

WASKADA UNIT NO. 16 - PM 57

Waterflood Progress Report 2020

Prepared for:

Manitoba Industry, Economic Development and Mines

Petroleum Branch

Prepared by:



TUNDRA OIL & GAS

Date: 2021-08-26

Introduction

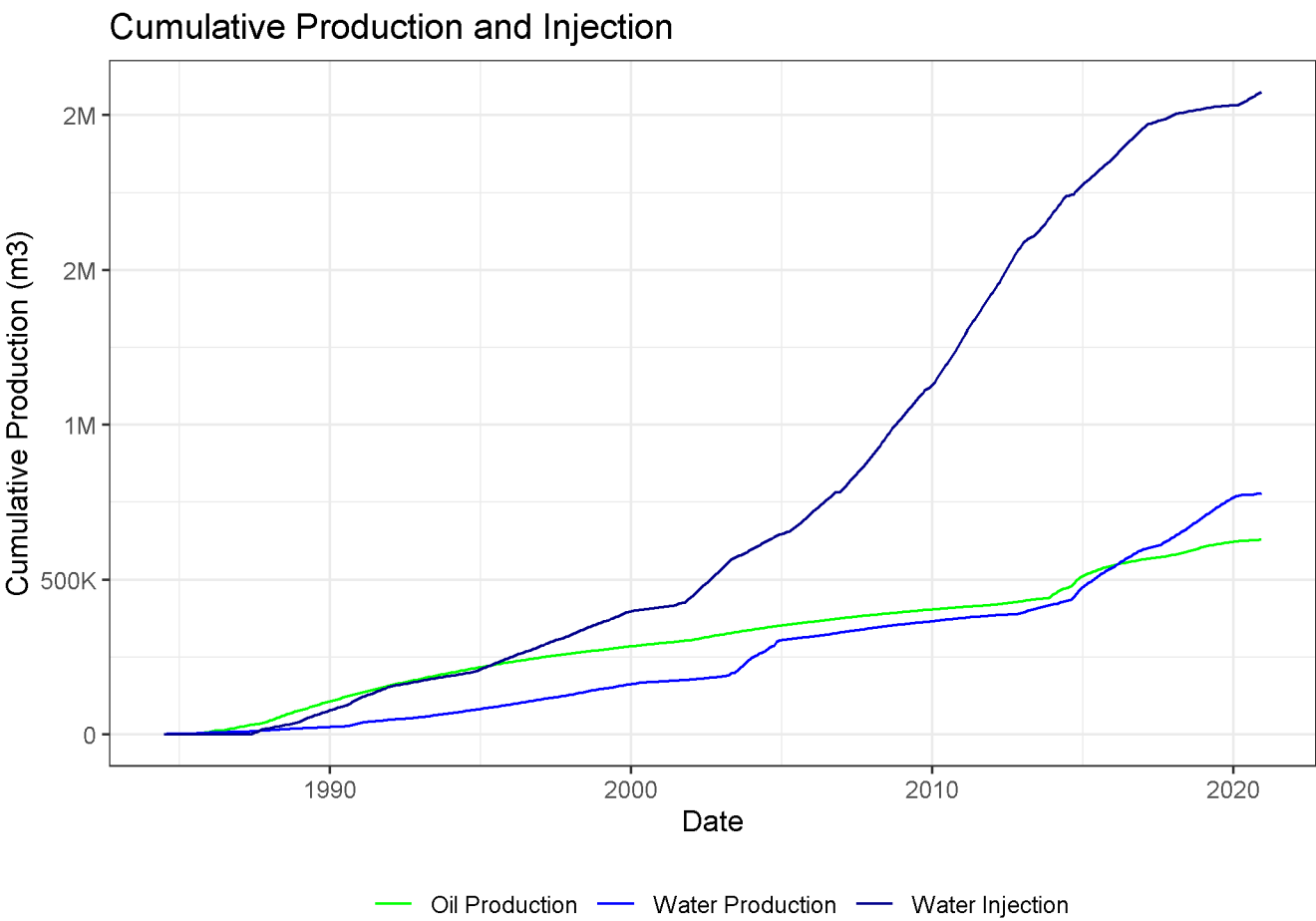
The Waskada Unit No.16 pressure maintenance project commenced water injection into the Lower Amaranth A pool in accordance with Manitoba Energy and Mines Order No. PM 57, dated May 1, 1987. This unit was enlarged on October 1, 1988 to its current boundary. Waskada Unit No. 16 was acquired from EOG Resources Canada Inc. effective October 1, 2014 with Tundra Oil and Gas (Tundra) as the new operator. THE EOR project area contains wells over 33 LSDs in Township 2, Range 25W1. The Unit contains 76 wells. 27 producers, 10 injectors, and 39 abandoned/suspended/other.

Monthly oil and water production rates, injection rate, GOR and WOR

MONTH	Cal Day Oil m3/d	Cal Day Water m3/d	Cal Day Injection m3/d	WOR	GOR
JAN 2020	37.20	148.33	21.71	3.99	0
FEB 2020	29.93	81.32	12.57	2.72	0
MAR 2020	30.33	72.16	39.08	2.38	0
APR 2020	19.59	63.40	113.95	3.24	0
MAY 2020	9.15	8.09	146.23	0.88	0
JUN 2020	12.46	11.19	167.74	0.90	0
JUL 2020	11.39	11.12	162.69	0.98	0
AUG 2020	16.86	28.63	158.25	1.70	0
SEP 2020	16.14	34.34	149.88	2.13	0
OCT 2020	20.46	46.40	141.58	2.27	0
NOV 2020	24.72	43.17	139.57	1.75	0
DEC 2020	27.34	57.01	133.87	2.09	0
Average	21.30	50.43	115.59		

Year summary of produced oil, gas, water and fluid injected

Categories	m3
Oil Production	7,789
Water Production	18,443
Gas Production	0
Water Injection	42,404
Cumulative Oil	629,618
Cumulative Water	780,065
Cumulative Injection	2,074,271



Monthly Wellhead Pressure

All readings are in kPa

UWI	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Average
100.09-04-002-25W1.00	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677
100.16-05-002-25W1.00	328	328	328	328	328	328	328	328	328	328	328	328	328
102.01-09-002-25W1.00	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
102.15-05-002-25W1.00			-83	-60	759	1,939	1,970	1,999	1,992	1,999	1,993	1,986	1,449
103.09-04-002-25W1.00			66	-40	-90	-84	-89	-43	940	1,835	1,997	1,990	648
103.10-05-002-25W1.00			-60	-93	-60	-32	-60	153	655	1,027	1,449	1,524	450
104.03-04-002-25W1.00			987	-94	-93	96	1,029	1,889	1,990	2,229	2,580	2,987	1,360
1C0.06-04-002-25W1.00	3,198	3,068	2,984	3,894	4,972	4,963	4,983	5,003	4,987	4,964	4,965	4,972	4,413
1C0.11-04-002-25W1.00	4,861	4,513	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	760
1C0.12-04-002-25W1.00	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900	4,900

Monthly Injected Volumes

All Volumes are in m3

UWI	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
102.15-05-002-25W1.00			232	789	1,050	1,100	985	939	891	918	921	997	8,822
103.09-04-002-25W1.00			217	734	1,003	1,181	1,220	1,235	1,181	1,136	867	741	9,515
103.10-05-002-25W1.00			217	789	1,051	1,219	1,245	1,237	1,181	1,186	1,188	1,231	10,544
104.03-04-002-25W1.00			237	763	1,043	1,187	1,257	1,176	954	857	929	901	9,304
1C0.06-04-002-25W1.00	308	186	309	344	385	346	336	319	289	292	282	280	3,676
1C0.11-04-002-25W1.00	365	178											543
Grand Total	673	364	1,212	3,419	4,532	5,033	5,043	4,906	4,496	4,389	4,187	4,150	42,404

Voidage

All Volumes are in m3 Oil Formation Volume Factor (Rm3/Sm3) = 1.17								
MONTH	Oil	Water	Injection	Cumulative Oil	Cumulative Water	Cumulative Injection	VRR	Cumulative VRR
JAN 2020	1,153	4,597	673	622,987	766,216	2,032,529	0.113	1.359
FEB 2020	868	2,358	364	623,855	768,574	2,032,893	0.108	1.357
MAR 2020	940	2,237	1,211	624,795	770,811	2,034,104	0.363	1.354
APR 2020	588	1,902	3,419	625,383	772,713	2,037,523	1.320	1.354
MAY 2020	284	251	4,533	625,667	772,964	2,042,056	7.772	1.357
JUN 2020	374	335	5,032	626,041	773,299	2,047,088	6.513	1.359
JUL 2020	353	344	5,043	626,394	773,643	2,052,131	6.662	1.362
AUG 2020	522	887	4,906	626,916	774,530	2,057,037	3.276	1.364
SEP 2020	484	1,030	4,496	627,400	775,560	2,061,533	2.817	1.366
OCT 2020	634	1,438	4,389	628,034	776,998	2,065,922	2.014	1.367
NOV 2020	742	1,296	4,187	628,776	778,294	2,070,109	1.935	1.367
DEC 2020	848	1,767	4,150	629,624	780,061	2,074,259	1.504	1.368

Workovers

UWI	Date	Description
102.04-10-002-25W1.00	2020-11-14	Rigless Acid Stimulation
102.08-09-002-25W1.00	2020-12-01	Rigless Acid Stimulation
102.09-04-002-25W1.00	2020-11-14	Rigless Acid Stimulation
103.04-10-002-25W1.00	2020-12-20	Pump Change & Acid
103.05-09-002-25W1.00	2020-11-12	Rigless Acid Stimulation
103.15-05-002-25W1.00	2020-11-30	Rigless Acid Stimulation
104.09-04-002-25W1.00	2020-12-08	Rigless Acid Stimulation
104.13-10-002-25W1.00	2020-11-16	Rigless Acid Stimulation

Well List

UWI	Type	Status
100.03-04-002-25W1.00	Vertical	Injection
103.03-04-002-25W1.00	Horizontal	Producing
104.03-04-002-25W1.00	Horizontal	Injection
1C0.03-04-002-25W1.00	Vertical	Injection
100.04-04-002-25W1.00	Vertical	Producing
100.05-04-002-25W1.00	Vertical	Injection
100.06-04-002-25W1.00	Vertical	Abandoned Zone
103.06-04-002-25W1.00	Horizontal	Producing
1C0.06-04-002-25W1.00	Vertical	Injection
100.09-04-002-25W1.00	Vertical	Injection
102.09-04-002-25W1.00	Horizontal	Producing
103.09-04-002-25W1.00	Horizontal	Injection
104.09-04-002-25W1.00	Horizontal	Producing
100.10-04-002-25W1.00	Vertical	Producing
1C0.10-04-002-25W1.00	Vertical	Abandoned
100.11-04-002-25W1.00	Vertical	Injection
103.11-04-002-25W1.00	Horizontal	Producing
1C0.11-04-002-25W1.00	Vertical	Injection
100.12-04-002-25W1.00	Vertical	Producing
1C0.12-04-002-25W1.00	Vertical	Injection
100.13-04-002-25W1.02	Vertical	Producing
102.13-04-002-25W1.00	Horizontal	Producing
100.14-04-002-25W1.00	Vertical	Abandoned Zone
1C0.14-04-002-25W1.00	Vertical	Injection
100.15-04-002-25W1.00	Vertical	Injection
102.15-04-002-25W1.00	Vertical	Producing
1C0.15-04-002-25W1.00	Vertical	Injection
100.16-04-002-25W1.00	Vertical	Producing
1C0.16-04-002-25W1.00	Vertical	Injection
100.09-05-002-25W1.00	Vertical	Producing
100.10-05-002-25W1.00	Vertical	Abandoned
102.10-05-002-25W1.00	Horizontal	Producing
103.10-05-002-25W1.00	Horizontal	Injection
100.15-05-002-25W1.00	Vertical	Abandoned Zone
102.15-05-002-25W1.00	Horizontal	Injection
103.15-05-002-25W1.00	Horizontal	Producing
100.16-05-002-25W1.00	Vertical	Injection
100.01-09-002-25W1.00	Vertical	Injection
102.01-09-002-25W1.00	Horizontal	Injection
103.01-09-002-25W1.00	Horizontal	Producing
100.02-09-002-25W1.00	Vertical	Producing
102.02-09-002-25W1.00	Horizontal	Producing
100.03-09-002-25W1.00	Vertical	Abandoned Zone

UWI	Type	Status
1C0.03-09-002-25W1.00	Vertical	Injection
100.04-09-002-25W1.02	Vertical	Producing
102.04-09-002-25W1.00	Horizontal	Producing
100.05-09-002-25W1.00	Vertical	Abandoned
102.05-09-002-25W1.00	Vertical	Producing
103.05-09-002-25W1.00	Horizontal	Producing
104.05-09-002-25W1.00	Horizontal	Producing
100.06-09-002-25W1.00	Vertical	Injection
100.07-09-002-25W1.00	Vertical	Producing
1C0.07-09-002-25W1.00	Vertical	Injection
100.08-09-002-25W1.00	Vertical	Abandoned Zone
102.08-09-002-25W1.00	Horizontal	Producing
100.09-09-002-25W1.00	Vertical	Injection
1C0.09-09-002-25W1.00	Vertical	Abandoned
100.10-09-002-25W1.00	Vertical	Abandoned
102.10-09-002-25W1.00	Horizontal	Producing
103.10-09-002-25W1.00	Horizontal	Producing
100.15-09-002-25W1.00	Vertical	Producing
100.16-09-002-25W1.00	Vertical	Injection
100.04-10-002-25W1.00	Vertical	Producing
102.04-10-002-25W1.00	Horizontal	Producing
103.04-10-002-25W1.00	Horizontal	Producing
1C0.04-10-002-25W1.00	Vertical	Injection
100.05-10-002-25W1.00	Vertical	Injection
102.05-10-002-25W1.00	Horizontal	Injection
100.12-10-002-25W1.00	Vertical	Abandoned Zone
1C0.12-10-002-25W1.00	Vertical	Injection
100.13-10-002-25W1.00	Vertical	Producing
103.13-10-002-25W1.00	Horizontal	Producing
104.13-10-002-25W1.00	Horizontal	Producing
1C0.13-10-002-25W1.00	Vertical	Injection
100.14-10-002-25W1.00	Vertical	Producing
1C0.14-10-002-25W1.00	Vertical	Injection