

WASKADA UNIT NO. 6
WATERFLOOD EOR PROJECT
ANNUAL REPORT FOR 2014

June 16, 2015

Tundra Oil and Gas Partnership

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Attention: **Stacy McBride, P.Eng.**
A/Chief Petroleum Engineer

RE: Waskada Unit No.6

Tundra Oil and Gas (Tundra), as the operator of the Waskada Unit 6 Enhanced Oil Recovery (EOR) project hereby submits the 2014 EOR report as per section 73 of the Drilling and Production Regulations.

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

| MONTH | AVERAGE OIL PRODUCTION m ³ /day | AVERAGE FLUID INJECTION RATE m ³ /day | AVERAGE WATER PRODUCTION m ³ /day | GOR m ³ /m ³ | WOR m ³ /m ³ |
|-------|--|--|--|---------------------------------------|---------------------------------------|
| JAN. | 49.9 | 524.1 | 360.8 | 48 | 7.2 |
| FEB. | 53.3 | 218.3 | 298.7 | 48 | 5.6 |
| MAR. | 46.3 | 456.7 | 281.3 | 48 | 6.1 |
| APRIL | 46.0 | 435.2 | 391.6 | 48 | 8.5 |
| MAY | 45.2 | 446.0 | 391.7 | 48 | 8.7 |
| JUNE | 37.1 | 433.5 | 389.3 | 48 | 10.5 |
| JULY | 29.6 | 362.0 | 322.5 | 48 | 10.9 |
| AUG. | 31.8 | 415.5 | 399.7 | 48 | 12.6 |
| SEPT. | 26.1 | 399.5 | 338.8 | 48 | 13.0 |
| OCT. | 26.3 | 0.0 | 378.6 | 48 | 14.4 |
| NOV. | 21.4 | 433.9 | 389.4 | 48 | 18.2 |
| DEC. | 21.8 | 406.6 | 390.3 | 48 | 17.9 |

b) Cumulative 2014 volume of oil, gas and water produced and fluid injected

| 2014 PRODUCTION | |
|------------------------|--------------------------|
| Produced Oil | 13,191 m ³ |
| Produced Gas | 633,168 m ³ |
| Produced Water | 131,905 m ³ |
| Fluid Injected | 138,114 m ³ |
| CUMMULATIVE PRODUCTION | |
| Produced Oil | 301,573 m ³ |
| Produced Water | 2,163,100 m ³ |

c) Monthly wellhead injection pressure for each injection well

| MONTHLY INJECTION VOLUMES AND PRESSURES | | | | | | | | | | |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|-----------------|
| | 100/13-06-01-25 | | 102/13-07-01-25 | | 100/15-07-01-25 | | 100/15-12-01-26 | | Waskada Unit 6 | |
| | Inj Water (m³) | Avg Inj P (kPa) | Inj Water (m³) | Avg Inj P (kPa) | Inj Water (m³) | Avg Inj P (kPa) | Inj Water (m³) | Avg Inj P (kPa) | Total Inj Water (m³) | Avg Inj P (kPa) |
| JAN | 2657 | 3119 | 8944 | 2955 | 1406 | 2740 | 3240 | 2497 | 16247 | 2872 |
| FEB | 1677 | 3535 | 2547 | 1806 | 406 | 2142 | 1482 | 1636 | 6112 | 2261 |
| MAR | 2282 | 3020 | 7943 | 2429 | 1188 | 3137 | 2746 | 2004 | 14159 | 2501 |
| APR | 2095 | 3255 | 7276 | 2229 | 1141 | 3394 | 2544 | 1850 | 13056 | 2422 |
| MAY | 1872 | 3221 | 6423 | 1745 | 1841 | 2195 | 3689 | 1337 | 13825 | 1896 |
| JUNE | 1807 | 3062 | 5734 | 2597 | 1807 | 2144 | 3656 | 2447 | 13004 | 2557 |
| JULY | 1606 | 3268 | 5241 | 1854 | 1485 | 2798 | 2889 | 2002 | 11221 | 2220 |
| AUG | 1793 | 2284 | 5520 | 2178 | 1969 | 3207 | 3600 | 1853 | 12882 | 2259 |
| SEPT | 1852 | 3266 | 5024 | 2823 | 1717 | 3600 | 3393 | 2081 | 11986 | 2793 |
| OCT | 2291 | 3510 | 5853 | 2606 | 1842 | 3786 | 3819 | 1994 | 13805 | 2744 |
| NOV | 2010 | 2401 | 5233 | 1892 | 2097 | 2899 | 3676 | 1832 | 13016 | 2116 |
| DEC | 2054 | 2511 | 5075 | 1854 | 1878 | 2413 | 3599 | 1420 | 12606 | 1920 |
| TOTAL | 23996 | - | 70813 | - | 18777 | - | 38333 | - | 151919 | 2380 |
| AVG INJ P | - | 3038 | - | 2247 | - | 2871 | - | 1913 | - | - |

| 2014 WATER INJECTION SUMMARY | | | | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | JAN. | FEB. | MAR. | APRIL | MAY | JUNE | JULY | AUG. | SEPT. | OCT. | NOV. | DEC. |
| TOTAL(m3) | 16247 | 6112 | 14159 | 13056 | 13825 | 13004 | 11221 | 12882 | 11986 | 13805 | 13016 | 12606 |
| DAILY(m3/day) | 524.1 | 218.3 | 456.7 | 435.2 | 446.0 | 433.5 | 362.0 | 415.5 | 399.5 | 445.3 | 433.9 | 406.6 |
| 2014 AVG. ANNUAL DAILY INJECTION = 415 m3/day | | | | | | | | | | | | |
| CUMULATIVE INJECTION TO Dec 31, 2013 = 3,149,655 m3 | | | | | | | | | | | | |
| TOTAL 2014 ANNUAL INJECTION = 151,919 m3 | | | | | | | | | | | | |
| CUMULATIVE INJECTION TO Dec 31, 2014 = 3,301,574 m3 | | | | | | | | | | | | |

d) Summary of the result of any survey of reservoir pressure conducted in 2014. N/A

e) Date and type of any well servicing.

| | | |
|---------------------|--|------------|
| 03/10-12-001-26W1/0 | Pump Change | 1/9/2014 |
| 02/04-18-001-25W1/0 | Pump Change/Tubing Reconfiguration | 1/10/2014 |
| 02/16-07-001-25W1/0 | Spearfish Frac Completion | 3/15/2014 |
| 03/16-07-001-25W1/0 | Spearfish Frac Completion | 3/16/2014 |
| 03/10-12-001-26W1/0 | Rod Failure | 4/17/2014 |
| 03/10-01-001-26W1/0 | Cleanout lateral/ Acidize | 8/13/2014 |
| 03/07-01-001-26W1/0 | Pump Change | 8/19/2014 |
| 04/16-12-001-26W1/0 | Pump Change | 9/15/2014 |
| 03/15-01-001-26W1/0 | HZ Cemented Liner Cleanout & Conversion to WIW | 11/8/2014 |
| 02/07-01-001-26W1/0 | HZ Cemented Liner Cleanout & Conversion to WIW | 11/12/2014 |
| 03/03-12-001-26W1/0 | HZ Cemented Liner Cleanout | 11/27/2014 |
| 02/03-12-001-26W1/0 | HZ Cemented Liner Cleanout | 12/2/2014 |

f) Calculations of voidage replacement ratio on a monthly and cumulative basis

| 2014 VOIDAGE CALCULATIONS | | | | | | | |
|--|-------------------|---------------------|----------------|------------------|--------------------|----------------|---------------------------------|
| OIL FORMATION VOLUME FACTOR = 1.17 Rm3 | | | | | | | |
| MONTH | OIL PRODUCTION | WATER PRODUCTION | OIL VOIDAGE | TOTAL VOIDAGE | TOTAL INJECTION | NET VOIDAGE | VOIDAGE REPLACEMENT RATIO |
| | m3 | m3 | Rm3 | Rm3 | Rm3 | Rm3 | VRR (Rm3/m3) |
| JAN. | 1548 | 11186 | 1811 | 12996 | 16247 | -3251 | 1.25 |
| FEB. | 1492 | 8363 | 1746 | 10109 | 6112 | 3997 | 0.60 |
| MAR. | 1437 | 8721 | 1681 | 10401 | 14159 | -3758 | 1.36 |
| APRIL | 1380 | 11747 | 1615 | 13362 | 13056 | 306 | 0.98 |
| MAY | 1402 | 12143 | 1640 | 13783 | 13825 | -42 | 1.00 |
| JUNE | 1112 | 11678 | 1301 | 12979 | 13004 | -25 | 1.00 |
| JULY | 919 | 9999 | 1075 | 11074 | 11221 | -147 | 1.01 |
| AUG. | 987 | 12390 | 1155 | 13545 | 12882 | 663 | 0.95 |
| SEPT. | 782 | 10163 | 915 | 11078 | 11986 | -908 | 1.08 |
| OCT. | 815 | 11737 | 954 | 12690 | 0 | 12690 | 0.00 |
| NOV. | 642 | 11681 | 751 | 12432 | 13016 | -584 | 1.05 |
| DEC. | 675 | 12100 | 790 | 12890 | 12606 | 284 | 0.98 |
| TOTAL | 13191 | 131905 | 15433 | 147339 | 138114 | 9225 | 0.94 |

g) An outline of the method used for quality control and treatment of the injected fluid

The injected fluid is treated by filtration.

h) A report of any unusual performance problems and remedial measures taken or being considered. N/A

i) Any other information necessary to evaluate the project

j) Well List

Waskada Unit No. 6 Well List

| <i>UWI</i> | <i>Type</i> | <i>Status</i> | <i>Future Plans</i> |
|----------------------|--------------------|----------------------|----------------------------|
| 100/12-06-001-25W1/0 | Vertical | Abandoned | - |
| 100/13-06-001-25W1/0 | Vertical | Injector | - |
| 100/04-07-001-25W1/2 | Vertical | Abandoned | - |
| 102/05-07-001-25W1/0 | Vertical | ABD Injector | - |
| 100/11-07-001-25W1/0 | Vertical | Abandoned | - |
| 103/12-07-001-25W1/0 | Vertical | Producer | - |
| 102/13-07-001-25W1/0 | Vertical | Injector | - |
| 102/14-07-001-25W1/0 | Vertical | Producer - Shut-In | - |
| 100/15-07-001-25W1/0 | Vertical | Injector - Suspended | - |
| 100/16-07-001-25W1/0 | Vertical | Producer | - |
| 102/16-07-001-25W1/0 | Horizontal | Producer | - |
| 103/16-07-001-25W1/0 | Horizontal | Producer | - |
| 100/03-18-001-25W1/0 | Vertical | Abandoned - Q4 2011 | - |
| 100/04-18-001-25W1/0 | Vertical | Abandoned | - |
| 102/04-18-001-25W1/0 | Horizontal | Producer | - |
| 100/05-18-001-25W1/0 | Vertical | ABD Injector | - |
| 100/06-18-001-25W1/0 | Vertical | Abandoned | - |
| 100/07-01-001-26W1/0 | Vertical | Abandoned - Q4 2011 | - |
| 102/07-01-001-26W1/0 | Horizontal | Injector | - |
| 103/07-01-001-26W1/0 | Horizontal | Producer | - |
| 100/08-01-001-26W1/2 | Vertical | Abandoned - Q4 2011 | - |
| 100/09-01-001-26W1/0 | Vertical | Abandoned - Q4 2011 | - |
| 100/10-01-001-26W1/2 | Vertical | Abandoned - Q4 2011 | - |
| 102/10-01-001-26W1/0 | Horizontal | Producer | - |
| 103/10-01-001-26W1/0 | Horizontal | Producer | - |
| 100/15-01-001-26W1/2 | Vertical | Abandoned - Q4 2011 | - |
| 102/15-01-001-26W1/0 | Horizontal | Producer | - |
| 103/15-01-001-26W1/0 | Horizontal | Injector | - |
| 100/16-01-001-26W1/2 | Vertical | Abandoned - Q4 2011 | - |
| 100/01-12-001-26W1/0 | Vertical | Abandoned - Q4 2011 | - |
| 100/02-12-001-26W1/2 | Vertical | Abandoned | - |

| | | | |
|----------------------|------------|---------------|---|
| 100/03-12-001-26W1/2 | Vertical | Abandoned | - |
| 102/03-12-001-26W1/0 | Horizontal | Producer | - |
| 103/03-12-001-26W1/0 | Horizontal | Producer | - |
| 100/05-12-001-26W1/0 | Vertical | ABD Injector | - |
| 100/06-12-001-26W1/2 | Vertical | Producer | - |
| 102/06-12-001-26W1/0 | Horizontal | Producer | - |
| 100/07-12-001-26W1/0 | Vertical | ABD Injector | - |
| 102/07-12-001-26W1/0 | Horizontal | Producer | - |
| 100/08-12-001-26W1/0 | Vertical | Producer | - |
| 102/09-12-001-26W1/0 | Vertical | Mannville WSW | - |
| 100/10-12-001-26W1/0 | Vertical | Producer | - |
| 102/10-12-001-26W1/0 | Horizontal | Producer | - |
| 103/10-12-001-26W1/0 | Horizontal | Producer | - |
| 100/15-12-001-26W1/0 | Vertical | Injector | - |
| 102/15-12-001-26W1/0 | Horizontal | Producer | - |
| 102/16-12-001-26W1/0 | Vertical | Producer | - |
| 104/16-12-001-26W1/0 | Horizontal | Producer | - |

k) Discussion

The Waskada Unit No. 6 field has been producing with Lower Amaranth redevelopment with infill horizontal (HZ) wells. The following operations were carried out in 2014 to further assess and improve upon our EOR strategy:

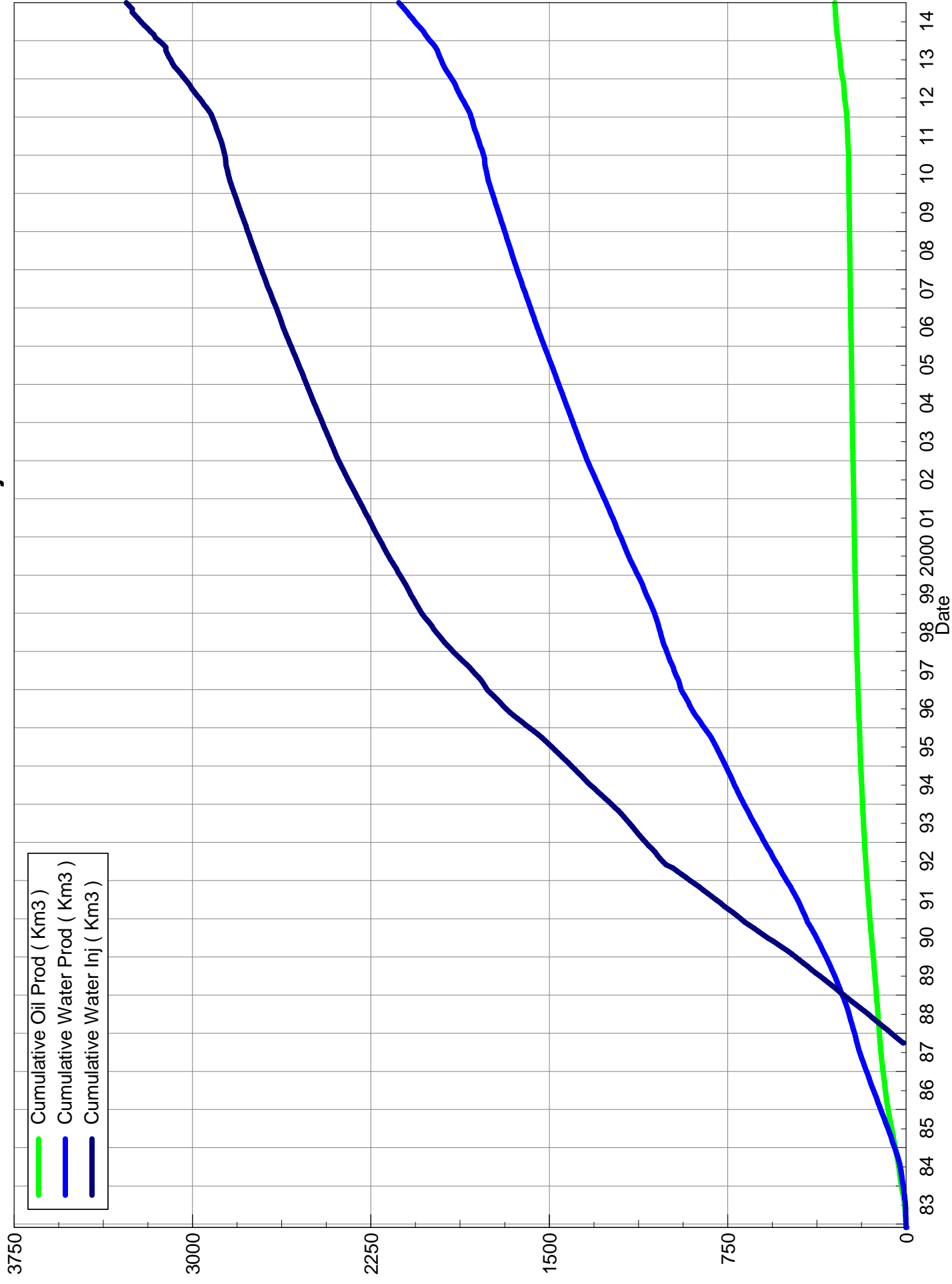
1. HZ cemented liner cleanouts (in the south of the unit) in order to test whether declines in production were due to scale or lack of reservoir pressure.
2. Two water injection conversions to increase reservoir pressure support (03/15-01-001-26W1/0 and 02/07-01-001-26W1/0).
3. Conversion of 02/09-12-001-26W1/0 producer to Mannville source water well for injection.
4. New water filtration system and injection infrastructure.

We continue to test production performance in different parts of the Unit. In an effort to improve oil recovery moving forward, a detailed EOR study of the Unit was conducted. This study encompassed a detailed look at geological, completion and production data over the history of the Unit, in hopes of developing an improved EOR strategy. From this work, it was concluded that additional injection was needed in the south of Waskada Unit No. 6. Therefore, 2 horizontal wells were converted to injection: 03/15-01-001-26W1/0 and 02/07-01-001-26W1/0. These wells will inject filtered Mannville water from 02/09-12-001-26W1/0, starting in 2015. Injectivity will be closely monitored.

Three HZ cemented liner cleanouts were also completed in the unit. These wells initially showed improved performance due to the removal of scale, but it was also evident that reservoir pressure support was lacking. The HZ injection conversions listed above should provide the support required.

WaskadaUnit6

Cumulative Production and Injection



WaskadaUnit6

Production and Injection Rates

