INTRODUCTION

PROJECT DESCRIPTION AND STATUS

SUBSURFACE
- Geoscience
- Well Design and Instrumentation
- 4-D Seismic and Monitoring
- Scheme Performance
- Future Plans

SURFACE
- Facilities
- Measurement and Reporting
- Water Production, Injection and Uses
- Sulphur Production
- Compliance
- Future Plans
DEVELOPMENT OVERVIEW

PROJECT DETAILS
- Located 20 km south of Fort McMurray, AB
- 5 production pads
- 25 horizontal well pairs (5 well pairs per pad)
- Central Processing Facility (CPF)
- Offsite services and utilities

INFRASTRUCTURE
- Fuel gas from TransCanada Pipeline (TCPL)
- Dilbit export to Enbridge Cheecham Terminal
- Diluent from Inter Pipeline (IPL)
HANGINGSTONE PROJECT

- First steam (downhole) achieved March 2015
  - *First oil produced July 2015*

- 24 well pairs in SAGD mode and 1 standing well pair
  - AA05 converted to SAGD in June 2018
  - Last well pair (AA03) to be brought on-stream when steam is available

- Expansion application submitted in 2013
  - *Environmental Impact Assessment report deemed complete by the AER pursuant to Section 53 of EPEA*
  - Expands Project Area and Development Area
  - Application includes 3 phases (+70,000 bbl/d)
IN THE REPORTING PERIOD THERE WERE NO NEW GEOSCIENCE ANALYSES OBTAINED

- i.e. cores, petrographic, geomechanical or fracture pressure or caprock integrity tests

<table>
<thead>
<tr>
<th>Area</th>
<th>Area (km²)</th>
<th>MCMR Cored Wells</th>
<th>Image Logs</th>
<th>Caprock Core</th>
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STRATIGRAPHY AND REFERENCE WELL

MIDDLE MCMURRAY TARGET RESERVOIR

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<thead>
<tr>
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<tr>
<td>Sandy IHS</td>
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<tr>
<td>Muddy IHS</td>
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<tr>
<td>Mudstone</td>
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<td>Limestone</td>
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<table>
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<tr>
<th>STRATIGRAPHIC UNIT</th>
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<tr>
<td>CENOZOIC</td>
<td>Quaternary Glacial Drift &amp; Till</td>
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<tr>
<td>GRAND RAPIDS FM</td>
<td>Low Grand Rapids</td>
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<tr>
<td>CLEARWATER FM</td>
<td>Wabiskaw</td>
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<tr>
<td>MCMURRAY FM</td>
<td>Upper</td>
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<td>BEAVERHILL LAKE GROUP</td>
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<tr>
<td>RESISTIVITY HIGH</td>
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<tr>
<td>RESISTIVITY LOW</td>
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<table>
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<table>
<thead>
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<td>150</td>
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<tr>
<td>200</td>
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<tr>
<td>250</td>
</tr>
</tbody>
</table>

Definitions:
- Sand: Yellow
- Sandy IHS: Orange
- Muddy IHS: Green
- Mudstone: Purple
- Limestone: Blue
- SEISMIC PEAK: HIGH
- RESISTIVITY: HIGH
- TROUGH: LOW
- Depth (m): Numerical values representing the depth in meters.
- Scale: 1:5000 represents the map scale.
MIDDLE McMURRAY GROSS PAY DEFINITION

- Thickness $\geq 10$ m
- GR $< 70$ API
- Density $> 27\%$
- Resistivity $> 18$ ohm-m
- Water Saturation $< 50\%$
- Includes $< 1$ m thick mud

- Net pay thickness uses gross pay criteria but excludes mud
STRUCTURAL CROSS SECTION NW-SE ACROSS HS1 AREA
STRUCTURE MAP OF TOP OF BITUMEN PAY

ELEVATION RANGE

- 262 - 301 masl
STRUCTURE MAP OF BASE OF BITUMEN PAY

ELEVATION RANGE
- 241 to 262 masl
MIDDLE McMURRAY GAS

- Minimal thickness and limited distribution within the development area
ISOPACH MAP OF MIDDLE McMURRAY BOTTOM WATER

Bottom Water Net Thickness and Basal Mud Thickness

Interbedded mud and water saturated sand
LOW BITUMEN SATURATION ZONE (LSZ)

- GR<60 API, density porosity >0.27 and resistivity 10-18 ohm-m and core water saturation >50%
- Core So= 0.36 and porosity = 0.37, thus the LSZ will still contribute to the overall bitumen production
2018

- No pressure or temperature change has been observed in the caprock during the reporting period.
- No new caprock core, mini-frac or tri-axial testing completed during the reporting period.

HISTORICAL

- Caprock is defined as the unit between the top of the Clearwater and Wabiskaw.
- One observation well has one piezometer and two thermocouples in the caprock.
RESERVOIR PROPERTIES AND OBIP ABOVE PRODUCER

RESERVOIR PROPERTIES

- Typical Producer Depth: 191 TVD (258 masl)
- Initial Reservoir Pressure @ 190m TVD: 600 kPaa
- Initial Reservoir Temperature: 8°C
- Horizontal Permeability: 3,500-4,300 mD
- Vertical Permeability: 2,800-3,600 mD
- Bitumen Viscosity @ initial reservoir temperature: >1mln cP

Gross OBIP = Thickness from Top to Base Pay x Area x Porosity x So

<table>
<thead>
<tr>
<th></th>
<th>Avg Por (frac)</th>
<th>Avg So (frac)</th>
<th>OBIP (mln m³)</th>
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<tr>
<td>Drainage Areas</td>
<td>0.36</td>
<td>0.72</td>
<td>15.6</td>
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<td>Development Area</td>
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<tr>
<td>Project Area</td>
<td>0.36</td>
<td>0.72</td>
<td>18.6</td>
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2018
  o No new wells were drilled during this reporting period

HISTORICAL
  o 5 well pads with 25 well pairs
All wells initially completed with all-metal PCP
- Wells and facilities built with flexibility to convert from PCPs to ESPs
- Converted from PCPs to ESPs as rates improved and the wells matured
- Typical pump operating conditions:
  - Average bottomhole pressure = 1,800 kPag
  - Average bottomhole temperature = 180 °C

### Artificial Lift Performance

<table>
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<th>ESP</th>
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<tr>
<td>Typical Minimum Rate (m³/d)</td>
<td>100</td>
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<tr>
<td>Typical Maximum Rate (m³/d)</td>
<td>600</td>
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### Wells and Type

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<tr>
<th>Well</th>
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<td>AA3</td>
<td>PCP*</td>
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<tr>
<td>AA4</td>
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<tr>
<td>AA5</td>
<td>PCP</td>
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<td>AD1</td>
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<tr>
<td>AE4</td>
<td>ESP</td>
</tr>
<tr>
<td>AE5</td>
<td>ESP</td>
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*Production assurance well
INSTRUMENTATION & FLOW CONTROL

TEMPERATURE
- Two types of fiber for temperature measurements
  - Fiber Bragg Grating (FBG) and Distributed Temperature Sensing (DTS)
- Both systems adequate for temperature management along the wellbore

PRESSURE
- Injector BHP is measured with blanket gas
- Producer BHP is measured using optical gauges and/or bubble tubes

FLOW CONTROL DEVICES (FCDs)
- FCD installed in well AB04, March 2018
- Evaluation of performance is on-going

LEGEND
- **Producer Only:** Fiber with 1 or 2 pressure sensors
- **Producer and Injector:** Fiber with 1 or 2 pressure sensors
- **SS = Steam Splitters**
  - 4 injectors, each with 2 ports
  - AA4I and AB4I have slimbore 7” liner
- FCDs installed on one producer to date (AB04)
INSTRUMENTATION – OBSERVATION WELLS

OBSERVATION WELLS

- Some pressure sensors have failed (typically after steam conditions observed)
- Instrumentation used to monitor reservoir pressure and temperature growth

LEGEND
- 10 Vertical delineation wells
- 5 Obs wells with 10 to 20 TCs
- 10 Obs wells with 10 to 20 TCs and 3-6 piezometers
- Obs well also monitoring above pay (U. McM, Wab and CLW caprock)
SUBSURFACE
4D SEISMIC AND MONITORING
SEISMIC DATA OVERVIEW

2018
- No new data acquired in reporting period

HISTORICAL
- 3D acquired in 2011 and 2012, merged in 2012
- Total proprietary 2D ~ 450 km
- Total 3D area ~98 km² (merged), covers development area
- Total 4D area ~3.72 km²
  - Baseline acquired Q1 2014
  - First Monitor acquired Q1 2016 / Second Monitor acquired Q1 2017

3D/4D PARAMETERS
- Source line/source spacing: 60m/20m
- Receiver line/receiver spacing: 40-60m/20m
RESERVOIR SATURATION TOOL (RST)

2018
- No new data acquired in reporting period

HISTORICAL
- Baseline acquired in 2012
- 2016 acquired 7 saturation logs; 2017 acquired 8 saturation logs
- RST results show steam chamber thickness correlates with observation well temperature profiles
SURFACE HEAVE MONITORING

PROGRAM DESIGN
- 31 permanent surface heave monuments (0.30 x 0.30 m plate)
- Real-time Kinematic (RTK) survey method was used, survey tolerance range is +/- 2 cm

SURVEY/RESULTS
- During 2018 the maximum change observed was 7 cm over Pad AD
- The maximum change observed between February 2015 and January 2018 was 9 cm

2017-18 Cumulative Displacement, cm
2015-18 Cumulative Displacement, cm
SUBSURFACE
SCHEME PERFORMANCE
FIELD HISTORY

- Field continuing to ramp-up
  - Currently 24 of the 25 SAGD well pairs on production
  - Injectors have reached target operating pressure
  - SOR declining as upper portions of the reservoir begin to drain
  - FCD installed on AB04
  - AA05 brought on-stream

- Maximum monthly bitumen rate 1,551 m³/d (9,754 bbl/d) with SOR of 4.7 (Jun 2018)
## PAD RECOVERY

<table>
<thead>
<tr>
<th>Pad</th>
<th>Well Pairs</th>
<th>Average Lateral Length (m)</th>
<th>Average Net Pay above Producer (m)</th>
<th>Oil Saturation (frac)</th>
<th>Total Net Pay Porosity (frac)</th>
<th>OBIP (10⁶ m³)</th>
<th>Current Recovered (10⁶ m³)</th>
<th>Current Recovery Factor (%)</th>
<th>Predicted Recovery Factor (%)</th>
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<tbody>
<tr>
<td>AA</td>
<td>4/5</td>
<td>850</td>
<td>23.7</td>
<td>0.71</td>
<td>0.35</td>
<td>3.3</td>
<td>0.21</td>
<td>6.5</td>
<td>50-70</td>
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<tr>
<td>AB</td>
<td>5/5</td>
<td>640</td>
<td>22.4</td>
<td>0.73</td>
<td>0.37</td>
<td>2.9</td>
<td>0.54</td>
<td>18.7</td>
<td>50-70</td>
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<tr>
<td>AC</td>
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<td>750</td>
<td>24.3</td>
<td>0.70</td>
<td>0.36</td>
<td>3.0</td>
<td>0.20</td>
<td>6.7</td>
<td>50-70</td>
</tr>
<tr>
<td>AD</td>
<td>5/5</td>
<td>670</td>
<td>26.2</td>
<td>0.71</td>
<td>0.35</td>
<td>3.2</td>
<td>0.26</td>
<td>8.2</td>
<td>50-70</td>
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<td>AE</td>
<td>5/5</td>
<td>830</td>
<td>22.6</td>
<td>0.70</td>
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<td>3.2</td>
<td>0.29</td>
<td>9.1</td>
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<td>TOTAL</td>
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<td>15.6</td>
<td>1.51</td>
<td>9.7</td>
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</table>

1 Recovery Factor based on cumulative oil production in Oct 2018

Notes:
- Well Spacing: 100 m, Spacing between pads: 130 m
- Volumetrics include 25 m at heel and toe of the well pair
- OBIP is gross oil volume between base and top of pay
- Predicted recovery factor accounts for drainage through the low bitumen saturation zone and from the IHS
- Approved Maximum Operating Pressure is 2,100 kPag
- Throughout the reporting period, the reservoir continues pressuring up
  - Pressure data shows vertical and horizontal pressure communication throughout the entire pay interval across entire field
- No pressure change in caprock

**Average daily field pressure at base, middle and top of reservoir**

**Average daily injection pressure in each Pad**
STEAM CHAMBER PROGRESSION IN OBSERVATION WELLS

PROGRESSING THROUGH IHS

- Significant steam chamber growth through the Low Bitumen Saturation Zone and into the IHS across all pads in 2018
- Conductive heating into IHS observed in all OBS wells

Temperature Plots

- Nov 1, 2017
- Oct 31, 2018
- Jan 15, 2019

AC05OB: Steam chamber development above mudstone in September; 1 to 2 m mudstone acted as a baffle, not barrier, to flow
Variation of pad performance depends on geology, pad boundary, well pair trajectories, pump performance and subcool conformance

- Pads AB, AD and AE selected as examples of high/medium/low performing pads
  - Selection based on cumulative oil recovery and cSOR
  - Differences in the productivity of the wells primarily due to geological variability
PAD PERFORMANCE – HIGH PAD AB

PAD AB

- Cumulative production: 543,061 m³
- Highest reservoir quality
  - Mostly sandy reservoir
  - High oil saturation around well pairs
  - Thin low bitumen saturation zone
- Highest average effective wellbore (97%)
- Peak well pair monthly rates >1,000 bbl/d

CHANGES SINCE LAST REPORTING PERIOD¹

- Oil: relatively constant at 3,523 bbl/d (+0.4%)
- Oil Cut: decreased from 27% to 25.5% (-6%)
- cSOR: decreased from 3.4 to 3.2 (-6%)
- Significant steam chamber development
  - Well AB03OE shows 7 m steam chamber rise near toe of AB03
- Pressure increase at top of reservoir through IHS

PAD PERFORMANCE – MID PAD AD

PAD AD
- Cumulative production: 262,614 m³
- Average reservoir quality
  - Thickest net pay (26.2 m)
  - IHS with high oil saturation in upper reservoir
  - Thick low bitumen saturation zone above injection well
- Shortest wells
- Most bounded pad
- High average effective wellbore (96%)

CHANGES SINCE LAST REPORTING PERIOD¹
- Oil: increased from 1,344 to 1,607 bbl/d (+20%)
- Oil Cut: increased from 14.0% to 16.1% (+15%)
- cSOR: decreased from 6.1 to 5.7 (-7%)
- Well AD02OA shows 2.5m steam chamber development at heel of AD02
  - Temperature increase through IHS
  - Steam chamber advancing through LSZ
- Increased contribution from upper reservoir (IHS) resulting in improved rates and oil cut

**PAD PERFORMANCE – LOW PAD AC**

**PAD AC**

- Cumulative production: 201,960 m³
- Heterogeneous reservoir
  - *IHS dominated*
  - *Thin low bitumen saturation zone above injection well*
- Bounded at east of pad
- Sharing west boundary with pads AB and AD

**CHANGES SINCE LAST REPORTING PERIOD**

- Oil: relatively constant at 978 bbl/d (-2%)
- Oil Cut: unchanged from 14.2%
- cSOR: increased from 6.0 to 6.4 (+6%)
- OBS wells AC03OD and AC05OB show appreciable steam chamber progression over the year
  - *AC03OD passed through LSZ and is now advancing through SIHS and Breccia*
  - *AC05OB shows drainage around a thick mudstone between the Producer and Injector, proving its limited lateral extent.*

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STEAM QUALITY

- Steam quality leaving the plant is approximately 98% (incl. Continuous Blow Down (CBD) at typically 6,000 kPag
- Steam quality decreases to wellheads and is not measured but is modeled to be ~95%
- These conditions align with the original design
WELL INTEGRITY & ABANDONMENTS

WELL INTEGRITY

- Well integrity is addressed by using thermally engineered casing, thermal cement and completing cement bond logs in accordance with Directive 051
  - No wellbore integrity failures during the reporting period
  - No non-compliances of reporting and repairing wellbore integrity issues during the reporting period
- AOC has in place a wellhead valve maintenance program to prevent wellhead valve failures
  - No wellhead failures during the reporting period

ABANDONMENTS

- No wells have been abandoned or suspended within the project area to date
FUTURE PLANS

- No plans for the drilling of any new SAGD well pairs for next reporting period
- No abandonments planned in the next 5 years
- Production assurance well AA03 to be brought online pending steam availability
- Expect to convert remaining active PCP wells to ESPs as required
- Evaluating opportunities for Flow Control Devices (FCDs) into producer wells
No major facility modifications during this reporting period
No modifications during this reporting period
MEASUREMENT, ACCOUNTING AND REPORTING PLAN (MARP)

- MARP approved October 5, 2012
- MARP variance for steam measurement meters approved in 2017
- No changes or alterations made during the 2018 reporting period
2018
  - No changes or alterations made to measurement methodology in reporting period

MEASUREMENT METHODOLOGY

  - WELL PRODUCTION AND INJECTION VOLUMES
    - Each well pad has a dedicated test separator with liquid flow meter and water cut analyzer to determine well bitumen and water production
    - Wells are individually put on test for one valid testing hour for every 20 hours of operation
      - Valid well test criteria per approved MARP
    - Well gas production prorated from Battery Level GOR using a proration factor of 1
      - Battery Level GOR is updated monthly
    - Steam injection is metered at each individual wellhead. Primary and secondary steam production metering available at the central steam plant

  - BATTERY SALES OIL
    - Sales oil is shipped via pipeline from the Hangingstone Battery. Custody transfer metering is done at receiving facility

  - MEASUREMENT TECHNOLOGY
    - Well testing uses standard method of test separators with microwave water cut analyzers

  - STEAM VOLUMES
    - Steam quality leaving the plant is approximately 98%
    - A continuous blowdown (CBD) of approximately 2% is added to the steam of each boiler and is injected into the wells
    - Intermittent blow down (IBD) flow is estimated at 0.02% of total water out of the facility using sound engineering practices

  - PRODUCED WATER VOLUMES
    - Calculated using the measured Water Disposition to the Injection Facility plus the Water Dispositions from the Plant plus changes in Water Inventory less any Water Receipts
PRORATION OF BITUMEN AND WATER

Proration Factor for Bitumen & Water

- Bitumen Proration
- Water Proration

Lower Limit (-15%)  Upper Limit (+15%)
FACILITY PERFORMANCE

SITE RELIABILITY > 95%

- Based on steam performance
- Integrity management program and predictive maintenance programs have been implemented to maintain higher site reliability

MAJOR ACTIVITIES

- Boiler Mechanical Cleaning
- Evaporator Mechanical Cleaning

MAJOR CHALLENGES

- De-oiling optimization
BITUMEN PRODUCTION

Bitumen Production

- Bitumen Production (bpd)
- Plant Design (bpd)
- Bitumen Production (m3/d)
- Plant Design (m3/d)
FACILITY PERFORMANCE

STEAM GENERATION

Steam Generation

- **Actual (m³/month)**
- **Plant Design (m³/month)**

<table>
<thead>
<tr>
<th>Month</th>
<th>Actual (m³/month)</th>
<th>Plant Design (m³/month)</th>
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<tr>
<td>Sep-18</td>
<td>200,000</td>
<td>220,000</td>
</tr>
<tr>
<td>Oct-18</td>
<td>210,000</td>
<td>220,000</td>
</tr>
</tbody>
</table>
POWER USAGE YTD 103,961 MWH

POWER USAGE (MWh per month)
FACILITY PERFORMANCE

DIRECT GHG EMISSIONS FROM NOVEMBER 2017 – OCTOBER 2018: 338 KT CO$_2$e

- Sources: stationary combustion, flaring, venting and fugitives
- Calculated using 2018 CCIR
FACILITY PERFORMANCE

TOTAL GAS USAGE YTD 157,853 e³m³
SOLUTION GAS RECOVERY 100%

GAS USAGE (e³m³ per month)
○ Disposal limit calculated as per Directive 081
PRODUCED WATER RECYCLE (AVG. 97%)

Directive 081, Appendix H, Equation 6
Produced Water Recycle improved by 1%

Produced Water Recycle %

- Nov-17
- Dec-17
- Jan-18
- Feb-18
- Mar-18
- Apr-18
- May-18
- Jun-18
- Jul-18
- Aug-18
- Sep-18
- Oct-18
FACILITY PERFORMANCE

WASTE DISPOSAL

- Waste streams are slop oil, evaporator blowdown and excess produced water
- Evap. Waste disposal volume reduced by 8,908 m³
- Slop oil disposal volume reduced by 3,737 m³

Volumes reported via Petrinex
Currently there are no sulphur recovery facilities at the Hangingstone Project.

SO$_2$ emissions are calculated based on analytical results of produced gas samples.
SURFACE
SOURCE WATER AND WATER CHEMISTRY
NON-SALINE WATER WELLS

- Hangingstone Water Act License 00316166-01-00 annual allocation is 479,975 m$^3$
- During Nov. 1, 2017 to Oct. 31, 2018 AOC diverted 139,671 m$^3$
- Aquifer drawdown is stable and within the allowable as specified in the Water Conservation and Allocation Guideline for Oilfield Injection (AENV 2006)

<table>
<thead>
<tr>
<th>Well ID</th>
<th>Location</th>
<th>Formation</th>
<th>TDS (mg/L)</th>
<th>Maximum Rate of Diversion (m$^3$/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSW153308508W400</td>
<td>15-33-085-08-W4</td>
<td>Quaternary</td>
<td>286</td>
<td>3,000</td>
</tr>
<tr>
<td>WSW061208609W400</td>
<td>06-12-086-09-W4</td>
<td>Quaternary</td>
<td>310*</td>
<td>3,000</td>
</tr>
<tr>
<td>WSW040808608W400</td>
<td>04-08-086-08-W4</td>
<td>Quaternary</td>
<td>320*</td>
<td>3,000</td>
</tr>
</tbody>
</table>

Wells are less than 150 m in depth and not licenced with the AER. Well IDs are AOC internal identifiers, not UWIs.
* 2018 Analysis
## TYPICAL WATER ANALYSIS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Non-Saline Make-up Water (mg/L)</th>
<th>Produced Water (mg/L)</th>
<th>Disposal Water (Evap blow-down) (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.97</td>
<td>7.36</td>
<td>11.8</td>
</tr>
<tr>
<td>Total Dissolved Solids (TDS)</td>
<td>320</td>
<td>2,300</td>
<td>130,000</td>
</tr>
<tr>
<td>Chlorides</td>
<td>7.4</td>
<td>1,200</td>
<td>49,000</td>
</tr>
<tr>
<td>Hardness as CaCO₃</td>
<td>220</td>
<td>14.5</td>
<td>550</td>
</tr>
<tr>
<td>Alkalinity as CaCO₃</td>
<td>270</td>
<td>320</td>
<td>25,000</td>
</tr>
<tr>
<td>Silica</td>
<td>5</td>
<td>150</td>
<td>7,000</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>&lt;1</td>
<td>180</td>
<td>6,000</td>
</tr>
<tr>
<td>Oil Content</td>
<td>&lt;1</td>
<td>20</td>
<td>500</td>
</tr>
</tbody>
</table>
APPROVALS AND AMENDMENTS

- November 2017, AOC received approval for the short-term exceedance of Maximum Operating Pressure to 2,500 kPag.
MONTHLY AND ANNUAL MONITORING PROGRAMS

- Passive air monitoring stations—no exceedances \((\text{SO}_2, \text{NO}_2, \text{H}_2\text{S})\) of the Alberta Ambient Air Quality Objectives
- A continuous air monitoring station is not an EPEA approval requirement
- Continuous \text{NO}_2 emissions monitored using a Continuous Emissions Monitoring System (CEMS) as required under the EPEA approval (Boiler A)
- \text{SO}_2 and \text{NO}_2 emissions were summarized in monthly and annual EPEA Air Emissions Reports
- Industrial wastewater and runoff—all releases monitored with no exceedances
- Groundwater water monitoring completed (2 events)
  - *Completed thermal groundwater screening assessment (well pad) new requirement June 2018*
- No soil management or monitoring events were required in the reporting period
- Water Act Licenses (term & surface) all conditions met and reporting completed
**NO\textsubscript{x} MONTHLY AVERAGE**

- Boiler A NO\textsubscript{x} calculated using AER approved Method 4 during CEMS unit repair (July-Nov.)

**NO\textsubscript{x} Monthly Average**

![Graph showing NO\textsubscript{x} Monthly Average for different months from Nov-17 to Oct-18. The graph shows monthly averages and limits. The monthly averages for Nov-17 to Jun-18 exceed the NO\textsubscript{x} limit, while subsequent months decrease and stay below the limit.](image-url)
AUDITS

- AER Compliance Audit for Aboveground Pipeline Wildlife Crossing Directive.
  - Submitted November 30, 2017
  - No further follow-up required

INSPECTIONS

- AER Inspection of CPF and Pad AD conducted on November 20, 2017
  - Follow-up action plan submitted January 4, 2018
  - Inspection closed out February 3, 2018
### Notices of Non-Compliance and Voluntary Self Disclosures

<table>
<thead>
<tr>
<th>Event</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 26, 2017 - Voluntary Self-Disclosure: MOP Exceedance</td>
<td>Control systems operated as designed, the well was quickly brought into compliance. No further follow-up identified.</td>
</tr>
<tr>
<td>January 12, 2018 - Voluntary Self-Disclosure: MOP Exceedance</td>
<td>Root cause investigation resulted in an update to the winter start-up procedure for steam injection. No further follow-up identified.</td>
</tr>
<tr>
<td>April 18, 2018 – AER Notice of Non-Compliance: Measurement</td>
<td>AOC responded to the AER May 23, 2018. No further follow-up identified.</td>
</tr>
<tr>
<td>August 31, 2018 – CEMS Code violation: unable to meet 90% availability</td>
<td>CEMS analyzer was removed for repair and the reinstallation completed in 2018. Method 4 proposal to address interim data management and reporting was approved by the AER.</td>
</tr>
</tbody>
</table>

From November 1, 2017 to October 31, 2018 there were

- 3 reportable spills and
- 4 reportable venting occurrences.
- Completed off disposition reclamation work in response to the 2016 Ft. McMurray wildfire (Temporary Field Authorization 17382)
- OSE reclamation assessment work is ongoing
COMPLIANCE – REGIONAL INITIATIVES

AOC IS A FUNDING MEMBER OF:

- Oil Sands Environmental Monitoring Program
- Wood Buffalo Environmental Association (WBEA) – air shed monitoring
- Regional Industry Caribou Collaboration (RICC)
- Oil Sands Black Bear Partnership
- Faster Forests – reclamation research industry collaboration
- Industrial Footprint Reduction Options Group (iFROG) – wetland reclamation research industry collaboration

AOC PARTICIPATES IN:

- Various regional CAPP Committees
  - Oil Sands Environmental Policy and Regulatory Committee
  - NE Alberta Caribou Working Group
  - Indigenous Affairs Committee
  - Air Issues Committee
ATHABASCA OIL CORPORATION HANGINGSTONE PROJECT IS IN COMPLIANCE WITH AER APPROVALS AND REGULATORY REQUIREMENTS

- For the period of November 1, 2017 to October 31, 2018, AOC has no unaddressed non-compliant events
FUTURE PLANS

- No new initiatives planned