enhanced oil recovery:
Innovating Heavy Oil and Bitumen Extraction with Radio Frequency Heating
November 1, 2018
FORWARD LOOKING STATEMENTS & ADVISORY

Certain statements in this presentation include forward-looking information (as defined in Canadian securities legislation). Such statements appear in Slides 6 & 7 [RF Economics for E&P Companies], Slide 8 [Environmental Benefits of RF], Slide 9 [Commercial-Scale Test], Slides 12, 13 and 14 [Energy Efficiency], and Slide 15 [Next Steps to Commercialization].

These statements involve numerous assumptions about future economic conditions and courses of action, and are therefore subject to various risks and uncertainties. These risks and uncertainties include, but are not restricted to, the ability of Acceleware Ltd. ("Acceleware", "AXE" or the "Corporation") to fund its research and development ("R&D") activities, the timing of such R&D, the likelihood that the patent applications filed by the Corporation will be granted, continued increased demand for the Corporation's products, the Corporation's ability to maintain its technological leadership in various fields, the future price and cost of producing heavy oil and bitumen, the availability of key components and the Corporation's ability to attract and retain key employees and defend itself against any future patent infringement claims.

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ACCELEWARE ("AXE")
An Established Technology Company Developing a Game-Changing Process for Enhanced Oil Recovery ("EOR")

AXE is developing a technology that uses electro-magnetic energy in the radio frequency ("RF") spectrum to heat and mobilize heavy oil and bitumen at a fraction of the cost of current processes.

As an EOR technique, AXE’s RF solution yields dramatic benefits quickly, generates higher production than steam assisted gravity drainage ("SAGD") and uses half the energy.
RF PATH TO COMMERCIALIZATION
Setting The Table For Success

1/20 Scale Test Success
- Delivered high power to the formation with scaled components
- Heated the formation as predicted by simulation
- Tested and confirmed proprietary system design

2005 | AXE EM Solver SW was released

2010 | AXE RF Heating studies for super-major oil company

2011 | Design, simulation & field tests begin

2015 | AXE modular RF tank tests & patent filing

2016 | GE partnership announced & additional RF XL Patents filed

2017 | RF XL 1:20 scale field demo

2018 | Signed commercial-scale test agreement with Prosper Petroleum Ltd.

Graph:
Match of the temperature in the top layer

- Measured temperature, Top East
- Simulated temperature, Top East
- Measured temperature, Top West
- Simulated temperature, Top West
- Measured temperature, Top Center
- Simulated temperature, Top Center
WHAT IS RF XL?
An Innovative Solution for Recovering Heavy Oil and Bitumen

- RF heating works like an “inside-out” microwave oven: RF XL lines heat connate water in the formation, lowering the viscosity of the bitumen, and stimulating oil production.

- RF XL is designed for:
  - Efficiency
  - Cost reduction
  - Ease of deployment
  - Flexibility / applicability
  - Scalability
RF XL – ECONOMIC ADVANTAGES
Driving a More Energy Efficient, Accessible and Environmentally-Friendly Solution

- Economically scalable – well by well
  - Simple, inexpensive, easy to deploy
  - Standard components and processes
- Lower capex (60%) and opex (42%)
- More energy efficient\(^1\)
  - Retains 97% of “useful heat” v. 70% for SAGD
- Quicker to first production
  - No steam plant construction and no pre-heating
- Specifically developed for long-reach horizontal wells
- Design and components allow for rapid commercialization.

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1. Internal AXE estimate

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Oil Rate vs Time\(^1\)

- RF XL:
  - 475,000 GJ
  - 1.0 million bbls
- SAGD:
  - 1,150,000 GJ
  - 0.7 million bbls

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Oil Rate SC-Monthly (m3/day)

- 0
- 20
- 40
- 60
- 80
- 100

DAYS

(3MW input power for RF and 250 m3/d of steam injection)
# RF ECONOMICS FOR E&P COMPANIES

Deploying Capital More Efficiently than SAGD

<table>
<thead>
<tr>
<th></th>
<th>AXE RF XL(^2) Greenfield</th>
<th>SAGD(^3) Greenfield</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WTI (constant pricing)</strong></td>
<td>US/bbl</td>
<td>$65.00</td>
</tr>
<tr>
<td><strong>Steam Oil Ratio</strong></td>
<td>bbl/bbl</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Energy/Oil Ratio</strong></td>
<td>GJ/bbl</td>
<td>3.25</td>
</tr>
<tr>
<td><strong>Initial Capital - Facilities</strong></td>
<td>000</td>
<td>$591,000</td>
</tr>
<tr>
<td><strong>Initial Capital - Wells</strong></td>
<td>000</td>
<td>$282,000</td>
</tr>
<tr>
<td><strong>Subsequent Capital</strong></td>
<td>000</td>
<td>$2,236,000</td>
</tr>
<tr>
<td><strong>Total Capital</strong></td>
<td>000</td>
<td>$3,109,000</td>
</tr>
<tr>
<td><strong>Estimated Ultimate Recovery</strong></td>
<td>000 bbls</td>
<td>403,000</td>
</tr>
<tr>
<td><strong>Average Production Rate</strong></td>
<td>bbls/d</td>
<td>36,800</td>
</tr>
<tr>
<td><strong>Time to First Oil</strong></td>
<td>Years</td>
<td>&lt;2</td>
</tr>
<tr>
<td><strong>After Tax NPV 10%</strong></td>
<td>000</td>
<td>$1,211,485</td>
</tr>
<tr>
<td><strong>F&amp;D</strong></td>
<td>$/bbl</td>
<td>$7.72</td>
</tr>
<tr>
<td><strong>Capital Intensity</strong></td>
<td>/bbl/d</td>
<td>$21,830</td>
</tr>
<tr>
<td><strong>Opex</strong></td>
<td>/bbl</td>
<td>$7.00</td>
</tr>
<tr>
<td><strong>Payback</strong></td>
<td>Years</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>IRR after tax</strong></td>
<td>28%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Economics reflect a 40,000 bbl/d operation, a standard measure for SAGD projects
- RF generates a significantly higher return
- RF economics relative to SAGD improve further with smaller project sizes

RF opens the door to smaller heavy oil and bitumen projects

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1. 40 well pairs: 1 producing well paired with 1 RF/steam injector
2. Source – Internal Estimate
3. Source – GMP First Energy
RF XL - ENVIRONMENTAL BENEFITS
Elimination of Water and Steam Reduces GHG Emissions and Minimizes Surface Disturbance

- GHG emission reductions ranging from:
  - A 23% reduction based on Alberta’s current power grid
  - A 56% reduction based on Alberta’s the 2030 power grid
  - 50% reduction using Combined Cycle Gas Turbine power.
  - Potential for a 100% reduction when using renewable sources of electricity
- No external water is required and no tailings ponds.
- No solvent injection or recovery required, eliminating associated economic and environmental risks.
- 67% less land than comparable SAGD operation
Rigel Commercial-Scale Test
Commencing Commercial-Scale Test of Innovative RF XL Technology with Prosper Petroleum

• July 2018 AXE and Prosper Petroleum Ltd. (“Prosper”) agreed to complete a commercial-scale test of RF XL at the Rigel property.
• The pilot will run on an 1100m RF XL heating well and producer.
• The first phase will run for six months using Acceleware’s two-megawatt Silicon Carbide (SiC) generator developed with partner General Electric (GE)
• The test may be extended to run longer at four megawatts of power to complete a full production cycle on the pilot well.

• AXE / GE work started January 2018 with the first unit ready late 2018.
• Design and engineering phase to be completed in December 2018.
• Drilling and construction at the site will begin in Q1 2019
• Six month heating test scheduled for the second half of 2019.
Rigel Test Site – Reservoir Properties
High Quality Resource

- Depth: 424m
- Spacing: 81m
- Well length: 1100m
- Thickness: 26m
- Porosity: 0.34 (average)
- Permeability:
  - Horizontal: 8-9 D (average)
  - Vertical: 5.5-6 D (average)
- Initial Oil Saturation: 0.75 (average). Sw = 0.25 (average)
- Swr: 0.235 (some initial water is mobile, layers with Sw=0.35)
- OOIP: 575,400 m³ (3.6 MBls)
- Initial oil viscosity: 747,900 cp (live oil, 2% gas mol fraction)
- Initial pressure: 900 kPa the whole reservoir
- Initial temperature: 13°C
- Initial GOR: 0.85 m³/m³
Rigel Simulations – Oil Rate, Cum. Oil, & RF
Initial Simulations Show Very Strong Production Results

• Rapid early production – no pre-heating
• Average production of 1,070 bbl/day at 2500 days
• Cum energy/oil ratio of 3.5 GJ/m3 vs 7.5 GJ/m3 projected for SAGD.
• Cum oil 2.5 million bbls
### Energy Efficiency Comparison – EOR¹

RF is more efficient than steam for energy input and cost.

<table>
<thead>
<tr>
<th>Description</th>
<th>Energy Efficiency (GJ/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam (SAGD) for Oil Sands</td>
<td>6.3 – 9.0</td>
</tr>
<tr>
<td>RF XL for Oil Sands</td>
<td>2.5 – 4.5</td>
</tr>
<tr>
<td>RF XL for Heavy Oil</td>
<td>2.0 – 3.5</td>
</tr>
<tr>
<td>RF XL Heavy Oil ON/OFF</td>
<td>1.5 – 2.5</td>
</tr>
</tbody>
</table>

*Energy efficiency drives both economic and environmental results.*
Energy Efficiency Comparison – OPEX/bbl\(^1\)
RF is more efficient than steam for energy input and cost.

- Steam (SAGD) for Oil Sands: $10.81/bbl
- RF XL for Oil Sands: $6.65/bbl
- RF XL for Heavy Oil: $5.86/bbl
- RF XL Heavy Oil ON/OFF: < $4.50/bbl?

*Potential operating costs reductions per barrel are significant.*

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1. Internal AXE estimate
Energy Efficiency Comparison – CO2/bbl\(^1\)

Efficiency translates into lower GHG emissions as well.

- Steam (SAGD) for Oil Sands: 100.42 kg
- RF XL for Oil Sands: 57.84 kg
- RF XL for Heavy Oil: 45.80 kg
- RF XL Heavy Oil ON/OFF: 0 - 33.77 kg

*Emission reduction potential is equally compelling.*

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1. Internal AXE estimate
Next Steps to Commercialization
The RF XL test project is now fully underway.

• Rigel oil sands pilot test in 2019

• Heavy oil pilot tests and initial commercial deployments in 2020

• Simulation work and plans for other heavy oil and oil sands deployments are ongoing.
FAQ : QUESTION ONE
Two key questions to address

Why will RF work now when it didn’t before?

• We’ve tested the traditional approaches to RF heating, identified their limitations, and abandoned those elements.

• We’ve designed a completely new approach combining our RF XL heating lines with partner GE’s SiC generator, eliminating the use of dipole antennae.

• The RF XL design was proven successful in our 1/20th scale field test in Q1 2017.

• We continue working with industry experts and thought leaders to ensure the pilot is successful.
FAQ: QUESTION TWO
Two key questions to address

How do you produce oil without “filling the void?”

• Void space is filled by:
  • Expansion from water to steam.
  • Change pore volume due to rock compressibility.
  • Solution gas release.
• Mobilized oil is produced via gravity drainage.
CONTACT
RF XL: a Better, Cleaner Alternative for Enhanced Recovery

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