

**East Manson Unit No. 7  
Waterflood EOR Project**

**2016 Annual Report**

**February 23, 2017  
Crescent Point Energy Corporation**

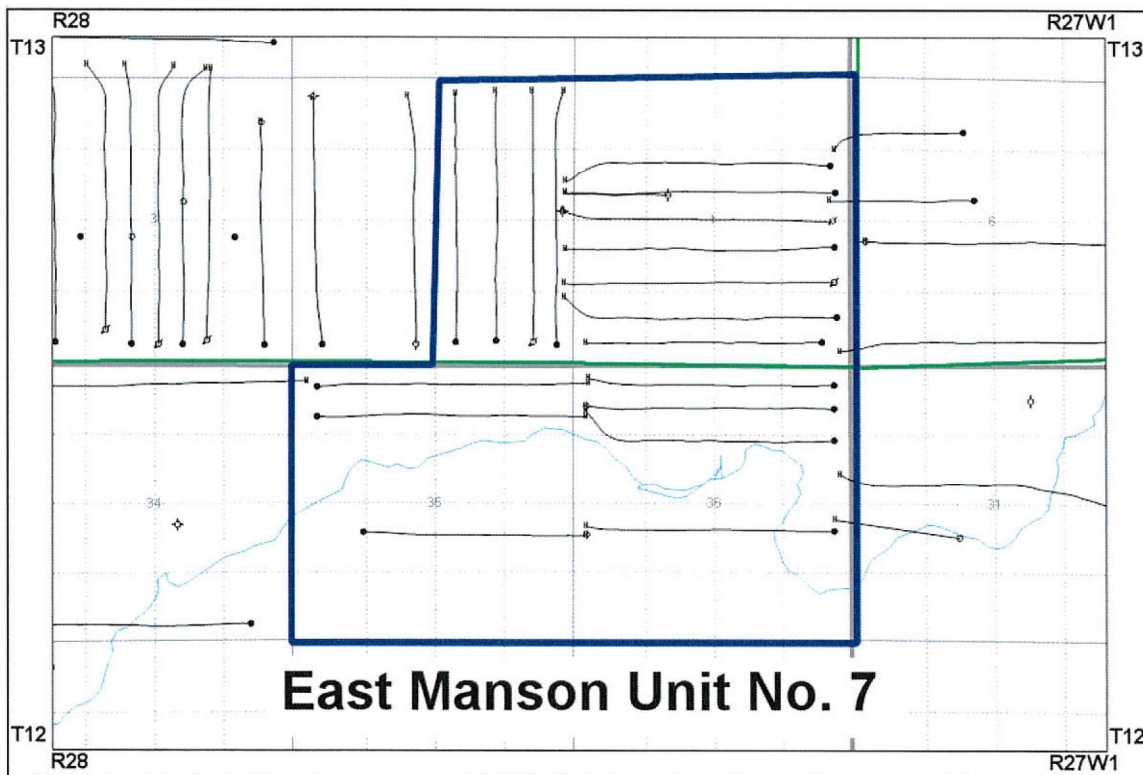
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## Introduction

East Manson Unit No. 7 (EM7) was approved on April 20, 2016. EM7 includes 15 horizontal producing wells and 3 water injection wells located in E/2 2-13-28, Sections 1-13-28, 35-12-28, 36-12-28 as shown in the figure below.

**Figure 1: East Manson Unit No. 7 Area Outline**



Crescent Point Energy (CPG), in accordance with Section 73 of the Manitoba Drilling and Production Regulation, hereby submits the 2016 Annual Progress Report for EM7.

## Production History

The first well that was drilled was 00/09-01-013-28W1/2 and was placed on production March 2013 and a second was drilled in August 2013. In 2014 and 2015, development continued with the drilling of 4 wells and 9 wells respectively. Production peaked in September 2015 at 140.2 m<sup>3</sup>/d (882.1 bbl/d) with a 37.4% watercut. Production in December 2016 was 79.3 m<sup>3</sup>/d (497.1 bbl/d) with a 47.3% watercut. Injector conversions and facility work started in July 2016 and water injection commenced in August 2016. The oil production rate, injection rate, and WOR during each month for the whole project are presented in Appendix C. The rate and WOR are plotted in Figure 2.

**Figure 2: East Manson Unit No. 7 Production**

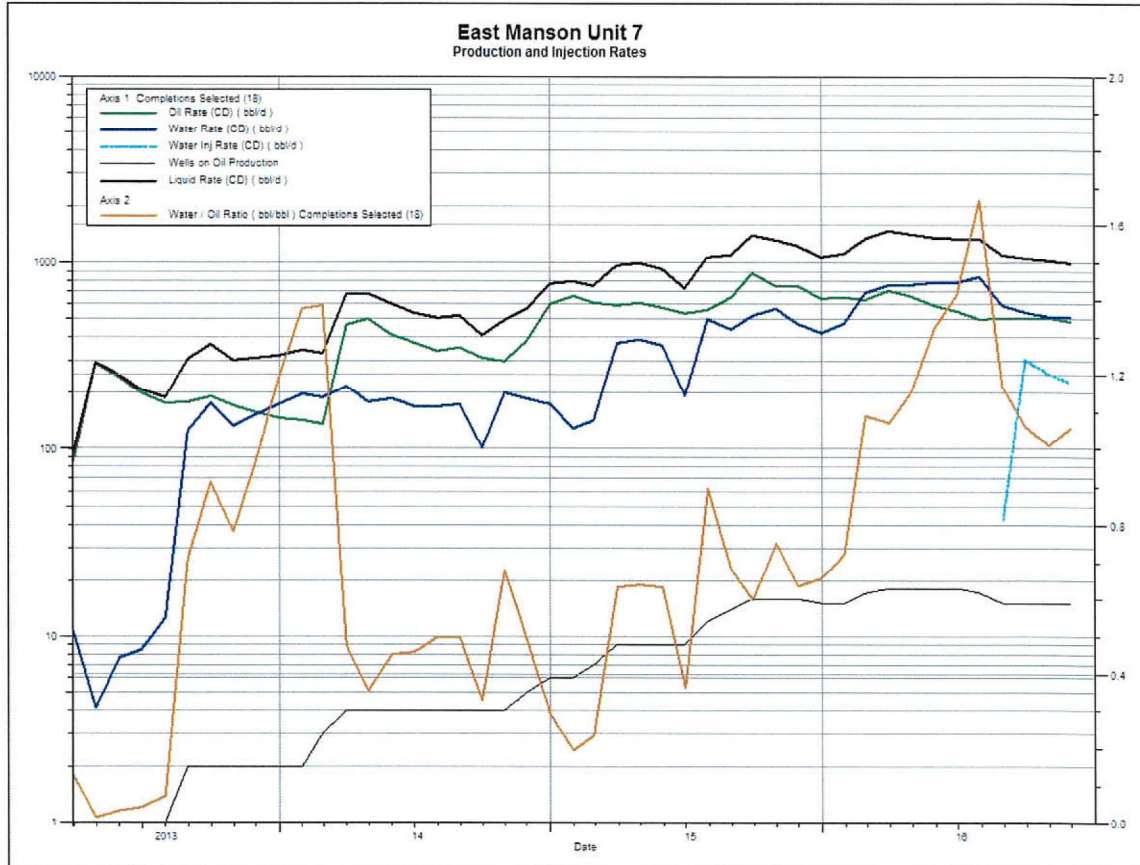
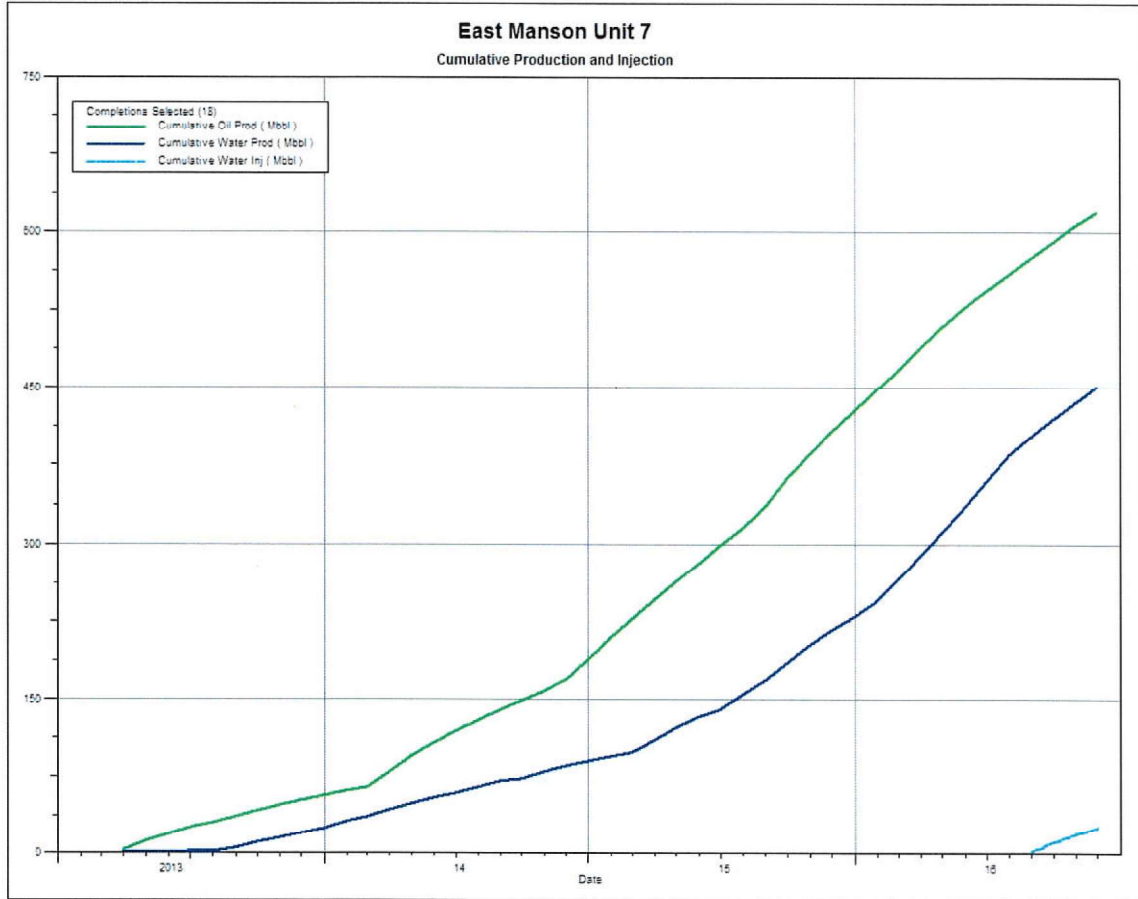


Figure 3 shows the cumulative production for EM7 to the end of November 2016 is 98.7  $\text{e}^3\text{m}^3$  (620.6 mbbbl) of oil and 71.7  $\text{e}^3\text{m}^3$  (450.7 mbbbl) of water, which represents a cumulative recovery factor to date of 6.4%. The cumulative volume of oil, water produced, and fluid injected for the whole project are presented in Appendix C.

**Figure 3: East Manson Unit No. 7 Cumulative Production and Water Injected**



## Waterflood History

Water injection started in February 2016. As of December 2016, the Unit has 3 active horizontal injection wells at 02/01-02-013-28W1/0, 00/08-01-013-28W1/0 and 00/09-01-013-28W1/2. A summary of each injector is presented in Appendix C.

## Waterflood Operating Strategy

### Water Source and Quality

The injection water for EM7 will be produced water from the 16-4-13-28W1 battery, where it is treated with scale inhibitor, filtered to 5.0 micron and distributed to the injection system.

### Injection Wellhead Pressures

The maximum allowable wellhead injection pressure in EM7 is 5700 kPa. The monthly wellhead injection pressures for each injection well are summarized in Appendix B, showing pressures since August 2016.

## Reservoir Pressure

**Table 1: East Manson Unit 7 Reservoir Pressures**

UWI	Date	Pressure (kPa)
00/01-02-013-28W1/0	2/22/2014	5,717
00/01-01-013-28W1/0	3/4/2014	5,760
00/13-35-012-28W1/0	10/28/2014	5,581
00/05-35-012-28W1/0	1/28/2015	5,709
00/08-36-012-28W1/0	2/6/2015	6,240
02/09-01-013-28W1/0	7/7/2015	3,699
02/01-01-013-28W1/0	7/17/2015	2,508
02/16-36-012-28W1/0	8/17/2015	2,903
02/13-35-012-28W1/0	8/21/2015	3,466
02/02-02-013-28W1/0	8/27/2015	4,939
03/09-01-013-28W1/0	2/19/2016	3,574
00/09-01-013-28W1/2	7/17/2016	2,057
02/01-02-013-28W1/0	8/6/2016	2,921
00/08-01-013-28W1/0	8/6/2016	1,743

## Well Servicing

**Table 2: East Manson Unit 7 2016 Well Servicing**

UWI	Date	Well Service
100/09-01-013-28W1/02	7/17/2016	Injector Conversion
100/16-36-012-28W1/00	7/25/2016	Rod Repair
100/08-01-013-28W1/00	7/26/2016	Injector Conversion
102/01-02-013-28W1/00	8/6/2016	Injector Conversion
100/05-35-012-28W1/00	9/18/2016	Rod Repair
100/08-36-012-28W1/00	11/20/2016	Pump Change
100/01-02-013-28W1/00	12/20/2016	Rod Repair

## **Voidage Replacement**

Cumulative voidage for East Manson Unit 7 was 0.02 in November 2016 and continues to climb steadily with a monthly voidage of about 0.22. Calculations, plots and tables of the Voidage Replacement Ratio on a monthly and cumulative basis for each the whole project area is presented in Appendix C.

## Waterflood Performance

The original oil-in-place (OOIP) of  $1,536.6 \text{ e}^3\text{m}^3$  with cumulative oil recovered to date of  $98.7 \text{ e}^3\text{m}^3$  results in a recovery factor of 6.4%. At this time, the ultimate recovery factor has not yet been determined due to the continual increase in production.

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Crescent Point Energy Corporation

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## **List of Appendices**

Appendix A: Well Name and Status

Appendix B: Average Monthly Injection Pressures

Appendix C: Injector Pattern Production/Injection Rates, Cumulative VRRs,  
Plots and Tables



## Appendix A

UWI	Surface Location	Well Status
00/05-35-012-28W1/0	00/05-36-012-28W1/0	Producing
00/13-35-012-28W1/0	00/13-36-012-28W1/0	Producing
02/13-35-012-28W1/0	02/13-36-012-28W1/0	Producing
00/08-36-012-28W1/0	00/05-36-012-28W1/0	Producing
00/09-36-012-28W1/0	00/13-36-012-28W1/0	Producing
00/16-36-012-28W1/0	00/13-36-012-28W1/0	Producing
02/16-36-012-28W1/0	02/13-36-012-28W1/0	Producing
00/01-01-013-28W1/0	00/01-02-013-28W1/0	Producing
02/01-01-013-28W1/0	02/04-01-013-28W1/0	Producing
00/08-01-013-28W1/0	00/08-02-013-28W1/0	Injection
02/08-01-013-28W1/0	02/08-02-013-28W1/0	Producing
00/09-01-013-28W1/2	00/09-02-013-28W1/2	Injection
02/09-01-013-28W1/2	02/09-02-013-28W1/0	Producing
03/09-01-013-28W1/0	03/09-02-013-28W1/0	Producing
00/01-02-013-28W1/0	00/16-02-013-28W1/0	Producing
02/01-02-013-28W1/0	02/16-02-013-28W1/0	Injection
00/02-02-013-28W1/0	00/15-02-013-28W1/0	Producing
02/02-02-013-28W1/0	02/15-02-013-28W1/0	Producing

Appendix B

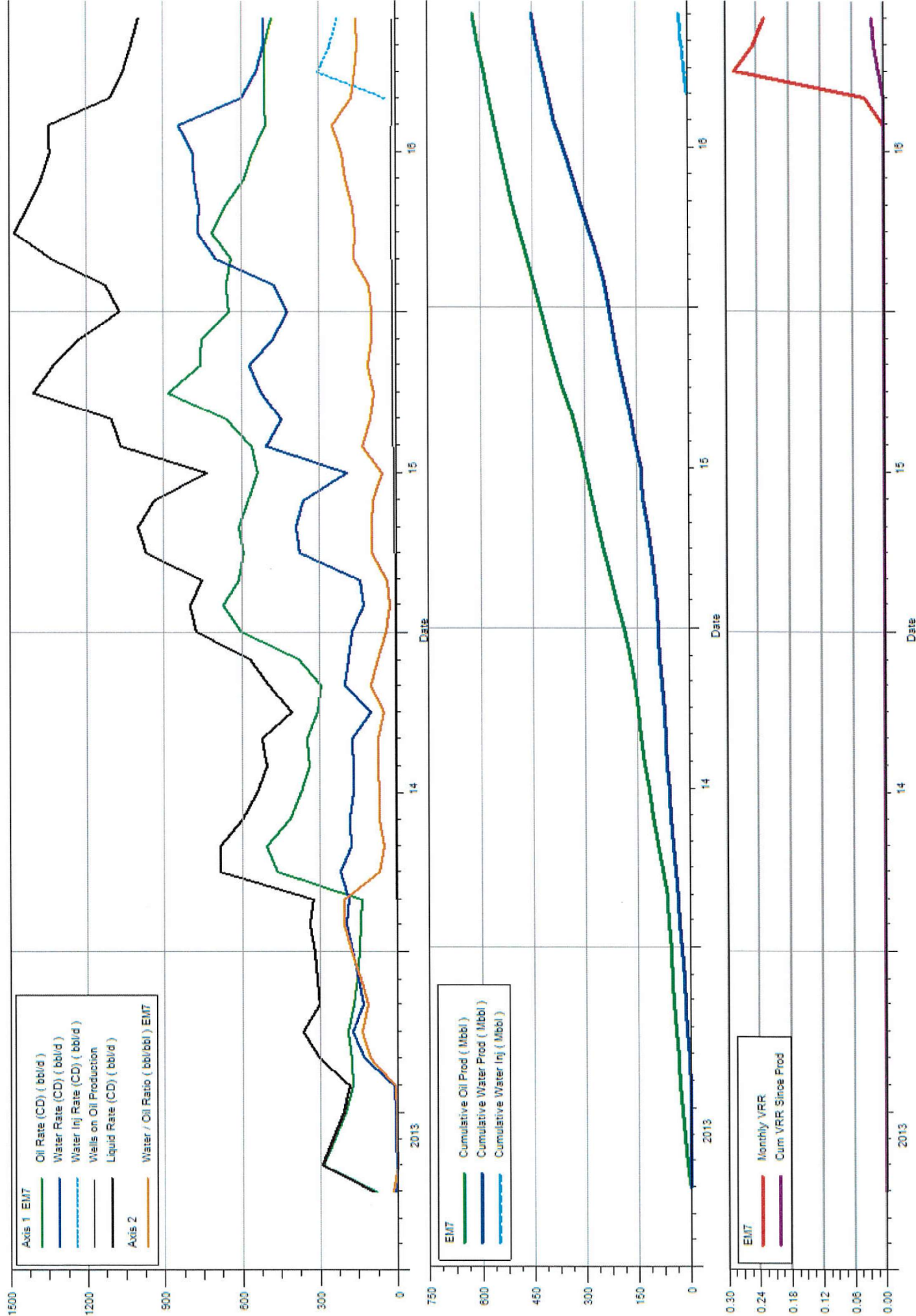
Average Monthly Injection Pressures

	Injection Pressure		
Month	00/08-01-013-28W1/0	00/09-01-013-28W1/2	02/01-02-013-28W1/0
Aug-16	118.93	143.07	1,558.21
Sep-16	1,118.10	1,226.16	4,104.90
Oct-16	2,463.65	2,431.40	4,623.71
Nov-16	3,132.28	2,987.03	4,306.46
Dec-16	2,539.49	3,113.09	4,376.16

**Appendix C**  
**Rates and WRR**  
**Plots and Tables**

# East Manson Unit 7

Oil Rate (CD) : 485.20 bbl/d  
Water Rate (CD) : 513.21 bbl/d  
Water Inj Rate (CD) : 230.16 bbl/d



Pattern: EM7 Set: Unit 7

	Oil Rate (CD)	Water Rate (CD)	Water Inj Rate (CD)	Cum Oil Prod	Cum Water Prod	Cum Water Inj	Water Cut	Voidage Replacement Ratio	Cum Voidage Replacemt Ratio
Date	bbl/d	bbl/d	bbl/d	Mbbl	Mbbl	Mbbl	%		
3/31/2013	84.63	10.57		2.62	0.33	0	11.1	0	0
4/30/2013	290.61	4.13		11.34	0.45	0	1.4	0	0
5/31/2013	245.69	7.59		18.96	0.69	0	3	0	0
6/30/2013	202.03	8.43		25.02	0.94	0	4	0	0
7/31/2013	176.5	12.46		30.49	1.33	0	6.59	0	0
8/31/2013	178.47	126.99		36.02	5.26	0	41.57	0	0
9/30/2013	193.16	176.49		41.82	10.56	0	47.75	0	0
10/31/2013	170.88	133.4		47.12	14.69	0	43.84	0	0
11/30/2013	158.99	153.7		51.88	19.3	0	49.16	0	0
12/31/2013	146.33	174.23		56.42	24.71	0	54.35	0	0
1/31/2014	143.31	197.62		60.86	30.83	0	57.97	0	0
2/28/2014	137.32	190.65		64.71	36.17	0	58.13	0	0
3/31/2014	465.69	219.53		79.14	42.98	0	32.04	0	0
4/30/2014	505.53	179.05		94.31	48.35	0	26.15	0	0
5/31/2014	412.98	186.22		107.11	54.12	0	31.08	0	0
6/30/2014	371.73	169.89		118.26	59.22	0	31.37	0	0
7/31/2014	338.78	168.63		128.77	64.44	0	33.23	0	0
8/31/2014	351.17	174.49		139.65	69.85	0	33.19	0	0
9/30/2014	309.19	101.66		148.93	72.9	0	24.74	0	0
10/31/2014	296.05	200.64		158.11	79.12	0	40.4	0	0
11/30/2014	381.85	187.18		169.56	84.74	0	32.89	0	0
12/31/2014	603.9	174.31		188.28	90.14	0	22.4	0	0
1/31/2015	669.84	129.16		209.05	94.15	0	16.17	0	0
2/28/2015	611.86	142.91		226.18	98.15	0	18.93	0	0
3/31/2015	594.61	375.74		244.61	109.8	0	38.72	0	0
4/30/2015	612.29	390.3		262.98	121.5	0	38.93	0	0
5/31/2015	576.43	363.04		280.85	132.76	0	38.64	0	0
6/30/2015	540.36	195.51		297.06	138.62	0	26.57	0	0
7/31/2015	562.9	504.28		314.51	154.26	0	47.25	0	0
8/31/2015	656.07	445.22		334.85	168.06	0	40.43	0	0
9/30/2015	881.64	526.44		361.3	183.85	0	37.39	0	0
10/31/2015	757.76	569.21		384.79	201.5	0	42.9	0	0
11/30/2015	751.9	477.82		407.35	215.83	0	38.86	0	0
12/31/2015	648.05	424.03		427.44	228.98	0	39.55	0	0
1/31/2016	656.25	471.84		447.78	243.6	0	41.83	0	0
2/29/2016	639.17	697.73		466.32	263.84	0	52.19	0	0
3/31/2016	714.32	766.71		488.46	287.61	0	51.77	0	0
4/30/2016	662.86	763.25		508.35	310.5	0	53.52	0	0
5/31/2016	590.94	783.47		526.67	334.79	0	57	0	0
6/30/2016	556.31	787.59		543.35	358.42	0	58.6	0	0
7/31/2016	505.34	842.98		559.02	384.55	0	62.52	0	0
8/31/2016	510.79	596.78	41.82	574.85	403.05	1.3	53.88	0.039	0.001
9/30/2016	511.91	544.76	304.68	590.21	419.39	10.44	51.55	0.297	0.011
10/31/2016	509.13	514.63	255.83	605.99	435.35	18.37	50.27	0.258	0.018
11/30/2016	485.2	513.21	230.16	620.55	450.74	25.27	51.4	0.238	0.024