



Changing the Way Oil Sands Bitumen is Extracted



Our patented process achieves breakthrough environmental and economic performance

US Oil Sands (“USO”) is a publicly-traded Canadian company that has developed a proprietary process which uses a biodegradable, non-toxic solvent derived from citrus fruit to economically and environmentally extract bitumen from mined oil sands without the need for tailings ponds. USO’s highly efficient and low cost process represents a paradigm shift for the industry in terms of capital intensity and its environmental stewardship.

Economic benefits:

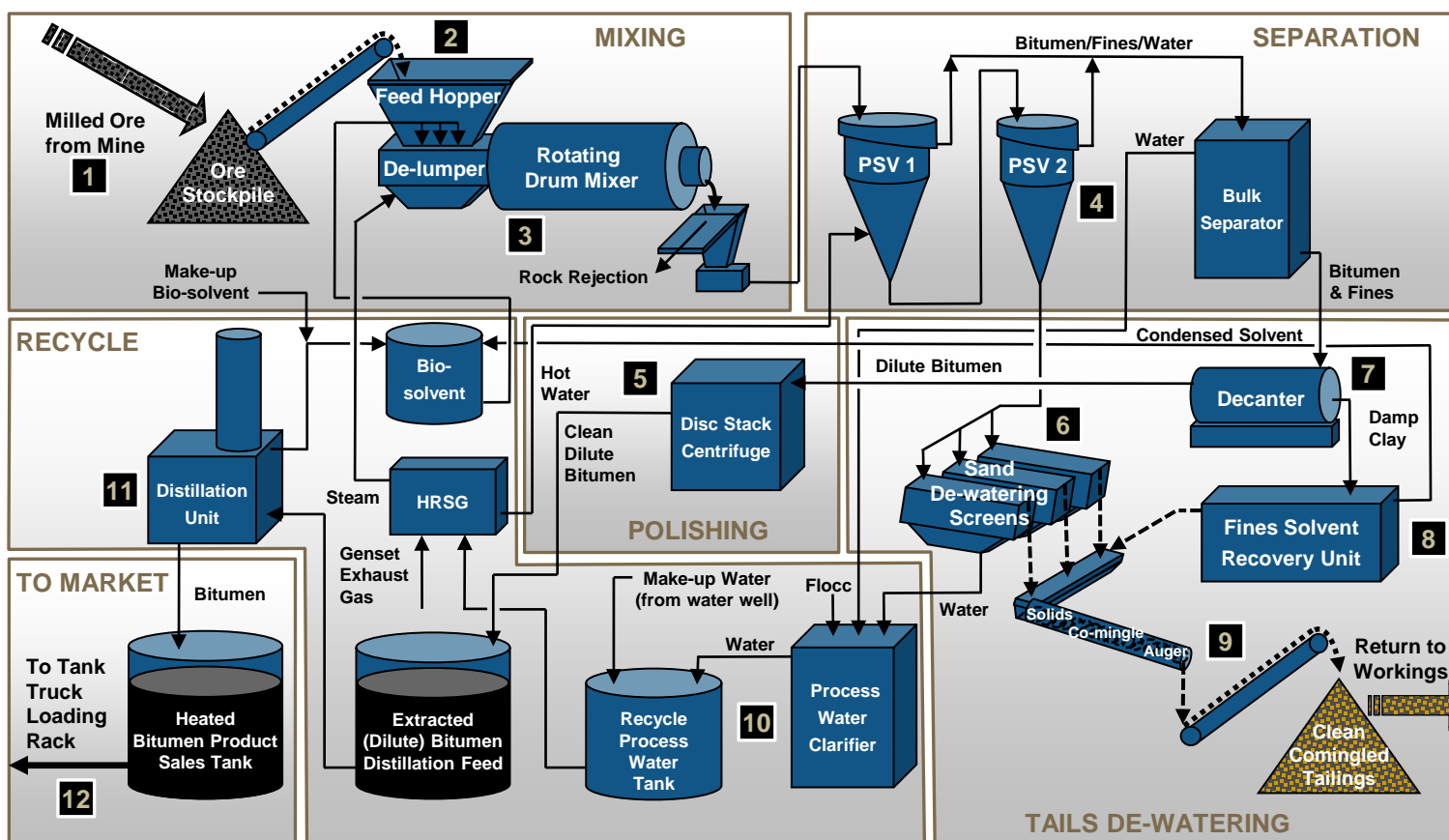
- » >75% lower capital intensity than current oil sands mining projects
- » Low upfront capital, reduces payout
- » 90+% bitumen recovery, one of the highest commercial rates in the industry
- » Plant size scalable to match resource, increasing operating efficiency
- » Modular design allows for phased capital deployment, rapid construction and early cash flow
- » Ability to recycle and re-use solvent lowers operating costs

Environmental benefits:

- » Concurrent mining and reclamation process eliminates tailings ponds
- » 90%-95% smaller surface footprint than traditional oil sands mining projects (on a per-barrel basis)
- » ~95% of water used in the process is immediately recycled and reused
- » Targeting 50% less energy used (per produced barrel) than other oil sands projects
- » Best-in-class GHG emissions, lower than some conventional oil & gas projects

Revolutionary Bitumen Extraction Process

Adding a bio-solvent results in a highly capital efficient and operationally simplified extraction process.



Process facts:

- » Process uses low mechanical energy, reduces clay suspensions / emulsions
- » Eliminates expensive water handling, bitumen froth treatment, middling sludge management and tailings storage recovery
- » Works on both water-wet and oil-wet oil sands
- » Components are off-the-shelf leading to reduced fabrication schedules and increased reliability
- » Process has been pilot tested since 2003 on units ranging from 24 – 500 bpd
- » Process is patented in Canada and the U.S.

Mixing

1. Ore milled to ~20mm by surface mining machine and stockpiled at the plant site
2. Milled ore is fed to the plant's feed hopper where it passes through a "de-lumper" which crushes reconsolidated lumps and screens reject material
3. Conditioned ore is fed into a slowly-rotating drum along with hot water and bio-solvent
 - Low shear process provides efficient extraction without the formation of stable clay suspensions / emulsions

Separation

4. The mixture of diluted bitumen, water and solids is fed into primary separation vessels where gravity separation is used
 - Coarse solids and water drop to the bottom of the vessels and are pumped to de-watering screens

Polishing

5. The bitumen/solvent mixture containing lesser quantities of water and fine solids is processed to sales specification through the use of a disc stack centrifuge which separates the remaining fine solids and water

Tails De-watering

- Available water in tailings is recovered and recycled
6. Free water entrained in the coarse solids is removed with sand screens
 7. Fine sediments and clays are separated from the hydrocarbon stream with a decanting centrifuge

8. Fine solids are de-watered and residual bio-solvent is captured for recycle by a paddle dryer
9. Fine solids discharge from the paddle dryer are commingled with coarse solids from the sand screens for back haul to the mine for reclamation

Recycle

10. Water from various stages is collected and clarified using a flocculant
 - ~95% of the water is immediately recycled and reused in the process
11. The diluted bitumen mixture is sent to a wiped film evaporator to remove the bio-solvent
 - ~98% of the bio-solvent is immediately recycled and reused in the process

To Market

12. Hot bitumen containing <0.5% BS&W is stored for transport
 - Product is trucked / railed to refineries utilizing heat traced and insulated tankers

Pilot Scale Bitumen Extraction Plant



Pilot facts:

- » State of the art programmable logic controlled and fully instrumented
- » Sized to process 3,000 lb/hr of ore (approximately 24 bpd depending on ore grade)
- » Rapid process: system comes to full operating equilibrium in 30 minutes, yielding clean coarse solids, fines, recycled water and dilute bitumen
- » Stackable clean fine solids (~15% moisture) produced at equilibrium
- » Has successfully processed hundreds of tonnes of ore
- » Has successfully processed ore from various regions in Athabasca and Utah (both water-wet and oil-wet sands)
- » Unit is extremely flexible in testing different equipment and process configurations
- » Onsite analytical laboratory

As part of its strategy to commercialize its bitumen extraction process, USO has fabricated a pilot scale extraction plant at its research & development facility in Grande Prairie, Alberta.

This plant, referred to as the Shop Demonstration Unit or “SDU” is a fully integrated plant with a capacity of 3,000 lb/hr of raw oil sand ore that produces separate streams of clean sand, fine solids, recycled water and diluted bitumen (approximately 1 barrel per hour of bitumen depending on ore grade). The fully instrumented SDU enables USO to collect process data and operating metrics required for the scale-up and engineering of commercial units. The unit has proven to be extremely flexible and has allowed USO to incorporate and test different components and aspects of the extraction process. To date, oil sands from various regions in Athabasca and Utah have been successfully processed.

Utilizing the SDU, USO's extraction process can be demonstrated to outside parties very readily. The process is rapid and comes to equilibrium quickly. Typically, clean coarse solids are produced 10 minutes after the start of the run and the system comes to full operating equilibrium in 30 minutes. In a normal trial, 90% - 98% of the bitumen is extracted from the ore, depending on ore quality.

Selected SDU Trial Run Results

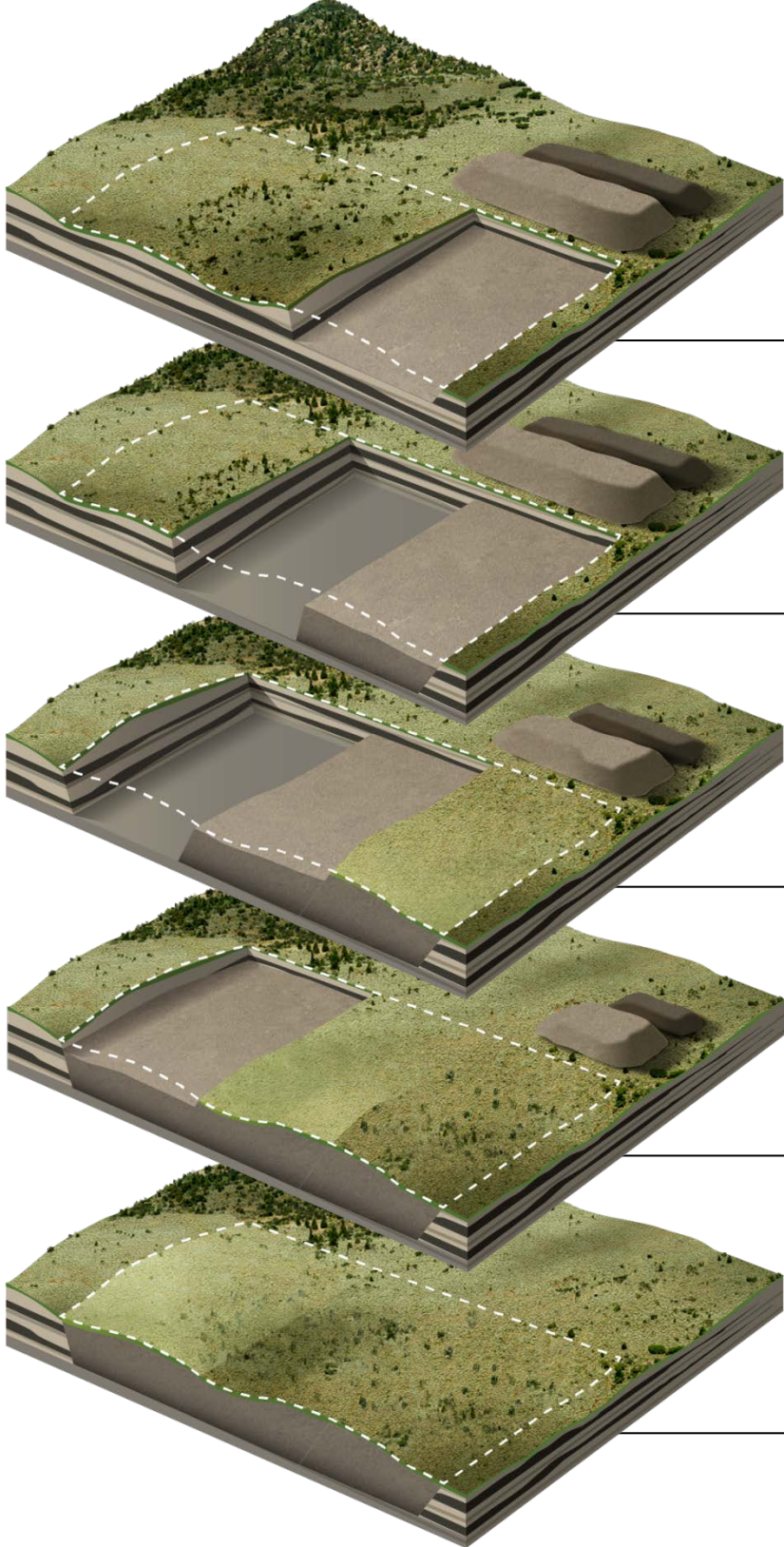
Trial Run (#)	Date	Feedstock	Bitumen Extraction (%)	Residual Bitumen in Tailings (%)	Residual Bio-solvent in Tailings (%)
30	Aug. 2, 2007	10.85 wt% Athabasca ore	95.76	0.46	0.00
91	Jun. 22, 2011	9.87 wt% Utah ore	97.24	0.27	0.01
94	Nov. 10, 2011	9.70 wt% Utah ore	98.84	0.11	0.00
190	Nov. 6, 2014	7.48 wt% Athabasca ore	90.42	0.02	0.00

Simultaneous Oil Sands Mining & Reclamation

US Oil Sands will have the smallest land footprint of any commercial oil sands mining project.

The extraction process allows simultaneous mining and reclamation of the same plot of land, which means the land can be returned back to its natural state far sooner than would be possible with traditional oil sands mining projects. This concurrent reclamation is a first in oil sands mining and it is estimated that US Oil Sands' surface footprint will be 90%-95% smaller than traditional oil sands mining projects (on a per barrel basis).

The steps toward full reclamation:

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- A**
 - i. Initial mine opening with topsoil and overburden removed down to initial oil sands bed
 - ii. Overburden and topsoil are temporarily stored until deepest oil sand bed has been mined
 - iii. Clean dewatered tailings from initial oil sands processing also temporarily stored until deepest oil sand bed mined
 - B**
 - i. Mine pit progressed to full depth
 - ii. Concurrent backfill of mine pit with clean dewatered tailings from processing
 - iii. Mine face progresses to deepest oil sand bed in subsequent pit
 - C**
 - i. Mining operations and concurrent backfill with clean dewatered tailings continues
 - ii. Overburden and topsoil replaced and revegetation process begins on initial mined area
 - D**
 - i. Mining complete
 - ii. Backfill of final mine pit with clean dewatered tailings and overburden nearing completion
 - iii. Revegetation process continues on mined areas
 - E**
 - i. Final overburden and topsoil storage areas reclaimed
 - ii. Revegetation process completed, ultimately leaving no trace of the mined area in an estimated 4 – 6 years



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