4.1 Project background

4.2 Subsurface Overview Related to Resource Evaluation and Recovery

4.3 Surface Operations, Compliance, and Issues Not Related to Resource Evaluation and Recovery
PROJECT BACKGROUND
McKay River Project was previously owned and operated by Southern Pacific Resource Corp.

- November 2010 - Receives project approval:
  - EPEA Approval No. 255245-00-00
  - Oil Sands Conservation Act Approval No. 11461
  - Approved Capacity 12,000 bbl/d oil treating

- In January 2015, Southern Pacific Resources, previous owner of STP – McKay, was granted protection under the CCAA and subsequently entered Receivership in June 2015
- Due to the depressed commodity price environment and high operating costs at the time, production was shut-in, and the Receiver initiated and completed a warm-hibernation program by August 2015

- Project was officially transferred to Everest Canadian Resources on February 2019
• Everest Canadian Resources (ECR) – McKay is a 12,000 bpd Name Plate, Steam-Assisted-Gravity-Drainage (“SAGD”) facility.

• Located 45 km northwest of Fort McMurray on an approved 10.5 section development area within a larger acreage block

• Project Area is 10.5 sections in Township 91, Range 14, W4M and Township 91, Range 15, W4M

• Development Area is 1.25 Sections in Township 91, Range 14, W4M
• Current approved development includes four well pads (101 to 104)
• The initial development is west of the MacKay River and includes well pads 101 & 102
• Process Facility existing capacity of 12,000 bbld oil and 37,400 bbld steam
Everest Canadian Resources

SUBSURFACE
4.2 SUBSURFACE

1. PROJECT BACKGROUND
2. GEOLOGY & GEOSICENCE
3. HEAVE MONITORING & CAPROCK
4. DRILLING & COMPLETIONS
5. OBSERVATION WELLS
6. SCHEME PERFORMANCE
7. SUBSURFACE FUTURE PLANS
McKay: Full Bitumen Exploitation Plan

Everest Canadian Resources

GEOLOGY & GEOSICENCE
ECR McKay (T91-14W4)

Source: Mike Ranger's Regional Study, 2011
APPROVAL AREA

- Approval Area
  - 10.5 Sections (27 Km$^2$)
- Approval Area OBIP
  - 579 MMbbl

98 delineation wells were drilled in the current project area including 82 cored wells and 8 observation wells.
**Average Reservoir Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth (m TVD)</td>
<td>190</td>
</tr>
<tr>
<td>Pay Zone Thickness (m)</td>
<td>17 - 27</td>
</tr>
<tr>
<td>Lateral Well Pair Spacing (m)</td>
<td>100</td>
</tr>
<tr>
<td>Horizontal Well Length (m)</td>
<td>800 - 1100</td>
</tr>
<tr>
<td>Porosity (%)</td>
<td>32</td>
</tr>
<tr>
<td>Oil Saturation (%)</td>
<td>74</td>
</tr>
<tr>
<td>Original Reservoir Pressure (kPa)</td>
<td>650</td>
</tr>
<tr>
<td>Original Reservoir Temperature (°C)</td>
<td>8.5</td>
</tr>
</tbody>
</table>
- Upper McMurray in North McKay
  - Estuarine/Deltaic deposits:
    The reservoir at STP’s North McKay project ranges from a thickly bedded, tidally influenced, sand dominated tidal unit to a slightly brackish-water, sandy embayment.
  - Large continuous sand deposits:
    Ichnofossils in these sands include: *Planolites*, *Thalassinoides*, *Asterosoma* with rare *Cylindrichnus*, *Rhizocorralium*
Structure Map on the Top of Bitumen Pay

Project Area
McMurray Continuous Net Bitumen Pay

Pay calculated:
- GR <60 api
- Density >27% porosity
- Resistivity >20 ohm*m

Project Area
Everest Canadian Resources

APPROVAL AREA TYPE CURVE

Pad 102
5-18-091-14W4

- Cleanwater Shale
- Wabiskaw Reservoir
- Wabiskaw Shale
- Upper McMurray Sand
- McMurray Non-Reservoir
- Lower McMurray Reservoir
- Devonian
- SAGD Interval

Pad 101
7-18-091-14W4

- Cleanwater Shale
- Wabiskaw Reservoir
- Wabiskaw Shale
- Upper McMurray Sand
- McMurray Non-Reservoir
- Lower McMurray Reservoir
- Basal Unit
- Devonian
- SAGD Interval
BITUMEN PAY FACIES PATTERN ON PAD 1 & 2

PAD 1 PAY FACIES PATTERN

Top

Base

PAD 2 PAY FACIES PATTERN

Top

Base
**Approval Area Petrographical Analysis**

**Upper Reservoir (Bioturbated)**
- Very Fine to Fine grained (<180 um)
- Moderately sorted, Subangular with elongate grains
- Framework consists of quartz, common chert, siltstones with some feldspars
- Clays are within the microporosity of the chert, but also exist within the pore spaces. Pore space has 10% clay in the pore space.
- **XRD:** Analysis shows 86% qtz, 4% K-feldspar, 2% Plagioclase, 1% dolomite, 1% pyrite and 6% total clay.

**Main Reservoir**
- Fine to Medium grained (180-250 um)
- Moderately sorted, Subrounded with elongate and spherical grains
- Framework consists of quartz, chert, siltstones with some feldspars
- Similar clays with less interstitial clay found in the rock matrix.
- **XRD:** Analysis shows 93% qtz, 2% K-feldspar, 1% pyrite and 4% total clay.

---

**Core Analysis/Thin Section**

*AA/04-17-91-14w4*
Reservoir Quality Comparison

Grain Size

Sorting

Fines Content

Roundness
PAD 1 & PAD 2 RESERVES

Porosity = Average porosity from the SAGD reservoir interval
Saturation = Average bitumen saturation from the SAGD reservoir interval
OBIP = Original Bitumen In-Place and measured in $10^6 m^3$ units and converted to barrels using the factor of 6.29

<table>
<thead>
<tr>
<th>Pad</th>
<th># Well Pairs</th>
<th>Drainage Box Area A ($m^2$)</th>
<th>Average Porosity $\phi$ (%)</th>
<th>Average Saturation $S_o$ (%)</th>
<th>Average Pay Thickness $H$ (m)</th>
<th>OBIP ($10^6$ bbl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pad 1</td>
<td>6</td>
<td>540,000</td>
<td>32</td>
<td>72</td>
<td>20</td>
<td>15.7</td>
</tr>
<tr>
<td>Pad 2</td>
<td>6</td>
<td>720,000</td>
<td>34</td>
<td>73</td>
<td>20</td>
<td>22.6</td>
</tr>
</tbody>
</table>

$$OBIP = A \times H \times \phi \times S$$
HEAVE MONITORING & CAPROCK INTEGRITY
• 35 Corner reflectors were installed in 2012
• The Surface monitoring started in March 2012
• Based on historical, between 2012 and 2015, cumulative movement of the surface since SAGD operations started was insignificant, ranged between -10 mm (subsidence) and 38 mm (heave).
• Everest did not conduct Heave or other surface monitoring between February 2019 and May 2020.
CAPROCK INTEGRITY

- No change in Caprock integrity
- AER approved Maximum Operating Pressure (MOP) of 2,450 kPa.
- McKay met all AER conditions and information requests and received approval in 2011
- Caprock integrity studies was focused on:
  - Core and geological log evaluations
    - No fault planes observed on logs or in core.
    - No borehole breakouts/drilling induced fractures observed from 17 HMI logs.
  - Laboratory testing (reservoir & geomechanical)
    - Low permeability caprock.
    - Geomechanical properties derived from lab testing.
  - Mini-frac testing for characterizing in situ stress state
    - Mini-frac tests conducted at 2 wells.
  - Geomechanical simulation (Taurus Reservoir Solutions)
    - 2,450 kPa operating pressure is conservative
MINI-FRAC TESTS AND FRACTURE PRESSURE

- **Mini-Frac Tests**
  - Mini-frac tests completed at wells 5-16 and 1-18
  - Stress gradient results are consistent and similar to those expected in the Athabasca Oil Sands.
  - Vertical stress gradient is ~21.5 kPa/m.

- **Fracture Pressure**
  - Assessment of minimum fracture pressure ($S_{min}$) at the base of the Clearwater Formation using mini-frac test results.
  - $S_{min}$ from both wells 5-16 and 1-18 were consistent.
  - $S_{min}$ fracture pressure at the base of the Clearwater Formation caprock was between ~2,860 kPa and ~3,020 kPa.

### Table: Depth to Caprock Base and Fracture Gradient

<table>
<thead>
<tr>
<th>Well</th>
<th>Depth to Caprock Base (m)</th>
<th>Fracture Gradient (kPa/m)</th>
<th>$S_{min}$ Fracture Pressure (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-16</td>
<td>145</td>
<td>19.7</td>
<td>2857</td>
</tr>
<tr>
<td>1-18</td>
<td>144</td>
<td>21.0</td>
<td>3024</td>
</tr>
</tbody>
</table>

### Table: Well Logs

<table>
<thead>
<tr>
<th>Well</th>
<th>Depth (m TVD)</th>
<th>Lithology</th>
<th>Minimum Stress (kPa)</th>
<th>Minimum Stress Gradient (kPa/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-16-91-14W4</td>
<td>126</td>
<td>Clearwater Shale</td>
<td>2520</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>140</td>
<td>Clearwater Shale</td>
<td>2760</td>
<td>19.7</td>
</tr>
<tr>
<td></td>
<td>155</td>
<td>Wabiskaw Shale</td>
<td>2710</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td>174</td>
<td>McMurray Sandstone</td>
<td>2900</td>
<td>16.7</td>
</tr>
<tr>
<td>1-18-91-14W4</td>
<td>131</td>
<td>Clearwater Shale</td>
<td>2900</td>
<td>No Breakdown</td>
</tr>
<tr>
<td></td>
<td>138</td>
<td>Clearwater Shale</td>
<td>2900</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>147</td>
<td>Wabiskaw Sandstone</td>
<td>3060</td>
<td>20.8</td>
</tr>
<tr>
<td></td>
<td>156</td>
<td>Wabiskaw Shale</td>
<td>3250</td>
<td>20.8</td>
</tr>
<tr>
<td></td>
<td>164</td>
<td>Upper McMurray Sandstone</td>
<td>3300</td>
<td>20.1</td>
</tr>
<tr>
<td></td>
<td>186</td>
<td>McMurray Sandstone</td>
<td>3060</td>
<td>16.5</td>
</tr>
</tbody>
</table>
CAPROCK INTEGRITY- MONITORING

- Clearwater Formation:
  - 6 vertical, nested observation wells measuring pressure and temperature.
- Wabiskaw Member:
  - 1 horizontal well measuring temperature and pressure
- Surface heave monitoring program.
- Blanket Gas system to monitor bottomhole injection pressures.
DRILLING & COMPLETIONS
Everest Canadian Resources
• Approved Development area outlined in blue

• Drilled to date (black):
  • Pad 101 (6 pairs) → 800 m Hz
  • Pad 102 (6 pairs) → ~ 1,000 m Hz
  • Wabiskaw observation well (lies above 1P1)

• Approved Pads (red):
  • Pad 103 (6 pairs)
  • Pad 104 (6 pairs)
- Initial Wells completion design
  - Six installations in production wells
  - All production wells are equipped for gas lift
  - Coil tubing with temperature instrumentation is run to toe.

- ICD Installation Producer (Gas Lift)
  - Six installations in production wells
  - All production wells are equipped for gas lift
  - Coil tubing with temperature instrumentation is run to toe.
OBSERVATION WELLS
OBSERVATION WELLS

- 6 Vertical, Nested Observation Wells:
  - Pressure and temperature measurements extending from McMurray to Clearwater Formations
  - 10-18 and 12-18 wells have experienced 1 TC failure each. 5-18 has experienced 4 TC failures.

- Horizontal Observation Well:
  - Wabiskaw Member
  - Temperature/Pressure measurements

<table>
<thead>
<tr>
<th>Well</th>
<th>Temperature</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB/2-18-91-14W4</td>
<td>12 temperature points</td>
<td>6 pressure points</td>
</tr>
<tr>
<td>AB/4-18-91-14W4</td>
<td>12 temperature points</td>
<td>6 pressure points</td>
</tr>
<tr>
<td>AB/5-18-91-14W4</td>
<td>12 temperature points</td>
<td>6 pressure points</td>
</tr>
<tr>
<td>AA/7-18-91-14W4</td>
<td>11 temperature points</td>
<td>5 pressure points</td>
</tr>
<tr>
<td>AB/10-18-91-14W4</td>
<td>12 temperature points</td>
<td>6 pressure points</td>
</tr>
<tr>
<td>AA/12-18-91-14W4</td>
<td>12 temperature points</td>
<td>6 pressure points</td>
</tr>
<tr>
<td>09/10-18-914-14W4</td>
<td>High Temperature Fibre</td>
<td></td>
</tr>
</tbody>
</table>
- 12 thermocouples spaced between the Base of McMurray to Clearwater
- 6 piezometers spaced between Base of McMurray to Clearwater
- Instrumentation strapped to outside of casing string
VERTICAL WELL

Everest Canadian Resources
WDBD
ELEV KB: 474.5
AA/12-18-091-14W4/0
RIG_DATE: 2/23/2011

Pressure Gauge and Thermocouple Location
- Thermocouple Location

Pad 102

Clearwater Shale
Wabiskaw Sand
Wabiskaw Shale
McMurray Fm
McMurray Reservoir
Devonian Carbonate

~80m to the West
2S5 (~185.8m TVD)
2P5 (~191.2m TVD)

~20m to the East
2S4 (~187.7m TVD)
2P4 (~192.3m TVD)

Pad 101

Clearwater Shale
Wabiskaw Sand
Wabiskaw Shale
McMurray Fm
McMurray Reservoir
Devonian Carbonate

~40m to the West
1S4 (~186.7m TVD)
1P4 (~193.2m TVD)

~60m to the East
1S3 (~186.5m TVD)
1P3 (~193.5m TVD)

Everest Canadian Resources
WDBD
ELEV KB: 469
AB/02-18-091-14W4/0
RIG_DATE: 3/6/2011

AA/12-18-91-14W4

AB/2-18-91-14W4
VERTICAL WELL

Everest Canadian Resources
WDBD
ELEV KB: 470
AA/07-18-091-14W4/0
RIG_DATE: 2/20/2010

Pressur Gauge and Thermocouple Location

Everest Canadian Resources
WDBD
ELEV KB: 470
AA/07-18-091-14W4/0
RIG_DATE: 2/20/2010

Clearwater Shale
Wabiskaw Sand
Wabiskaw Shale
McMurray Fm
McMurray Reservoir
Devonian Carbonate

~93m to the West
1S4 (~183.5m TVD)
1P4 (~189.1m TVD)

~14m to the East
1S3 (~184.6m TVD)
1P3 (~190.8m TVD)

Clearwater Shale
Wabiskaw Sand
Wabiskaw Shale
McMurray Fm
McMurray Reservoir
Devonian Carbonate

~93m to the West
1S4 (~183.5m TVD)
1P4 (~189.9m TVD)

~14m to the East
1S3 (~184.0m TVD)
1P3 (~190.0m TVD)
HORIZONTAL WABISKAW OBSERVATION WELL

- Horizontal observation well designed and drilled in Wabiskaw formation for potential future production from zone
- Original Pad101 fiber failed, currently there is no plans to replace failed fiber string
• Production was shut-in via Warm-Hibernation program by August 2015
• Commissioning and startup process started Pad102
• Pad101 still on hibernation mode

<table>
<thead>
<tr>
<th>Pad101</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>101Pair01</td>
<td>Wellpair suspended since Mar. 2015</td>
</tr>
<tr>
<td>101Pair02</td>
<td>-2013 liner breach $\rightarrow$ SI for over a year $\rightarrow$ ICD’s installed Oct. 2014 $\rightarrow$ Bullhead to producer, but not converted to SAGD $\rightarrow$ Wellpair suspended since Apr. 2015</td>
</tr>
<tr>
<td>101Pair03</td>
<td>-No bottom hole temperature measurement $\rightarrow$ Wellpair suspended since May 2015</td>
</tr>
<tr>
<td>101Pair04</td>
<td>-Producer liner breach at toe $\rightarrow$ Wellpair suspended since Nov. 2013</td>
</tr>
<tr>
<td>101Pair05</td>
<td>-ICD’s installed in Feb. 2014 $\rightarrow$ Wellpair suspended since May 2015</td>
</tr>
<tr>
<td>101Pair06</td>
<td>-ICD’s installed Oct. 2014 $\rightarrow$ Wellpair suspended since May 2015</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pad102</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>102Pair02</td>
<td>-ICD’s installed in Sep. 2014 $\rightarrow$ Wellpair suspended since Jun. 2015 $\rightarrow$ Tested/Restarted (Nov-2019 to Mar-2020)</td>
</tr>
<tr>
<td>102Pair03</td>
<td>-Wellpair suspended since Jun. 2015 $\rightarrow$ Tested/Restarted (Nov-2019 to Mar-2020)</td>
</tr>
<tr>
<td>102Pair04</td>
<td>-Liner failure in Jan-13 $\rightarrow$ Wellpair suspended since May 2015 $\rightarrow$ Tested/Restarted (Nov-2019 to Mar-2020)</td>
</tr>
<tr>
<td>102Pair05</td>
<td>-ICD’s installed in June 2014 $\rightarrow$ Wellpair suspended since May 2015 $\rightarrow$ Tested/Restarted (Nov-2019 to Mar-2020)</td>
</tr>
<tr>
<td>102Pair06</td>
<td>-Wellpair suspended since Jun. 2015 $\rightarrow$ Tested/Restarted (Nov-2019 to Mar-2020)</td>
</tr>
</tbody>
</table>
WELLPAIR CURRENT STATUS

Pad 101 and 102 Schematic Sections

- Presence of Basal McMurray underlying Pad 101 complicated well trajectories with respect to maximizing resource recovery
WELLPAIR CURRENT STATUS

Pad 101 Schematic Sections

1P1 & 1S1
101P1 100/10-18, 101S1 105/10-18

1P2 & 1S2
101P2 102/10-18, 101S2 106/10-18

1P3 & 1S3
101P3 103/10-18, 101S3 107/10-18

1P4 & 1S4
101P4 104/10-18, 101S4 108/10-18

1P5 & 1S5
101P5 100/11-18, 101S5 107/11-18

1P6 & 1S6
101P6 102/11-18, 101S6 108/11-18

<30 API cutoff

<60 API cutoff
Pad 102 Schematic Sections

**2P1 & 2S1**
102P1 103/11-18, 102S1 105/11-18

**2P2 & 2S2**
102P2 104/11-18, 102S2 106/11-18

**2P3 & 2S3**
102P3 100/12-18, 102S3 105/12-18

**2P4 & 2S4**
102P4 102/12-18, 102S4 106/12-18

**2P5 & 2S5**
102P5 103/12-18, 102S5 107/12-18

**2P6 & 2S6**
102P6 104/12-18, 102S6 108/12-18

<30 API cutoff

<60 API cutoff
COMMISSIONING AND STARTUP

• Pad102
  • Commissioning and startup process started on November 2019
  • All wellpairs were inspected, serviced, and Pressure Tested as per AER Directive D013
  • Verified and Validated:
    • Wellpair string integrity
    • Temperatures (TCs) and Pressures
    • Surface → Well → Reservoir connectivity
  • Average Producers downhole temperature before restart (Feb 2020)

• On February 2020 and after the warmup phase was completed, the steam ramp up phase was started but, due to COVID-19 this phase has been temporarily suspended since March 2020
SUBSURFACE FUTURE PLANS
SUBSURFACE FUTURE PLANS

• Q3 2020 resume and continue with Pad 102 and Pad 101 wellpairs warmup, startup and rampup throughout 2020 and into 2021 until target reservoir Pressure is reached

• Drilling Plans Medium to Long Term
  • Pads 101 and 102 Downspacing
    • Down-spacing amendment application fully approved by AER
    • Capacity for 12 additional well pairs (infills) on existing Pads 101 and 102
  • Pads 103 and 104 are currently approved (with 100 m spacing/Six Pairs), an amendment will be submitted to the AER to reduce spacing increase well count
Everest Canadian Resources

SURFACE FACILITIES & ENVIRONMENTAL
4.3 SURFACE FACILITIES & ENVIRONMENTAL

1. FACILITY PLOT PLAN
2. FACILITY SCHEMATIC
3. MEASUREMENT AND REPORTING
4. WATER SOURCES & USES
5. ENVIRONMENTAL SUMMARY
6. SURFACE FUTURE PLANS
• General
  • Main EPEA approvals have been transferred to Everest
  • The project is not yet fully operational, therefore:
    • MARP approved: Mach 2011 → Annual 2020 MARP report and update will be submitted in February 2021
    • Review of Controls for EPAP Declaration will be completed, and the declaration will be submitted February 2021.

• Well Production / Injection Volumes
  • Well production will be prorated from bulk scheme production using intermittent test data via dedicated test separators on Pads 101 and 102. (6 pairs per separator)
  • Wells will meet or exceed the current minimum well test requirements per Directive 17
  • Manual samples will be taken to determine bitumen, water, solids and chloride content and have proven reliable and repeatable.
WATER SOURCES & USES

• *Water Act* licence amendment No. 00262149-02-00 was granted on April 06, 2020 extending the licence expiry date to April 5, 2025

• Fresh Water Uses - make-up water for the project to be drawn from the McKay Channel Empress Formation. Details on the Water Act license are as follows:

<table>
<thead>
<tr>
<th>Licence No. 00262149-02-00</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8-8-91-14-W4M</td>
<td>853 m³/day</td>
</tr>
<tr>
<td>16-8-91-14-W4M</td>
<td>2,401 m³/day</td>
</tr>
<tr>
<td>15-8-91-14-W4M</td>
<td>2,475 m³/day</td>
</tr>
<tr>
<td>Daily Maximum Diversion</td>
<td>5,729 m³/day</td>
</tr>
<tr>
<td>Annual Maximum Diversion</td>
<td>419,750 m³</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL SUMMARY

- AER Commercial Scheme Approval No. 11461 - no compliance issues
- EPEA Approvals all main approvals have been transferred to Everest:
  - EPEA Approval 255245-00-00
  - EPEA Approval 255245-00-01
  - EPEA Approval 255245-00-02
  - EPEA Approval 287052-00-00
- Water Act Diversion Licence Amended No. 00262149-02-00 – extended to April 5, 2025 - no compliance issues
- EPEA approval 287052-00-00 (Wastewater System) – The Wastewater treatment facilities will be commissioned in Q3-2020. Currently, all influent have been hauled and managed by a third-party service contractor.
SURFACE FUTURE PLANS

• Everest Canadian Resources top priority is to re-establish safe, compliant and steady-state operations

• Plans include but not limited to:
  • CPF
    • Continue with commissioning and rampup
    • Pursue optimization opportunities
  
  • Wellpads
    • 102 wellpad → Resume startup and rampup
    • 101 wellpad → Commission, startup and rampup