KIRBY IN SITU OIL SANDS PROJECT
AER DIRECTIVE 54 ANNUAL PERFORMANCE
PRESENTATION

October 2015
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>4 – 5</td>
</tr>
<tr>
<td>Geology</td>
<td>7 – 33</td>
</tr>
<tr>
<td>Cap Rock</td>
<td>34 – 35</td>
</tr>
<tr>
<td>Subsurface Schematic</td>
<td>36</td>
</tr>
<tr>
<td>Artificial Lift</td>
<td>37</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>38</td>
</tr>
<tr>
<td>Well Schematics</td>
<td>39 – 45</td>
</tr>
<tr>
<td>Operational Strategy</td>
<td>46– 47</td>
</tr>
<tr>
<td>Kirby South Performance</td>
<td>48 – 77</td>
</tr>
<tr>
<td>Observation Well Results</td>
<td>78 – 80</td>
</tr>
<tr>
<td>Future Plans – Subsurface</td>
<td>81</td>
</tr>
<tr>
<td>Topic</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Surface Facilities Overview</td>
<td>83 – 88</td>
</tr>
<tr>
<td>Kirby South Facility Performance</td>
<td>89 – 97</td>
</tr>
<tr>
<td>Measurement &amp; Reporting</td>
<td>98 – 99</td>
</tr>
<tr>
<td>Future Plans – Surface</td>
<td>100</td>
</tr>
<tr>
<td>Kirby North Site Activities</td>
<td>101</td>
</tr>
<tr>
<td>Water Treatment Technology</td>
<td>101 – 103</td>
</tr>
<tr>
<td>Kirby South Water Usage</td>
<td>104 – 111</td>
</tr>
<tr>
<td>Kirby South Pressure Balancing Scheme</td>
<td>112 – 114</td>
</tr>
<tr>
<td>Kirby South Disposal</td>
<td>115</td>
</tr>
<tr>
<td>Kirby North Water Strategy</td>
<td>116</td>
</tr>
<tr>
<td>Kirby South Waste Disposal</td>
<td>117</td>
</tr>
<tr>
<td>Environmental Summary</td>
<td>118 – 122</td>
</tr>
<tr>
<td>Approvals</td>
<td>123 – 129</td>
</tr>
<tr>
<td>Compliance</td>
<td>130</td>
</tr>
</tbody>
</table>
Background

Location of Kirby Project

Approved Project Area
Background
Scheme Approval 11475N Project Area

- Recovery Process: Steam Assisted Gravity Drainage (SAGD)
Directive 54 Section 3.1.1
Subsurface Issues Related to Resource Evaluation and Recovery
Geology
Project Area SAGD Pay Isopach
Geology
Project Area Volumetrics

<table>
<thead>
<tr>
<th></th>
<th>Average Pay Thickness (m)</th>
<th>Average Oil Saturation (%)</th>
<th>Average Porosity (%)</th>
<th>OBIP ($e^3m^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kirby Approved Project Area</td>
<td>14.8</td>
<td>78.4</td>
<td>32.7</td>
<td>275,864</td>
</tr>
</tbody>
</table>

- Volumetric calculation (for >10m contour):
  - Area above 10m of pay $\times$ Pay Thickness $\times$ Oil Sat. $\times$ Porosity
Geology
Kirby South Type Log
Geology
Kirby South Development Area

• Recovery Process: Steam Assisted Gravity Drainage (SAGD)
Geology
Kirby South SAGD Pay Isopach

[Map of Kirby South SAGD Pay Isopach with various drainage boxes marked.]
### Geology

**Kirby South Development Area Volumetrics**

<table>
<thead>
<tr>
<th></th>
<th>Average Pay Thickness (m)</th>
<th>Average Oil Saturation (%)</th>
<th>Average Porosity (%)</th>
<th>OBIP (E^3m3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kirby South Approved Development Area</td>
<td>19.7</td>
<td>76.3</td>
<td>33.2</td>
<td>55,000</td>
</tr>
</tbody>
</table>

- Volumetric calculation (for >10 m contour):
  - Area above 10 m of pay × Pay Thickness × Oil Sat. × Porosity
## Geology
### Kirby South Drainage Area Volumetrics

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Area (m²)</th>
<th>Oil Saturation (%)</th>
<th>Porosity (%)</th>
<th>Pay Thickness (m)</th>
<th>OBIP (E³m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>600,017</td>
<td>67.9%</td>
<td>33.3%</td>
<td>28.9</td>
<td>3,920</td>
</tr>
<tr>
<td>B</td>
<td>669,345</td>
<td>75.4%</td>
<td>32.8%</td>
<td>23.45</td>
<td>3,880</td>
</tr>
<tr>
<td>C</td>
<td>629,989</td>
<td>78.3%</td>
<td>33.4%</td>
<td>25.36</td>
<td>4,180</td>
</tr>
<tr>
<td>D</td>
<td>792,398</td>
<td>79.5%</td>
<td>33.3%</td>
<td>26.27</td>
<td>5,510</td>
</tr>
<tr>
<td>E</td>
<td>502,828</td>
<td>75.5%</td>
<td>34.2%</td>
<td>23.08</td>
<td>3,000</td>
</tr>
<tr>
<td>F</td>
<td>462,018</td>
<td>77.6%</td>
<td>33.3%</td>
<td>21.03</td>
<td>2,510</td>
</tr>
<tr>
<td>G</td>
<td>654,516</td>
<td>82.9%</td>
<td>33.2%</td>
<td>25.17</td>
<td>4,530</td>
</tr>
</tbody>
</table>
## Geology
### Average Reservoir Properties

<table>
<thead>
<tr>
<th></th>
<th>Initial Reservoir Pressure (kPa)</th>
<th>Initial Bottom Water Pressure (kPa)</th>
<th>Initial Reservoir Temperature (°C)</th>
<th>Average Depth of Reservoir, McMR SAGD Pay Top (mTVD)</th>
<th>Average Pay Thickness (m)</th>
<th>Average Porosity, Φ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kirby South Operating Area</td>
<td>~2600</td>
<td>~2550</td>
<td>10 to 15</td>
<td>530</td>
<td>21.9</td>
<td>33.2</td>
</tr>
<tr>
<td>Kirby Approved Project Area</td>
<td>~2600</td>
<td>~2550</td>
<td>12 to 13</td>
<td>490</td>
<td>14.8</td>
<td>32.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Average Oil Saturation (%)</th>
<th>Average Water Saturation (%)</th>
<th>Average Horizontal Permeability from OB plugs, Kh (mD)</th>
<th>Average Vertical Permeability from OB plugs, Kv (mD)</th>
<th>Kv/Kh Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kirby South Operating Area</td>
<td>74.8</td>
<td>25.2</td>
<td>6410</td>
<td>5260</td>
<td>0.82</td>
</tr>
<tr>
<td>Kirby Approved Project Area</td>
<td>78.4</td>
<td>21.6</td>
<td>6560</td>
<td>5510</td>
<td>0.84</td>
</tr>
</tbody>
</table>
• No additional Kirby South stratigraphic wells drilled in 2015
  – No cores cut and no special core analysis performed
Geology
Kirby South SAGD Pay Top Structure
Geology
Kirby South SAGD Pay Base Structure
Geology
Kirby South Net Water Sand Isopach
Geology
Kirby North Type Log

1AA110207509W400

Cap Rock Interval
Wabiskaw D SAGD Pay
McMurray SAGD Pay
McMurray Basal Water Sand
Paleozoic Unconformity

Clearwater A Shale
Wabiskaw
Wabiskaw B
Wabiskaw D
McMurray
Geology
Kirby North Structural Cross Section

A

Clearwater A Shale
Wabiskaw B
Wabiskaw D
McMurray

Paleozoic Unconformity

Cap Rock Interval

McMurray SAGD Pay
McMurray Basal Water Sand
Geology
Kirby North SAGD Pay Isopach
Geology
Kirby North Development Area Volumetrics

<table>
<thead>
<tr>
<th>Reservoir/Development Area</th>
<th>Average Pay Thickness (m)</th>
<th>Average Oil Saturation (%)</th>
<th>Average Porosity (%)</th>
<th>OBIP (e³m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wabiskaw D Reservoir</td>
<td>15.6</td>
<td>77.5</td>
<td>32.8</td>
<td>43,691</td>
</tr>
<tr>
<td>McMurray Reservoir</td>
<td>18.2</td>
<td>80.0</td>
<td>32.3</td>
<td>78,237</td>
</tr>
<tr>
<td>Kirby North Approved</td>
<td></td>
<td></td>
<td></td>
<td>121,928</td>
</tr>
<tr>
<td>Development Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Volumetric calculation (for >10m contour):
  - Area above 10m of pay X Pay Thickness X Oil Sat. X Porosity
# Geology

## Kirby North Drainage Area Volumetrics

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Area (m²)</th>
<th>Oil Saturation (%)</th>
<th>Porosity (%)</th>
<th>Pay Thickness (m)</th>
<th>OBIP (e³m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KN01</td>
<td>763,120</td>
<td>79.7</td>
<td>32.7</td>
<td>23.8</td>
<td>4,720</td>
</tr>
<tr>
<td>KN02</td>
<td>757,079</td>
<td>82.8</td>
<td>32.3</td>
<td>22.2</td>
<td>4,510</td>
</tr>
<tr>
<td>KN03</td>
<td>763,033</td>
<td>84.8</td>
<td>33.4</td>
<td>22.9</td>
<td>4,940</td>
</tr>
<tr>
<td>KN04</td>
<td>763,316</td>
<td>83.8</td>
<td>33.4</td>
<td>23</td>
<td>4,900</td>
</tr>
<tr>
<td>KN05</td>
<td>443,723</td>
<td>81.6</td>
<td>33.5</td>
<td>20.8</td>
<td>2,530</td>
</tr>
</tbody>
</table>
Geology
Kirby North Core Photos

1AB070107509W400

Clearwater A Shale
Wabiskaw
Wabiskaw B
Wabiskaw D
McMurray

Cap Rock Interval

Paleozoic Unconformity

McMurray SAGD Pay
McMurray Basal Water Sand
• No additional Kirby North stratigraphic wells drilled in 2015
  – No cores cut and no special core analysis performed
Geology
Kirby North Wabiskaw D SAGD Pay Top Structure
Geology
Kirby North Wabiskaw D SAGD Pay Base Structure
Geology

Seismic Coverage

- 4D Seismic Acquired March 2015
- Processing Completed June 2015
- Quality of data is very good
- Currently calibrating 4D observations against engineering data
- Working towards defining extent of steam chamber development
- No final interpretation to date

Legend:
- Approved Project Area
- 3D seismic Coverage & Acquisition Dates
- 2015 4D seismic Coverage
- Kirby South Drainage Boxes
Cap Rock Isopach Map

- Cap Rock interval varies in thickness from 9-22 m over development areas
- 1AA/09-06-075-08W4 Mini-Frac location (2012)
- 100/13-20-073-07W4 Mini-Frac location (2011)
Cap Rock
Mini Frac Results

MOP for Kirby South Pads A to G and Kirby North Pads KN01-KN05 is 7 MPa.
Majority of wells are equipped with ESPs. Currently there are 5 wells on rod pump and 44 wells on ESP.

- Range of lift capacity
  - Rod Pump: 0-300m³/d
  - ESP: 150-1000m³/d
- Operating Temperature
  - Less than 250°C for both rod pumps and ESPs

Completion is continually being optimized as required

- Steam splitters are installed to improve steam distribution in the injector
- Scab liners are installed to enhance toe production in the producer and reduce heel hot spots
- Tubing deployed inflow and outflow control devices are presently deployed as follows:
  - Steam splitters (13 wells)
  - Scab liners (27 wells)
• Blanket gas pressures are used to monitor bottom hole pressures for SAGD injection wells.

• SAGD producers are equipped with fiber optic temperature monitoring (DTS) along the lateral and bubble tubes with surface measurement for heel or toe pressure.

• Observation wells gather multiple temperatures and pressures at various elevations.
244.5 mm (9 5/8") Casing set @ ~ 750.0 mKB

339.7 mm (13 3/8") Surface Casing set @ ~ 200.0 mKB

88.9 mm (3 1/2") short tubing (Heel) @ ~ 750.0 mKB

88.9 mm (3 1/2") Long Tubing (Toe) @ ~ 1700.0 mKB

Liner Hanger ~20 m behind ICP

Slotted Liner 177.8 mm (7")

600-1000 m Hz sections
Well Schematics
Injection Well (Single String)

339.7 mm (13 3/8”) Surface Casing set @ ~ 200.0 mKB

244.5 mm (9 5/8”) Casing set @ ~ 750.0 mKB

114.3 mm (4 1/2”) Long Tubing @ ~ 1700.0 mKB

Liner Hanger ~20 m behind ICP

2 - 114.3 (4 1/2”) Steam Splitters

Slotted Liner 177.8 mm (7”)

600-1000 m Hz sections
88.9mm (3 ½") tubing to Pump landed ~50 m behind Liner Hanger

339.7 mm (13 3/8") Surface Casing set @ ~ 200.0 mKB

244.5 mm (9 5/8") Casing set @ ~ 750.0 mKB

Liner Hanger ~20 m behind ICP

600-1000 m Hz sections

48 mm (1.9") guide string with DTS fibre instrumentation

Pump

Slotted Liner 177.8 mm (7")
Well Schematics
Production Well (Scab Liner)

339.7 mm (13 3/8") Surface Casing set @ ~ 200.0 mKB

244.5 mm (9 5/8") Casing set @ ~ 750.0 mKB

88.9mm (3 ½") tubing to Pump landed ~50 m behind Liner Hanger

Pump

Scab Liner 127mm (5’’)

Slotted Liner 177.8 mm (7’’)

48 mm (1.9”) guide string with DTS fibre instrumentation

600-1000 m Hz sections
Completion Optimization

• Steam splitter and scab liner installations were selected based on specific opportunities for each well.
  – Steam splitters to target a specific stream distribution in the injector
  – Scab liner to encourage toe development and minimize heel temperature variations

• Impact on well performance has been well pair specific
  – In general, the results of completion optimization installations have been encouraging.
Completion Optimization Example

A5 producer scab liner installation resulted in immediate increased oil production.

Scabliner install
October 2014
Completion Optimization Example

A5 producer has more uniform temperature distribution in lateral after scabliner installation. Reduction in heel temperature variation and encouraging toe development.

A5 Producer Lateral Flowing Temperature Comparison

- July 15, 2014 without Scabliner
- March 17, 2015 with Scabliner
Well Schematics
Observation Well

8 to 20 Temperature measurement points
(Basal McMurray to CLWT)

222mm Surface Casing

139.7mm Production Casing
Thermal cement to surface

CLWTR A shale

External casing pressure Transmitter
(Pressure and Temperature sensor)

Mid MCM

McMurray Transition zone
or Water

Note: Shows a plan for 2011-2013 drilled observation wells, as previous wells don’t have external casing transmitters
Well Schematics
Disposal Well

- 244.5 mm SURFACE CASING, SET BETWEEN 25 m & 150 m CEMENTED FULL LENGTH
- 177.8 mm PRODUCTION CASING THERMALLY CEMENTED TO SURFACE
- 88.9 mm TUBING
- ANNULUS FILLED WITH INHIBITED WATER
- McMURRAY TOP
- INJECTION ISOLATION PACKER
- PERFORATIONS OR SCREEN
- McMURRAY BASAL AQUIFER (≈ 550 m)
Well Schematics
13-20 Hz Water Disposal Well

339.7 mm (13 3/8”) Surface Casing set @ ~ 182.0 mKB

244.5 mm (9 5/8”) Casing set @ ~ 730.0 mKB

114.3 mm (4 1/2”) Tubing @ ~ 692.0 mKB with isolation packer set at 690.0

Liner Hanger 20 m behind ICP

Slotted Liner 177.8 mm (7”) Slotted Liner

Inhibited water on backside, top filled with diesel.

525m Hz section
Operational Strategy
SAGD

- Inject steam down short and long string in injector
- Pump fluid from producer using artificial lift
- Operate wells based on a target steam chamber pressure and target subcool
- Steam chamber pressure is measured by blanket gas pressure in the injector and is controlled by the steam injection rate
  - Target pressure chosen to balance bottom water where it exists, typically 2.5 MPa to 3.5 MPa (Pads A to F)
  - For pads without bottom water influence, pressures may increase up to 5 MPa (Pad G)
Operational Strategy
SAGD Continued

- Subcool is the difference between saturated temperature at producer pressure and the highest temperature along the producer lateral
  - Target chosen to maximize production and minimize live steam production

- To optimize pressure and subcool target, a combination of parameters are monitored including:
  - Water retention in reservoir
  - Chlorides concentration in produced water
  - SOR
  - Bottom hole pressures
Kirby South Performance
Kirby South Drilling Activity Update

Slide 51
### Kirby South Performance
#### Kirby South Drilling Activity Update

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Reason for Re-drilling</th>
<th>Re-drill Trajectory Relative to Original</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2 RE Well Pair</td>
<td>• Performance Concerns&lt;br&gt;• Original injector encountered breccia and I.H.S. near wellbore&lt;br&gt;• Better quality reservoir, and production rates, expected above current position</td>
<td>• A2P RE and A2I RE drilled 10m above original producer and injector elevations, respectively&lt;br&gt;• A2 RE well pair drilled 12m left of original A2 trajectory</td>
</tr>
<tr>
<td>A3 RE Well Pair</td>
<td>• Performance Concerns&lt;br&gt;• Original injector encountered breccia and I.H.S. near wellbore&lt;br&gt;• Better quality reservoir, and production rates, expected above current position</td>
<td>• A3P RE and A3I RE drilled 10m above original producer and injector elevations, respectively&lt;br&gt;• A3 RE well pair drilled 12m left of original A3 trajectory</td>
</tr>
<tr>
<td>A4P RE</td>
<td>• Liner Failure&lt;br&gt;• Steam breakthrough resulted in the accumulation of solids in the production liner</td>
<td>• A4P RE drilled 5m right of original A4P trajectory, and at the same elevation</td>
</tr>
<tr>
<td>B2I RE</td>
<td>• Liner Failure&lt;br&gt;• Steam breakthrough due to muddy injector facies resulted in the accumulation of solids in the production liner&lt;br&gt;• Better quality reservoir, and production rates, expected above current position</td>
<td>• B2I RE drilled 5m directly above the original injector elevation  Original B2I converted to producer</td>
</tr>
</tbody>
</table>
## Kirby South SAGD Well Spacing

<table>
<thead>
<tr>
<th>Pad</th>
<th>Number of Well Pairs</th>
<th>Inter well Spacing (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>D</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>E</td>
<td>6</td>
<td>80</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>50</td>
</tr>
<tr>
<td>G</td>
<td>8</td>
<td>80</td>
</tr>
</tbody>
</table>

- Original well spacing on Pads A, B, & C were 100 m.

- Well spacing was optimized from 100 m to 80 m to achieve improved CDOR, SOR and recovery factors for wells with less bottom water influence.

- F Pad spacing was decreased to 50 m where thicker bottom water exists to lessen the slumping of oil and therefore improve CDOR, SOR and recovery factor.
## Kirby South Performance Pad Recoveries

<table>
<thead>
<tr>
<th>Pad</th>
<th>OBIP (E3m³)</th>
<th>Ult. Recovery (E3m³)</th>
<th>Cum Oil (E3m³)</th>
<th>RF</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3,920</td>
<td>2,352</td>
<td>152</td>
<td>4%</td>
</tr>
<tr>
<td>B</td>
<td>3,880</td>
<td>2,328</td>
<td>301</td>
<td>8%</td>
</tr>
<tr>
<td>C</td>
<td>4,180</td>
<td>2,508</td>
<td>361</td>
<td>9%</td>
</tr>
<tr>
<td>D</td>
<td>5,510</td>
<td>3,306</td>
<td>251</td>
<td>5%</td>
</tr>
<tr>
<td>E</td>
<td>3,000</td>
<td>1,800</td>
<td>365</td>
<td>12%</td>
</tr>
<tr>
<td>F</td>
<td>2,510</td>
<td>1,506</td>
<td>178</td>
<td>7%</td>
</tr>
<tr>
<td>G</td>
<td>4,530</td>
<td>2,718</td>
<td>202</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>27,530</td>
<td>16,518</td>
<td>1,809</td>
<td>7%</td>
</tr>
</tbody>
</table>

Recovery as of August 20, 2015
Kirby South Performance
Kirby Field Production

Kirby South Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate (m³/d)

August-13  November-13  February-14  May-14  September-14  December-14  March-15  July-15

SOR (m³/m³)

15000
13500
12000
10500
9000
7500
6000
4500
3000
1500
0

Forest Fires
Plant Issues
First SAGD conversion
Kirby South Performance Summary

- Reservoir performance is similar to expectations, currently optimizing well-pair conformance.
- Facility performance more steady than 2013-2014.
- Record oil production to date ~6000 m³/d
- 4 wells re-drilled due to liner failures (A4, B2, D3, D7, D8)
- 2 wells re-drilled due to performance concerns (A2, A3)
- All 49 wells, including re-drills, have been converted to SAGD operation as of July 2015
- SAGD well pair: 6
- First steam: Oct. 2013
- Inter-well pair spacing: 100 m
- Avg. net pay: 29 m
- Avg. So: 68%
- Avg. porosity: 33%
- Current RF: 4%
Kirby South Performance
Pad A Production

Kirby South - Pad A Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Circulating Re-Drills
Conversion of Re-Drills

Rate (m³/d)
SOR (m³/m³)

December-13 March-14 June-14 September-14 January-15 April-15 July-15
Kirby South Performance
High Recovery Pad A Well Pair

Kirby South - Well Pair A6 Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate (m³/d)

SOR (m³/m³)

- December-13
- March-14
- June-14
- September-14
- January-15
- April-15
- July-15
Kirby South Performance
Low Recovery Pad A Well Pair

Kirby South - Well Pair A1 Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate (m3/d)

SOR (m3/m3)

December-13  March-14  June-14  September-14  January-15  April-15  July-15
Kirby South Performance
Pad A Obs Well – 26 metres from A4
Kirby South Performance
Pad A Obs Well Pressures

- BW pressure changes as pad pressures are increased / decreased
- McMurray pressure beginning to be influenced by SAGD pressure (26m from A4)
- Clearwater gauge landed in impermeable shale
- Clearwater declining pressure result of gauge effects and does not indicate change in cap rock properties
Kirby South Performance
Pad A Key Learnings

• To date, Pad A has performed below reservoir expectations

• Re-drilled A2 and A3 Pairs as well as A4 producer
  ▪ First well Spudded: January 27, 2015
  ▪ Last well Rig Released: March 4, 2015
  ▪ Circulated A2 and A3 Re-drill Pairs from April 2015 until July 2015
  ▪ Circulated A4 from April 2015 until Mid-May 2015

• Re-drilled pairs are performing as expected.

• Evaluating the economic potential to re-drill A1 in 2016.

• A1, A4, A5, and A6 producers communicate with bottom water
  – Balance pressures with bottom water
  – To date bottom water does not seem to be influencing performance
Kirby South Performance
Pad D

- SAGD well pair: 8
- First steam: Oct. 2013
- Inter-well pair spacing: 80 m
- Avg. net pay: 26 m
- Avg. So: 80%
- Avg. porosity: 33%
- Current RF: 5%
Kirby South Performance
Pad D Production

Kirby South - Pad D Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate (m3/d)

SOR (m3/m3)

December-13 March-14 June-14 September-14 January-15 April-15 July-15

Circulating Re-Drills

Conversion of Re-Drills
Kirby South Performance
High Recovery Pad D Well Pair

Kirby South - Well Pair D4 Production
- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate (m3/d)
SOR (m3/m3)

December-13 March-14 June-14 September-14 January-15 April-15 July-15
Kirby South Performance
Low Recovery Pad D Well Pair

 Kirby South - Well Pair D6 Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate (m³/d)

SOR (m³/m³)

December-13  March-14  June-14  September-14  January-15  April-15  July-15
Kirby South Performance
Horizontal Observation Well
Pad D Obs wells show good pressure sensitivities to changes in SAGD operations
Kirby South Performance
Pad D Obs Well – 5 m From D2
Note: Fixed thermocouple string [May 2015]
Kirby South Performance
Pad D Key Learnings

- Reservoir performance is meeting expectations
- D3, D7, & D8 re-drills commenced circulation Oct 2014
- All re-drills On SAGD operation as of Q2 2015
- Known communication through old RAX SAGD pilot
  - To date no performance issues due to RAX pilot to date
  - Long term strategy to balance pressures between C & D pad
  - Continually monitor RAX pressure and temperatures
- Scab liners have been installed on D1 & D2 to improve temperature conformance
- Evaluating the economics of re-drilling D5 in 2016 (suspect liner failure).
- SAGD well pair: 7
- First steam: Sept. 2013
- Inter-well pair spacing: 100 m
- Avg. net pay: 25 m
- Avg. So: 78%
- Avg. porosity: 33%
- Current RF: 9%
Kirby South Performance
High Recovery Pad C Well Pair

Kirby South - Well Pair C2 Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate [m3/d] vs. SOR [m3/m3]

- December-13
- March-14
- June-14
- September-14
- January-15
- April-15
- July-15
Kirby South Performance
Low Recovery Pad C Well Pair

Kirby South - Well Pair C6 Production

- Oil Production
- Water Production
- Steam Injection
- ISOR
- CSOR

Rate (m3/d)

SOR (m3/m3)

December-13
March-14
June-14
September-14
January-15
April-15
July-15
Kirby South Performance
Pad C Obs Well – 36 m From C2
Kirby South Performance
Pad C Obs Well – 27 m From C2

Temperature Sensor

OB2A - 104/15-20-073-07W4

Temperature (deg C)

Depth (mKB)

- September-13
- December-13
- March-14
- June-14
- August-14
- November-14
- February-15
- May-15
- August-15
Kirby South Performance
Pad C Key Learnings

• Reservoir performance is meeting expectations

• Producers communicate with transition zone
  – To date no performance issues due to bottom water
  – Balance pressures with bottom water
Kirby South Performance
5 Year Outlook – Pad Abandonments

• No expected pad abandonments in the next 5 years
Kirby South Performance
Wellhead Steam Quality

• During steady operations, wellhead quality should be 95% or greater

• There is some evidence that certain pads and wells have experienced slightly lower quality during start-up
  – This is not expected to have an impact on recovery

• No other fluids are injected with the steam
Kirby South Observation Well Results
100/10-28-073-07W4 – 4 m From G3

Colony gas well to evaluate the ability of non-thermal cement to maintain hydraulic isolation in a thermal environment.
- Seeing temperatures heat up in the Wabiskaw formation due to proximity to A5P build section (~5 m).
- Very localized and isolated temperature increase.
Kirby South Observation Well Results

Overall Performance

- **103/10-20-073-07W4/00 Hz Obs Well**
  - Data was not being transmitted to surface. Pulled gauges, repaired and re-ran. All problems resolved.

- **102/10-20-073-07W4/00 Obs Well**
  - Suspicious thermocouple readings. Blew well dry, and re-ran string. All problems resolved.

- **100/03-29-073-07W4/00 Obs Well**
  - Perforated McMurray bottom water and re-ran thermocouple string with pressure gauge.

- **102/12-20-073-07W4/00 Obs Well**
  - Perforated McMurray bottom water and re-ran thermocouple string with pressure gauge.

- **100/15-28-073-08W4/00 - New water observation well**

- **Potential repairs for next winter season**
  - **102/12-20-073-07W4/00** – Pressure data not transmitting
  - **100/09-28-073-07W4/00** – Pressure and temperature data appears erroneous
  - **100/10-28-073-07W4/00** – 1 TC is showing a cooling effect.

- **Annual preventative maintenance program for all observation wells.**
 Kirby South Observation Well Results
Overall Performance

• 1AB/11-20-073-07W4/00 OB1C
  – Well is cased to 498.0 mKB and has an estimated cement top within the casing of 475.0 mKB. A 10 point thermocouple string is landed from 446.0 – 473.0 mKB across the Clearwater cap rock. There are no plans to enter this well.

• 100/06-21-073-07W4/00
  – In March 2014, the thermocouple string was pulled and the McMurray bottom water was perforated because the external pressure gauge was not providing accurate data. An internal pressure gauge was run and the thermocouple string was not re-run. There are no plans to enter this well.
• Continue to optimize SAGD pairs

• Pending favorable economic conditions, the following future plans are contemplated:
  – Potentially re-drill D5 (failed producer liner) and A1 (performance).
  – F pad: drill remaining approved wells (F8, F9, F10)
  – Scheme Amendment applications (H & I Pads – Section 23)

• Kirby North Development
  – Received scheme approval for revised pads KN01-KN05 in Nov, 2014.
  – Canadian Natural announced in January 2015 that the Kirby North project would be deferred due to several external factors including commodity prices.
  – Construction suspended August 2015.
Directive 54 Section 3.1.2
Surface Operations, Compliance and Issues Not Related to Resource Evaluation and Recovery
Surface Facilities Overview
Plot Plans

• Detailed Site Plot Plans:
  – Kirby SAGD Production Pad Plot Plan
    ▪ Dwg No. KBF-G-210-0001
  – Kirby South Central Plant Plot Plan
    ▪ Dwg No. KBP-00-210-0002
  – Kirby North Central Plant Plot Plan
    ▪ Dwg No. KNP-100-210-0001 R1

• Simplified Schematic:
  – Kirby In-Situ Oil Sands Project Simplified Schematic
Surface Facilities Overview
Kirby South SAGD Production Pad Plot Plan
Surface Facilities Overview
Kirby South Central Plant Plot Plan
Surface Facilities Overview
Kirby South Modifications

• Summary of Modifications since August 2014
  – Slop oil recycle re-integration (enhanced integration to process train)
  – Piping modifications in the Evaporators to facilitate cleaning and vessel draining
  – Disposal fluid treatment upgrade and anti-scale addition
  – Boiler floor refractory installation/optimization and burner tuning
  – Metering changes made to improve measurement of utility gas injection
  – New maintenance office building completion
Kirby South Facility Performance
Oil Treating/Produced Water De-oiling Area

• Overall water quality and oil treating targets have been generally met
  – Experienced some treating challenges due to higher rates and below par skim tank performance
  – Continued dealing with periodic oil treating upsets during the ramp up phase as production rates hit new highs
    ▪ Continued optimizations to the chemical treating program, vessel operation, and instrumentation have been made to resolve the issues
    ▪ Plans in place to remove issues as rates increase to full design
  – Several PW de-oiling upsets have led to short-term restrictions for evaporator cleaning and protection
    ▪ Several changes to operating parameters and chemical treating program have been made to resolve the issues
    ▪ Plans in place to continue optimizing/removing issues as rates increase to full capacity
  – Challenges in keeping up with slop generation
    ▪ Improvements made to slop handling flexibility (recycle, trucking)
In general good performance in the evaporators - meeting design expectations

Water upsets have affected evaporator performance periodically due to excess oil being sent to the evaporators. This has affected steam availability

- Oil-in-water excursion response protocol updated based on operating data
- Chemical / Mechanical cleaning procedures in place and optimized to address the issue and quickly restore evaporator capacity after an upset
- Plans in place to further streamline upset response and cleaning procedures
Kirby South Facility Performance

Boilers

• Boiler failures

  – Tube header failures discovered in April 2014 and Furnace tube failures discovered in July 2014 causing steam limitation

  – Engineering solution implemented to protect boilers fully meeting 2015 steam demand

    ▪ Tubes were replaced and refractory was installed on the furnace floor in all boilers to eliminate future failures

    ▪ Burners were tuned to shift heat away from furnace

    ▪ Since its installation, refractory has been modified and burners re-tuned

  – Plans in place to further optimize the solution based on inspection/performance of the repaired / upgraded boilers to meet increasing well steam demand into 2016
• Salt caverns continue to manage evaporator blowdown solids

• Some optimization ongoing to cavern return filtration

• 2015 Sonar Logging
  – Cavern 1 complete
  – Cavern 2 scheduled for this fall

• Both salt caverns have passed their MIT
  – MIT will be performed on a five year cycle.
Kirby South Facility Performance
Power Consumption

- Power Consumption on a monthly basis

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Power Consumption (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep -14</td>
<td>12,800,171</td>
</tr>
<tr>
<td>Oct -14</td>
<td>12,593,742</td>
</tr>
<tr>
<td>Nov -14</td>
<td>13,601,048</td>
</tr>
<tr>
<td>Dec -14</td>
<td>13,974,570</td>
</tr>
<tr>
<td>Jan -15</td>
<td>14,705,705</td>
</tr>
<tr>
<td>Feb -15</td>
<td>14,835,522</td>
</tr>
<tr>
<td>Mar -15</td>
<td>13,350,334</td>
</tr>
<tr>
<td>Apr -15</td>
<td>14,247,749</td>
</tr>
<tr>
<td>May -15</td>
<td>14,388,195</td>
</tr>
<tr>
<td>Jun -15</td>
<td>14,076,847</td>
</tr>
<tr>
<td>Jul -15</td>
<td>14,401,652</td>
</tr>
<tr>
<td>Aug-15</td>
<td>15,823,554</td>
</tr>
</tbody>
</table>
Kirby South Facility Performance
Gas Usage

- Gas Usage on a monthly basis

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Purchased Gas e³m³</th>
<th>Total Gas Produced e³m³</th>
<th>Total Gas Vented e³m³</th>
<th>Total Solution Gas to Flare e³m³</th>
<th>Solution Gas Recovered %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep -14</td>
<td>15,385</td>
<td>279</td>
<td>-</td>
<td>0</td>
<td>100.0</td>
</tr>
<tr>
<td>Oct -14</td>
<td>18,725</td>
<td>296</td>
<td>-</td>
<td>0</td>
<td>100.0</td>
</tr>
<tr>
<td>Nov -14</td>
<td>20,052</td>
<td>380</td>
<td>-</td>
<td>2</td>
<td>99.6</td>
</tr>
<tr>
<td>Dec -14</td>
<td>20,536</td>
<td>307</td>
<td>-</td>
<td>0.3</td>
<td>99.9</td>
</tr>
<tr>
<td>Jan -15</td>
<td>21,467</td>
<td>252</td>
<td>-</td>
<td>7.1</td>
<td>97.0</td>
</tr>
<tr>
<td>Feb -15</td>
<td>19,201</td>
<td>313</td>
<td>-</td>
<td>17.1</td>
<td>95.0</td>
</tr>
<tr>
<td>Mar -15</td>
<td>20,284</td>
<td>216</td>
<td>-</td>
<td>1.2</td>
<td>99.0</td>
</tr>
<tr>
<td>Apr -15</td>
<td>21,218</td>
<td>357</td>
<td>-</td>
<td>0</td>
<td>100.0</td>
</tr>
<tr>
<td>May -15</td>
<td>20,044</td>
<td>549</td>
<td>-</td>
<td>0.6</td>
<td>99.9</td>
</tr>
<tr>
<td>Jun -15</td>
<td>21,477</td>
<td>233</td>
<td>-</td>
<td>13.3</td>
<td>94.3</td>
</tr>
<tr>
<td>Jul -15</td>
<td>23,213</td>
<td>700</td>
<td>-</td>
<td>7.6</td>
<td>98.9</td>
</tr>
<tr>
<td>Aug-15</td>
<td>21,639</td>
<td>1,004</td>
<td>-</td>
<td>0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Kirby South Facility Performance Emissions

• Kirby Greenhouse Gas Emissions
  – Currently establishing baseline in accordance with the Specified Gas Emitters Regulation (SGER).

• Kirby Sulphur Emissions
  – No exceedance of the EPEA daily SO2 emissions limit of 2.0 t/d
  – No exceedance of the AER D56 calendar quarterly sulphur limit of 0.9 t/d
  – No plans for sulphur recovery installation at this time, as Canadian Natural anticipates sulphur emissions to be less than 1 t/d sulphur
  – Contingency plan is to reduce production if the sulphur emission rate approaches the EPEA or D56 limit
Kirby South Facility Performance
Ambient Air Quality Results

- During the monitoring periods, there were no ambient SO2, H2S or NO2 readings above the Alberta Ambient Air Quality Objective (AAAQO).
Measurement and Reporting Summary

- MARP approved in October 2011 and last updated in February 2015
  - Most were minor changes (typos on drawings, inconsistencies between information on the drawings and measurement list)
  - A couple of meters added on flare system and incorporation of a few sample points
- Methods for estimating well production and injection volumes:
  - Produced emulsion from the scheme is commingled at the battery. Bitumen and water production from the battery will be prorated to each well using monthly proration test data and proration factors
    - Total Battery Oil (Water) / Total Test Oil (Water) at Wells = Oil (Water) Proration Factor
    - Oil (Water) Proration Factor * Each Well Test Oil (Water) Volume = Oil (Water) Allocated to Each Well
  - Gas is allocated to each well using a battery GOR
    - Total Solution Gas Produced / Total Battery Oil = Gas Oil Ratio
    - Gas Oil Ratio * Oil Allocated to Each Well = Gas Allocated to Each Well
  - Injected steam volumes will be continuously measured at the wellhead and prorated to the total steam leaving the injection facility
- Test Durations
  - Based on our operating experience, wells are currently being tested for a period of anywhere between 1 to 6 hours/day, each depending on their unique conditions and maturity
Measurement and Reporting
KS Battery & Injection Reporting Codes

Kirby South Battery
Location: 14-21-73-07W4M
Registry Code: ABBT0116017
Registry Sub Type: 344 – Crude Bitumen Multi-Well Proration Battery

Kirby South Steam Plant
Location: 14-21-73-07W4M
Registry Code: ABIF0116018
Registry Sub Type: 506 - In Situ Oil Sands

Kirby South Disposal Wells
Location: Various
Registry Code: ABIF0117173
Registry Sub Type: 503 - Disposal

Kirby South Salt Cavern #1
Location: 14-21-73-07W4M
Registry Code: ABWP0116019
Registry Sub Type: 702 – Cavern Waste

Kirby South Salt Cavern #2
Location: 14-21-73-07W4M
Registry Code: ABWP0117526
Registry Sub Type: 702 – Cavern Waste
Measurement and Reporting Proration Factors

- 100% compliance with D17 (3-month avg. range 0.85-1.15)
- Some spikes and fall offs caused due to shutdowns and/or very low rates
- Continuing to improve calibration techniques to further improve profacs
Future Plans – Surface
Kirby South Planned 2015 – 2016 Activities

• Central Plant
  – Optimize the Oil train process and improve overall de-oiling performance, including
    ▪ New ISF installation in series with existing ISF vessel
      ▪ Un-satisfactory skim tank performance
      ▪ ISF technology has worked well for our Bitumen-Water mixture separation
    ▪ Diluent to bitumen optimization (continuous improvement)
    ▪ Separation chemical testing to optimize rates and location (continuous improvement).
  – Slop oil recycle modifications
  – Evaporator performance optimization by modification to vapor washer spray reducing carryover fluids into the vapor washer
  – Boiler 1, 3, 4, 5 floor refractory installation/optimization and burner tuning
  – Piping additions/modifications to accommodate potential new disposal well

• Pads
  – Piping modifications on F-pad step outs (pending budget approval)
  – Piping modifications on two well re-drills (pending budget approval)
Kirby North Site Activities Summary

• Canadian Natural announced in January 2015 that the Kirby North project would be deferred due to several external factors including commodity prices.

• Construction suspended August 2015.
Water Treatment Technology Summary

- Mechanical Vapor Compression (MVC) evaporators selected for BFW treatment
  - Treatment of both recycled produced water and makeup water
  - Evaporator blow down solids disposal to on-site salt cavern
  - Silica Sorption process selected vs. high pH process from application
Water Treatment Technology Schematic

Mechanical Vapor Compression Evaporator:

- Brine Distributors
- Vent
- Deaerator
- Heat Exchanger
- Distillate Pump
- Recirculation Pump
- Compressor
- Waste Brine
- Wastewater
- Distillate
Kirby South Produced and Make-up Water Usage

Water Sources

Saline
- McMurray Fm
  - TDS = 14,500 ppm
  - Pressure balancing and make-up water
- Grand Rapids
  - TDS 4,500 ppm (tested frequently)
  - Make-up water

Non-Saline
- Grand Rapids
  - TDS 2,450 ppm
  - Make-up water
- Empress Fm
  - TDS = 550 ppm
  - Make-up and utility water
Kirby South Produced and Make-up Water Usage

<table>
<thead>
<tr>
<th>Month</th>
<th>Non-saline Volume</th>
<th>Saline Volume</th>
<th>Non Saline Make-Up Percentage</th>
<th>Injection</th>
<th>Produced</th>
<th>PWR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m³</td>
<td>m³</td>
<td>%</td>
<td>m³</td>
<td>m³</td>
<td>%</td>
</tr>
<tr>
<td>Sep-14</td>
<td>14,986</td>
<td>36,679</td>
<td>29</td>
<td>21,526</td>
<td>214,046</td>
<td>90</td>
</tr>
<tr>
<td>Oct-14</td>
<td>6,843</td>
<td>26,655</td>
<td>20</td>
<td>21,826</td>
<td>279,968</td>
<td>92</td>
</tr>
<tr>
<td>Nov-14</td>
<td>11,637</td>
<td>31,536</td>
<td>27</td>
<td>18,971</td>
<td>298,406</td>
<td>94</td>
</tr>
<tr>
<td>Dec-14</td>
<td>6,649</td>
<td>34,548</td>
<td>16</td>
<td>20,525</td>
<td>297,629</td>
<td>93</td>
</tr>
<tr>
<td>Jan-15</td>
<td>6,064</td>
<td>34,933</td>
<td>15</td>
<td>22,820</td>
<td>316,655</td>
<td>93</td>
</tr>
<tr>
<td>Feb-15</td>
<td>14,436</td>
<td>24,111</td>
<td>37</td>
<td>17,108</td>
<td>283,221</td>
<td>94</td>
</tr>
<tr>
<td>Mar-15</td>
<td>22,671</td>
<td>19,118</td>
<td>54</td>
<td>19,453</td>
<td>306,218</td>
<td>94</td>
</tr>
<tr>
<td>Apr-15</td>
<td>15,991</td>
<td>20,785</td>
<td>43</td>
<td>20,910</td>
<td>340,453</td>
<td>94</td>
</tr>
<tr>
<td>May-15</td>
<td>15,193</td>
<td>28,556</td>
<td>35</td>
<td>22,375</td>
<td>327,370</td>
<td>93</td>
</tr>
<tr>
<td>Jun-15</td>
<td>25,746</td>
<td>27,016</td>
<td>49</td>
<td>18,818</td>
<td>327,117</td>
<td>94</td>
</tr>
<tr>
<td>Jul-15</td>
<td>17,030</td>
<td>15,956</td>
<td>52</td>
<td>24,194</td>
<td>418,640</td>
<td>94</td>
</tr>
<tr>
<td>Aug-15</td>
<td>17,025</td>
<td>23,281</td>
<td>42</td>
<td>30,001</td>
<td>403,345</td>
<td>93</td>
</tr>
</tbody>
</table>

2014-2015 Totals

- Water Act Diversion License renewed in August, 2015
- Non-saline volumes declined and saline volumes increased vs 2013-2014
- Also used a total of 45837 m³ of non-saline/potable water to supply camps and office complex during first year of operations
Kirby South Source and Disposal Well Map

- Disposal Well
- Saline Source Well
- Off-Lease Saline Evaluation Well
- Non-Saline Source Well (Make-Up)
- Non-Saline Source Well (Domestic)
- Salt Cavern Disposal Well
<table>
<thead>
<tr>
<th>Well Name</th>
<th>Use</th>
<th>Unique Well Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>McMurray Source Wells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNRL WSW01 Kirby 14-30-73-7</td>
<td>Make-up Source (not used)</td>
<td>1F1/14-30-73-7W4M</td>
</tr>
<tr>
<td>CNRL WSW MC01 Kirby 10-33-73-8</td>
<td>Make-up Source</td>
<td>1F1/10-33-73-8 W4M</td>
</tr>
<tr>
<td>CNRL WSW MC02 Kirby 10-33-73-8</td>
<td>Make-up Source</td>
<td>1F2/10-33-73-8 W4M</td>
</tr>
<tr>
<td><strong>McMurray Off-Lease Saline Source Evaluation Well</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNRL WSW MC03 Kirby 11-13-73-6</td>
<td>Make-up Source</td>
<td>1F1/11-13-73-06W4M</td>
</tr>
<tr>
<td><strong>Grand Rapids Source Well</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNRL WSW GR01 Kirby 13-21-73-7</td>
<td>Make-up Source</td>
<td>1F3/13-21-073-07W4M</td>
</tr>
</tbody>
</table>
## Kirby South Source Wells – Non-Saline

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Use</th>
<th>Unique Well Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GRAND RAPIDS Formation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Rapids Source Wells</td>
<td>Make-up Source</td>
<td>1F2/14-30-73-8W4M</td>
</tr>
<tr>
<td>CNRL WSW02 Kirby 14-30-73-7</td>
<td>Make-up Source</td>
<td>1F2/14-30-73-8W4M</td>
</tr>
<tr>
<td><strong>EMPRESS Formation Source Wells</strong></td>
<td>Utility Source</td>
<td>1F2/13-21-73-07W4M</td>
</tr>
<tr>
<td>CNRL WSW Kirby 13-21-73-7</td>
<td>Utility Source</td>
<td>1F1/12-21-73-07W4M</td>
</tr>
<tr>
<td>CNRL WSW EMP03 12-21-73-7</td>
<td>Utility Source</td>
<td>1F1/12-21-73-07W4M</td>
</tr>
<tr>
<td><strong>MURIEL LAKE Formation - Source Wells</strong></td>
<td>Domestic Source</td>
<td>1F4/13-21-73-7W4M</td>
</tr>
<tr>
<td>CNRL WSW ML03 Kirby 13-21-73-7</td>
<td>Domestic Source</td>
<td>1F4/13-21-73-7W4M</td>
</tr>
<tr>
<td><strong>ETHEL LAKE Formation - Source and Standby Wells</strong></td>
<td>Domestic Source</td>
<td>1F1/16-29-73-7W4M</td>
</tr>
<tr>
<td>CNRL WSW EL01 Kirby 16-29-73-7</td>
<td>Domestic Source</td>
<td>1F1/16-29-73-7W4M</td>
</tr>
<tr>
<td>CNRL WSW EL02 Kirby 15-29-73-7</td>
<td>Domestic Source</td>
<td>1F1/16-29-73-7W4M</td>
</tr>
<tr>
<td>CNRL WSW EL01 Kirby 15-29-73-7</td>
<td>Domestic Source</td>
<td>No UWI</td>
</tr>
<tr>
<td>CNRL WSW EL02 Kirby 15-29-73-7</td>
<td>Domestic Source</td>
<td>No license required</td>
</tr>
</tbody>
</table>
# Kirby South Disposal Wells

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Use</th>
<th>Unique Well Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>McMurray Disposal Wells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAX Kirby 9-34-73-8</td>
<td>Disposal (not currently used)</td>
<td>00/09-34-073-08W4M</td>
</tr>
<tr>
<td>CNRL WDW01 Kirby 8-17-74-8</td>
<td>Disposal</td>
<td>00/08-17-074-08W4M</td>
</tr>
<tr>
<td>CNRL WDW02 Kirby 10-17-74-8</td>
<td>Disposal</td>
<td>02/10-17-074-08W4M</td>
</tr>
<tr>
<td>CNRL WDW03 Kirby 15-17-74-8</td>
<td>Disposal</td>
<td>00/15-17-074-08W4M</td>
</tr>
<tr>
<td>CNRL WDW HZ MCM05 Kirby 13-20-73-8</td>
<td>Disposal</td>
<td>00/13-20-073-08W4M</td>
</tr>
<tr>
<td><strong>Salt Cavern Wells</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNRL CAVERN VERT KIRBY 13-21-73-7</td>
<td>Lotsburg</td>
<td>00/13-21-073-07W4M</td>
</tr>
<tr>
<td>CNRL CAVERN DD KIRBY 4-28-73-7</td>
<td>Prairie Evaporate</td>
<td>02/04-28-073-07W4M</td>
</tr>
</tbody>
</table>
Kirby South Pressure Balance Scheme Update
Kirby South Pressure Balance Scheme Update

- After initial declines, pressure in Basal McMurray Aquifer now almost equal to initial pressure in all observation wells in South sourcing/disposal area
Kirby South Pressure Balance Scheme Update

- McMurray Fm Basal Aquifer pressure near 10-17-74-8 disposal area
  - Pressure increased in aquifer early on during cavern washing, but has now decreased to ~ 3,000 kPa and holding
  - Obtained chemistry sample at 1-17 obs well in March, 2014, TDS ~12,500, which is background concentration
Kirby South Disposal

• Disposal issues
  – Seeing decreasing injectivity over time.
    ▪ Plugging
    ▪ Oil Carryover
    ▪ Scale buildup in pipelines
  – Operating close to MWHIP
  – Acid stimulations showing diminishing returns.

• Potential future work
  – Hydraulic fracture Stimulation
  – Evaluating need for additional disposal well
  – Upgrade filter system at the plant
Kirby North Source and Disposal Strategy

Water Sources and Wastewater Disposal

• Salt caverns to treat water and drop out particulates in the Prairie Evaporite and the Lotsburg Formation

• McMurray Formation Basal Aquifer – Primary Wastewater Disposal Zone
  – Pressure balanced with source wells, water used for cavern wash and make-up
    ▪ Used learnings from Kirby South to locate wells

• Clearwater Formation B Aquifer – Saline water source
  – Cavern wash and make-up water

• Empress Formation Terrace Aquifer – Non-Saline water source
  – Cavern wash, peak make-up, and utility
<table>
<thead>
<tr>
<th>Location</th>
<th>Quantity</th>
<th>Recipient</th>
<th>Quantity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaver Regional Municipal Landfill</td>
<td>4,745 kg debris</td>
<td>Recycle Systems</td>
<td>21.6 kg gas</td>
</tr>
<tr>
<td>Blue Plant Recycling</td>
<td>3,713 kg plastic</td>
<td>Secure Pembina Landfill</td>
<td>13.6 kg solids/flammable liquid</td>
</tr>
<tr>
<td>Clean Harbors Ryley Landfill</td>
<td>56,991 kg leachable solids</td>
<td>Sunset Recycle &amp; Sales Ltd.</td>
<td>26,660 kg metal</td>
</tr>
<tr>
<td>Custom Environmental</td>
<td>146.2 kg aerosols</td>
<td>Tervita Janvier Landfill</td>
<td>91,690 kg soils &amp; debris</td>
</tr>
<tr>
<td>General Scrap Edmonton</td>
<td>2,366 kg scrap metal</td>
<td>Van Brabant Oil</td>
<td>1,900 kg oil/glycol</td>
</tr>
<tr>
<td>GFL Edmonton Oil</td>
<td>12,000 kg leachable oil</td>
<td>Wood Buffalo Landfill</td>
<td>96,030 kg domestic waste</td>
</tr>
<tr>
<td>MCL Waste Systems Environmental</td>
<td>15,870 kg solids</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Wildlife Mitigation Plan and Monitoring Program

- Monitoring mitigation efficacy (above ground pipelines, barriers to wildlife movement, effects of human presence)
- 21 remote cameras deployed throughout the project
  - 13 species detected, including black bear, Canada lynx, coyote, fisher, grey wolf, moose, muskrat, red fox, red squirrel, river otter, snowshoe hare, white-tailed deer, woodland caribou
- Marsh bird survey conducted
  - 43 species heard or observed, including Western toad and common nighthawk. No occurrences of yellow rail.
- Comprehensive report to be completed in 2017
Environmental Summary
Monitoring Programs

• Wetland and Waterbody Monitoring Program
  – Culvert inspection program identified corrective action required on culverts.
  – Overall, effects on wetlands are due to culvert functionality. Mitigation measures implemented on culverts.
  – Surface water withdrawal monitoring yielded changes in water elevation at one site. Further monitoring required to investigate causal factors.
  – Water quality monitoring yielded no substantial changes from previous reporting period.
  – Updated Wetland and Waterbody Monitoring Program submitted December 2014 and February 2015
Groundwater Monitoring Program

- Well pad monitoring program to monitor potential effect of steam injection on mineral solubility and mobilization of trace elements
  - 1 monitoring well on each Pad B, Pad D, Pad F
  - No impacts to groundwater quality identified

- Central Plant monitoring program monitors groundwater conditions within shallow sediments
  - 20 groundwater monitoring wells at CPF
  - Groundwater elevations in two wells increased from dry, likely due to seasonal variability with slow recharge in winter months

- Groundwater chemistry monitoring: Parameters that were identified above comparative guidelines were not considered impacts to the groundwater quality as the parameters were most likely naturally occurring.

Environmental Summary
Monitoring Programs

• Air Monitoring
  – Source Monitoring
    ▪ Two manual stack surveys reported with RATAs in 2014
    ▪ CEMS at steam generator measures SO2 and NO2
    ▪ Two cylinder gas audits conducted in 2014
      ▪ Results show CEMS code is met
      ▪ Increase in SO2 emissions consistent with increase in production
  – Ambient Air Monitoring
    ▪ Continuous ambient air monitoring station located 0.7 km from plant site
      ▪ No significant air quality issues related to plant operations
    ▪ Five passive monitoring stations located around the plant site
      ▪ All passive exposure monitoring results for SO2, H2S, NO2 and O3 were low for the monitoring period
Environmental Summary
Reclamation Activities

• Reclamation Activities
  – Four borrow areas have been revegetated
  – Two borrow areas have reclamation soils placed
  – 28.8 ha undergoing land reclamation

• Reclamation Monitoring
  – Objectives are to ensure:
    ▪ land is reclaimed to an equivalent land capability
    ▪ appropriate replacement of all salvaged topsoil on recontoured areas
    ▪ sustainable, diverse vegetation growth on all disturbed areas
    ▪ pre-disturbance wildlife carrying capacities are obtained
  – Regular site monitoring throughout reclaimed areas within the Project Area
  – Updated reclamation monitoring program proposal due June 2016.
Environmental Summary
Provincial/Federal Programs

• Canadian Oil Sands Innovation Alliance (COSIA)

• Lower Athabasca Regional Plan (LARP)
  – Participation in the South Athabasca Oil Sands (SAOS) area for Groundwater Management

• Joint Canada/Alberta Implementation Plan for Oil Sands Environmental Monitoring
  – Participation in the implementation of the program. Technical information and site access provided as necessary.

• Provincial and Federal Woodland Caribou Policies
  – Participating in the implementation of habitat restoration work on Canadian Natural project lands as part of the Regional Industry Caribou Collaboration
  – Participating in the upcoming GOA process to develop and implement range-level restoration plans

• Base Level Industrial Emissions Requirements (BLIERs)
  – Providing feedback through CAPP on Multi-sector Air Pollutants Regulations (MSAPR) which includes BLIERs for Reciprocating Engines and Boilers & Heaters
# Approvals

## Commercial Oil Sands Scheme

<table>
<thead>
<tr>
<th>Approval Code</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11475</td>
<td>September 2010</td>
<td>Commercial Oil Sands Scheme Approval</td>
</tr>
<tr>
<td>11475A</td>
<td>November 2010</td>
<td>Revise initial development Pads A to G</td>
</tr>
<tr>
<td>11475B</td>
<td>November 2011</td>
<td>Change inter-well spacing Drainage Area D</td>
</tr>
<tr>
<td>11475C</td>
<td>December 2011</td>
<td>Change inter-well spacing in Drainage Area B</td>
</tr>
<tr>
<td>11475D</td>
<td>May 2012</td>
<td>Change inter-well spacing in Drainage Area E</td>
</tr>
<tr>
<td>11475E</td>
<td>June 2012</td>
<td>Evaluation of on-lease McMurray brackish water</td>
</tr>
<tr>
<td>11475F</td>
<td>August 2012</td>
<td>Change inter-well spacing in Drainage Area G</td>
</tr>
<tr>
<td>11475G</td>
<td>September 2012</td>
<td>Change inter-well spacing in Drainage Area F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Addition to Drainage Area D</td>
</tr>
<tr>
<td>11475H</td>
<td>April 2013</td>
<td>Evaluation of off-lease Clearwater brackish water</td>
</tr>
</tbody>
</table>
# Approvals

## Commercial Oil Sands Scheme

<table>
<thead>
<tr>
<th>Approval Code</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11475I</td>
<td>January 2014</td>
<td>Operational Strategy amendment</td>
</tr>
<tr>
<td>11475J</td>
<td>March 2014</td>
<td>Trajectory and lateral length modifications in Drainage Area G</td>
</tr>
<tr>
<td>11475K</td>
<td>May 2014</td>
<td>Approval of Kirby In Situ Oil Sands Expansion Project</td>
</tr>
<tr>
<td>11475L</td>
<td>November 2014</td>
<td>Revise initial Kirby North development Pads KN01-KN05</td>
</tr>
<tr>
<td>11475M</td>
<td>December 2014</td>
<td>Redrill well pairs A1, A2, A3</td>
</tr>
<tr>
<td>11475N</td>
<td>May 2015</td>
<td>Additional Kirby South and Kirby North disposal wells</td>
</tr>
</tbody>
</table>

In Compliance
# Approvals Disposal

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class 1b Cavern Disposal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11716</td>
<td>November 2011</td>
<td>Cavern Solution Mining</td>
</tr>
</tbody>
</table>
| 11716A | July 2013 | Class 1b Cavern Disposal  
• Prairie Evaporites formation through well 00/13-21-073-07W4  
• Lotsberg formation through well 00/04-28-073-07W4 |
| 11716B | June 2015 | Modify testing requirements. Approval modified to reference CSA Z341.4 |

**In Compliance**
## Approvals Disposal

### Class Ib Disposal

<table>
<thead>
<tr>
<th>Approval</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11761</td>
<td>December 2011</td>
<td>Class Ib Disposal</td>
</tr>
<tr>
<td>11761</td>
<td>December 2011</td>
<td>- 00/08-17-74-08W4</td>
</tr>
<tr>
<td>11761</td>
<td>December 2011</td>
<td>- 02/10-17-74-08W4</td>
</tr>
<tr>
<td>11761</td>
<td>December 2011</td>
<td>- 00/15-17-74-08W4</td>
</tr>
<tr>
<td>11761A</td>
<td>April 2013</td>
<td>Modify pH requirements</td>
</tr>
<tr>
<td>11761B</td>
<td>March 2014</td>
<td>Amend MWHIP</td>
</tr>
<tr>
<td>11761C</td>
<td>May 2015</td>
<td>Additional Kirby South disposal well</td>
</tr>
<tr>
<td>11761C</td>
<td>May 2015</td>
<td>- 100/13-21-73-08W4</td>
</tr>
<tr>
<td>11761C</td>
<td>May 2015</td>
<td>Additional Kirby North disposal well</td>
</tr>
<tr>
<td>11761C</td>
<td>May 2015</td>
<td>- 02/08-22-74-10W4</td>
</tr>
</tbody>
</table>

**In Compliance**
## Approvals
### Disposal (continued)

<table>
<thead>
<tr>
<th>Class II Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9113</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>9594</strong></td>
</tr>
<tr>
<td><strong>9594A</strong></td>
</tr>
<tr>
<td><strong>9594B</strong></td>
</tr>
</tbody>
</table>

**In Compliance**
## Approvals

### Facility License

<table>
<thead>
<tr>
<th>License Number</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F42290</td>
<td>October 2010</td>
<td>Kirby South Phase 1 Central Processing Facility</td>
</tr>
<tr>
<td>F42290 amended</td>
<td>July 2013</td>
<td>Amended for KS1 CPF to reflect stream day rates and number of compressors and pumps</td>
</tr>
</tbody>
</table>
| F44051         | July 2014   | Kirby North Phase 1 Central Processing Facility                              

**In Compliance**
## Approvals
### EPEA and Water Act

<table>
<thead>
<tr>
<th>Approval ID</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>237382-00-00</td>
<td>April 2011</td>
<td>Approval of Kirby In Situ Oil Sands Project</td>
</tr>
<tr>
<td>237382-00-01</td>
<td>July 2014</td>
<td>Approval of Kirby In Situ Oil Sands Expansion Project</td>
</tr>
<tr>
<td>237382-00-02</td>
<td>February 2015</td>
<td>Amend Kirby South steam generator NOx limit to include efficiency credit</td>
</tr>
<tr>
<td>00334375-00-00</td>
<td>August 2013</td>
<td>Groundwater diversion license, Empress Unit 1 and Grand Rapids Formation</td>
</tr>
<tr>
<td>00337375-01-00</td>
<td>August 2015</td>
<td>Renewal of Groundwater diversion license</td>
</tr>
<tr>
<td>00288494-00-00</td>
<td>April 2011</td>
<td>Groundwater diversion license, Ethel Lake Formation</td>
</tr>
<tr>
<td>00327156-00-00</td>
<td>August 2013</td>
<td>Industrial surface runoff diversion license</td>
</tr>
<tr>
<td>00303825-00-00</td>
<td>July 2014</td>
<td>Preliminary Certificate groundwater diversion, Empress Terrace Formation</td>
</tr>
<tr>
<td>00303820-00-00</td>
<td>September 2014</td>
<td>Industrial surface runoff diversion license</td>
</tr>
</tbody>
</table>

**In Compliance**
• **Reportable Spills**
  – 5 reportable spills: 2 produced water, 1 acid + produced water, 2 fresh water. All sites remediated.

• **EPEA Contraventions**
  – CEMS malfunction, less than 90% total run time December 2014 and April 2015
  – Exceedances of NOx emission limit of 16.4 kg/hr between Dec 19 – 25, 2014
    ▪ 1 exceedance of 17.5 kg/hr NOx
  – NOx emission limit was corrected to 17.5 kg/hr to account for allowable efficiency credit.

• **Scheme Approval**
  – Lapse in data acquisition at groundwater monitoring well 100/04-30-74-8W4, March 2015.

• **Water Act**
  – Missed groundwater chemistry sample at 1F1/12-21-73-7W4.

• All compliance items reported to ESRD/AEP/AER as required.
Forward Looking Statements

Certain statements relating to Canadian Natural Resources Limited (the “Company”) in this document or documents incorporated herein by reference constitute forward-looking statements or information (collectively referred to herein as “forward-looking statements”) within the meaning of applicable securities legislation. Forward-looking statements can be identified by the words “believe,” “anticipate,” “expect,” “plan,” “estimate,” “target,” “continue,” “could,” “intend,” “may,” “potential,” “predict,” “should,” “will,” “objective,” “project,” “forecast,” “goal,” “guidance,” “outlook,” “effort,” “seeks,” “schedule,” “proposed,” or expressions of a similar nature suggesting future outcome or statements regarding an outlook. Disclosure related to expected future commodity pricing, forecast or anticipated production volumes, royalties, operating costs, capital expenditures, income tax expenses, and other guidance provided throughout this presentation constitute forward-looking statements. This forward-looking information is based on annual budgets and multi-year forecasts, and is reviewed and revised throughout the year as necessary in the context of targeted financial ratios, project returns, product pricing expectations and balance in project risk and time horizons. These statements are not guarantees of future performance and are subject to certain risks and the reader should not place undue reliance on these forward-looking statements as there can be no assurances that the plans, initiatives or expectations upon which they are based will occur.

In addition, statements relating to “reserves” are deemed to be forward-looking statements as they involve the implied assessment based on certain estimates and assumptions that the reserves described can be profitably produced in the future. There are numerous uncertainties inherent in estimating quantities of proved and proved plus probable crude oil and natural gas and natural gas liquids (NGLs) reserves and in projecting future rates of production and the timing of development expenditures. The total amount or timing of actual future production may vary significantly from reserve and production estimates.

The forward-looking statements are based on current expectations, estimates and projections about the Company and the industry in which the Company operates, which speak only as of the date such statements were made or as of the date of the report or document in which they are contained, and are subject to known and unknown risks and uncertainties that could cause the actual results, performance or achievements of the Company to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such risks and uncertainties include, among others: general economic and business conditions which will, among other things, impact demand for and market prices of the Company’s products; volatility of and changes in market prices for crude oil and natural gas; fluctuations in currency and interest rates; assumptions on which the Company’s current guidance is based; economic conditions in the countries and regions in which the Company conducts business; political uncertainty, including actions of or against terrorists; ability of the Company and its subsidiaries to complete capital programs; the Company’s and its subsidiaries’ ability to secure adequate transportation for its products; unexpected disruptions or delays in the resumption of the mining, extracting or upgrading of the Company’s bitumen products; potential delays or changes in plans with respect to exploration or development projects or capital expenditures; ability of the Company to attract the necessary labour required to build its thermal and oil sands mining projects; operating hazards and other difficulties inherent in the exploration for and production and sale of crude oil and natural gas and in mining, extracting or upgrading the Company’s bitumen products; availability and cost of financing; the Company’s and its subsidiaries success of exploration and development activities and their ability to replace and expand crude oil and natural gas reserves; timing and success of integrating the business and operations of acquired companies; production levels; imprecision of reserve estimates and estimates of recoverable quantities of crude oil, natural gas and NGLs not currently classified as proved; actions by governmental authorities; government regulations and environmental laws and regulations; financial performance and ratios; potential increases in the cost of regulatory compliance; potential changes in regulatory enforcement; the adequacy of the Company’s provision for taxes; and other circumstances affecting revenues and expenses. The Company’s operations have been, and in the future may be, affected by political developments and by federal, provincial and local laws and regulations such as restrictions on production, changes in taxes, royalties and other amounts payable to governments or governmental agencies, price or gathering rate controls and environmental protection regulations. Should one or more of these risks or uncertainties materialize, or should any of the Company’s assumptions prove incorrect, actual results may vary in material respects from those projected in the forward-looking statements. The impact of any one factor on a particular forward-looking statement is not determinable with certainty as such factors are dependent upon other factors, and the Company’s course of action would depend upon its assessment of the future considering all information then available. For additional information refer to the “Risks Factors” section of the AIF.

Readers are cautioned that the foregoing list of factors is not exhaustive. Unpredictable or unknown factors not discussed in this report could also have material adverse effects on forward-looking statements.

Although the Company believes that the expectations conveyed by the forward-looking statements are reasonable based on information available to it on the date such forward-looking statements are made, no assurances can be given as to future results, levels of activity and achievements. All subsequent forward-looking statements, whether written or oral, attributable to the Company or persons acting on its behalf are expressly qualified in their entirety by these cautionary statements. Except as required by law, the Company assumes no obligation to update forward-looking statements, whether as a result of new information, future events or other factors, or as the foregoing factors affecting this information, should circumstances or Management’s estimates or opinions change.
Special Note Regarding Currency, Production and Reserves

In this document, all references to dollars refer to Canadian dollars unless otherwise stated. Reserves and production data are presented on a before royalties basis unless otherwise stated. In addition, reference is made to crude oil and natural gas in common units called barrel of oil equivalent (“BOE”). A BOE is derived by converting six thousand cubic feet of natural gas to one barrel of crude oil (6Mcf:1bbl). This conversion may be misleading, particularly if used in isolation, since the 6Mcf:1bbl ratio is based on an energy equivalency conversion method primarily applicable at the burner tip and does not represent a value equivalency at the wellhead. In comparing the value ratio using current crude oil prices relative to natural gas prices, the 6Mcf:1bbl conversion ratio may be misleading as an indication of value.

This document, herein incorporated by reference, have been prepared in accordance with IFRS, as issued by the International Accounting Standards Board.

For the year ended December 31, 2013 the Company retained Independent Qualified Reserves Evaluators (“Evaluators”), Sproule Associates Limited and Sproule International Limited (together as “Sproule”) and GLJ Petroleum Consultants Ltd. (“GLJ”), to evaluate and review all of the Company’s proved and proven plus probable reserves with an effective date of December 31, 2013 and a preparation date of February 3, 2014. Sproule evaluated the North America and International light and medium crude oil, primary heavy crude oil, Pelican Lake heavy crude oil, bitumen (thermal oil), natural gas and NGLs reserves. GLJ evaluated the Horizon SCO reserves. The evaluation and review was conducted in accordance with the standards contained in the Canadian Oil and Gas Evaluation Handbook (“COGE Handbook”) and disclosed in accordance with National Instrument 51-101 – Standards of Disclosure for Oil and Gas Activities (“NI 51-101”) requirements. In previous years, Canadian Natural had been granted an exemption order from the securities regulators in Canada that allowed substitution of U.S. Securities Exchange Commission (“SEC”) requirements for certain NI 51-101 reserves disclosures. This exemption expired on December 31, 2010. As a result, the 2011 and 2012 reserves disclosure is presented in accordance with Canadian reporting requirements using forecast prices and escalated costs.

The Company annually discloses net proved reserves and the standardized measure of discounted future net cash flows using 12-month average prices and current costs in accordance with United States Financial Accounting Standards Board Topic 932 “Extractive Activities - Oil and Gas” in the Company’s Form 40-F filed with the SEC in the “Supplementary Oil and Gas Information” section of the Company’s Annual Report targeted to be released in late March 2013.

Resources Other Than Reserves

The contingent resources other than reserves (“resources”) estimates provided in this presentation are internally evaluated by qualified reserves evaluators and are not currently considered commercially viable due to one or more contingencies. There is no certainty that it will be commercially viable to produce any portion of these resources.

Due to the inherent differences in standards and requirements employed in the evaluation of reserves and contingent resources, the total volumes of reserves or resources are not to be considered indicative of total volumes that may actually be recovered and are provided for illustrative purposes only.

Crude oil, bitumen or natural gas initially-in-place volumes provided are discovered resources which include production, reserves, contingent resources and unrecoverable volumes.

Special Note Regarding non-GAAP Financial Measures

This document includes references to financial measures commonly used in the crude oil and natural gas industry, such as adjusted net earnings from operations, cash flow from operations, cash production costs and net asset value. These financial measures are not defined by International Financial Reporting Standards (“IFRS”) and therefore are referred to as non-GAAP measures. The non-GAAP measures used by the Company may not be comparable to similar measures presented by other companies. The Company uses these non-GAAP measures to evaluate its performance. The non-GAAP measures should not be considered an alternative to or more meaningful than net earnings, as determined in accordance with IFRS, as an indication of the Company’s performance. The non-GAAP measures adjusted net earnings from operations and cash flow from operations are reconciled to net earnings, as determined in accordance with IFRS, in the “Financial Highlights” section of the Company’s MD&A. The derivation of cash production costs is included in the “Operating Highlights – Oil Sands Mining and Upgrading” section of the Company’s MD&A. The Company also presents certain non-GAAP financial ratios and their derivation in the “Liquidity and Capital Resources” section of the Company’s MD&A.

Volumes shown are Company share before royalties unless otherwise stated.
THE PREMIUM VALUE.
DEFINED GROWTH.
INDEPENDENT.

Canadian Natural