Advisory

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<thead>
<tr>
<th>Section</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>Dermot O’Shea</td>
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<tr>
<td>Geology/Seismic</td>
<td>Dermot O’Shea</td>
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<tr>
<td>Drilling &amp; Completions</td>
<td>Heather Krislock</td>
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<td>Artificial Lift</td>
<td>Heather Krislock</td>
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<td>Instrumentation</td>
<td>Heather Krislock</td>
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<tr>
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<td>Heather Krislock</td>
</tr>
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<td>Future Plans</td>
<td>Mark Anderson</td>
</tr>
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</table>
Project Background
Section 3.1.1-1
Brief Background of Scheme

- Jackfish 1, 2 and 3 utilize steam-assisted gravity drainage (SAGD) to recover bitumen from the McMurray formation
- Located 150 km south of Fort McMurray
- Jackfish 1 Scheme approval granted in Aug 2006
- Jackfish 2 Scheme approval granted in Aug 2008
- Amalgamation of Jackfish approvals (including Jackfish 3) in Nov 2011
Brief Background of Scheme
Overall Scheme Map

3.1.1-1
### Brief Background of Scheme Jackfish

<table>
<thead>
<tr>
<th>Asset</th>
<th>Licensed Capacity m³/day (bbl/d)</th>
<th>Number of Operating Pads</th>
<th>Number of Operating Well Pairs</th>
<th>Upcoming Pads</th>
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<td>Jackfish 1</td>
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<td>7</td>
<td>49</td>
<td>G</td>
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<tr>
<td>Jackfish 2</td>
<td>5,565 (35,000)</td>
<td>6</td>
<td>44</td>
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<td>Jackfish 3</td>
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### Geology

**Jackfish Approved Area OBIP**

#### 3.1.1-2a

<table>
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<tr>
<th></th>
<th>Area (Ha)</th>
<th>OBIP ((10^6 m^3)^*)</th>
<th>Avg. Net Steamable Pay (m)**</th>
<th>Avg. Oil Saturation (So)**</th>
<th>Avg. Porosity (%)**</th>
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</table>

*OBIP derived from Geomodel: Steamable interval >18m

**Average attributes derived from well control

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**Net Steamable Pay >18m**

![Net Steamable Pay >18m](image_url)

**Phi>25%; So>50%; VSh<30%**
3.1.1-2a

1. Lithological facies are identified using core, logs and associated petrophysical attributes.

2. Steamable interval is deterministically defined by a “steamable” top and base using vertical well control.

3. Create steamable top and base structure surfaces.

4. 3D geomodel is statistically distributed with facies and their associated reservoir attributes (water saturation, porosity, permeability).

J1 Pad A
Facies Distribution

STM_T
Steamable Interval
STM_BS

Grid: 25mW X 0.25mH
### Geology

**Jackfish 1 OBIP and Reservoir Properties**

3.1.1-2b

<table>
<thead>
<tr>
<th>Pad</th>
<th>OBIP ($10^6 m^3$)</th>
<th>Avg Steamable Interval (m)</th>
<th>Avg Net Steamable Pay (m)</th>
<th>Avg Oil Saturation Of Pay (%)</th>
<th>Avg Porosity of Pay (%)</th>
<th>Status</th>
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<td>25.7</td>
<td>83</td>
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<td>Operating</td>
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<tr>
<td>C</td>
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<td>D</td>
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<td>E</td>
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<td>H</td>
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<tr>
<td>I</td>
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<td>25.5</td>
<td>84</td>
<td>33</td>
<td>Operating</td>
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**Net Steamable Pay**
- Cumulative pay that exists within the steamable interval and contributes to OBIP
- $\Phi > 25\%$; $So > 50\%$; $Vsh < 30\%$
## Geology
### Jackfish 2 OBIP and Reservoir Properties

**3.1.1-2b**

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<tr>
<th>Pad</th>
<th>OBIP ($10^6 m^3$)</th>
<th>Avg Steamable Interval (m)</th>
<th>Avg Net Steamable Pay (m)</th>
<th>Avg Oil Saturation Of Pay (%)</th>
<th>Avg Porosity of Pay (%)</th>
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<td>AA</td>
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<td>CC</td>
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</table>

**Net Steamable Pay**
- Cumulative pay that exists within the steamable interval and contributes to OBIP
- $\Phi > 25\%$; $S_o > 50\%$; $V_{sh} < 30\%$

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**page 12**
Geology

Jackfish 3 OBIP and Reservoir Properties

<table>
<thead>
<tr>
<th>Pad</th>
<th>OBIP (10^6 m^3)</th>
<th>Avg Steamable Interval (m)</th>
<th>Avg Net Steamable Pay (m)</th>
<th>Avg Oil Saturation Of Pay (%)</th>
<th>Avg Porosity of Pay (%)</th>
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<td>81</td>
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Net Steamable Pay
- Cumulative pay that exists within the steamable interval and contributes to OBIP
- Phi > 25%; So > 50%; Vsh < 30%

Net Steamable Pay > 18m
### Jackfish 1, 2 & 3 Average Reservoir Properties

<table>
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<th>Property</th>
<th>Jackfish 1</th>
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<th>Jackfish 3</th>
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<td>Avg Reservoir Depth mTVD</td>
<td>400 mTVD</td>
<td>459 mTVD</td>
<td>428 mTVD</td>
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<tr>
<td>Avg Reservoir Depth mASL</td>
<td>202 mASL</td>
<td>202 mASL</td>
<td>202 mASL</td>
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<tr>
<td>Avg. Original Reservoir Pressure kPa</td>
<td>2,700 @ scheme startup</td>
<td>2,700 @ scheme startup</td>
<td>2,700 @ scheme startup</td>
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<tr>
<td>Avg. Reservoir Temp. °C</td>
<td>12 °C</td>
<td>12 °C</td>
<td>12 °C</td>
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<tr>
<td>Avg Kh md</td>
<td>5,000 md</td>
<td>3,000 md</td>
<td>4,000 md</td>
</tr>
<tr>
<td>Avg Kv md</td>
<td>2,000 md</td>
<td>1,200 md</td>
<td>1,500 md</td>
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<td>Avg Phi %</td>
<td>33 %</td>
<td>33 %</td>
<td>33 %</td>
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<tr>
<td>Avg Bitumen Visc. Cp</td>
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<td>1,000,000+</td>
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<td>Original Bottom Water Pressure kPa</td>
<td>2,300 kPa</td>
<td>2,300 kPa</td>
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Geology
Jackfish Net Steamable Pay > 18 m

Development Area 10097
Project Area

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Geology
Jackfish Structure On Top Steamable Surface
Geology
Jackfish McMurray Water Contact to Paleozoic Isopach

3.1.1-2d
Geology
Jackfish 1 Representative Well Log

3.1.1-2e
Geology
Jackfish 2 Representative Well Log

3.1.1-2e

CLWTR Regional Caprock

MCMR Regional Barrier

Net Steamable Interval

McMR Basal Mud

Paleozoic

WBSK MKR

MCMR

STM_Top

Breccia

STM_Base PLZ

DEVON NEC CONKLIN 1-29-75-7
ELEV_KB : 670

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Geology

Jackfish 3 Representative Well Log

3.1.1-2e

[Diagram of geology with labeled sections: CLWTR Regional Caprock, MCMR Regional Barrier, Net Steamable Interval, Wet McMR, Paleozoic, STM_Top, STM_Base, WBSK MKR, McMR, PLZ]
Geology
Jackfish Cores and FMI Logs

3.1.1-2f

Project Area
2013-14 Wells: 48  Total Well Count: 383
2013-14 Core: 8   Total Core: 170
2013-14 FMI: 46   Total FMI: 294

Special Core Analysis
No special core analysis conducted on cores from the 2013-14 drilling season

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Geology

Jackfish 2 Representative Structural Cross-section

3.1.1-2i

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Geology

Jackfish Clearwater Regional Cap Rock Isopach

3.1.1-2j,m

- Regionally extensive
- 15 to 25 m throughout project area

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3.1.1-2j,m

- 02/05-27 075-07W4 & 02/01-27 075-07W4 previously selected for caprock core and subsequent geomechanical testing
- Geomechanical testing completed on 02/01-27
- Geomechanical testing still underway on 02/05-27 (sample selection to be determined)
- 4 additional caprock cores proposed for 2014-15 drilling season to build upon our commitment to caprock integrity
3.1.1-2j,m

Geomechanical Tests

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Geology
Jackfish Geomechanical Testing

3.1.1-2j,m

Currently incorporating strength and elastic data into geomechanical models (heave & MOP)

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Core Depth (m)</th>
<th>Measured Depth (m)</th>
<th>Effective Confining Pressure (MPa)</th>
<th>Volumetric Yield Strength (MPa)</th>
<th>Peak Strength (MPa)</th>
<th>Residual Strength (MPa)</th>
<th>Young’s Modulus (MPa)</th>
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3.1.1-2j,m

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**Geology**

**Caprock FMI Fracture Distribution**

Full Caprock FMI Coverage: 143 wells
Partial Caprock FMI Coverage: 30 wells

15 wells of 173 wells (8%) had evidence of fractures in the caprock.

Most fractures closed and exhibit insignificant (<20cm) or no bedding offset.

Fractures random & generally high angle (dip is 40-69°)
Jackfish 1 (2008-2014)
Max cumulative displacement: 250 mm (Pad A-D)
No steam related subsidence observed
Jackfish 1
Comparing Accumulated Displacement

3.1.1-2k
Jackfish 2 (2011-14)
Max cumulative displacement: 125 mm (Pad AA & BB)
No steam related subsidence observed
Jackfish 2
Comparing Accumulated Displacement

3.1.1-2k
Water Disposal Geology
Basal McMurray Aquifer
Source Water Geology
Grand Rapids C Aquifer

Jackfish Source Well
Source from Grand Rapids C

Jackfish Monitoring Well
Monitoring Grand Rapids C
Monitoring other formations

Quaternary Channel Outlines

Grand Rapids C Isopach
C.I. = 5m

75m

5m

Date: Oct. 27, 2014

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3.1.2-4h
4-D Seismic
Section 3.1.1-6
2003-2008: Jackfish 3-D 23 km²

Jackfish 2 4-D
2013: 6.3 km²
2015: 9.4 km² (Prop)

Jackfish 1 4-D
2010: 8.4 km²
2011: 8.4 km²
2012: 8.7 km²
2014: 11.6 km²
3.1.1-6b

Significant steam chamber growth proximal to B7 (2,000 Bbls/d)

Pad B currently the best producing pad at Jackfish 1 at 6,100 Bbls/d (exceeding forecast)

- Colour gradient represents BHL reflector depth change from 2003 to 2014
- Time delay is in direct relation to level of steam chamber development
Drilling & Completions
Section 3.1.1-3
Operating SAGD Horizontal Wells

- **Jackfish 1:** 49 well pairs on seven pads (Hz sections are 790 - 1,200m)
- **Jackfish 2:** 44 well pairs on six pads (Hz sections are 790 - 900m)
- **Jackfish 3:** 24 well pairs on three pads (Hz sections are ~790m)

Observation Wells

- 33 SAGD observation wells in operation (2-3 per operating pad)
- 5 additional wells to be online
- 21 regional multi-zone monitoring wells equipped with piezometers

Service Wells

- 8 brackish source water wells (Grand Rapids)
- 2 non-operational brackish source water wells (McMurray)
- 13 water disposal wells (Class 1b)
Drilling & Completions
Jackfish 1 Overview - SAGD Wells

3.1.1-3a

Existing Pads

- Pad A, B, C, D, E, H & I: 7 well pairs per pad
- 2 observation wells per pad (heel and toe)

Future Pad Activity

- Pad G is currently in drilling/completion phase
Existing Pads
- Pad AA, BB, CC, DD & KK: 7 well pairs per pad
- Pad FF: 9 well pairs
- 2 observation wells per pad (heel and toe), 3 wells at Pad FF

Future Pad Activity
- Pad OO & PP are currently in drilling/completion phase
Existing Pads
- Pad J & EE: 7 well pairs per pad
- Pad VV: 10 well pairs

Future Pad Activity
- Pad K (10 well pairs) & RR (9 well pairs) to be started in 2015
Drilling & Completions
Typical Injection Well Schematic

3.1.1-3c

- Shift-able Steam Subs utilized on several injection wells
  - Majority of new wells to have steam sub installed on long injection string to improve steam distribution

406.4 mm (16") Surface Casing

298.5 mm (11 ¾") Intermediate Casing

Short and long tubing are from 88.9 to 114.3 mm (3 ½" to 4 ½")

25.4 mm (1") coil tubing instrument string with thermocouples and a conduit to pump down fiber optics

219.1 mm (8 5/8") Slotted Liner

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Inflow Control Devices (ICD’s) are trialed on two wells (CC1P, DD2P)
- Goal is to gain better understanding of technology in SAGD environment
- Devices promote production through uniform inflow

- 406.4 mm (16”) Surface Casing
- 298.5 mm (11 ¾”) Intermediate Casing
- 31.8 mm (1 ¼”) Lift Gas Coils

Short and long tubing are from 88.9 to 114.3 mm (3 ½” to 4 ½”)

- 25.4 mm (1”) coil tubing instrument string with thermocouples and a conduit to pump down fiber optics
- 219.1 mm (8 5/8”) Slotted Liner
Artificial Lift

Section 3.1.1-4
Artificial Lift

• Gas lift is currently used exclusively for artificial lift at Jackfish District
• Gas lift continues to be an effective lift strategy for Jackfish operating conditions
  – Typical producer operating pressure above 1,800 kPag
  – Ability to handle over 1,000 m³/day emulsion flow
  – No operating temperature limitation
• No ESP installs completed in 2014
  – Plan to install ESP’s in two wells at Jackfish 1 in 2015 (B3P & B7P)
Instrumentation

Section 3.1.1-5
Instrumentation in Wells
SAGD Injection & Producer Wells

3.1.1-5b

- 25.4 mm (1”) coil tubing instrument string with 4 - 6 evenly spaced thermocouples and a conduit to pump down fiber optics
- Fiber optics currently trialed on 19 wells
  - Evaluating the technology to make a decision for commercialization
Jackfish 1, 2, & 3 SAGD observation wells contain:

- 20 points thermocouples (25 points in more recently drilled wells), spaced above, below & within pay interval
- 2 pressure sensors*, one in the bitumen and the other in the basal water

*New Jackfish 3 wells have an additional pressure sensor near the top of the McMurray
Instrumentation in Wells
Instrumentation Data

3.1.1-5c,d

• Required information for Section 3.1.1-5c - d is located in Appendix A
Scheme Performance
Section 3.1.1-7
Circulation (~3 months)

- Circulate steam into injectors and producers to heat the inter-well region
- Inject steam down long tubing; returns up short tubing
- Bottom hole pressures are controlled at or slightly above reservoir pressure to minimize interference from the aquifer
- Once sufficient heat has been transferred to the formation, wells are transitioned to full SAGD operating mode
  - use temperature falloff and bump tests to confirm heat transfer
Partial SAGD (~4-5 days)
- Returns from injector are closed (direct injection)
- Continue to circulate steam in producer

Full SAGD
- Inject steam down both long and short tubing of injector
- Produce up both long and short tubing of producer
- Adjust steam and choke to achieve injector bottom hole temperature target
- Startup plan has been successful; continue to follow the plan
- If a well pair is not performing as expected, well pair would be converted to partial or full circulation mode for short duration:
  - Attempt to warm up the inter-well fluids and optimize drainage
  - Hence, producer will have small volume of steam injection reported to Petrinex
Well pair performance predictions based on Butler’s equation, empirical data and input from geology and reservoir

Well capability forecasted and subsequent well and plant service factors applied

Service factors based on historical data, future plans and quantified risks
Jackfish 1
• Production is approximately 35,000 bbl/d
• Current CSOR is approximately 2.5 which is below initial plant design of 2.65
• 49 wells currently on production from 7 pads

Jackfish 2
• Current production above 26,000 bbl/d
• Current CSOR is 3.0, above plant design of 2.65
• 44 wells currently on production from 6 pads

Jackfish 3
• First Steam injected downhole July 14, 2014
• 24 Wellpairs currently in circulation phase from 3 pads
• Excellent run-time (CPF and Wells) to date
• Plant design SOR of 2.65
Devon manages injection pressures to maximize producing rates, manage leakoff and increase overall reservoir recovery. A reduction in operating pressure was implemented in 2013 and continued into 2014.
Scheme Performance
Jackfish 2 Bottom Hole Injector Pressures

3.1.1-7b

Turn around

Pressure (kPa)

Jun-11 Aug-11 Nov-11 Jan-12 Apr-12 Jul-12 Sep-12 Dec-12 Mar-13 May-13 Aug-13 Oct-13 Jan-14 Apr-14 Jun-14 Sep-14 Dec-14

Pad AA  Pad CC  Pad DD  Pad KK  Pad FF  Pad BB

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## Scheme Performance
### Jackfish 1 Pad Recoveries

3.1.1-7c

<table>
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<tr>
<th>Pad</th>
<th>OBIP ((10^6 \text{m}^3))</th>
<th>Ult Rec (^{1}) ((10^6 \text{m}^3))</th>
<th>Cum Prod (^{2}) ((10^6 \text{m}^3))</th>
<th>R.F. (%) to Date (^{2})</th>
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<tbody>
<tr>
<td>A</td>
<td>6.0</td>
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<td>3.6</td>
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<tr>
<td>B</td>
<td>4.0</td>
<td>2.6</td>
<td>1.3</td>
<td>33</td>
</tr>
<tr>
<td>C</td>
<td>4.1</td>
<td>3.0</td>
<td>2.2</td>
<td>54</td>
</tr>
<tr>
<td>D</td>
<td>4.8</td>
<td>2.7</td>
<td>1.7</td>
<td>36</td>
</tr>
<tr>
<td>E</td>
<td>3.9</td>
<td>2.6</td>
<td>1.1</td>
<td>27</td>
</tr>
<tr>
<td>H</td>
<td>3.4</td>
<td>2.2</td>
<td>0.5</td>
<td>14</td>
</tr>
<tr>
<td>I</td>
<td>4.0</td>
<td>2.6</td>
<td>0.2</td>
<td>5</td>
</tr>
</tbody>
</table>

\(^{1}\) Approximately 65% recovery factor (predicted) for most pads

\(^{2}\) Effective August 31, 2014
## Scheme Performance
### Jackfish 2 Pad Recoveries

<table>
<thead>
<tr>
<th>Pad</th>
<th>OBIP (10^6\text{m}^3)</th>
<th>Ult Rec (10^6\text{m}^3)</th>
<th>Cum Prod (10^6\text{m}^3)</th>
<th>R.F. (%) to Date$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>2.4</td>
<td>1.6</td>
<td>0.7</td>
<td>31</td>
</tr>
<tr>
<td>BB</td>
<td>4.5</td>
<td>2.9</td>
<td>1.4</td>
<td>31</td>
</tr>
<tr>
<td>CC</td>
<td>4.3</td>
<td>1.9</td>
<td>0.4</td>
<td>8</td>
</tr>
<tr>
<td>DD</td>
<td>2.9</td>
<td>1.9</td>
<td>0.4</td>
<td>16</td>
</tr>
<tr>
<td>FF</td>
<td>5.2</td>
<td>3.4</td>
<td>0.2</td>
<td>4</td>
</tr>
<tr>
<td>KK</td>
<td>2.9</td>
<td>1.9</td>
<td>0.4</td>
<td>15</td>
</tr>
</tbody>
</table>

1. Approximately 65% recovery factor (predicted) for most pads
2. Effective August 31, 2014
<table>
<thead>
<tr>
<th>Pad</th>
<th>OBIP $(10^6 \text{m}^3)$</th>
<th>Ult Rec $^1$ $(10^6 \text{m}^3)$</th>
<th>Cum Prod $^2$ $(10^6 \text{m}^3)$</th>
<th>R.F. (%) to Date $^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE</td>
<td>4.6</td>
<td>3.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>J</td>
<td>4.1</td>
<td>2.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VV</td>
<td>4.5</td>
<td>2.9</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

$^1$ Approximately 65% recovery factor (predicted)

$^2$ Effective August 31, 2014
Jackfish 2 - Pad CC Highlights
Low Performer

- First steam occurred during June 2011
- 7 well pairs are operational
- Difficulties converting CC5 and CC6 to full SAGD due to poor interwell reservoir quality
- Heterogeneous reservoir is impacting steam chamber development
- Stable producer in plateau phase
- 1 Inflow Control Device installed during August 2013 turnaround; currently under-performing due to generic inflow design. Generic design promotes equal inflow along lateral and does not account for geology
Pad CC Performance
Jackfish 2 Pad CC Life Plot

Jackfish 2 Pad CC Life Plot
Jan ‘14 to Mar ‘14 data gap due to power loss during winter months.
Top piezometer confirmed in poor communication with reservoir. Please review summary slide in Appendix for further information. Aug '11 to Feb '12 data gap due to conversion of temporary to permanent SCADA tower equipment. Jan '14 to Mar '14 data gap due to power loss during winter months.
Jackfish 1 - Pad B Highlights
Medium Performer

• First steam in August 2007
• 7 well pairs in operation
• Medium performance pad example, production currently in the plateau phase
• Recent success in lowering injection pressure and decreasing SOR without sacrificing oil production. Well work also completed during same time frame. Evaluation on-going regarding SOR versus operating pressure relationship.
Pad B Heel Observation Well Temp (6.5m from B2 well pair)

3.1.1-5d

Previous data gaps due to poor data quality.
Pad B Heel Observation Well Pressure (6.5m from B2 well pair)

Previous data gaps due to poor data quality.
Pad B Toe Observation Well Temp (4.1m from B2 well pair)
Elevated bottom piezometer pressure in March to April 2011 does not appear to be related to any operational changes at adjacent well pair B2I or B2P. Temporary increase in observed pressure may be partially linked to cleanout of a neighboring lateral.

Top piezometer not believed to be in communication with reservoir. Please review summary slide in Appendix for further information.
Jackfish 2 - Pad BB Highlights
High Performer

- First steam occurred in May 2011
- Pad BB was the first Pad to startup and has the longest production history at Jackfish 2
- 7 well pairs are operational
- Best performing pad at Jackfish 2 and is exceeding expectation
- Increased operating pressure to return pad to previous capability
Pad BB Performance
Jackfish 2 Pad BB Life Plot

Jackfish 2 Pad BB Life Plot

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Pad BB Heel Observation Well Temp (13.5m from BB4 well pair)

3.1.1-5d
Pad BB Heel Observation Well Pressure (13.5m from BB4 well pair)

Bottom piezometer data gap due to poor data quality. Please review summary slide in Appendix for further information.
• No anticipated pad abandonments at Jackfish within the next five years
### Wellhead Steam Quality

<table>
<thead>
<tr>
<th>Location</th>
<th>Pressure (kPag)</th>
<th>Temperature (°C)</th>
<th>Quality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Gate</td>
<td>9,500</td>
<td>308</td>
<td>100%</td>
</tr>
<tr>
<td>J1 Wellhead</td>
<td>2,800-4,300</td>
<td>230-255</td>
<td>97%</td>
</tr>
<tr>
<td>J2 Wellhead</td>
<td>3,600-4,600</td>
<td>247-260</td>
<td>97%</td>
</tr>
<tr>
<td>J3 Wellhead</td>
<td>3,100-4,700</td>
<td>237-262</td>
<td>97%</td>
</tr>
</tbody>
</table>

- 5.5 Mpa wellhead injection limit
- Losses occur as steam is transported to the pads
- Utilize condensate traps at each pad to maximize wellhead steam quality
Devon Pad C Solvent Pilot

Description of Test #1:
1. Single well test co-injecting hexane and steam
2. Solvent recovery tracked in gas and liquid phases using Devon-operated site lab
3. Injection started Q1-2013 and stopped Q3-2013

Objectives and Status of Test #1:

<table>
<thead>
<tr>
<th>Objective</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirm increasing production rates or reduction in SOR</td>
<td>Inconclusive based on test results</td>
</tr>
<tr>
<td>Validate testing and sampling procedures</td>
<td>Testing and sampling have been successful throughout the pilot</td>
</tr>
<tr>
<td>Review changes in gas analysis and bitumen composition</td>
<td>Both gas and bitumen displayed increasing concentration in hexane following injection</td>
</tr>
</tbody>
</table>
Co-injection Pilot

- Co-injection of methane with steam in the field to improve SOR
- Methane was co-injected with steam into Pad A well pairs intermittently:
  - A3 (April 2013 - present)
  - A4 (July 2013 - present)
  - A5 (June 2013 - present)
- Rates vary between 5 - 10 \( \text{e}^3 \text{m}^3/\text{d} \)
- NCG co-injection was temporarily interrupted due to operational issues
- Co-injection has not demonstrated a negative impact on production since April 2013
- Impact on CSOR and rate of recovery are currently being studied
Job Summary:

- Failure at 190.4 mKB and impairment at 315.5 mKB
- Original casing has ID of 276.4 mm
- Slimhole assembly installed/cemented from 33.9 - 435.6 mKB with an ID of 203.6 mm
- Well has since been ramped up and operating normally with no signs of issues
Jackfish Performance
Key Learnings

• Focused on Pressure Management:
  – SOR optimization
  – Reduced leak off
  – Hot spot reduction
  – Improved ramp-up performance

• Improved knowledge of non-conventional completions
  – Candidate selection
  – Impact to steam quality and hydraulics for injector completions
Future Plans
Section 3.1.1-8
Future Plans
Jackfish 1 Well Operations, Drilling, and Trials

3.1.1-8a,b

• Continued production at design capacity
• Steam limited operations
• SAGD drilling on Pad G in Q3/Q4 2014
• SAGD drilling on Pad F in 2015
• ESP trial on two Jackfish 1 wells in 2015
• Two pre-SAGD observation wells per pad to be drilled on future Pads F, O, and R
• Plant maintenance turnaround planned for 2015
Future Plans
Jackfish 2 Well Operations, Drilling and Trials

3.1.1-8a,b

• Jackfish 2 at well capacity
• Pad FF ramping up
• SAGD drilling on Pad OO and PP in 2014 and 2015
• One pre-SAGD observation well to be drilled on future Pad QQ
• Surfactant steam additive pilot to improve oil rates
• One mini-frac test planned in Jackfish 2 for 2015
• Shooting 4D seismic over Jackfish 2 producing pads in 2015
Future Plans

Jackfish 3 Well Operations, Drilling and Trials

3.1.1-8a,b

- First 3 pads ramping up. First steam on Pad K and RR in 2015
- Two pre-SAGD observation wells per pad to be drilled on future Pads III and EEE
- One additional observation well to be drilled on Pad RR
- Two standing cased wells in Pad VV currently suspended with downhole plugs & cement. To be instrumented internally in 2015.
- Liner deployed inflow control installed on two Pad RR producers
- One 1,250 m extended reach lateral drilled on Pad RR. Vacuum insulated tubing trial and steam subs on the long injector.
- Multiple uptracks drilled on two Pad RR injectors for stratigraphic data and execution trial. Geological interpretation underway.
- Two mini-frac tests planned in Jackfish 3 for 2015
Jackfish 1 Steam Strategy

- Jackfish 1 first five pads on production with anticipated decline in 2015
- Pad H and Pad I onstream and ramping up
- Jackfish 1 expected to be steam limited exiting 2015
- *Plant maintenance turnaround planned for 2015

### Steam Forecast by Well w/ DT (MBbl/day)

<table>
<thead>
<tr>
<th></th>
<th>Pad A</th>
<th>Pad B</th>
<th>Pad C</th>
<th>Pad D</th>
<th>Pad E</th>
<th>Pad H</th>
<th>Pad I</th>
<th>Pad G</th>
<th>Total</th>
<th>Total (T/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg Balance of 2014</td>
<td>15.5</td>
<td>10.0</td>
<td>11.5</td>
<td>10.5</td>
<td>16.5</td>
<td>12.5</td>
<td>12.5</td>
<td></td>
<td>89.0</td>
<td>590</td>
</tr>
<tr>
<td>Avg 2015</td>
<td>12.5</td>
<td>8.5</td>
<td>11.0</td>
<td>8.0</td>
<td>16.5</td>
<td>12.5</td>
<td>13.5</td>
<td></td>
<td>83.0</td>
<td>551*</td>
</tr>
<tr>
<td>Exit Rates 2015</td>
<td>12.5</td>
<td>7.5</td>
<td>11.0</td>
<td>7.5</td>
<td>18.0</td>
<td>13.5</td>
<td>14.5</td>
<td>10.5</td>
<td>95.0</td>
<td>630</td>
</tr>
</tbody>
</table>
Jackfish 2 Steam Strategy

- Jackfish 2 production at well capacity in 2015
- Pad FF will continue to ramp up in 2015
- Jackfish 2 not expected to be steam limited in 2015

Steam Forecast by Well w/ DT (MBbl/day)

<table>
<thead>
<tr>
<th>Pad</th>
<th>Pad AA</th>
<th>Pad BB</th>
<th>Pad CC</th>
<th>Pad DD</th>
<th>Pad KK</th>
<th>Pad FF</th>
<th>Total</th>
<th>Total (T/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg Balance of 2014</td>
<td>12.8</td>
<td>25.0</td>
<td>7.5</td>
<td>9.5</td>
<td>10.5</td>
<td>16.5</td>
<td>81.8</td>
<td>515</td>
</tr>
<tr>
<td>Avg 2015</td>
<td>12.7</td>
<td>22.7</td>
<td>7.3</td>
<td>9.9</td>
<td>10.5</td>
<td>17.3</td>
<td>80.4</td>
<td>505</td>
</tr>
<tr>
<td>Exit Rates 2015</td>
<td>12.3</td>
<td>21.0</td>
<td>7.3</td>
<td>9.9</td>
<td>10.4</td>
<td>17.3</td>
<td>78.2</td>
<td>490</td>
</tr>
</tbody>
</table>
Jackfish 3 Steam Strategy

- Jackfish 3 Plant and pads ramping up through 2015
- First steam anticipated in 2015 on Pad K and RR

Steam Forecast by Well w/ DT (MBbl/day)

<table>
<thead>
<tr>
<th></th>
<th>Pad J</th>
<th>Pad VV</th>
<th>Pad EE</th>
<th>Pad K</th>
<th>Pad RR</th>
<th>Total</th>
<th>Total (T/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg Balance of 2014</td>
<td>8.7</td>
<td>14.8</td>
<td>10.5</td>
<td>0.0</td>
<td>0.0</td>
<td>34.0</td>
<td>225</td>
</tr>
<tr>
<td>Avg 2015</td>
<td>9.2</td>
<td>21.9</td>
<td>14.9</td>
<td>14.2</td>
<td>9.7</td>
<td>69.9</td>
<td>463</td>
</tr>
<tr>
<td>Exit Rates 2015</td>
<td>9.7</td>
<td>24.0</td>
<td>16.1</td>
<td>23.4</td>
<td>15.8</td>
<td>89.0</td>
<td>590</td>
</tr>
</tbody>
</table>
Monitoring wells cover areas of Jackfish 1, 2, and 3.

Twenty-one wells

- 00/07-32-75-6W4 (5 piezometers)
- F1/08-28-75-6W4 (4 piezometers)
- F1/09-14-75-6W4 (4 piezometers)
- F1/12-31-75-6W4 (4 piezometers)
- F1/10-22-75-6W4 (5 piezometers)
- F1/04-26-75-7W4 (5 piezometers)
- F1/06-28-75-7W4 (5 piezometers)
- F1/15-19-75-6W4 (5 piezometers)
- F1/09-24-75-7W4 (5 piezometers)
- F1/14-25-75-6W4 (5 piezometers)
- F1/05-12-75-6W4 (5 piezometers)
- F1/09-22-75-7W4 (4 piezometers)
- 02/12-23-75-7W4 (4 piezometers) *
- 02/01-35-75-7W4 (3 piezometers)
- 00/15-07-75-5W4 (4 piezometers)
- 00/07-22-75-7W4 (2 piezometers)
- 00/03-15-75-6W4 (4 piezometers) **
- 02/09-33-75-6W4 (4 piezometers)
- 00/04-30-75-7W4 (3 piezometers)
- 00/01-19-75-6W4 (4 piezometers) **
- AA/11-30-75-6W4 (5 piezometers)

* Perf with a Level Logger
** Perf for water sampling
### Observation Well Summary Measurement Challenges

#### 3.1.1-5d

<table>
<thead>
<tr>
<th>Measurement Challenge</th>
<th>Description Of Challenge</th>
<th>Effected Pad Observation Wells</th>
<th>Action Plan</th>
</tr>
</thead>
</table>
| **Non-Repeatable Data: Temperature and/or Pressure** | Low confidence in non-repeatable day-to-day temperature and/or pressure data is potentially caused by, but not limited to:  
• Irregular or noisy power from solar panel, (including SunSaver), inducing noise on the thermocouple wires  
• Noise induced from other sources  
• Poor reference temperature device  
• Poor grounding/isolation | Pad A Heel and Toe, Pad C Toe, Pad D Heel and Toe, Pad E Toe, Pad BB Toe, Pad CC Heel, Pad DD Heel | • Working with vendor to identify root cause of non-repeatable data and implement solution(s) from investigation across all observation wells |
| **Piezometer Currently or Historically Considered in Poor Communication With Reservoir** | Piezometer pressure data considered suspect due to unlikely pressure readings when compared to other nearby piezometers and downhole operating conditions | Pad B Toe, Pad D Toe, Pad H Heel, Pad BB Heel, Pad CC Toe, Pad FF Mid Heel | • Currently viewing other vendor options  
• Reviewing moving instrumentation internal to the casing  
• Continuing to work with current instrumentation vendor to develop corrective actions to improve data reliability  
• Conducting fluid shots on adjacent wellbores to confirm suspect pressure readings |
| **Undersized Fuses in Power System** | Undersized fuses were causing power system to fail. Maximum available charge current exceeded fuse rating on negative and positive terminals causing a potential for failure | Pad I Toe (Near I5 Well Pair), Pad AA Toe, Pad FF Mid Heel, Mid Toe, and North Toe | • Problem was mitigated in Q1 2014 |
Devon remains committed in working towards overcoming current observation well measurement challenges and increasing data reliability. In 2014 steps towards mitigating the issues outlined in the previous slide include:

- Conducting a major maintenance program that involved vendor technicians visiting and troubleshooting various issues at every observation well in the field
- Replacement of batteries and enhanced monitoring at numerous sites to mitigate potential future power loss issues
- Working with vendor to investigate non-repeatable data issue and implement corrective actions
- Reduced drill hole diameters for observation wells which decreases the chance of pressure sensors being isolated by cement
- Detonation of small charges near installed pressure sensors to remove possible blockages
- Currently reviewing moving instrumentation internal to the casing with monitoring equipment
- Currently reviewing other vendor options
Pad A Heel and Pad C Heel data was reversed. Temperature plot submitted in 2013 displayed Pad C Heel temperature data from Feb’12 to Oct’13 due to a network configuration issue which caused the PI system to log data from the wrong RTU address. Issue has been rectified.

Previous data gaps due to poor data quality. 2014 temperature trends being investigated. Please review summary slide for further information.

NYSE: DVN
3.1.1-5d

Pad A Heel and Pad C Heel data was reversed. Pressure plot submitted in 2013 displayed Pad C Heel pressure data from Feb’12 to Oct’13 due to a network configuration issue which caused the PI system to log data from the wrong RTU address. Issue has been rectified.

Previous data gaps due to poor data quality. 2014 pressure trends being investigated. Please review summary slide for further information.

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Previous data gaps due to poor data quality. Recent 2014 temperature trends being investigated. Please review summary slide for further information.
Bottom Piezometer confirmed failed.

Previous data gaps due to poor data quality. 2014 top piezometer pressure trend being investigated. Please review summary slide for further information.
Pad B Heel Observation Well Temp (6.5m from B2 well pair)

3.1.1-5d

Previous data gaps due to poor data quality.

NYSE: DVN
Pad B Heel Observation Well Pressure (6.5m from B2 well pair)

Previous data gaps due to poor data quality.
Pad B Toe Observation Well Temp 
(4.1m from B2 well pair)
Elevated bottom piezometer pressure in March to April 2011 does not appear to be related to any operational changes at adjacent well pair B2I or B2P. Temporary increase in observed pressure may be partially linked to cleanout of a neighboring lateral.

Top piezometer not believed to be in communication with reservoir. See summary slide for further information.
Pad A Heel and Pad C Heel data was reversed. Temperature plot submitted in 2013 displayed Pad A Heel temperature data from Feb’12 to Oct’13 due to a network configuration issue which caused the PI system to log data from the wrong RTU address. Issue has been rectified.

NYSE: DVN
Pad C Heel Observation Well Pressure (3.1m from C5 well pair)

Pad A Heel and Pad C Heel data was reversed. Pressure plot submitted in 2013 displayed Pad A Heel pressure data from Feb’12 to Oct’13 due to a network configuration issue which caused the PI system to log data from the wrong RTU address. Issue has been rectified.

Top Piezometer confirmed failed.
Previous data gaps due to poor data quality. Recent 2014 temperature trends being investigated. Please review summary slide for further information.
Previous data gaps due to poor data quality. Recent 2014 pressure trends being investigated. Please review summary slide for further information.
Previous data gaps due to poor data quality, and previous surface equipment issues. Recent 2014 temperature trends being investigated. Please review summary slide for further information.
Top piezometer confirmed failed.

Previous data gaps due to poor data quality, and previous surface equipment issues. 2014 pressure trend being investigated. Please review summary slide for further information.
Previous data gaps due to poor data quality. Recent 2014 temperature trends being investigated. Please review summary slide for further information.
3.1.1-5d

Previous data gaps due to poor data quality. Recent 2014 top piezometer pressure trend being investigated. Please review summary slide for further information.
Pad E Heel Observation Well Temp (35m from E5 well pair)

3.1.1-5d

Jan ‘13 to Feb ‘13 data gap due to SCADA equipment interference. Issue corrected and communication re-established. Other data gaps due to poor data quality.
Jan ‘13 to Feb ‘13 data gap due to SCADA equipment interference. Issue corrected and communication re-established.
Previous data gaps due to poor data quality. Jan '13 to Feb '13 data gap due to SCADA equipment interference. Recent 2014 temperature trends being investigated. Please review summary slide for further information.
3.1.1-5d

Jan '13 to Feb '13 data gap due to SCADA equipment interference. Issue corrected and communication re-established.
Pad H Heel Observation Well Temp
(11.4m from H7 well pair)

3.1.1-5d

Temperature (°C)

7/15/2013
8/15/2013
9/15/2013
10/15/2013
11/15/2013
12/15/2013
1/15/2014
2/15/2014
3/15/2014
4/15/2014
5/15/2014
6/15/2014
7/15/2014
8/15/2014

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Top and bottom piezometers inverted in 2013 presentation. 2014 bottom piezometer trend being investigated due to significant offset. Please review summary slide for further information.
Pad H Toe Observation Well Temp (7.4m from H4 well pair)

3.1.1-5d

Apr '14 to May '14 data gap due to electrical grounding issue at surface. Issue corrected and communication re-established.
2013 presentation displayed top piezometer as failed but actually bottom piezometer that failed upon installation. Apr ‘14 to May ‘14 data gap due to electrical grounding issue at surface. Issue corrected and communication re-established.
Pad I Toe* Observation Well Temp
*Both pad observation wells at toe of Pad I
(7m from I5 well pair)

Mar '14 data gap due to electrical issue at surface. Issue corrected and communication re-established. Please review summary slide for further information.

NYSE: DVN
Pad I Toe* Observation Well Pressure

*Both pad observation wells at toe of Pad I
(7m from I5 well pair)

3.1.1-5d

Mar ‘14 data gap due to electrical issue at surface. Issue corrected and communication re-established. Please review summary slide for further information.
Pad I Toe* Observation Well Temp
*Both pad observation wells at toe of Pad I
(6m from I2 well pair)

3.1.1-5d

Jul '14 and Aug '14 data gap due to electrical issue at surface. Issue corrected and communication re-established.
Pad I Toe* Observation Well Pressure
*Both pad observation wells at toe of Pad I
(6m from I2 well pair)

3.1.1-5d

Jul ’14 to Aug ‘14 data gap due to electrical issue at surface. Issue corrected and communication re-established.
3.1.1-5d

Minimal temperature response most likely due to long distance observation well is from nearest well pair.

Previous data gaps due to poor data quality. Mar ‘13 to May ‘13 data gap due to conversion of temporary to permanent SCADA tower equipment, and post install troubleshooting. Jan ‘14 to Mar ‘14 data gap due to power loss during winter months.

NYSE: DVN
Pad AA Heel Observation Well Pressure (36.5m from AA4 well pair)

3.1.1-5d

Previous data gaps due to poor data quality. Mar ‘13 to May ‘13 data gap due to conversion of temporary to permanent SCADA tower equipment, and post install troubleshooting. Jan ‘14 to Mar ‘14 data gap due to power loss during winter months.
Previous data gaps due to poor data quality. Jan '14 to Mar '14 data gap due to power loss during winter months. Please review summary slide for further information.
Pad BB Heel Observation Well Temp
(13.5m from BB4 well pair)

3.1.1-5d
3.1.1-5d

Bottom piezometer data gap due to poor data quality. Please review summary slide for further information.
Pad BB Toe Observation Well Temp (11.5m from BB4 well pair)

Nov ‘13, and Jan ‘14 to Mar ‘14 data gaps due to power loss during winter months.

3.1.1-5d

www.devonenergy.com
Recent 2014 pressure trends being investigated. Please review summary slide for further information. Nov ‘13, and Jan ‘14 to Mar ‘14 data gaps due to power loss during winter months.
Previous data gaps due to poor data quality. Jan ‘14 to Mar ‘14 data gap due to power loss during winter months. Recent 2014 temperature trends being investigated. Please review summary slide for further information.
Bottom piezometer confirmed failed. Jan ‘14 to Mar ‘14 data gap due to power loss during winter months.
Pad CC Toe Observation Well Temp
(11.7m from CC4 well pair)

3.1.1-5d

Jan '14 to Mar '14 data gap
due to power loss during
winter months.

NYSE: DVN
Top piezometer confirmed in poor communication with reservoir. Please review summary slide for further information. Aug '11 to Feb '12 data gap due to conversion of temporary to permanent SCADA tower equipment. Jan '14 to Mar '14 data gap due to power loss during winter months.
Recent 2014 temperature trends being investigated. Please review summary slide for further information. Jan ‘14 to Mar ‘14 data gap due to power loss during winter months.
3.1.1-5d

Previous data gaps due to poor data quality. Feb '14 to Mar '14 data gap due to power loss during winter months. Jun '14 data gap due to electrical issue on surface.
3.1.1-5d

Dec ‘11 to May ‘12 top piezometer data gap due to poor data quality. Please review summary slide for further information.

Feb ‘14 to Mar ‘14 data gap due to power loss during winter months. Jun ‘14 data gap due to electrical issue on surface.
Pad FF Mid Heel Observation Well Temp (12m from FF5 well pair)

3.1.1-5d

Feb ‘14 to Mar ‘14 data gap due to electrical issue at surface. Please review summary slide for further information.
Pad FF Mid Heel Observation Well Pressure (12m from FF5 well pair)

3.1.1-5d

Feb ‘14 to Mar ‘14 data gap due to electrical issue at surface. 2014 bottom piezometer trend being investigated due to offset. Please review summary slide for further information.
Nov '13, and Feb '14 to Mar '14 data gaps due to electrical issue at surface. Please review summary slide for further information.
3.1.1-5d

Pad FF Mid Toe Observation Well Pressure (3m from FF5 well pair)

Nov ’13, and Jan ‘14 to Mar ‘14 data gaps due to electrical issue at surface. Please review summary slide for further information.
Pad FF North Toe Observation Well Temp (4.5m from FF2 well pair)

3.1.1-5d

Nov ‘13 data gap due to electrical issue at surface. Surface equipment requires further vendor repair.

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Pad FF North Toe Observation Well Pressure (4.5m from FF2 well pair)

3.1.1-5d

Nov ’13, and Jan ‘14 to Mar ‘14 data gaps due to electrical issue at surface. Please review summary slide for further information.
Pad KK Heel Observation Well Temp (8.5m from KK5 well pair)

3.1.1-5d

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Pad KK Heel Observation Well Pressure (8.5m from KK5 well pair)
Pad KK Toe Observation Well Temp (9m from KK5 well pair)

3.1.1-5d

Jan '13 to Feb '13 data gap due to SCADA equipment interference. Feb '14 to Mar '14 data gap due to power loss during winter months. Current data gap due to SCADA equipment interference. Troubleshooting is ongoing.

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Jan '13 to Feb '13 data gap due to SCADA equipment interference. Feb '14 to Mar '14 data gap due to power loss during winter months. Current data gap due to SCADA equipment interference. Troubleshooting is ongoing.
Pad EE Heel Observation Well Temp
(4.8m from EE5 well pair)

3.1.1-5d
Pad EE Heel Observation Well Pressure (4.8m from EE5 well pair)
Pad EE Toe Observation Well Temp
(11.2m from EE2 well pair)

3.1.1-5d
Pad EE Toe Observation Well Pressure (11.2m from EE2 well pair)

3.1.1-5d
Pad J Mid Heel Observation Well Temp (5.6m from J5 well pair)

3.1.1-5d
Pad J Mid Heel Observation Well Pressure (5.6m from J5 well pair)

3.1.1-5d
Pad J Mid Toe Observation Well Temp (6.7m from J3 well pair)

3.1.1-5d
Pad J Mid Toe Observation Well Pressure (6.7m from J3 well pair)
Pad VV South Heel Observation Well Temp (9m from VV6 well pair)

3.1.1-5d
Pad VV South Heel Observation Well Pressure (9m from VV6 well pair)

3.1.1-5d

Top, Mid & Bottom Piezometer Pressure Pl Data

- VV-S Heel Top Piezometer
- VV-S Heel Mid Piezometer
- VV-S Heel Bottom Piezometer

Pressure (psi)

0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000

Time

01/01/14 06/01/14 07/01/14 08/01/14

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Pad VV Mid Toe Observation Well Temp (10m from VV7 well pair)

3.1.1-5d
Pad VV Mid Toe Observation Well Pressure
(10m from VV7 well pair)

3.1.1-5d
Appendix B
Production 3.1.1-7c
Pad A Performance
Jackfish 1 Pad A Life Plot

3.1.1-7c

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Pad C Performance
Jackfish 1 Pad C Life Plot

3.1.1-7c

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Daily Steam Injection
Daily Oil Production
Daily Water Production
ISOR
CSOR
Well Pairs
Pad KK Performance
Jackfish 2 Pad KK Life Plot

3.1.1-7c

[Graph showing performance metrics over time, with various data points and trend lines, labeled with categories like Daily Water Production, Daily Steam Injection, Daily Oil Production, ISOR, CSOR, and Well Count.]

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15 RST logs ran in Jackfish 1, 2, and 3 District in 2014:

<table>
<thead>
<tr>
<th>Jackfish</th>
<th>Pad</th>
<th>Relative Location</th>
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<tr>
<td>1</td>
<td>A</td>
<td>Heel near A5</td>
<td>Repeat</td>
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<tr>
<td>1</td>
<td>C</td>
<td>Heel &amp; Toe near C5</td>
<td>Repeat</td>
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<td>Baseline</td>
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<td>G</td>
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<td>Baseline</td>
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<td>2</td>
<td>FF</td>
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<td>3</td>
<td>EE</td>
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</tr>
<tr>
<td>3</td>
<td>K</td>
<td>Heel &amp; Toe near K5, K6</td>
<td>Baseline</td>
</tr>
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</table>

- Used to validate thermocouple instrument readings
- Used to validate vertical chamber growth
- Additional RST’s planned for Jackfish 1 and 2 in 2015
Surface Operations
<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities Overview</td>
<td>Jim Anderson</td>
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<td>Measurement &amp; Reporting</td>
<td>Jody Kutschera</td>
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<tr>
<td>Water Production, Injection &amp; Uses</td>
<td>Justin Goble</td>
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<td>Sulphur Production &amp; Air Emissions</td>
<td>Maude Ramsay</td>
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<td>Future Plans</td>
<td>Justin Goble</td>
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</table>
Facilities
Section 3.1.2-1
Facilities Performance
Section 3.1.2-2
Facilities Performance
2014 Overall Highlights

Jackfish 1
- Sustained facility nameplate production
- Ramped up all 7 well pairs on new Pad I

Jackfish 2
- Average monthly production within facility nameplate capacity
- Maintenance turnaround completed August 2013
- Ramped up all 9 well pairs on new Pad FF

Jackfish 3
- Commissioning and start-up executed in July 2014
- Started up all well pairs on new Pads EE, VV, & J
Bitumen Treatment

- Greater than nameplate production
  - Lower SOR than design (actual SOR 2.43; design SOR 2.65)
- Bitumen processing uptime > 99.0%
- Increased bitumen processing efficiency and reliability achieved through chemical and process optimization
- Stable operation maintained at higher blend densities and tight blend density ranges
- Production choke actuator/positioner upgrades to improve process control and reduce lost production
- Improved flowback method for well workover acid stimulations to control CPF process stability and minimize production disruption
- Sulphur Removal Unit (SRU) commissioned in Q3 2013
## Water Treatment

- Water plant uptime > 97%
- Significant water plant upsets due to lime & magox excursions
  - Upgrades ongoing to improve system reliability
- 24-hour lab services ongoing to allow earlier detection of upsets
- Blowdown Disposal Pipeline Liner Failures (*update from 2013*)
  - Root Cause Analysis (RCA) completed and learnings implemented
  - Repair failed liners in Q2 2014 and no pipeline corrosion was observed
  - Remaining pipeline liner repairs will be completed by end of Q1 2015
- Water Management
  - Utilized brackish water wells with TDS ranging from 5,000-13,000 ppm for all make up water requirements
  - Water recycle and disposal volumes within allowable limits in Directive 81
Facilities Performance
2014 Highlights - Jackfish 1

Steam Generation

- Steam plant uptime > 95%
- OTSG pigging completed in Q2 2014 due to elevated tube temperatures
- Ongoing refinement of critical operating directive to manage water quality excursions
- HP BFW Seal Optimization (update from 2013)
  - New mechanical seal trialed, similar to Jackfish 2 design, with improved run times
- Oxygen Analyzer Upgrade
  - New analyzer installed at Jackfish 1, similar to Jackfish 2 design, to improve run times
- Optimization Initiatives
  - OTSG 80% steam quality trial ongoing (multiple OTSGs) to decrease blowdown disposal volumes and increase steam generation
  - Main HP Steam Pipeline Condensation Study (Steam Trap Optimization)
  - Steam header pressure trial to optimize steam throughput to help meet nameplate capacity
Facilities Performance
2014 Highlights - Jackfish 2

Bitumen Treatment

• Bitumen processing uptime > 99.0%

• Increased bitumen processing efficiency and reliability achieved through chemical and process optimization

• Stable production output and operation maintained at higher blend densities and tight blend density ranges

• Production choke actuator/positioner upgrades to improve process control and reduce lost production

• Temporary Sulphur Removal Unit (SRU) commissioned in Q4 2013
  – Permanent Sulphur Removal Unit to be commissioned in 2015
Facilities Performance
2014 Highlights - Jackfish 2

3.1.2-2b

Water Treatment

• Water plant uptime > 99%

• Significant water plant upsets due to lime & magox excursion
  – Upgrades ongoing to improve system reliability

• Water Management
  – Utilized brackish water wells with TDS ranging from 5,000-13,000 ppm for all make up water requirements
  – Water recycle and disposal volumes within allowable limits in Directive 81
Steam Generation

- Steam plant uptime > 98%
- Ongoing refinement of critical operating directive to manage water quality excursions
- Optimization Initiatives
  - 80% steam quality trial completed
  - OTSG Rifle Tube Pilot Project (90% steam quality trial on one OTSG)
Bitumen Treatment

• First steam in July 2014

• Three pads in full circulation: Pads EE, VV, & J
Water Treatment

- Water plant uptime = 100% (July & August 2014)
- Upgrades expected to lime & magox systems to improve reliability
- Water Management
  - Utilized brackish water wells with TDS ranging from 5,000-13,000 ppm for all make up water requirements
  - Water recycle and disposal volumes within allowable limits in Directive 81
Steam Generation

- Steam plant uptime > 98%
- Optimizing steam qualities based on start-up water qualities
- Ongoing refinement of critical operating directive to manage water quality excursions
Facilities Performance

Power Consumption

3.1.2-2d

Power Consumption

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Facilities Performance
Flared Gas Volume

- Flare volumes are produced gas only, volumes are aligned with Directive 17 and MARP reporting requirements for Jackfish
- Peak volume in September 2013 at Jackfish 2 due to maintenance turnaround

Flared Gas

<table>
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<tr>
<th>Month</th>
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<th>J3</th>
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<td>May-14</td>
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<td>Jun-14</td>
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<td>Aug-14</td>
<td>11</td>
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Facilities Performance
Vented Gas Volume

3.1.2-2e

- Peak volume in Nov 2013 at Jackfish 2 due to integration of temporary SRU into process
- Venting Reduction Plan initiated Aug 2014. Reduction of venting volumes in Sept
Facilities Performance
Solution Gas Recovery

3.1.2-2e

Solution Gas Recovery

Monthly Percentage

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</table>

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page 198
Facilities Performance
Fuel Gas Consumption

3.1.2-2e

Fuel Gas Consumption J1

- Purchased Gas
- Produced Gas

Monthly Volume (e3m³)

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<th>Month</th>
<th>Sep-13</th>
<th>Oct-13</th>
<th>Nov-13</th>
<th>Dec-13</th>
<th>Jan-14</th>
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Facilities Performance
Fuel Gas Consumption

3.1.2-2e

Fuel Gas Consumption J3

- Purchased Gas
- Produced Gas

Monthly Volume (e3m³)

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3.1.2-2f

- Jackfish 1 YTD total: 720,205 tonnes CO₂E
- Jackfish 2 YTD total: 616,050 tonnes CO₂E
- Jackfish 3 YTD total: 40,032 tonnes CO₂E

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Measurement & Reporting
Section 3.1.2-3
Well Bitumen / Water Production

- The total battery production is allocated to each SAGD producing well based on individual well tests

- Battery Bitumen Production = Dispositions – Receipts + ΔInventory + Blending Shrinkage

- Battery Water Production = Inlet Produced Water + ΔInventory + Truck Out – Truck In – Desand Water to Treater & FWKO

- Individual well test:
  - Each pad equipped with test separator along with coriolis meter and watercut analyzer on liquid leg
  - Vortex meter for gas measurement / water vapor calculation
  - Tested water volume includes the calculated water vapor (from $P_{\text{sat}}/P_{\text{measured}}$)
  - Typical well test duration is 9 hours
Well Gas Production

- Well estimated test gas production = GOR x test bitumen production
- Battery Gas Production = Fuel + Fuel to IF + Flare - TCPL Purchase - Receipt Gas - Diluent Flash
- Battery gas is allocated to each well based on well test

Steam Injection

- Total steam to field measured off HP separators minus the steam condensate
- Vortex meters at each wellhead are used to allocate the total steam
Measurement & Reporting
Proration factors

3.1.2-3b

Bitumen / Water Proration Factor

- Typically less than +/- 10% (Jackfish 1 and 2)
- Jackfish 3 production still ramping up - proration variation expected

Steam Proration Factor

- 12 months avg was 1.06 for Jackfish 1 & 1.08 for Jackfish 2
- Continually monitoring proration factor trends to ensure proper meter operations
Current Implementation

- Jackfish 3 using alternate water cut device on test separators - Phase Dynamics
- Currently working through initial calibrations and tuning with manufacturer

Future Opportunity

- Very early stages of looking into multi-phase flow meter testing
Water Production, Injection & Uses

Section 3.1.2-4
Water Usage - Brackish

- Brackish source water produced from the Grand Rapids ‘C’ and McMurray zones
- Available for Jackfish 1, Jackfish 2 and Jackfish 3
- Two McMurray Wells:
  - F1/07-30-075-06W4
  - F1/03-15-075-06W4
- Six Grand Rapid Wells:
  - F1/12-15-075-06W4
  - F1/15-15-075-06W4
  - F1/03-10-075-06W4
  - F1/03-11-075-06W4
  - F1/04-16-075-06W4
  - F1/05-17-075-06W4

- 219.1 mm (8 5/8”) Production Casing
- 88.9 mm (3 ½”) or 114.3 mm (4 ½”) Production Tubing
- Thermal Cement
- Electric Submersible Pump
- Hanger
- Wire Wrapped Screen
- Grand Rapids ‘C’

~275 mKB -- ~315 mKB --
• Brackish water production from the Grand Rapids C commenced on July 12, 2007

• Brackish water quality analyzed 1-2 times per year
• Used for domestic/camp purposes and CPF utilities

• Five water supply well locations:
  - Jackfish 1: 12-28-075-06W4 (Approval 00251108-00 as amended)
  - Jackfish 2: F1 & F2 / 11-27-075-07W4 (Approval 00252624-00 as amended)
  - Jackfish 3: F1 & F2 / 10-24-075-07W4 (Approval 00337687-00)
  - Jackfish District Camp: F1 & F2 / 10-33-075-07W4 (Approval 00336306-00)
  - Jackfish District Camp: F1 & F2 / 03-33-075-07W4 (Approval 00336307-00 as amended)

• Each water supply well is paired with a dedicated observation well

• 12-28, 11-27, 10-24 and 03-33 produce from Empress Terrace Aquifer

• 10-33 produces from Bonnyville Sand Aquifer
Fresh Water Diversion

Monthly Water Volume (m$^3$)

- J1 Camp / CPF
- J2 Camp / CPF
- J3 Camp / CPF
- District Camp

Water Usage - Fresh
Produced Water Volume

3.1.2-4c

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<tr>
<td>J3</td>
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<td>300,000</td>
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</table>

Monthly Volume (m³)

<table>
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<th>Sep-13</th>
<th>Oct-13</th>
<th>Nov-13</th>
<th>Dec-13</th>
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<td>400,000</td>
<td>450,000</td>
<td>350,000</td>
<td>400,000</td>
<td>450,000</td>
<td>350,000</td>
<td>400,000</td>
<td>450,000</td>
<td>350,000</td>
<td>400,000</td>
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</table>

NYSE: DVN
Steam Injection Volume

3.1.2-4d

Steam Injection

<table>
<thead>
<tr>
<th>Month</th>
<th>J1</th>
<th>J2</th>
<th>J3</th>
</tr>
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<tbody>
<tr>
<td>Sep-13</td>
<td>350,000</td>
<td>100,000</td>
<td>0</td>
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<tr>
<td>Oct-13</td>
<td>400,000</td>
<td>150,000</td>
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</tr>
<tr>
<td>Nov-13</td>
<td>450,000</td>
<td>200,000</td>
<td>0</td>
</tr>
<tr>
<td>Dec-13</td>
<td>500,000</td>
<td>250,000</td>
<td>0</td>
</tr>
<tr>
<td>Jan-14</td>
<td>300,000</td>
<td>100,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Feb-14</td>
<td>375,000</td>
<td>125,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Mar-14</td>
<td>425,000</td>
<td>175,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Apr-14</td>
<td>475,000</td>
<td>225,000</td>
<td>125,000</td>
</tr>
<tr>
<td>May-14</td>
<td>525,000</td>
<td>275,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Jun-14</td>
<td>375,000</td>
<td>125,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Jul-14</td>
<td>425,000</td>
<td>175,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Aug-14</td>
<td>475,000</td>
<td>225,000</td>
<td>125,000</td>
</tr>
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</table>
Produced Water Recycle

3.1.2-4e

- No fresh ground water is employed in the Jackfish SAGD process; only brackish water is used for required makeup volumes
- Recycle Rate: \[
\frac{\text{Steam Injected - Fresh Water}}{\text{Water Produced}} \times 100\%
\]
  - Jackfish 1 2013/14 Recycle Rate Average: 106%
  - Jackfish 2 2013/14 Recycle Rate Average: 106%
  - Jackfish 3 2013/14 Recycle Rate Average: 92% due to plant ramp up, August Recycle Rate of 99.5%
  - Jackfish Scheme approval minimum Recycle Rate: 95%
  - Devon is in full compliance with produced water recycle
Blowdown Recycle %

3.1.2-4f

HP Blowdown Recycle

Monthly Volume (m³)

<table>
<thead>
<tr>
<th>Month</th>
<th>J1</th>
<th>J2</th>
<th>J3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep-13</td>
<td>80%</td>
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<tr>
<td>Oct-13</td>
<td>85%</td>
<td>85%</td>
<td>85%</td>
</tr>
<tr>
<td>Nov-13</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Dec-13</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Jan-14</td>
<td>85%</td>
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<td>Feb-14</td>
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<td>75%</td>
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<tr>
<td>Mar-14</td>
<td>70%</td>
<td>70%</td>
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</tr>
<tr>
<td>Apr-14</td>
<td>60%</td>
<td>60%</td>
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</tr>
<tr>
<td>May-14</td>
<td>55%</td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>Jun-14</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
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<tr>
<td>Jul-14</td>
<td>45%</td>
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<td>45%</td>
</tr>
<tr>
<td>Aug-14</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
</tr>
</tbody>
</table>
Disposal System is shared between Jackfish 1, Jackfish 2 and Jackfish 3

Two disposal streams:
- blowdown & regen waste

Thirteen Class 1b disposal wells in total

Approved MWIP of 6,000 kPa (July 2009)

Jackfish 1 disposal wells:
- 00, 02 & 03/09-14-075-06W4 (blowdown)
- 00 & 02/12-14-075-06W4 (regen)

Jackfish 2 disposal wells:
- 02 & 03/07-13-075-06W4 (blowdown)
- 02 & 04/12-15-075-06W4 (regen)

Jackfish 3 disposal wells:
- 02 & 03/05-12-075-06W4 (blowdown)
- 00 & 02/03-22-075-06W4 (regen)
- No regen water disposed at Jackfish 1 September/October due to neutralization tank outage, regen water sent to pond
- High blowdown at Jackfish 1 October/November to de-inventory neutralized regen water from pond
### Water Disposal - Approval No. 10790
00/09-14-075-06W4

#### 3.1.2-4h

#### 00/09-14-075-06W4 Disposal Well
MWIP 6,000 kPag

<table>
<thead>
<tr>
<th>Month</th>
<th>Volume (m³)</th>
<th>Pressure (kPag)</th>
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</thead>
<tbody>
<tr>
<td>Sep-13</td>
<td>25,000</td>
<td>3200</td>
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<tr>
<td>Oct-13</td>
<td>32,500</td>
<td>3800</td>
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<td>40,000</td>
<td>4500</td>
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<td>Dec-13</td>
<td>37,500</td>
<td>4200</td>
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<td>15,000</td>
<td>2800</td>
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<td>5,000</td>
<td>2000</td>
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<td>May-14</td>
<td>9,000</td>
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<td>Aug-14</td>
<td>12,000</td>
<td>3600</td>
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NYSE: DVN

www.devonenergy.com
02/09-14-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Monthly Volume (m$^3$)

Volume
Pressure

NYSE: DVN
03/09-14-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Monthly Volume (m³)

Volume
Pressure

0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
55,000
60,000
65,000
70,000
75,000

0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500
6,000

Sep-13 Oct-13 Nov-13 Dec-13 Jan-14 Feb-14 Mar-14 Apr-14 May-14 Jun-14 Jul-14 Aug-14
3.1.2-4h

02/07-13-075-06W4 Disposal Well
MWIP 6,000 kPag

- Volume
- Pressure

Average Wellhead Pressure (kPag)

Monthly Volume (m³)

Sep-13  Oct-13  Nov-13  Dec-13  Jan-14  Feb-14  Mar-14  Apr-14  May-14  Jun-14  Jul-14  Aug-14

NYSE: DVN
www.devonenergy.com page 223
03/07-13-075-06W4 Disposal Well
MWIP 6,000 kPag

- Volume
- Pressure

Monthly Volume (m$^3$)

Average Wellhead Pressure (kPag)

- Sep-13
- Oct-13
- Nov-13
- Dec-13
- Jan-14
- Feb-14
- Mar-14
- Apr-14
- May-14
- Jun-14
- Jul-14
- Aug-14

NYSE: DVN
Water Disposal - Approval No. 10790
02/12-14-075-06W4

02/12-14-075-06W4 Disposal Well
MWIP 6,000 kPag

- Volume
- Pressure

<table>
<thead>
<tr>
<th>Month</th>
<th>Volume (m³)</th>
<th>Pressure (kPag)</th>
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</thead>
<tbody>
<tr>
<td>Sep-13</td>
<td></td>
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<td>Oct-13</td>
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<tr>
<td>Nov-13</td>
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</tr>
<tr>
<td>Dec-13</td>
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</tr>
<tr>
<td>Jan-14</td>
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<td>4,000</td>
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<tr>
<td>Feb-14</td>
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<td>May-14</td>
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</tr>
<tr>
<td>Aug-14</td>
<td>10,000</td>
<td>11,000</td>
</tr>
</tbody>
</table>

Average Wellhead Pressure (kPag)

NYSE: DVN

www.devonenergy.com
02/12-15-075-06W4 Disposal Well
MWIP 6,000 kPag

- **Average Wellhead Pressure (kPag)**
- **Monthly Volume (m^3)**

<table>
<thead>
<tr>
<th>Month</th>
<th>Volume (m^3)</th>
<th>Pressure (kPag)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep-13</td>
<td>5,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Oct-13</td>
<td>5,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Nov-13</td>
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<td>Aug-14</td>
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<td>6,000</td>
</tr>
</tbody>
</table>

NYSE: DVN
04/12-15-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Monthly Volume (m³)

Volume
Pressure

0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
55,000
60,000
65,000
70,000
75,000

0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
5,500
6,000

Sep-13
Oct-13
Nov-13
Dec-13
Jan-14
Feb-14
Mar-14
Apr-14
May-14
Jun-14
Jul-14
Aug-14

25
4
192
1,907
3,134
5
6
0
5
6
7
8
9

3.1.2-4h
02/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Monthly Volume (m³)

Average Wellhead Pressure (kPag)

- Volume
- Pressure

02/05-12-075-06W4 Disposal Well
Approval No. 10790
02/05-12-075-06W4
03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)

03/05-12-075-06W4 Disposal Well
MWIP 6,000 kPag

Average Wellhead Pressure (kPag)

Volume
Pressure

Monthly Volume (m³)
## Off-site Water Disposal Volumes

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<thead>
<tr>
<th>Facility</th>
<th>Volume (m³)</th>
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<td>MROR Waste Plant</td>
<td>9.7</td>
</tr>
<tr>
<td>Newalta Amelia</td>
<td>48.0</td>
</tr>
<tr>
<td>Newalta Brooks</td>
<td>7.8</td>
</tr>
<tr>
<td>Newalta Elk Point</td>
<td>234.6</td>
</tr>
<tr>
<td>Newalta Hughenden</td>
<td>28.2</td>
</tr>
<tr>
<td>Newalta Ninton Junction</td>
<td>439.3</td>
</tr>
<tr>
<td>Newalta Stettler</td>
<td>5.5</td>
</tr>
<tr>
<td>Tervita Lindbergh Cavern Facility</td>
<td>3,825.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,598.3</strong></td>
</tr>
</tbody>
</table>
Start-up operational & reliability issues:
- Contactor Vessel Packing
- Compressor Slide Valve Indicator
- Cold weather troubleshooting
- Chemical Injection Pump

[Graph showing Jackfish 1 Sulphur Removal with annotations for SRU start-up, Start-Up Operational Issues, and Measurement Anomaly]
Start-up operational and reliability issues:
- Cold weather troubleshooting
- Chemical Injection Pump

Sulphur Inlet (t/d) vs. Sulphur Removal (%)

- Daily Removal
- Quarterly Average Recovery
- Required Removal
- Inlet Sulphur

Start-Up Operational Issues
SRU start-up

Sulphur Inlet (t/d)
Sulphur Operations under 1 tonne/day

Jackfish 3

- Produced gas was tested sweet in July and August
- Average daily sulphur emissions 0.0 tonnes per day
- Jackfish Sulphur Removal Unit will be operational before total sulphur emissions reach 1 tonne/day on a calendar quarter-year average basis
Sulphur Dioxide Emissions: Peak Daily and Rolling Averages

3.1.2-5c

Jackfish District: Daily and 30-day Rolling Average

- **Orange line**: Jackfish 1 Daily Avg.
- **Gray line**: Jackfish 2 Daily Avg.
- **Black line**: EPEA Approval Limit
- **Blue line**: District 30-day Rolling Avg.
  (30 day rolling average of the J1, J2 & J3 daily SO₂ emissions)

Both SRUs operational at Jackfish 1 and Jackfish 2
3.1.2-5d

Jackfish 2 continuous ambient air monitoring station was re-located to a new location between the Jackfish 2 and Jackfish 3 processing plants.

Minimal increase in NOx during winter months likely due to increased activities (trucking, drilling, heating)
Environmental Issues
Section 3.1.2-6
## Environmental Non-Compliances

### Event

<table>
<thead>
<tr>
<th>Event</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| Sulphur dioxide emission exceedance (Sept and Oct 2014) due to delay in SRU commissioning and start-up | • Accelerated SRU Installation plans and Reservoir pressure reductions at Jackfish 2  
• Ambient monitoring trailer and mobile monitoring trailers measured air quality to be well below the AAAQOs  
• 30 day rolling average SO\textsubscript{2} were below 4.0 tonnes / day |
### D78 Amendments - September 2013 to August 2014

* Indicates current approval as of August 31, 2014

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Category</th>
<th>Date</th>
<th>Number</th>
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<td>Pad RR Inflow Control Device</td>
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<td>December 9, 2013</td>
<td>Letter</td>
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<td>Pad VV Selective Steam Device</td>
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<td>December 9, 2013</td>
<td>Letter</td>
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<td>Pad PP, Pad OO, Pad G Proposal</td>
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<td>October 1, 2013</td>
<td>10097P</td>
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<td>Pad K Subsurface Drainage</td>
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<td>July 2, 2014</td>
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<td>Jackfish Tubing Size Amendment</td>
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<td>July 2, 2014</td>
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<td>2</td>
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<tr>
<td>Pad III Proposal</td>
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<td>Under review</td>
<td></td>
<td>2</td>
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</table>
D56 Facilities Licenses
• Jackfish 1 F33125 - Administrative amendment
• Changed facility category from C331 to D431 (Multiwell bitumen battery > 1 t/d sulphur) - Issued October 3, 2013

D65 Disposal Approval No. 10790H
• Amendment to dispose of boiler blowdown fluid with a pH from 6.0 to 11.2 issued - Issued January 31, 2014 (Approval 10790G)
• Amendment for additional disposal wells for regen. disposal for Jackfish 3 - Issued May 9, 2014 (Approval 10790H)
• Amendment for additional disposal wells for blowdown disposal for Jackfish 3 - Issued May 9, 2014 (Approval 10790H)
• UWI Change and Second Packer Installations, 100/05-12-075-06W4/0 & 102/03-22-075-06W4/0 (Under review)
D58 Jackfish Class II Landfill - Approval No. WM 105
Approval No. WM 105C

• One time approval to accept a maximum of 37,000 cubic metres of waste (drill cuttings) generated within the Pike project surface lease - Issued June 9, 2014
• Approval to add dry cement returns as an additional waste stream - Issued June 26, 2014
• One time approval to accept an estimated 600 tonnes sand blast sand resulting from cleaning the interior of carbon steel tanks - Issued August 6, 2014
AESRD Regulatory Approvals & Amendments

Jackfish District

EPEA Operating Approval No. 224816-00-04

• No Amendments

Water Diversion License No. 337687-00-00

• Jackfish 2 Potable Water - Issued December 19, 2013

Water Diversion Licence No. 336307-00-00 & 336307-00-01

• Replaced temporary diversion licenses for District Camp Potable Water - Issued December 20, 2013

Water Diversion Licence No. 336306-00-00

• Amendment to divert treated waste water from the camp for dust suppression ice roads and drilling purposes (Issued June 19, 2014) - Issued December 20, 2013
AESRD Regulatory Reporting Requirements

- Industrial Wastewater and Industrial Runoff Report
- Groundwater Monitoring Report
- Wetland Monitoring Report
- Potable Water Monitoring Report
- Air Monitoring Report
- Soil Management Report
- Soil Monitoring Report
- Conservation and Reclamation Annual Report
- Wildlife Mitigation and Monitoring Program
- Caribou Mitigation and Monitoring Program
Groundwater

• Jackfish 1 & 2 groundwater monitoring twice yearly at CPF and well pads as per EPEA approval
  – No concerns

• Jackfish 3 groundwater baseline samples taken Q1 & Q2 2014
  – First compliance monitoring event Fall 2014

• Submitted proposal in Aug 2014 for groundwater monitoring at Jackfish Tank Farm
  – Baseline sampling expected for Fall/Winter 2014
Water Management
Jackfish 1, 2 and 3

Wetland
- Wetland monitoring plan amendment to include Jackfish 3 approved March 2014

- 10 surface water monitoring stations (7 streams, 3 lakes/ponds) around Jackfish 1, 2 & 3

- 20 wetland monitoring plots established and surveyed (fens & bogs) Q3 2014

- No impacts seen to date
The Soil Monitoring Program consisted of 20 areas around the CPF and wells pads at Jackfish 2 that were investigated to assess surficial soil quality (2012).

A Soil Management Plan was developed to delineate localized areas on Jackfish 2 well pads. The investigation program will be conducted Sept 2014 with reporting to follow due in March 2015.
• As per EPEA Approval Condition, Devon’s Jackfish Wildlife Monitoring Program was authorized in July 2012.

• Some monitoring programs have been going on since 2002, while others began with authorization of the Wildlife Monitoring Program.

• Overall stable wildlife abundances for most species over the past 10+ years.

• As per AEPEA Approval Condition, results of monitoring program to be reported in a Comprehensive Wildlife Report to be submitted every 3 years (1st report due 2015).
Monitor the effectiveness of mitigations
- Initiated winter 2012, zero negative human-wildlife interactions since implementation of mitigations

Monitor wildlife habitat use and responses to incremental in situ development
- Winter tracking program ongoing since 2002 (2013-14 represented 8th consecutive year of monitoring specific to the EPEA approval)
- Overall stable wildlife trail densities for most species over the study period (2002-14) despite cumulatively increasing industrial footprint and activity over the survey period

Monitor wildlife responses to aboveground pipelines
- Very high rate of crossing success for all species, no caribou interactions detected yet (7 years of data)

Monitor amphibian mortality on project roads
- Spring and fall migration period road surveys initiated in spring 2013, 1 toad mortality detected (species unknown)

Monitor relative abundance of breeding songbirds
- Spring 2014 was 10th consecutive year of songbird surveys (some survey spots replicated four times)
- Minor change in species abundance or diversity indices since initiation

Monitor relative abundance of species at risk

Validate impact predictions from the EIA

Covered off by above monitoring programs
Environmental Monitoring & Progress
Wildlife Monitoring

• Jackfish Wildlife Mitigation and Monitoring Program acknowledged by GoA and 3rd parties as being the most intensive and extensive program approved by GoA.

• Wildlife monitoring data set acknowledged by GoA and 3rd parties as most robust wildlife monitoring data set in the in situ area of NE AB.

• Well beyond regulatory compliance (temporally and spatially) - ongoing in 2014/15 and likely beyond.

• Recipient of 2013 CAPP Responsible Canadian Energy Award for Environmental Performance.
ABMI (Alberta Biodiversity Monitoring Institute)
- Continued annual support (technical, financial) of Alberta Biodiversity Monitoring Institute (ABMI) at provincial and regional level, as well as implementing project-specific (Jackfish) biodiversity assessments using ABMI data and protocols

Wood Buffalo Environmental Association (WBEA)
- As the implementation of the Joint Provincial-Federal monitoring plan moves forward, Devon was actively involved in successfully expanding the WBEA’s monitoring network to the southern part of the airshed
- A permanent continuous community monitoring station has been installed in Conklin, monitoring is expected to start the end of September 2014
Cumulative Effects Management Association (CEMA)

- Devon is active on the Land Working Group and Ground Water Working Group and TEK Committee
- Devon will continue to participate in CEMA working groups as their mandates evolve to address in-situ concerns
Regional and Other Initiatives

- Christina Lake Regional Water Management Agreement (CLRWMA)
- Canada’s Oil Sands Innovation Alliance (COSIA)
- Alberta Biodiversity Monitoring Institute (ABMI)
- Wood Buffalo Environmental Association (WBEA)
- Regional Aquatics Monitoring Program (RAMP)
- Cumulative Effects Management Association (CEMA)
- Ecological Monitoring Committee for the Lower Athabasca (EMCLA)
- JOSM (Joint Oil Sands Monitoring)
- Monitoring Avian Productivity and Survivorship (MAPS Program)
- Regional Industry Caribou Collaboration (RICC)
COSIA (Canada’s Oil Sands Innovation Alliance)

- Devon is an active participant of the Water, Land and GHG Environmental Priority Areas (EPAs) and the COSIA Monitoring Working Group

- Aspirations for each EPA have been developed and Devon is striving to:
  - GHG: Produce oil with lower greenhouse gas emissions than other sources of oil
  - Land: Be world leaders in land management, restoring the land and preserving biodiversity of plants and animals
  - Water: Be world leaders in water management, producing Canadian energy with no adverse impact on water

- Devon is a participant and, in some cases leading, Joint Industry Projects in each of the EPAs
EMCLA (Ecological Monitoring Committee for the Lower Athabasca)

• Devon has been a founding member, major participant, and leader on the EMCLA which consists of industry, government and academics designing monitoring program to address biodiversity and associated components at a regional scale rather than project-specific where it makes sense to do so.

• ABMI has coordinated this monitoring process, and developed monitoring plans for rare animals, rare plants, and caribou habitat fragmentation and movement.

JOSM (Joint Oil Sands Monitoring)

• Devon continues to participate actively as members of the industry caucus in both the Biodiversity and Habitat Component Advisory Committee and the Air Quality Component Advisory Committee of JOSM.
Other Environmental Initiatives

MAPS Program (Monitoring Avian Productivity and Survivorship)
- Continued annual support (technical, financial) of the MAPS Program which analyzes influence of industry development on avian populations’ productivity and survivorship throughout northeast Alberta

RICC (Regional Industry Caribou Collaboration)
- Devon is leading a consortium of organizations (local energy sector and forestry sector, pipeline sector, non-government organizations, the Government of Alberta and the University of Alberta) in implementing a collaborative caribou conservation program for the Cold Lake Range, which comprises the JF and Pike district
- This program focuses on managing and reducing industry’s current and future footprint throughout the Cold Lake range and on identifying effective techniques to reduce wolf and bear movements on linear features throughout caribou habitat
Regulatory Compliance
Section 3.1.2-7,8
Devon Canada Corporation believes the Jackfish Project is in compliance with AER approvals and regulatory requirements. As of August 31, 2014, Devon has no unaddressed non-compliant events.
The following list summarizes non-compliant events that were identified by Devon and reported to the AER. For all events corrective actions were identified and tracked to completion.

<table>
<thead>
<tr>
<th>Event</th>
<th>Corrective Action</th>
</tr>
</thead>
</table>
| VSD: Steam distribution well completion modifications were performed on Jackfish 3 pads prior to receiving a scheme amendment from the AER under Directive 78. At the time wells were not operational and a previous approval was granted for the same completions technology at Jackfish 2 & 3. | • Category 2 amendment application submitted  
• Internal well application procedure updated to ensure amendment applications (if required) are submitted prior to proceeding with completion activities |
| VSD: Jackfish 2 MARP steam meter failures | • Implement “meter with bypass” project / completion end of Q1 2015  
• Implement substitute calculation for interim |
| VSD: Oilfield waste (spill material) stored on a remote site without prior approval. Waste was then accidently incorporated to the drilling mud recycle system, leading to improper waste disposal. | • Waste management procedures updated to ensure all regulatory requirements are in place prior to disposal |

*VSD: Voluntary Self-Disclosure*
<table>
<thead>
<tr>
<th>Event</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSD: Self disclosure pipeline amendment due to LACT unit relocation.</td>
<td>• Pipeline amendment submitted</td>
</tr>
</tbody>
</table>
| VSD: A perforation was found in the Landfill primary HDPE liner above the waste footprint | • Liner repair completed  
• Landfill liner protection procedure was reinforced with Landfill Operator |
| VSD: Drilling sump closure was not completed within 12 months and cement pit size exceedance due to insufficient communication | • Sump communication procedures updated including new pit signage requirements |
| Notice of Noncompliance: Outstanding casing failure repair, did not complete casing repair within 90 days | • Repair program submitted and all repairs completed prior to October 31st deadline  
• Additional well integrity program developed dedicated to managing / tracking casing repairs and notifications |

*VSD: Voluntary Self-Disclosure*
### AER Summary of Noncompliance

#### 3.1.2-8

<table>
<thead>
<tr>
<th>Event</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSD: Landfill leachate level exceedance due to pump failure</td>
<td>• Faulty leachate cell pump replaced</td>
</tr>
<tr>
<td></td>
<td>• Incident reviewed with Landfill Operator to stress importance of leachate maintenance</td>
</tr>
<tr>
<td>VSD: Failure to meet the calendar sulphur recovery requirement of 69.7%:</td>
<td>• Commissioning and start-up operational issues were addressed in Q4 2013 and Q1 2014: Replaced contactor vessel packing, compressor slide vane, chemical injection pumps and addressed cold weather operational issues</td>
</tr>
<tr>
<td>• Commissioning / operational issues of SRU at Jackfish 1 and 2</td>
<td>• To increase recovery rates at J1: Reduced gas to well pads and increased recovery rates of SRU to maximum sustainable rates</td>
</tr>
<tr>
<td>• Measurement anomalies at Jackfish 1</td>
<td></td>
</tr>
</tbody>
</table>

*VSD: Voluntary Self-Disclosure*
### AESRD & AER Spill Reporting

<table>
<thead>
<tr>
<th>Site</th>
<th>No. of Reportable Spills</th>
<th>Volume Released (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jackfish 1</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Jackfish 2</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Jackfish 3</td>
<td>3</td>
<td>14</td>
</tr>
</tbody>
</table>

- All spills were cleaned up and remediated promptly to eliminate any adverse effect
- Devon tracks all spill incidents within the Devon Corporate Incident Management System
Future Plans
Section 3.1.2-9
Future Plans (2015 - 2016)
Surface Operations

Jackfish 1
• Pad G Start-up planned for 2015
• Plant Maintenance Turnaround planned for 2015

Jackfish 2
• Sulphur Removal Unit (SRU) Installation planned for 2015
• Permanent installation to replace existing Temporary SRU

Jackfish 3
• Pads K and RR Start-up planned for 2015
• Sulphur Removal Unit Installation planned for 2015
Future Plans (2015 - 2016)
Surface Operations

3.1.2-9a,b,c,d

**District Plans**

- **Blowdown and Regen Disposal Reduction & Optimization**
  - Pilot regen disposal water recycling to HLS
  - Investigate disposal water filtration enhancements and/or reliability opportunities

- **Steam Generation Initiatives**
  - Investigate feasibility to further increase steam qualities (82% at Jackfish 1 and 2)
  - Pending commercialization, new steam generation technology (rifle tubes at Jackfish 2)

- Evaluate power generation initiatives to improve efficiency and reduce greenhouse gas emissions
  - Waste heat power generation via Organic Rankine cycle

- **Blowdown pipeline liner repairs**

- **Source water mixing tank to promote HLS stability (TDS balancing)**

- **Steam meter addition/replacement project (Jackfish 1, 2 and 3)**
Appendix C
Waste Disposal 3.1.2-4i
• Devon Jackfish Class II landfill Cell 1 is designed for disposal up to 210,000 m³ of oilfield wastes

• Located in SE¼ -28-75-6W4, south of the Jackfish 1 Central Processing Facility

• Landfill placed into operation in October 2008

• A total of 38,951 m³ of material was placed into the Jackfish Landfill during this year’s reporting period

<table>
<thead>
<tr>
<th>Jackfish Class II Landfill Oilfield Waste Deposit Volumes (m³)</th>
<th>Jackfish 1</th>
<th>Jackfish 2</th>
<th>Jackfish 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep. 1, 2013 - Aug. 31 2014</td>
<td>0</td>
<td>0</td>
<td>25,283</td>
</tr>
<tr>
<td>Drill Cuttings</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Lime Sludge Solids</td>
<td>5,763</td>
<td>6,024</td>
<td>4</td>
</tr>
<tr>
<td>Contaminated Debris &amp; Soil</td>
<td>828</td>
<td>176</td>
<td>11</td>
</tr>
<tr>
<td>Construction &amp; Demolition Material</td>
<td>0</td>
<td>0</td>
<td>274</td>
</tr>
<tr>
<td>Cement Returns</td>
<td>0</td>
<td>0</td>
<td>588</td>
</tr>
</tbody>
</table>
Thank You.