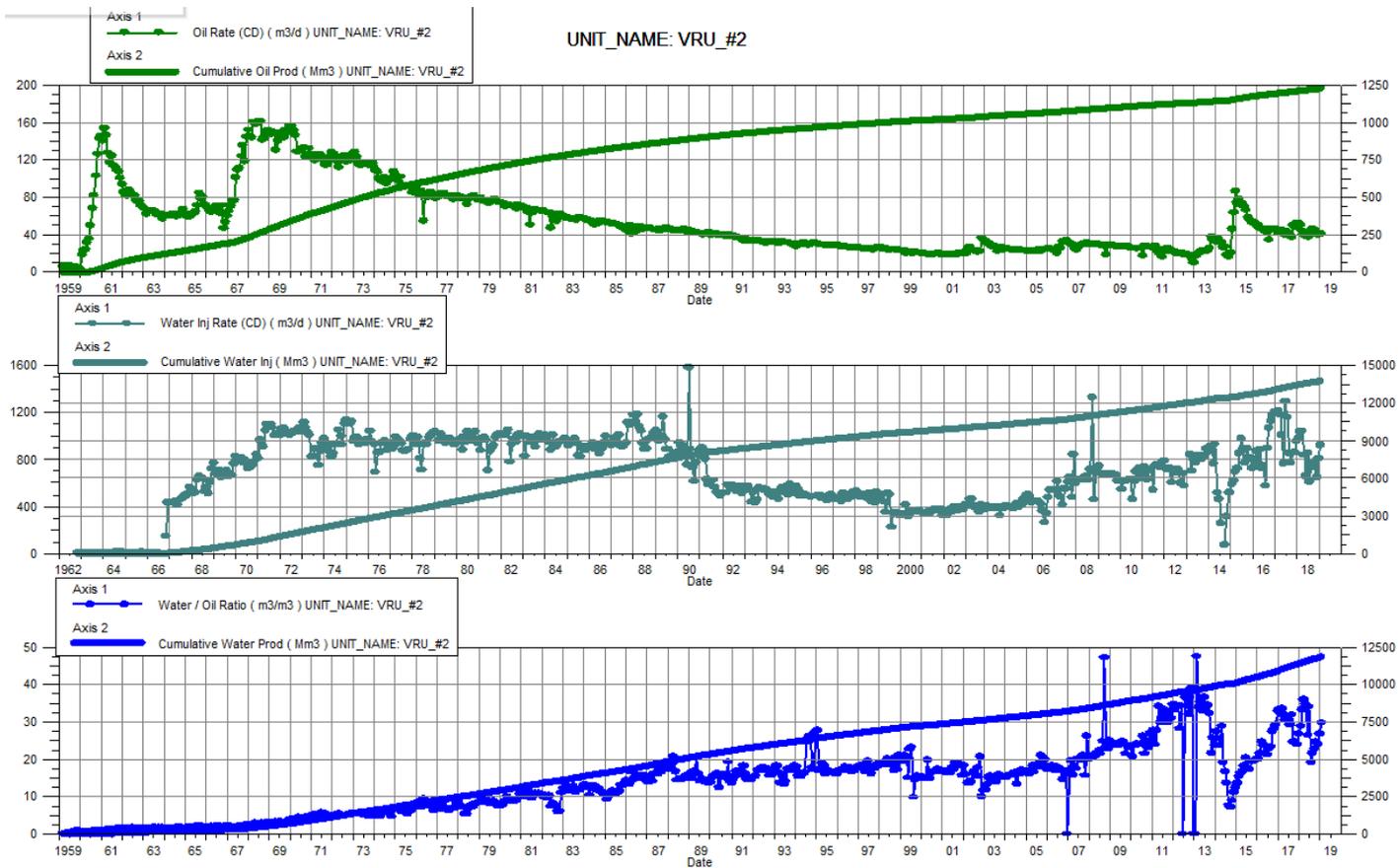


## Waterflood Patterns and Corresponding Injectors

Pattern	Injection Well
P-01	100/04-07-011-25W1/00
P-02	100/02-07-011-25W1/00
P-03	100/04-08-011-25W1/00
P-04	100/14-06-011-25W1/00
P-05	100/16-06-011-25W1/00
P-06	100/14-05-011-25W1/00
P-07	100/10-05-011-25W1/00, 103/16-05-011-25W1/00
P-08	100/12-06-011-25W1/00
P-09	100/10-06-011-25W1/00
P-10	100/12-05-011-25W1/00
P-11	100/08-06-011-25W1/00
P-12	100/02-06-011-25W1/00
P-13	100/04-05-011-25W1/00
P-14	100/10-36-010-26W1/00
P-15	100/12-31-010-25W1/00

# Total for Virden Roselea Unit #2

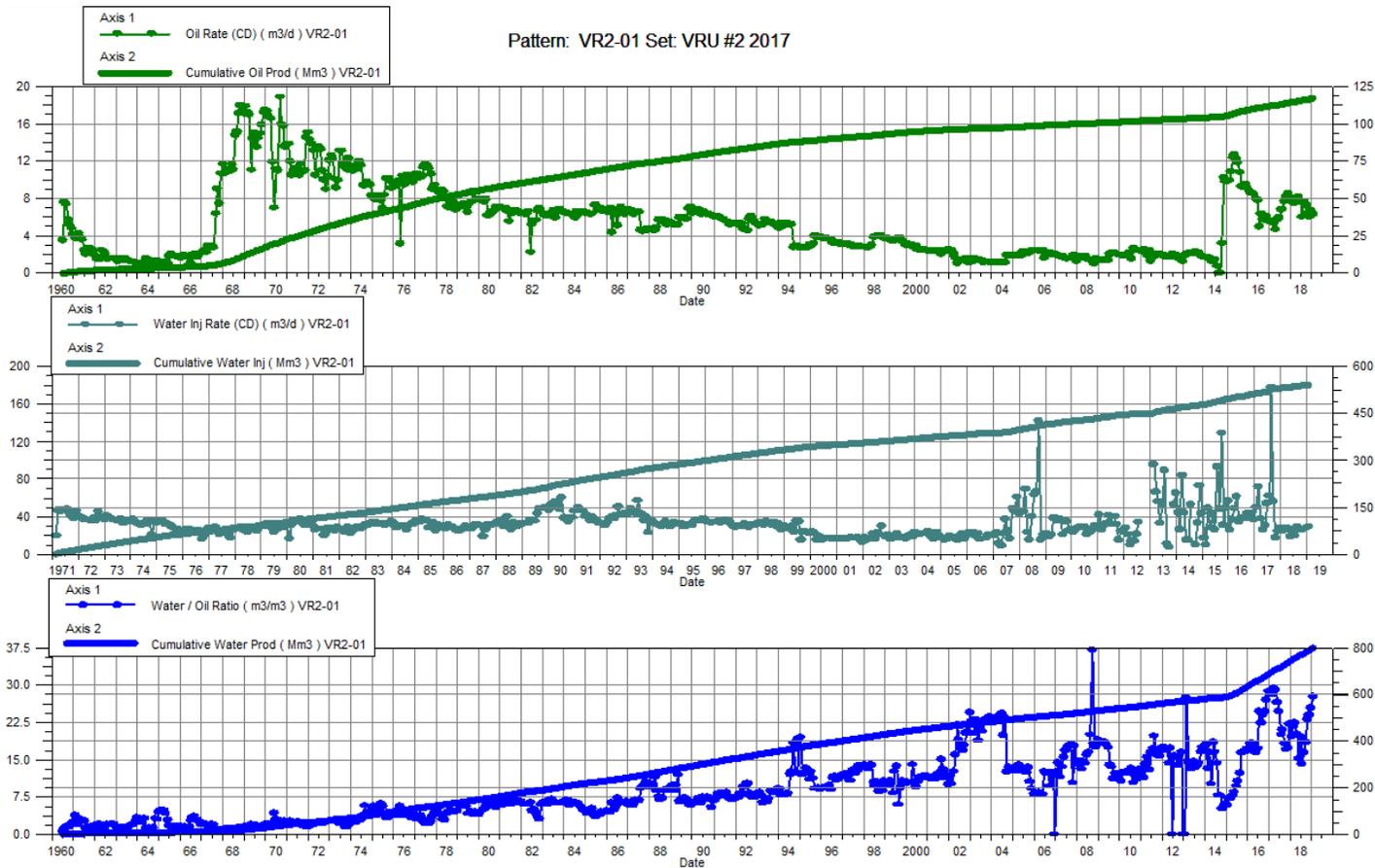
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	50.4	1216.33	1447.3	11418.74	981.9	13515.6	28.73	0.66	1.07	4,133.33
2-28-2018	44.2	1217.57	1472.1	11459.96	1042.00	13544.8	33.28	0.69	1.07	4,133.33
3-31-2018	40.5	1218.83	1454.5	11505.05	1046.46	13577.3	35.95	0.70	1.07	4,133.33
4-30-2018	38.9	1219.99	1354.4	11545.68	838.03	13602.4	34.83	0.60	1.06	4,133.33
5-31-2018	43.0	1221.33	1134.7	11580.86	660.22	13622.9	26.40	0.56	1.06	4,133.33
6-30-2018	38.1	1222.47	1291.3	11619.59	854.90	13648.5	33.94	0.64	1.06	4,133.33
7-31-2018	44.5	1223.85	851.0	11645.98	610.78	13667.5	19.12	0.68	1.06	4,133.33
8-31-2018	46.9	1225.30	1009.8	11677.28	731.56	13690.1	21.54	0.69	1.06	4,133.33
9-30-2018	45.8	1226.67	1047.8	11708.71	770.47	13713.2	22.87	0.70	1.06	4,133.33
10-31-2018	41.8	1227.97	1032.1	11740.71	736.87	13736.1	24.68	0.69	1.06	4,133.33
11-30-2018	39.3	1229.15	948.0	11769.15	647.33	13755.5	24.10	0.66	1.06	4,133.33
12-31-2018	41.8	1230.45	1120.3	11803.88	808.87	13780.6	26.79	0.70	1.06	4,133.33



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## Pattern P-01 - 00/04-07-011-25W1/0

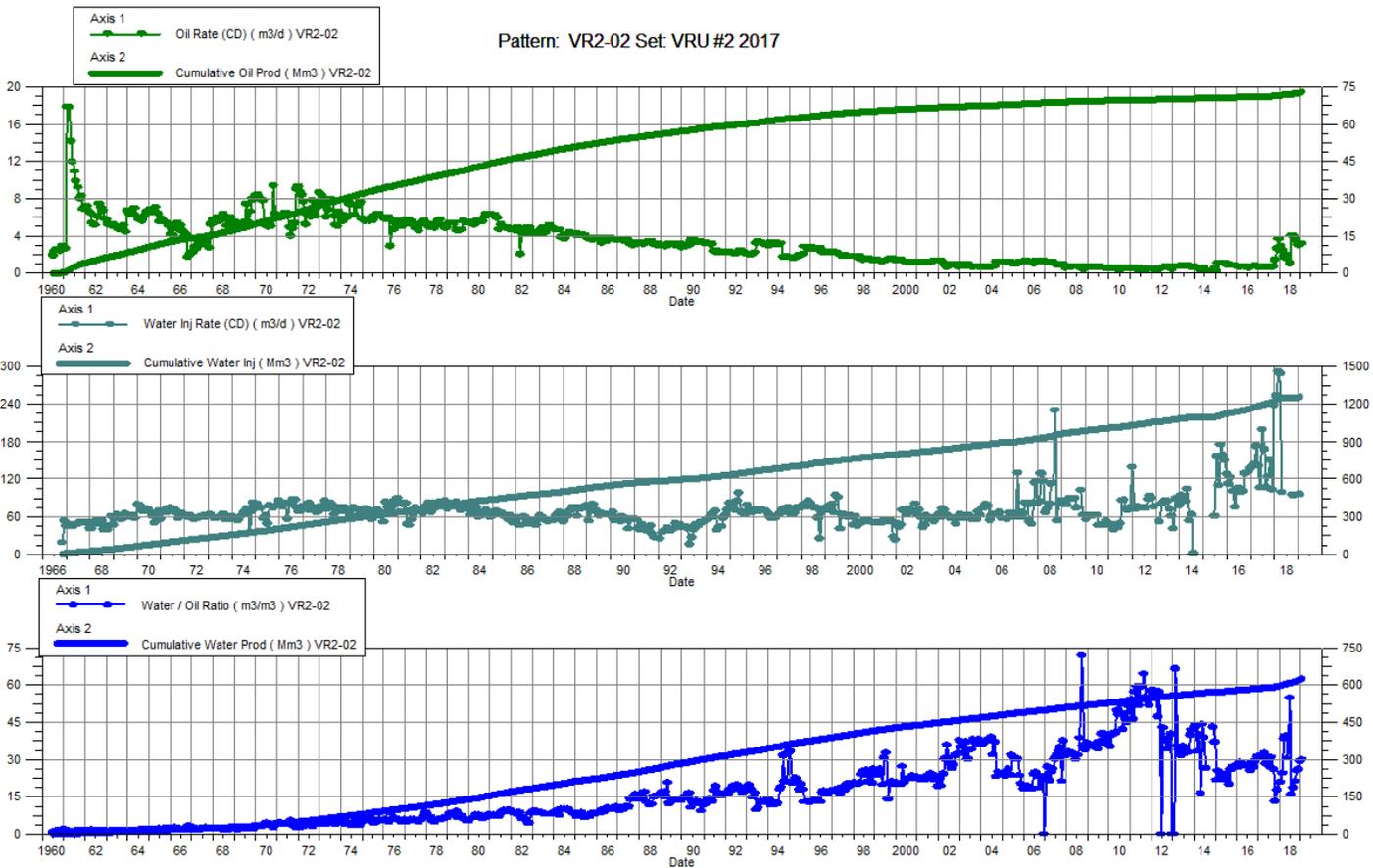
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	8.0	114.61	156.71	744.32	24.33	533.5	19.57	0.15	0.62	3,700.00
2-28-2018	7.6	114.83	164.56	748.93	27.48	534.27	21.69	0.16	0.62	3,700.00
3-31-2018	7.5	115.06	168.13	754.14	28.03	535.14	22.35	0.16	0.61	3,700.00
4-30-2018	7.9	115.30	158.51	758.89	25.30	535.90	20.05	0.15	0.61	3,700.00
5-31-2018	8.2	115.55	123.64	762.73	18.94	536.49	15.15	0.14	0.61	3,700.00
6-30-2018	7.7	115.78	150.45	767.24	23.87	537.20	19.68	0.15	0.61	3,700.00
7-31-2018	6.1	115.97	86.09	769.91	19.94	537.82	14.19	0.22	0.61	3,700.00
8-31-2018	7.7	116.20	126.64	773.83	29.00	538.72	16.49	0.22	0.60	3,700.00
9-30-2018	7.3	116.42	134.90	777.88	26.30	539.51	18.45	0.19	0.60	3,700.00
10-31-2018	6.4	116.62	146.45	782.42	25.81	540.3	23.06	0.17	0.60	3,700.00
11-30-2018	6.1	116.80	145.03	786.77	26.40	541.10	23.95	0.18	0.60	3,700.00
12-31-2018	6.8	117.01	172.43	792.12	28.13	542.0	25.39	0.16	0.60	3,700.00



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## Pattern P-02 - 00/02-07-011-25W1/0

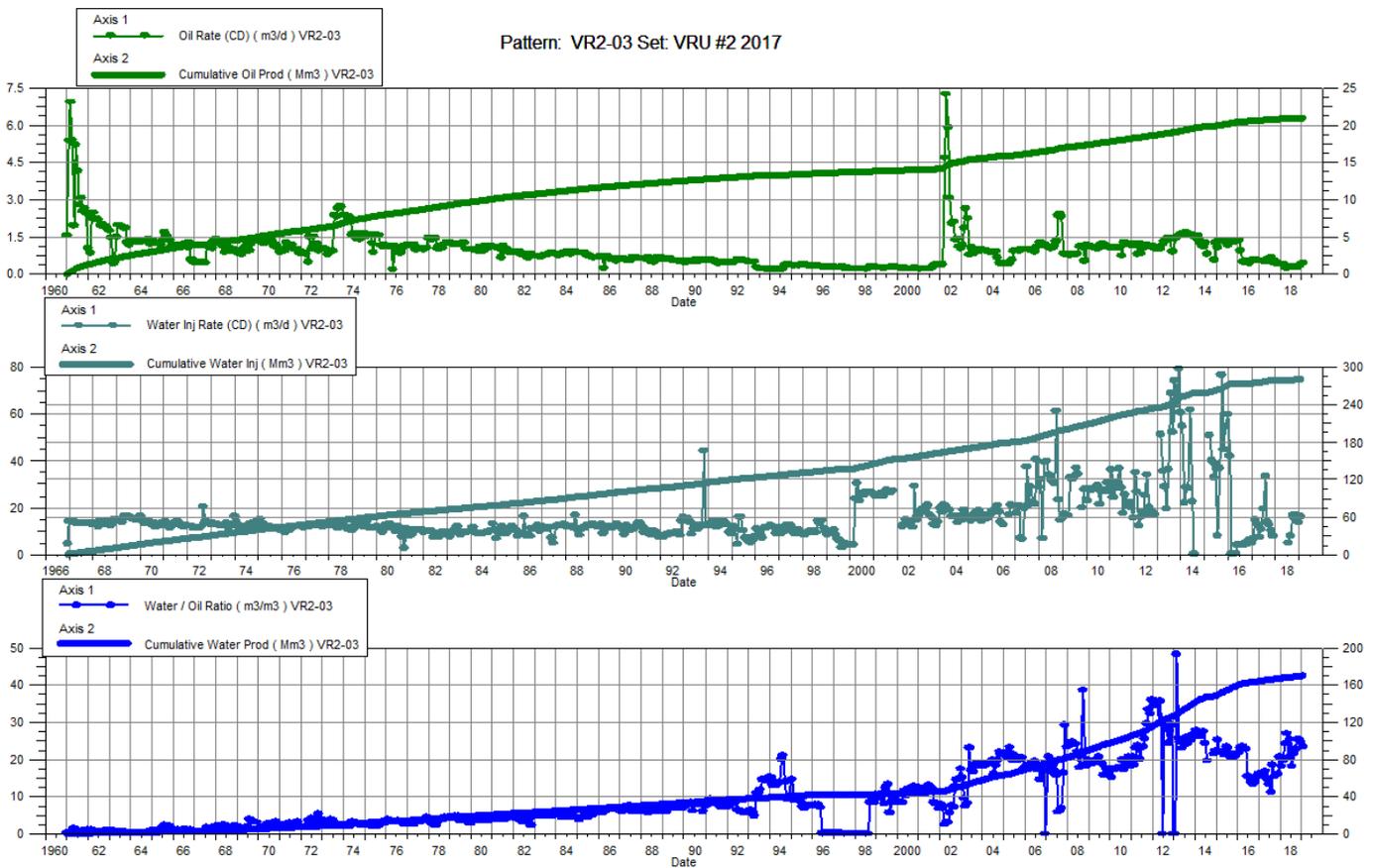
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	2.92	71.81	60.65	596.23	253.55	1232.55	20.75	3.99	1.84	6,300.00
2-28-2018	2.45	71.88	59.53	597.90	292.82	1240.75	24.32	4.72	1.85	6,300.00
3-31-2018	1.84	71.94	70.72	600.09	289.30	1249.72	38.45	3.99	1.86	6,300.00
4-30-2018	1.68	71.99	66.27	602.08	98.39	1252.67	39.41	1.45	1.86	6,300.00
5-31-2018	1.99	72.05	60.40	603.95		1252.67	30.36		1.85	6,300.00
6-30-2018	1.09	72.08	59.74	605.75		1252.67	54.61		1.84	6,300.00
7-31-2018	4.09	72.21	64.67	607.75		1252.67	15.82		1.84	6,300.00
8-31-2018	4.04	72.33	75.00	610.07		1252.67	18.58		1.83	6,300.00
9-30-2018	3.81	72.45	80.47	612.49	95.13	1255.53	21.11	1.13	1.83	6,300.00
10-31-2018	3.51	72.56	89.00	615.25	94.23	1258.45	25.33	1.02	1.83	6,300.00
11-30-2018	3.02	72.65	78.44	617.60		1258.45	25.94		1.82	6,300.00
12-31-2018	3.23	72.75	94.06	620.52		1258.45	29.10		1.81	6,300.00



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## Pattern P-03 - 00/04-08-011-25W1/0

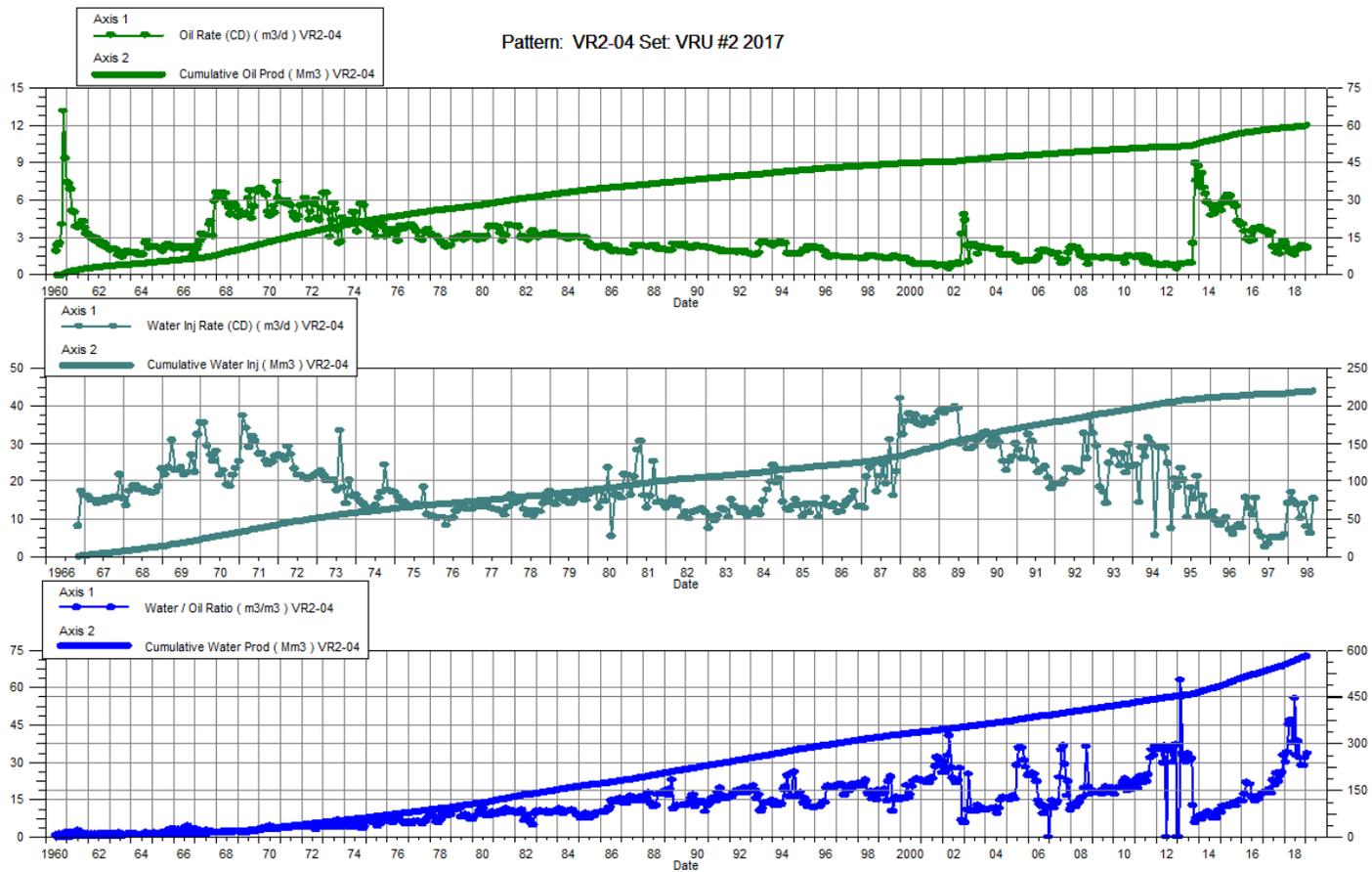
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	0.43	20.92	7.73	167.01		280.07	18.06		1.49	6,000.00
2-28-2018	0.42	20.94	8.25	167.24		280.07	19.58		1.49	6,000.00
3-31-2018	0.31	20.95	7.46	167.48		280.07	24.27		1.48	6,000.00
4-30-2018	0.27	20.95	7.28	167.69		280.07	26.98		1.48	6,000.00
5-31-2018	0.31	20.96	6.34	167.89		280.07	20.59		1.48	6,000.00
6-30-2018	0.30	20.97	7.71	168.12		280.07	25.36		1.48	6,000.00
7-31-2018	0.31	20.98	5.57	168.30	4.78	280.22	18.13	0.81	1.48	6,000.00
8-31-2018	0.30	20.99	6.37	168.49	8.07	280.47	21.45	1.21	1.48	6,000.00
9-30-2018	0.28	21.00	6.51	168.69	16.73	280.97	22.90	2.46	1.48	6,000.00
10-31-2018	0.30	21.01	7.55	168.92	15.65	281.46	25.44	1.99	1.48	6,000.00
11-30-2018	0.33	21.02	8.37	169.17	16.70	281.96	25.24	1.92	1.48	6,000.00
12-31-2018	0.42	21.03	10.37	169.49	13.94	282.39	24.74	1.29	1.48	6,000.00



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## Pattern P-04 - 00/14-06-011-25W1/0

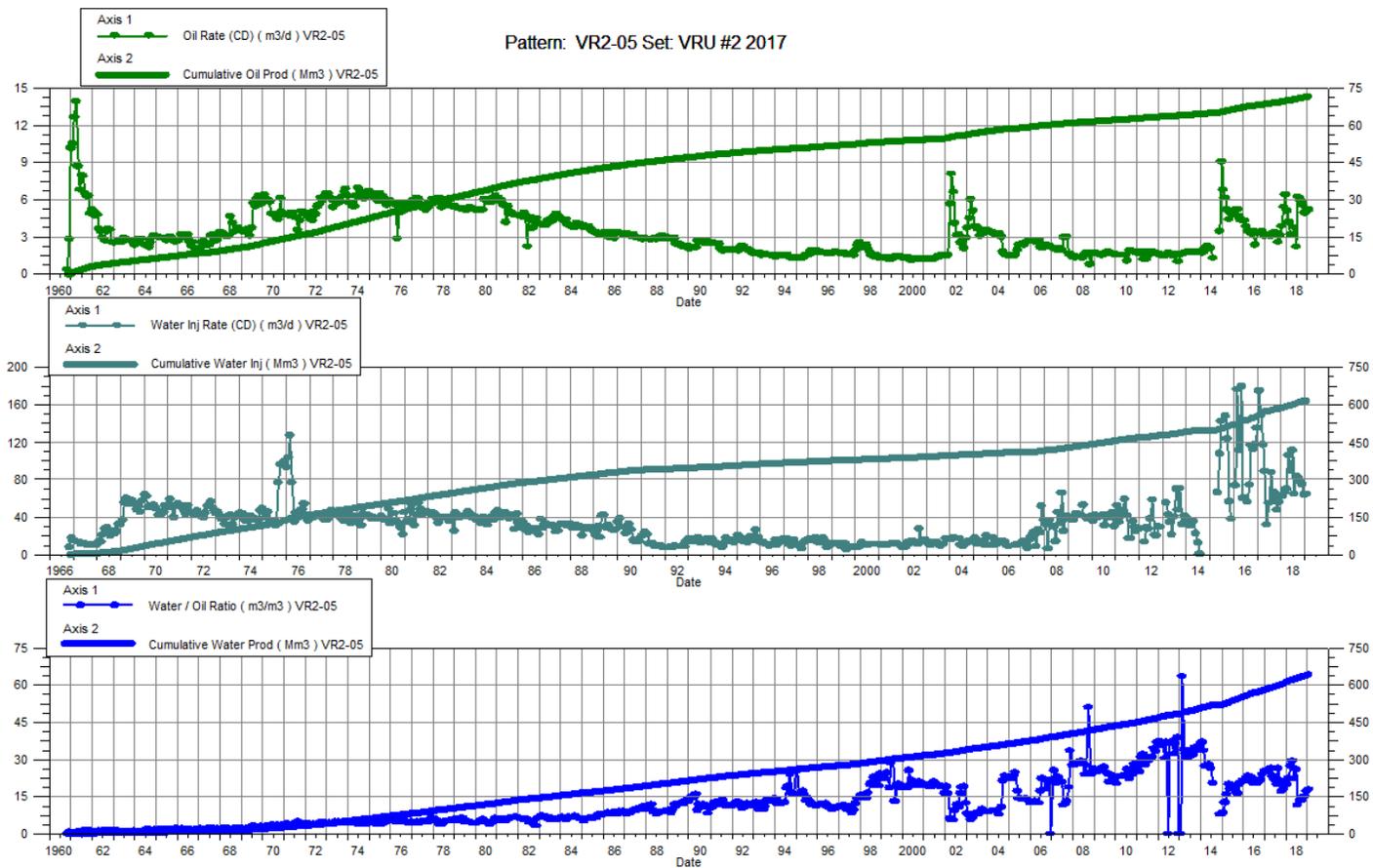
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	2.54	59.27	75.84	553.86		220.82	29.90		0.36	--
2-28-2018	2.13	59.33	72.36	555.89		220.82	34.02		0.36	--
3-31-2018	2.00	59.39	90.82	558.70		220.82	45.36		0.36	--
4-30-2018	1.79	59.44	83.86	561.22		220.82	46.92		0.36	--
5-31-2018	1.87	59.50	70.85	563.41		220.82	37.99		0.35	--
6-30-2018	1.62	59.55	89.76	566.11		220.82	55.47		0.35	--
7-31-2018	2.08	59.61	68.31	568.23		220.82	32.76		0.35	--
8-31-2018	2.03	59.68	78.05	570.64		220.82	38.45		0.35	--
9-30-2018	2.23	59.74	70.54	572.76		220.82	31.70		0.35	--
10-31-2018	2.36	59.82	67.72	574.86		220.82	28.75		0.35	--
11-30-2018	2.18	59.88	62.26	576.73		220.82	28.57		0.35	--
12-31-2018	2.27	59.95	72.20	578.97		220.82	31.74		0.35	--



# Virден Roselea Unit No. 2

## Pattern P-05 - 00/16-06-011-25W1/0

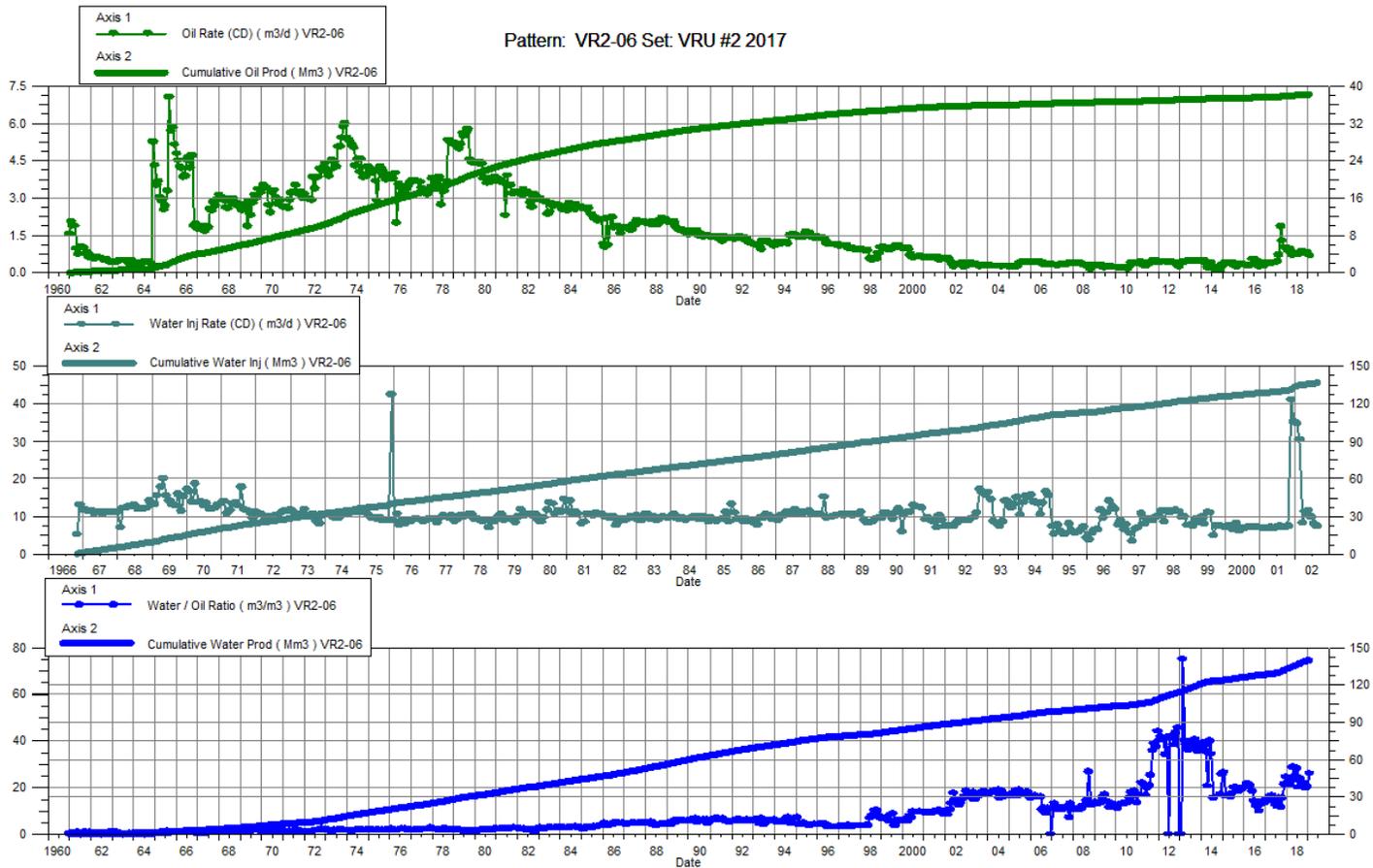
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	5.11	70.20	102.73	612.99	61.90	590.99	20.10	0.57	0.86	4,800.00
2-28-2018	4.20	70.31	94.35	615.63	67.83	592.89	22.47	0.69	0.86	4,800.00
3-31-2018	3.19	70.41	87.38	618.34	69.85	595.06	27.36	0.77	0.86	4,800.00
4-30-2018	3.26	70.51	95.65	621.21	106.39	598.25	29.33	1.08	0.86	4,800.00
5-31-2018	3.80	70.63	83.90	623.81	89.50	601.02	22.06	1.02	0.86	4,800.00
6-30-2018	2.26	70.70	58.46	625.57	111.50	604.37	25.91	1.84	0.87	4,800.00
7-31-2018	6.28	70.89	72.00	627.80	64.45	606.37	11.47	0.82	0.87	4,800.00
8-31-2018	6.11	71.08	82.27	630.35	83.81	608.97	13.46	0.95	0.87	4,800.00
9-30-2018	5.87	71.26	80.46	632.76	81.93	611.42	13.71	0.95	0.87	4,800.00
10-31-2018	5.54	71.43	81.48	635.29	77.35	613.82	14.71	0.89	0.87	4,800.00
11-30-2018	4.96	71.58	75.19	637.54	75.20	616.08	15.16	0.94	0.87	4,800.00
12-31-2018	5.19	71.74	89.50	640.32	63.71	618.05	17.26	0.67	0.87	4,800.00



# Virден Roselea Unit No. 2

## Pattern P-06 - 00/14-05-011-25W1/0

Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	0.90	38.00	19.84	133.00		137.03	21.96		0.80	--
2-28-2018	0.98	38.02	20.56	133.57		137.03	21.06		0.80	--
3-31-2018	0.89	38.05	20.04	134.19		137.03	22.54		0.79	--
4-30-2018	0.73	38.07	21.11	134.83		137.03	28.75		0.79	--
5-31-2018	0.80	38.10	18.45	135.40		137.03	23.03		0.79	--
6-30-2018	0.78	38.12	22.18	136.06		137.03	28.29		0.78	--
7-31-2018	0.79	38.15	15.91	136.56		137.03	20.13		0.78	--
8-31-2018	0.77	38.17	18.51	137.13		137.03	23.88		0.78	--
9-30-2018	0.86	38.20	17.61	137.66		137.03	20.57		0.78	--
10-31-2018	0.85	38.22	18.62	138.24		137.03	21.83		0.77	--
11-30-2018	0.83	38.25	16.64	138.74		137.03	20.03		0.77	--
12-31-2018	0.84	38.27	17.05	139.26		137.03	20.38		0.77	--

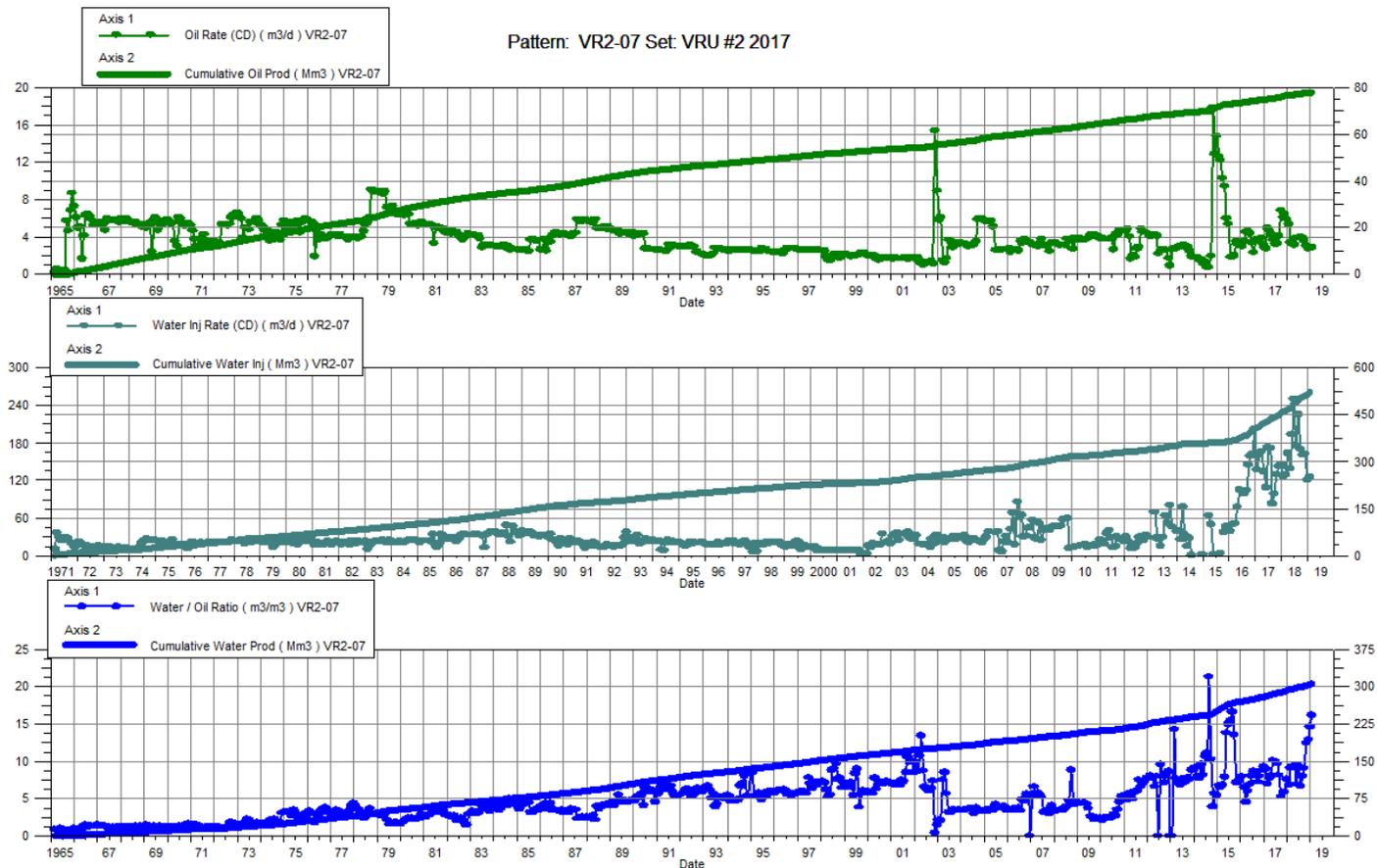


# Virден Roselea Unit No. 2

## Pattern P-07 - 00/10-05-011-25W1/0 &

## 03/16-05-011-25W1/0

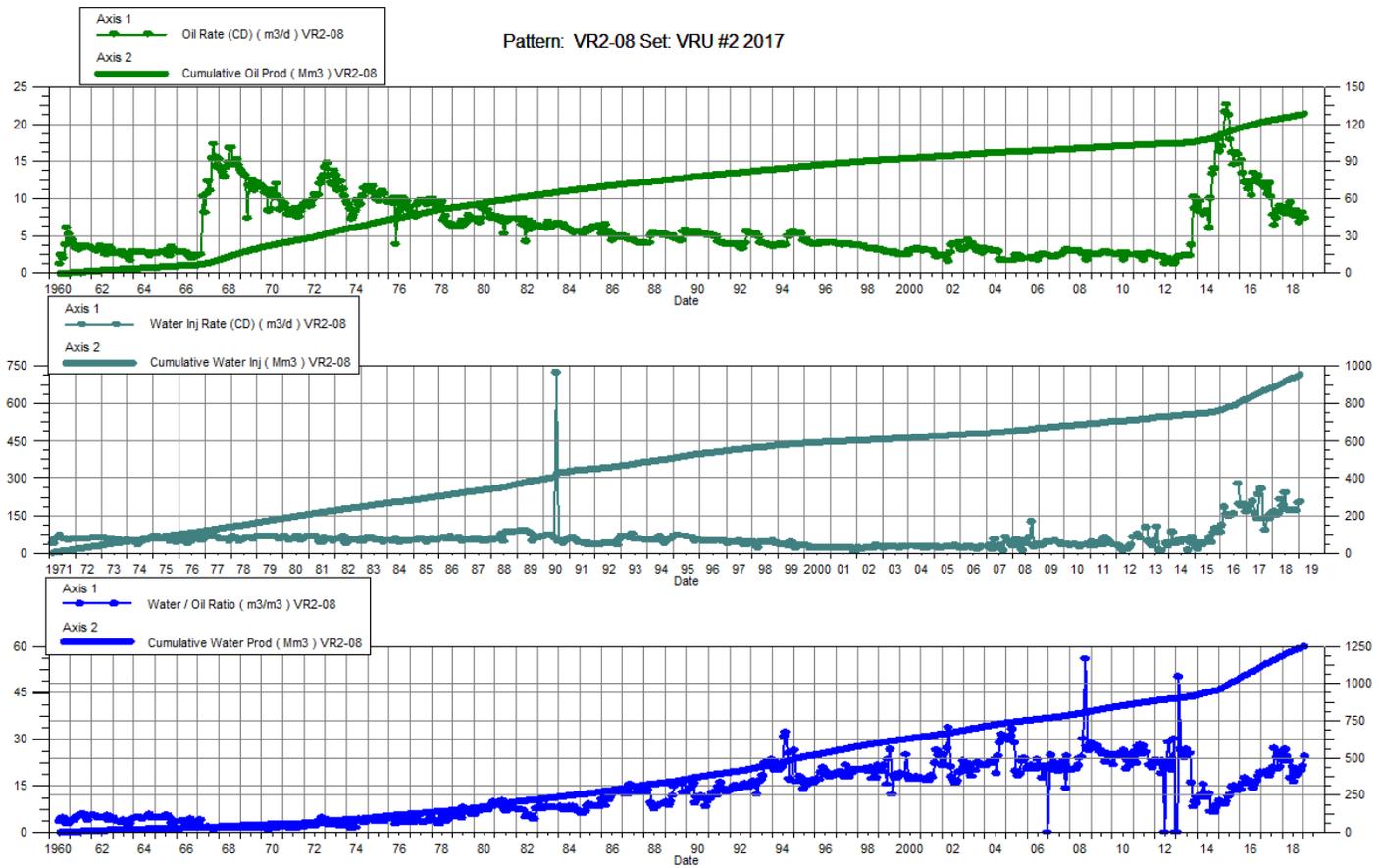
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa	Water Inj Pressure kPa
1-31-2018	5.39	76.90	36.30	292.82	126.08	460.41	6.73	3.02	1.24	5,600.00	3,800.00
2-28-2018	3.38	76.99	30.85	293.68	129.32	464.03	9.12	3.77	1.25	5,600.00	3,800.00
3-31-2018	3.21	77.09	29.67	294.60	164.24	469.12	9.24	4.99	1.26	5,600.00	3,800.00
4-30-2018	3.17	77.19	28.60	295.46	139.12	473.29	9.02	4.37	1.27	5,600.00	3,800.00
5-31-2018	3.98	77.31	27.48	296.31	193.88	479.30	6.91	6.15	1.28	5,600.00	3,800.00
6-30-2018	3.95	77.43	37.32	297.43	251.09	486.84	9.44	6.07	1.29	5,600.00	3,800.00
7-31-2018	4.01	77.55	26.89	298.26	176.52	492.31	6.71	5.70	1.31	5,600.00	3,800.00
8-31-2018	3.91	77.68	31.05	299.23	225.84	499.31	7.95	6.45	1.32	5,600.00	3,800.00
9-30-2018	3.63	77.78	32.70	300.21	170.07	504.41	9.01	4.67	1.33	5,600.00	3,800.00
10-31-2018	3.12	77.88	38.83	301.41	161.26	509.41	12.43	3.84	1.34	5,600.00	3,800.00
11-30-2018	2.80	77.97	36.10	302.49	163.07	514.30	12.87	4.19	1.35	5,600.00	3,800.00
12-31-2018	2.87	78.05	41.98	303.79	120.39	518.03	14.63	2.68	1.35	5,600.00	3,800.00



# Virден Roselea Unit No. 2

## Pattern P-08 - 00/12-06-011-25W1/0

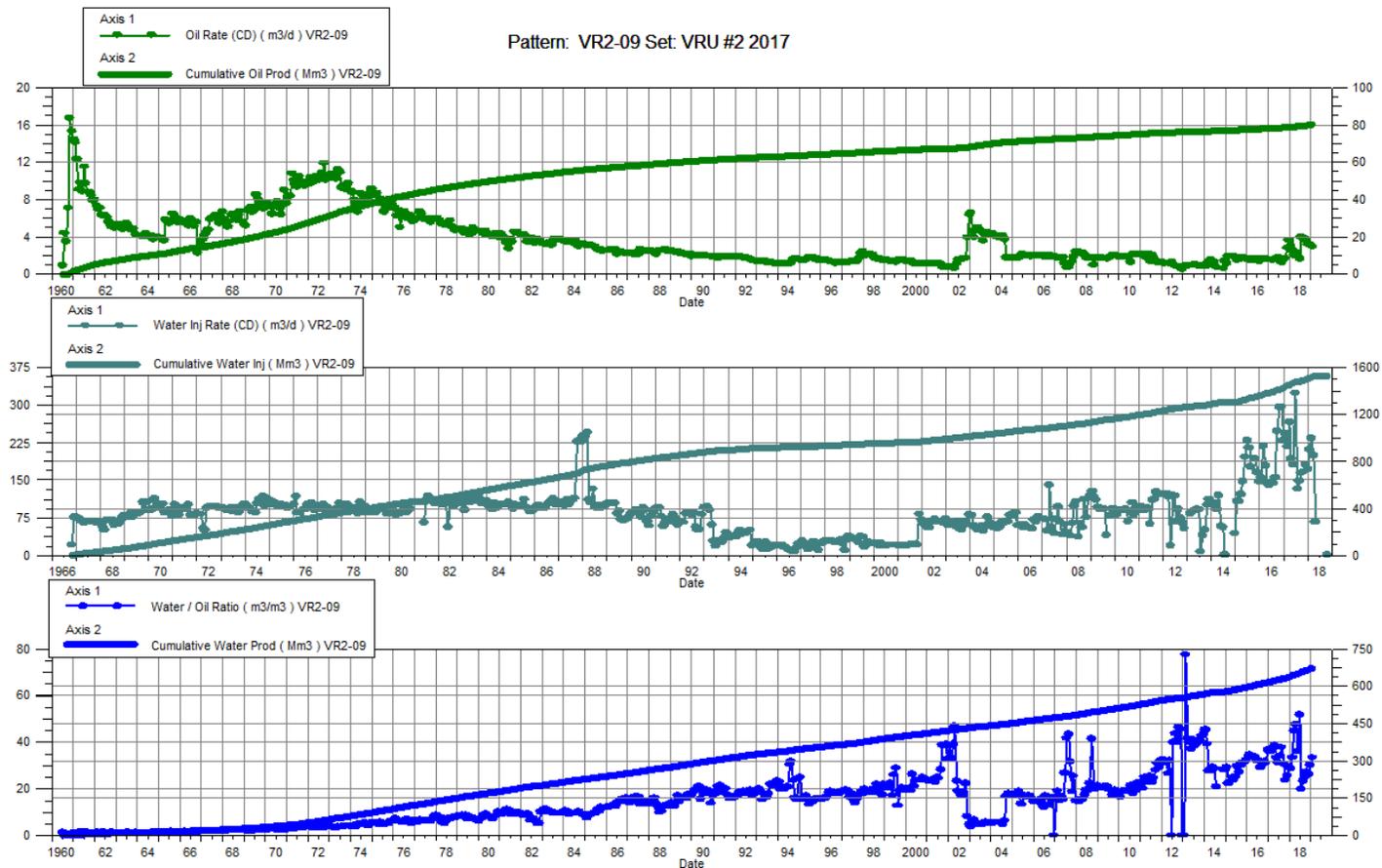
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	8.93	125.41	205.92	1187.97	167.08	893.26	23.06	0.78	0.68	6,600.00
2-28-2018	8.02	125.63	213.96	1193.96	149.65	897.45	26.66	0.67	0.68	6,600.00
3-31-2018	8.08	125.88	197.59	1200.08	162.82	902.49	24.45	0.79	0.68	6,600.00
4-30-2018	8.52	126.14	194.77	1205.93	213.56	908.90	22.86	1.05	0.68	6,600.00
5-31-2018	9.47	126.43	165.46	1211.06	186.73	914.69	17.46	1.07	0.68	6,600.00
6-30-2018	8.49	126.69	178.21	1216.40	242.64	921.97	20.98	1.30	0.69	6,600.00
7-31-2018	7.68	126.93	124.20	1220.25	173.57	927.35	16.17	1.32	0.69	6,600.00
8-31-2018	8.43	127.19	153.44	1225.01	169.39	932.60	18.21	1.05	0.69	6,600.00
9-30-2018	8.07	127.43	153.69	1229.62	173.03	937.79	19.04	1.07	0.69	6,600.00
10-31-2018	6.88	127.64	139.25	1233.94	168.74	943.02	20.25	1.15	0.69	6,600.00
11-30-2018	7.32	127.86	144.95	1238.29	170.97	948.15	19.80	1.12	0.69	6,600.00
12-31-2018	8.13	128.11	173.82	1243.67	201.00	954.38	21.38	1.10	0.69	6,600.00



# Virден Roselea Unit No. 2

## Pattern P-09 - 00/10-06-011-25W1/0

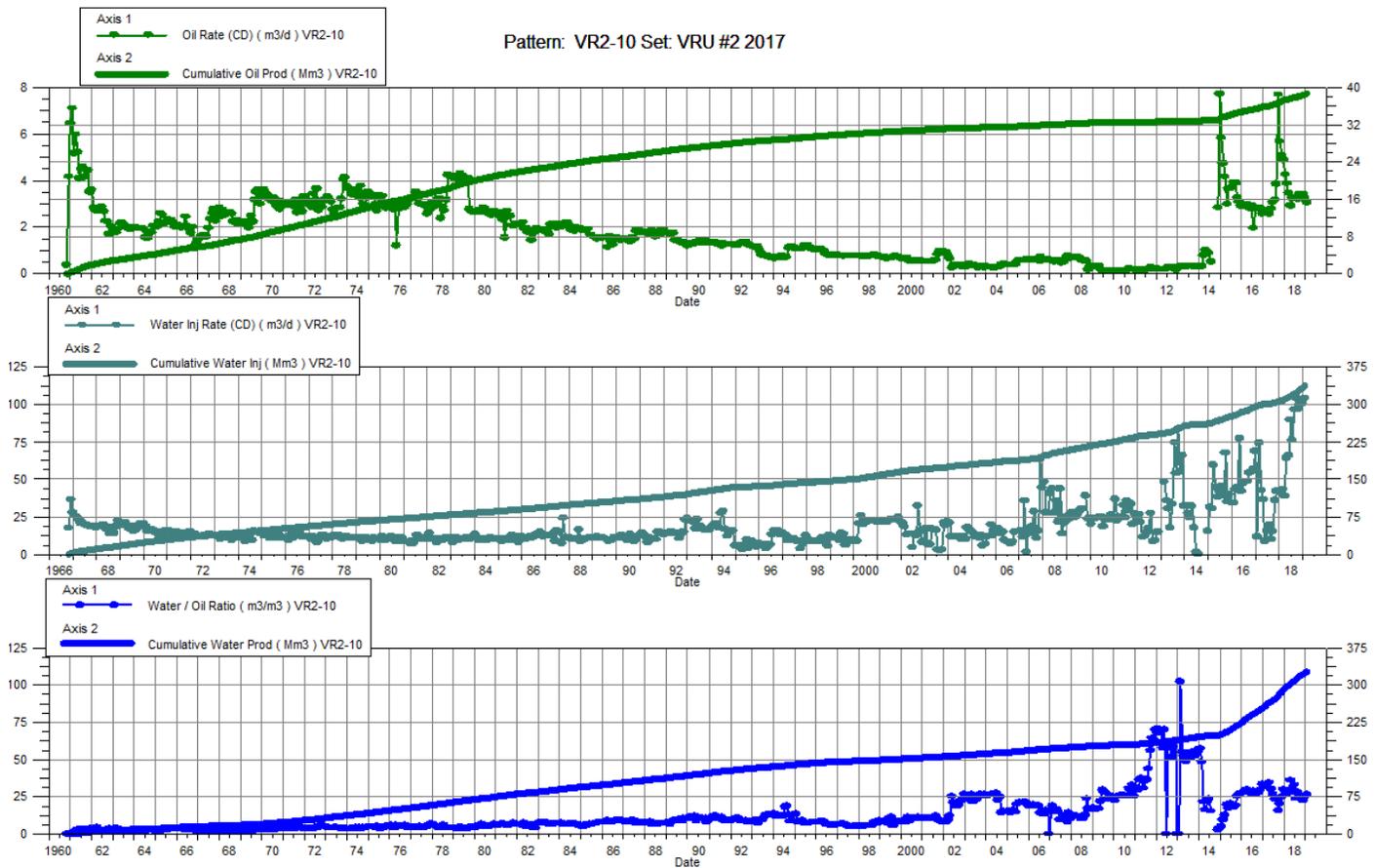
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	3.03	79.14	86.18	638.30	211.52	1516.17	28.40	2.37	2.11	5,000.00
2-28-2018	2.58	79.22	85.89	640.70	233.99	1522.72	33.25	2.64	2.11	5,000.00
3-31-2018	2.04	79.28	91.38	643.54	200.05	1528.92	44.75	2.14	2.11	5,000.00
4-30-2018	2.08	79.34	98.70	646.50	66.40	1530.91	47.43	0.66	2.11	5,000.00
5-31-2018	2.39	79.41	86.46	649.18		1530.91	36.12		2.10	5,000.00
6-30-2018	1.67	79.47	86.45	651.77		1530.91	51.61		2.09	5,000.00
7-31-2018	4.04	79.59	80.14	654.26		1530.91	19.85		2.08	5,000.00
8-31-2018	3.93	79.71	91.58	657.09		1530.91	23.31		2.07	5,000.00
9-30-2018	3.76	79.82	93.61	659.90		1530.91	24.93		2.07	5,000.00
10-31-2018	3.57	79.94	96.87	662.91	0.97	1530.94	27.15	0.01	2.06	5,000.00
11-30-2018	3.24	80.03	85.14	665.46		1530.94	26.30		2.05	5,000.00
12-31-2018	3.16	80.13	95.32	668.41		1530.94	30.12		2.04	5,000.00



# Virден Roselea Unit No. 2

## Pattern P-10 - 00/12-05-011-25W1/0

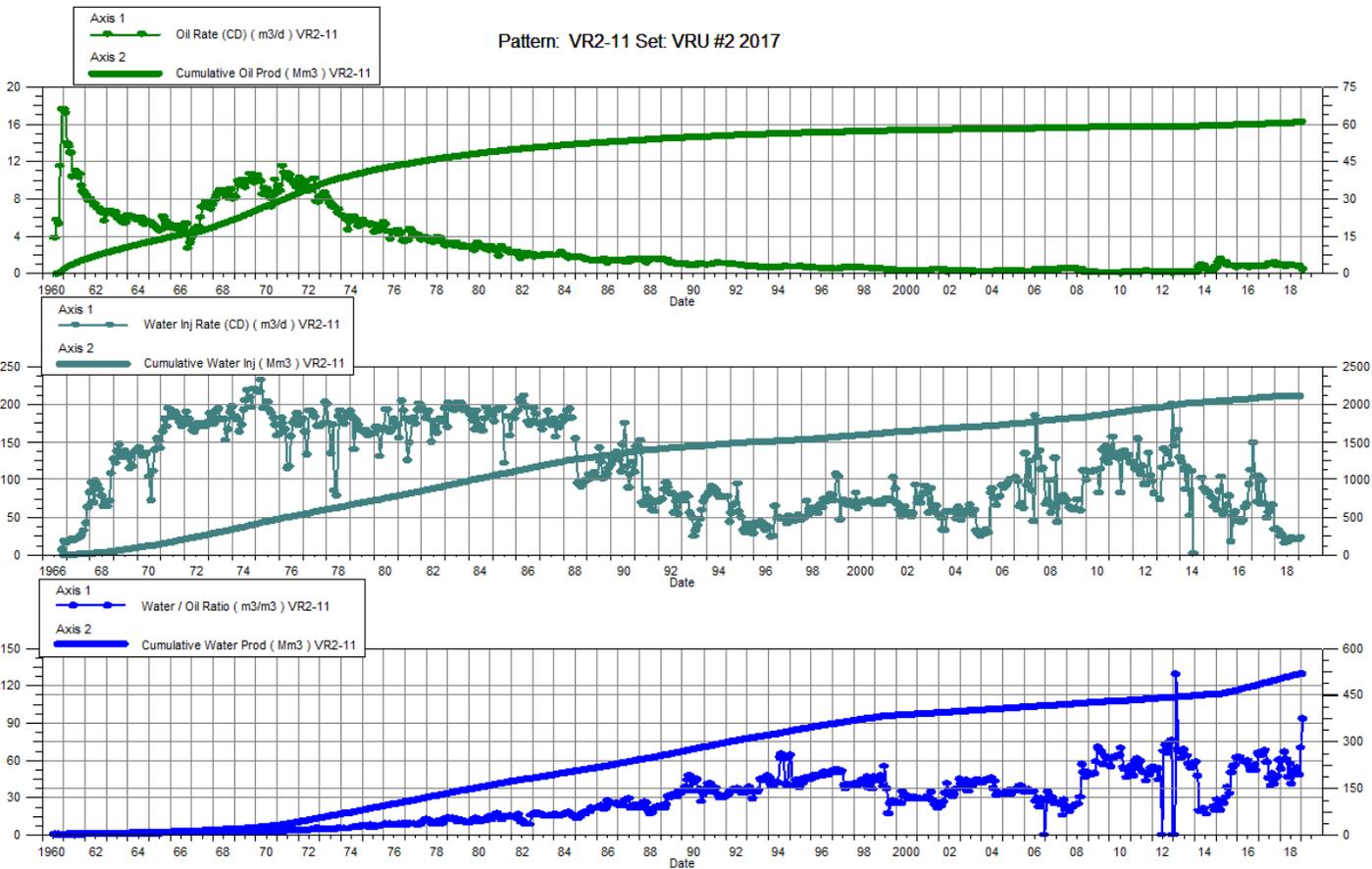
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	4.28	37.40	115.28	293.18	41.45	308.55	26.91	0.35	0.93	3,800.00
2-28-2018	3.87	37.51	104.86	296.12	43.50	309.77	27.07	0.40	0.93	3,800.00
3-31-2018	3.46	37.62	100.94	299.25	38.93	310.98	29.19	0.37	0.92	3,800.00
4-30-2018	2.92	37.70	105.32	302.41	64.25	312.90	36.11	0.59	0.92	3,800.00
5-31-2018	3.27	37.80	91.36	305.24	66.13	314.95	27.98	0.70	0.92	3,800.00
6-30-2018	3.25	37.90	107.37	308.46	90.17	317.66	33.08	0.82	0.92	3,800.00
7-31-2018	3.28	38.00	77.79	310.87	76.26	320.02	23.72	0.94	0.92	3,800.00
8-31-2018	3.20	38.10	89.22	313.64	96.74	323.02	27.88	1.05	0.92	3,800.00
9-30-2018	3.43	38.21	83.63	316.15	104.17	326.15	24.36	1.20	0.92	3,800.00
10-31-2018	3.45	38.31	85.44	318.79	97.06	329.16	24.77	1.09	0.92	3,800.00
11-30-2018	3.42	38.42	77.22	321.11	99.97	332.15	22.57	1.24	0.92	3,800.00
12-31-2018	3.29	38.52	80.65	323.61	100.68	335.28	24.52	1.20	0.92	3,800.00



# Virден Roselea Unit No. 2

## Pattern P-11 - 00/08-06-011-25W1/0

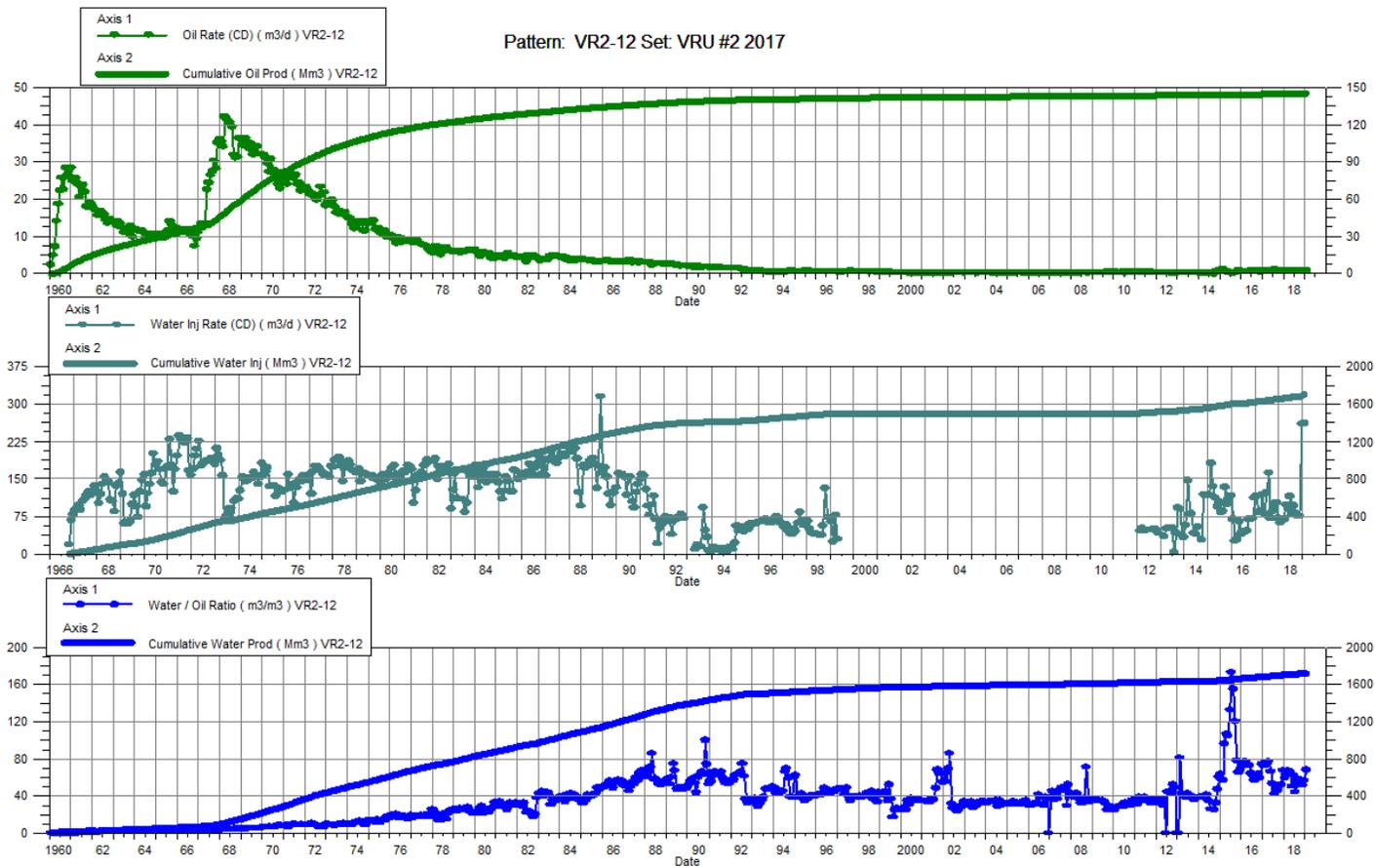
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemnt Ratio	Water Inj Pressure kPa
1-31-2018	0.97	60.73	51.31	502.48	34.10	2115.74	53.06	0.65	3.75	4,200.00
2-28-2018	0.90	60.75	53.67	503.98	31.61	2116.62	59.72	0.58	3.74	4,200.00
3-31-2018	0.76	60.78	50.55	505.55	23.92	2117.36	66.74	0.47	3.73	4,200.00
4-30-2018	0.83	60.80	50.81	507.07	26.08	2118.15	60.88	0.51	3.72	4,200.00
5-31-2018	0.95	60.83	44.20	508.44	15.27	2118.62	46.29	0.34	3.71	4,200.00
6-30-2018	0.94	60.86	53.74	510.05	20.01	2119.22	56.95	0.37	3.70	4,200.00
7-31-2018	0.95	60.89	38.82	511.26	16.43	2119.73	40.93	0.41	3.70	4,200.00
8-31-2018	0.92	60.92	44.35	512.63	21.65	2120.40	48.09	0.48	3.69	4,200.00
9-30-2018	0.88	60.95	45.34	513.99	21.63	2121.05	51.45	0.47	3.68	4,200.00
10-31-2018	0.87	60.97	47.04	515.45	19.65	2121.66	53.87	0.41	3.67	4,200.00
11-30-2018	0.87	61.00	41.96	516.71	19.90	2122.26	48.09	0.46	3.67	4,200.00
12-31-2018	0.65	61.02	45.41	518.12	20.03	2122.88	70.02	0.44	3.66	4,200.00



# Virден Roselea Unit No. 2

## Pattern P-12 - 00/02-06-011-25W1/0

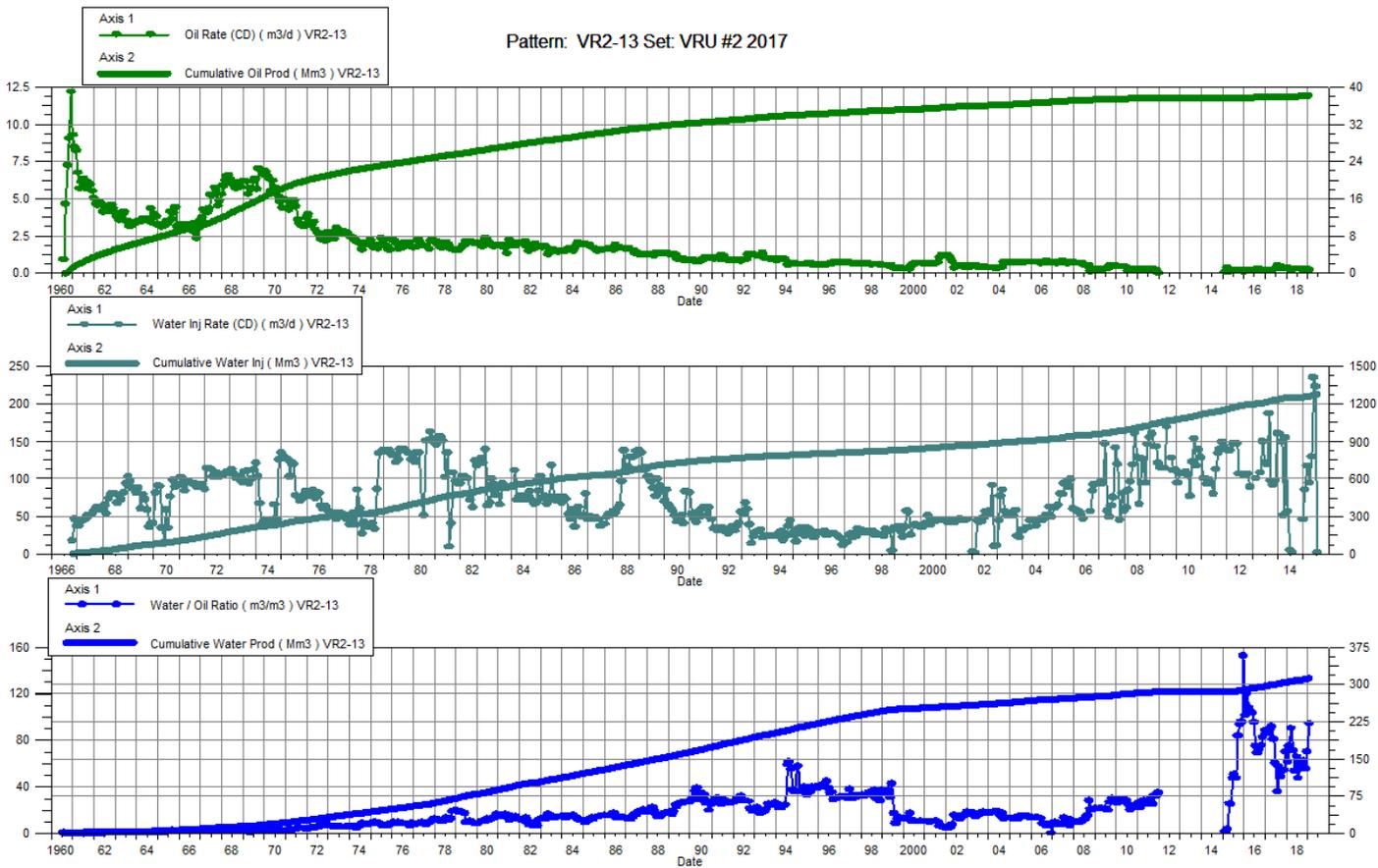
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	0.91	145.14	53.64	1697.67	61.90	1664.18	58.82	1.13	0.90	5,400.00
2-28-2018	0.90	145.16	57.25	1699.27	65.80	1666.02	63.50	1.13	0.90	5,400.00
3-31-2018	0.82	145.19	54.99	1700.98	69.33	1668.17	67.33	1.24	0.90	5,400.00
4-30-2018	0.68	145.21	44.54	1702.31	98.53	1671.13	65.64	2.18	0.90	5,400.00
5-31-2018	0.67	145.23	33.88	1703.36	89.77	1673.91	50.46	2.60	0.90	5,400.00
6-30-2018	0.69	145.25	42.77	1704.64	115.62	1677.38	62.24	2.66	0.91	5,400.00
7-31-2018	0.97	145.28	42.71	1705.97	78.84	1679.82	44.01	1.80	0.91	5,400.00
8-31-2018	0.94	145.31	48.80	1707.48	97.06	1682.83	51.75	1.95	0.91	5,400.00
9-30-2018	0.90	145.34	49.88	1708.98	81.47	1685.28	55.31	1.60	0.91	5,400.00
10-31-2018	0.89	145.36	51.81	1710.58	76.16	1687.64	57.96	1.45	0.91	5,400.00
11-30-2018	0.91	145.39	46.80	1711.99	75.13	1689.89	51.58	1.57	0.91	5,400.00
12-31-2018	0.93	145.42	52.54	1713.62	261.00	1697.98	56.31	4.88	0.91	5,400.00



# Virден Roselea Unit No. 2

## Pattern P-13 - 00/04-05-011-25W1/0

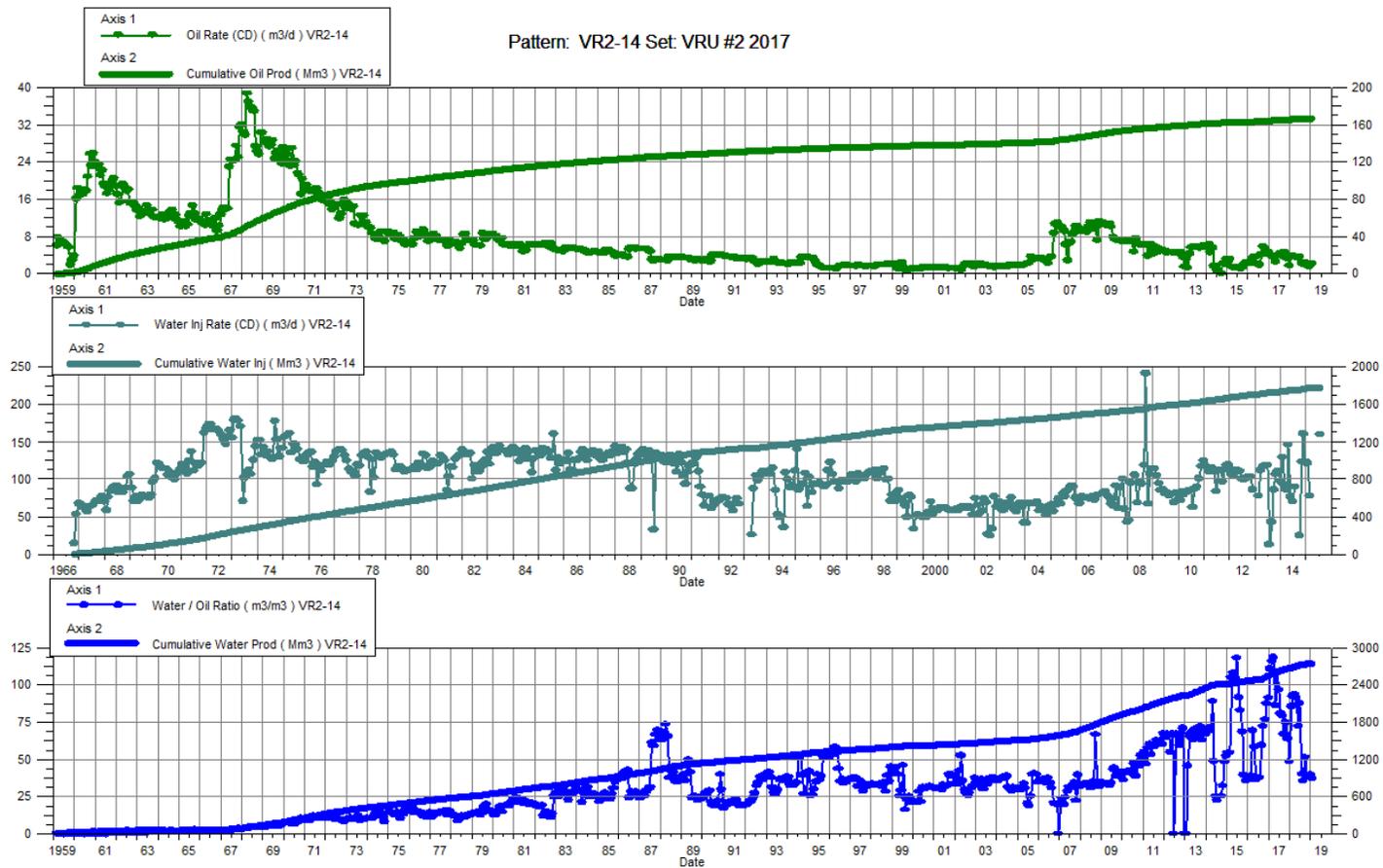
Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	0.4	38.05	22.29	304.01		1285.3	61.0		3.75	3,800.00
2-28-2018	0.3	38.06	22.70	304.65		1285.3	74.8		3.74	3,800.00
3-31-2018	0.2	38.07	20.84	305.29		1285.3	90.2		3.74	3,800.00
4-30-2018	0.3	38.08	20.66	305.91		1285.3	71.1		3.73	3,800.00
5-31-2018	0.3	38.09	17.94	306.47		1285.3	53.5		3.72	3,800.00
6-30-2018	0.3	38.10	21.82	307.12		1285.3	65.7		3.72	3,800.00
7-31-2018	0.3	38.11	15.76	307.61		1285.3	47.3		3.71	3,800.00
8-31-2018	0.3	38.12	18.01	308.17		1285.3	55.5		3.70	3,800.00
9-30-2018	0.3	38.13	18.40	308.72		1285.3	59.4		3.70	3,800.00
10-31-2018	0.3	38.14	19.10	309.31		1285.3	62.2		3.69	3,800.00
11-30-2018	0.3	38.15	17.04	309.83		1285.3	55.6		3.69	3,800.00
12-31-2018	0.3	38.16	20.32	310.46		1285.3	70.1		3.68	3,800.00



# Virден Roselea Unit No. 2

## Pattern P-14 - 00/10-36-010-26W1/0

Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	3.98	166.12	338.72	2668.82		1786.49	85.14		0.63	3,000.00
2-28-2018	3.93	166.23	361.46	2678.94		1786.49	91.99		0.63	3,000.00
3-31-2018	3.73	166.35	347.67	2689.72		1786.49	93.31		0.63	3,000.00
4-30-2018	3.49	166.45	319.54	2699.31		1786.49	91.58		0.62	3,000.00
5-31-2018	3.67	166.56	263.52	2707.48		1786.49	71.88		0.62	3,000.00
6-30-2018	3.71	166.68	325.79	2717.25		1786.49	87.77		0.62	3,000.00
7-31-2018	2.48	166.75	98.95	2720.32		1786.49	39.92		0.62	3,000.00
8-31-2018	2.10	166.82	73.70	2722.60		1786.49	35.15		0.62	3,000.00
9-30-2018	2.49	166.89	127.41	2726.43		1786.49	51.22		0.62	3,000.00
10-31-2018	1.99	166.95	78.34	2728.85		1786.49	39.39		0.62	3,000.00
11-30-2018	1.56	167.00	60.29	2730.66		1786.49	38.73		0.62	3,000.00
12-31-2018	1.94	167.06	76.58	2733.04		1786.49	39.39		0.62	3,000.00



# Virден Roselea Unit No. 2

## Pattern P-15 - 00/12-31-010-25W1/0

Date	Oil Rate (CD) m3/d	Cum Oil Prod Mm3	Water Rate (CD) m3/d	Cum Water Prod Mm3	Water Inj Rate (CD) m3/d	Cum Water Inj Mm3	Water Oil Ratio m3/m3	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio	Water Inj Pressure kPa
1-31-2018	0.29	53.08	6.90	478.17		483.90	23.65		0.91	--
2-28-2018	0.29	53.09	7.37	478.37		483.90	25.63		0.91	--
3-31-2018	0.27	53.10	7.09	478.59		483.90	25.85		0.91	--
4-30-2018	0.29	53.10	7.20	478.81		483.90	24.42		0.91	--
5-31-2018	0.34	53.12	6.27	479.00		483.90	18.61		0.91	--
6-30-2018	0.33	53.13	7.63	479.23		483.90	23.00		0.91	--
7-31-2018	0.23	53.13	3.87	479.35		483.90	16.53		0.91	--
8-31-2018	0.32	53.14	6.30	479.55		483.90	19.42		0.91	--
9-30-2018	0.31	53.15	6.43	479.74		483.90	20.76		0.91	--
10-31-2018	0.31	53.16	6.68	479.95		483.90	21.67		0.91	--
11-30-2018	0.31	53.17	5.96	480.13		483.90	19.42		0.91	--
12-31-2018	0.05	53.17	1.01	480.16		483.90	20.19		0.91	--

