# ALBERTA OIL SANDS INDUSTRY

## QUARTERLY UPDATE

SPRING 2013

Reporting on the period: Jan. 18, 2013, to Mar. 14, 2013

PHOTO: SUNCOR ENERGY INC.

Alberta Government

# All about the oil sands

Background of an important global resource

TABLE OF CONTENTS





Canada has the third-largest oil reserves in the world, after Saudi Arabia and Venezuela. Of Canada's 174 billion barrels of oil reserves, 170 billion barrels are located in Alberta, and about 169 billion barrels are recoverable from bitumen. This is a resource that has been developed for decades but is now gaining increased global attention as conventional supplies—so-called "easy" oil—continue to be depleted. The figure of 169 billion barrels of bitumen represents what is considered economically recoverable with today's technology, but with new technologies, this reserve estimate could be significantly increased. In fact, total oil sands reserves in place are estimated at 1.8 trillion barrels.

There are three major bitumen (or oil sands) deposits in Alberta. The largest is the Athabasca deposit, which is located in the province's northeast in the Regional Municipality of Wood Buffalo. The main population centre of the Athabasca deposit is Fort McMurray. The second-largest oil sands deposit is referred to as Cold Lake, just south of Athabasca, with the main population centre the City of Cold Lake. The smallest oil sands deposit is known as Peace River, which is located in northwest-central Alberta. A fourth deposit called Wabasca links to the Athabasca and is generally lumped in with that area.

The existence of bitumen in Alberta has been known for a long time. The first mention of it in Canadian history was in 1719, when a Cree named Wapasu brought a sample of the "gum" to a Hudson's Bay trading post. First Nations in what is now the Wood Buffalo area had traditionally used the bitumen, which seeps from outcrops along the Athabasca River, to waterproof their canoes.

Today, bitumen is produced as an energy source by two means—mining and in situ. In 2011, 51 per cent of oil sands production came from mines, but by 2015, in situ bitumen production is expected to surpass mined bitumen production. Alberta will need to rely to a greater extent on in situ production in the future, as 80 per cent of the province's proven bitumen reserves are too deep underground to recover using mining methods.

There are essentially two commercial methods of in situ (Latin for "in place," essentially meaning wells are used rather than trucks and shovels). In cyclic steam stimulation (CSS), high-pressure steam is injected into directional wells drilled from pads for a period of time, then the steam is left to soak in the reservoir for a period, melting the bitumen, and then the same wells are switched into production mode, bringing the bitumen to the surface.

In steam assisted gravity drainage (SAGD), parallel horizontal well pairs are drilled from well pads at the surface. One is drilled near the top of the target reservoir, while the other is drilled near its bottom. Steam is injected into the top well, a steam chamber forms, and the melted bitumen flows into the lower well via gravity and is pumped to the surface using artificial lift.

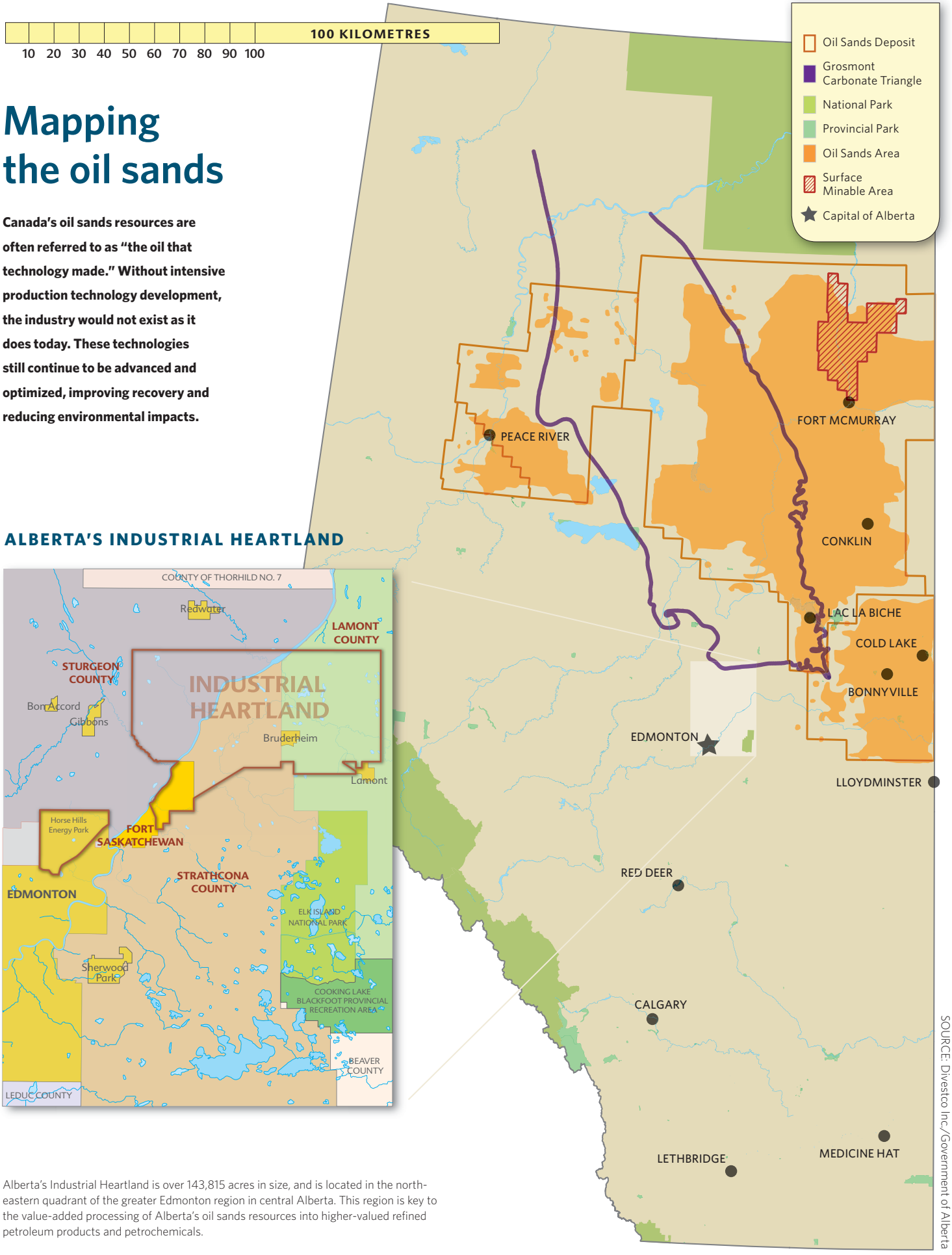
Both SAGD and CSS are used in the Cold Lake and Peace River deposits, while SAGD is the in situ technology of choice in the Athabasca deposit. The selection is based on a number of factors, including geology. The technologies combined currently produce just over one million barrels per day.

Research is underway on a number of other production technologies designed to optimize production, including variations on solvent-assisted SAGD and CSS, recovery using electricity, and in situ combustion.

Bitumen that has not been processed, or "upgraded," can be used directly as asphalt. It must be diluted to travel by pipeline. Adding value, some producers upgrade their product into synthetic crude oil, which is a refinery feedstock. That can be transformed into transportation fuels and other products. ■

# Mapping the oil sands

**Canada's oil sands resources are often referred to as "the oil that technology made." Without intensive production technology development, the industry would not exist as it does today. These technologies still continue to be advanced and optimized, improving recovery and reducing environmental impacts.**




Alberta's Industrial Heartland is over 143,815 acres in size, and is located in the north-eastern quadrant of the greater Edmonton region in central Alberta. This region is key to the value-added processing of Alberta's oil sands resources into higher-valued refined petroleum products and petrochemicals.

SOURCE: Divestco Inc./Government of Alberta

# GOVERNMENT UPDATE

## PREMIER REDFORD WELCOMES KEYSTONE XL PROGRESS

Alberta Premier Alison Redford provided the following statement in response to the U.S. State Department's Draft Supplementary Environmental Impact Study, released on March 1.

"On behalf of the people of Alberta, I welcome further progress towards a decision on the Keystone XL pipeline.

"As the safest, most secure and responsible energy supplier to the U.S., Alberta applauds the U.S. administration for the extensive, exacting and comprehensive review of potential environmental impacts from the project.

"I had the opportunity to speak to U.S. Ambassador to Canada David Jacobsen and Gary Doer, Canada's Ambassador to the U.S., where I reinforced Alberta's efforts to place strong environmental policy and clean technology development on an equal footing with a healthy energy sector and plentiful job opportunities for the middle class.

"This was a message I carried with me on my recent mission to Washington, D.C. And it is a message that our government will continue to reinforce as we redouble our efforts and our resolve to break bitumen barriers, get our products to market and position Alberta as a strong and secure place for global investment.

"I am also pleased to see that the State Department acknowledged Alberta's environmental leadership, including reference to the Lower Athabasca Regional Plan, a comprehensive land-use plan for the oil sands region that sets out strict triggers and limits through environmental frameworks, and sets aside a significant amount of protected land.

"The Keystone XL pipeline is a critically important project for our economies and to North American energy security.

"As I have said many times before, we respect the U.S. decision-making process and fully expect the president's final decision will be extremely well thought out and based on science and fact.

"I believe [this] report is another step in that direction."

## CARBON CAPTURE FUNDING AGREEMENT CANCELLED

On February 25, the Alberta government and Swan Hills Synfuels announced they have agreed to discontinue their $285-million carbon capture and storage (CCS) funding agreement.

Deferred project timelines move the carbon capture components beyond the scope of the government's funding requirements. To date, no money has been advanced by the province for the project.

In 2011, the province committed $285 million over 15 years for Swan Hills Synfuels to capture the $CO_2$ from the gasification of underground coal and sell it for use in enhanced oil recovery.

"Persistent low prices for Alberta's natural gas have driven this business decision," says Energy Minister Ken Hughes. "CCS remains a key part of Alberta's commitment to reducing greenhouse gas emissions and the responsible development of our energy resources."

The government is moving forward with two oil sands–related CCS projects, the Alberta Carbon Trunk Line and Royal Dutch Shell plc's Quest Carbon Capture and Storage Project. Combined, they are expected to reduce greenhouse gas emissions by 2.76 million tonnes annually by 2016, the equivalent of taking 550,000 cars off the road. "Alberta's unprecedented commitment of $1.3 billion for these projects speaks to how serious we are about climate change and reducing our impact," adds Hughes. No decisions have been made with respect to re-allocating the funding.

## PROVINCE SEEKS INPUT ON NEW ENERGY REGULATOR

Albertans will have a hand in building the regulations that will guide the work of the new Alberta Energy Regulator.

The regulator, which begins operations in June, marks a new phase of energy regulation for the province. Through the Responsible Energy Development Act, the province is protecting and improving participation rights for landowners, while ensuring industry has an effective and efficient regulatory process.

Public consultation sessions took place in 18 communities across the province (from February 20 to March 13).

Albertans who were unable to take part in the three-hour facilitated sessions can provide their ideas online until May 1. The survey and other information can be found at http://www.energy.alberta.ca/Initiatives/RegulatoryEnhancement.asp.

## ALBERTA PUSHES FORWARD WITH ASIA MARKET ACCESS STRATEGY

The 12-member Asia Advisory Council met with industry representatives from sectors including energy, forestry, agriculture and education in Calgary from January 29 to February 1 to discuss Alberta's Asia-specific initiatives.

The council also met with the managing directors of Alberta's international offices in Asia to discuss the offices' current activities as part of its information-gathering process. The Asia Advisory Council wrapped up three days of meetings with a discussion with Alberta Premier Alison Redford.

The council's efforts complement work led by Premier Redford to bolster new market access, trade and investment with key markets around the world. Accessing new markets remains Alberta's most critical economic priority.

Based on the feedback received, the council identified three priority outcomes:

- Enhance public awareness of the importance of expanding market access to Asia;
- Work with government and industry to set hard targets for trade and investment, work on strategies to create more opportunities for Alberta's small- and medium-sized enterprises doing business in Asia and for Alberta students to study abroad; and
- Help complement the Government of Alberta's advocacy efforts to create new access to Asian markets.

More findings from the council meetings are available on their website at http://www.international.alberta.ca/aac.cfm.

## NEW ONLINE SUPPORT FOR ALBERTA BUSINESSES

The Alberta government is making it easier for businesses to find information about services and regulations that affect them.

"We heard quite clearly from the Red Tape [Reduction] Task Force that more needs to be done to support small-business growth in Alberta," says Thomas Lukaszuk, Deputy Premier and Minister of Enterprise and Advanced Education. "Business owners have said that easy access to

timely, relevant information is important for their success. Consolidating all of this information online will help support new and existing businesses to prosper and grow."

A new landing page accessible with one click from the main Government of Alberta web page consolidates information on business services, such as:

- **The Business Link**—offering free to low-cost business seminars for business start-ups, helping entrepreneurs grow their business;
- **Productivity Alberta**—offering tools and services to help companies become stronger by showing them how they can increase their productivity and profitability;
- **Rural Alberta Business Centres**—where advisors provide one-stop access to information services that support the development, growth and success of small businesses in rural communities;
- **BizPal**—an online permit and licence service providing a complete list of permits and licences from all levels of government; and,
- **Alberta Innovates Connector**—offering free, personalized services connecting innovators and entrepreneurs to resources, people and organizations.

The landing page also provides a link to a new web page listing all 1,100 government regulations. It also includes a new feedback function so that Albertans can comment on proposed regulations.

The improved access to business services and regulations reflects input that the Alberta government heard from business organizations and the recommendations of the Red Tape Reduction Task Force.

## NEB ISSUES HEARING ORDER FOR ENBRIDGE LINE 9B REVERSAL

The National Energy Board (NEB) issued its Hearing Order for the Line 9B Reversal and Line 9 Capacity Expansion application submitted by Enbridge Pipelines Inc. As previously announced, the board will hold a public hearing for this project, consisting of written evidence and oral final argument.

On November 29, 2012, Enbridge filed its application under section 58 and under Part IV of the National Energy Board Act. Enbridge is seeking approval for the reversal a 639-kilometre segment of Line 9 between North Westover, Ont., and Montreal, Que. In addition, Enbridge requested to increase the capacity of the entire Line 9 from approximately 240,000 to approximately 300,000 barrels per day. Also included in the application is a request for the revision to the Line 9 rules and regulations tariff to allow transportation of heavy crude oil.

The majority of proposed work would take place on existing Enbridge facilities and surface leases, with no planned ground disturbance along the pipeline right-of-way.

The shift in flow direction from west to east would see the pipeline revert back to the direction that was originally approved in 1975. The current westward flow has been in place since 1999.

The NEB has identified a number of issues for discussion during the hearing. The complete List of Issues that the board will consider is listed in Appendix I of the Hearing Order [Filing A50521], available on the board's website at www.neb-one.gc.ca. Any person who wishes to suggest an amendment to the List of Issues must file their suggestion with the board and serve a copy on Enbridge by noon, Calgary time, on March 21.

You must apply for and be granted participation rights by the board in order for your views to be considered in this hearing. When completing your Application to Participate, you must demonstrate that your interest in this proceeding, or the information or expertise you wish to contribute, is relevant to the List of Issues.

The Application to Participate will be available on the NEB website after the List of Issues is finalized. A Procedural Update will be issued and will include the Application to Participate form and instructions on how to complete the application. The deadline to apply to participate is April 11, 2013.

The oral portion of the hearing will take place in late summer of 2013 at a location to be determined. ■

## What's new in the oil sands

# BUSINESS


PHOTO: SUNCOR ENERGY INC.

WorleyParsons Ltd. has signed a $140-million contract to handle detailed engineering on Suncor Energy Inc.'s proposed Fort Hills mine. The company will provide its services for the project's ore preparation plant, as well as the extraction and tailings areas. Work is expected to begin immediately out of WorleyParsons' Edmonton offices, with support from the company's eastern Canadian and Chinese operations.

Husky Energy Inc. says it has not experienced cost inflation while building the first phase of Sunrise, a $2.7-billion steam assisted gravity drainage project scheduled for completion next year.

Aware of the oil sands area's heated environment early on, Husky fixed as much of the costs as it could and made sure the company and contractors were aligned, says Alister Cowan, Husky's chief financial officer.

The project, shared with BP p.l.c., is now more than halfway through construction.

"Today we're at 85 per cent cost certainty because we have fixed the costs on those contracts. That has been very beneficial to us," says Cowan, adding, "We have a small increase in scope to assist operational efficiency [and] reliability going forward."

A date has not been determined for start-up of Imperial Oil Limited's Kearl oil sands mine. Operations were supposed to have begun in the fourth quarter of 2012, but were delayed due to cold weather, according to the company.

Spokeswoman Belinda de Wolde says the company was busy in December "mitigating the impacts of abnormally cold weather in that area, and the weather and other factors have pushed the outlook for first oil into 2013." Temperatures that month dropped below -30 degrees Celsius.

"Our intent was always to start up by the end of 2012, and we are indeed in the process of starting up," says spokesman Pius Rolheiser. "The timing of first oil, which we still anticipate in early 2013, will be dependent on our progress in completing that start-up process in the coming weeks."

The first shipment of diluted bitumen from Southern Pacific Resource Corp.'s increasingly productive thermal project in Alberta has arrived in Mississippi.

The first shipment of Southern Pacific's diluted bitumen (dilbit) from its STP-McKay project left the Lynton rail terminal, just south of Fort McMurray on December 22, and arrived at the Genesis Natchez terminal in Natchez, Miss., on January 6.

Steady rail shipments of dilbit are now being shipped to the terminal, where Southern Pacific has exclusive terminal capacity.

The company has several markets prepared for purchasing its product and expects to receive pricing competitive with other U.S. Gulf Coast heavy oil imports. As a result, Southern Pacific expects to receive a significantly improved netback for its bitumen sales as compared to a sale into local markets based on Western Canadian Select pricing.

Japan Petroleum Exploration Co., Ltd. (JAPEX) will begin development work immediately on its $1.4-billion Hangingstone thermal in situ project following a final investment decision made in December 2012 by the board of directors. Japan Canada Oil Sands Limited (JACOS), a consolidated subsidiary of JAPEX, currently produces 6,000–7,000 barrels of bitumen per day at its existing Hangingstone SAGD project, which has been operating since 1999. It is one of the earliest SAGD projects in the oilsands.

With the front-end engineering design already completed and with regulatory approval for the scheme in November 2012, JACOS and partner Nexen Inc. will plan to undertake full-scale development work, aiming at production start-up in the first half of 2016.

Suncor Energy Inc. has reached first production from the 62,500-barrel-per-day Firebag Stage 4 steam assisted gravity drainage project, approximately three months ahead of the original schedule. The expansion comes hot on the heels of Firebag Stage 3, another 62,500-barrel-per-day expansion at the facility that achieved first oil in August 2011. The Firebag complex, which started operations in 2004, exited November 2012 producing approximately 130,000 barrels per day. That compares to production of about 70,000 barrels per day in November 2011. Suncor says the pace of production ramp-up at Firebag Stage 3 has exceeded previous expectations. ■

## What's new in the oil sands

# TECHNOLOGY

MEG Energy Corp. is preparing to dramatically increase the scale of its testing of a partial-upgrading process the company believes will enable bitumen to be pipelined without diluent.

MEG also believes the process—called HI-Q—can convert bitumen into a crude oil that will have broader market reach than either diluted bitumen (dilbit) or synthetic crude oil.

"The HI-Q process seeks to improve the economics and lower the barriers to entry for converting bitumen into product oil with broader market reach than dilbit or synthetic crude oil, requiring no transport diluent and with higher market value than dilbit," the company says in a regulatory application filed with the Alberta Energy Resources Conservation Board. MEG has applied for regulatory approval to build a 3,000-barrel-per-day demonstration project in the Industrial Heartland area northeast of Edmonton.

Sunshine Oilsands Ltd. has signed a memorandum of understanding with China Oilfield Services Limited (COSL) to cooperate in developing multiple thermal fluid oilsands exploration technology in Canada. Developed and patented by COSL, the technology could potentially be used to reduce the facility footprint and operation cost for generating steam and other thermal injection fluids.

ATCO Emissions Management is adding heat-recovery steam generators to its equipment lineup. In addition to power and cogeneration applications, the generators are intended for use at steam assisted gravity drainage production facilities, where they can be used to recover heat from a hot gas stream. Initially, the generators will be used with gas turbines up to 100 megawatts.

"The adoption of the generators will allow these institutions to be greener and energy self-reliant," says Harry Wong, senior vice-president and general manager, ATCO Emissions Management.

Syncrude Canada Ltd. has signed up the modular fabricator that will be working on its new tailings management project: KBR Industrial Canada.

KBR will handle both module fabrication and field construction on Syncrude's Fluid Fine Tailings – Centrifuging Full Scale Plant. Work on the modules began late in 2012 and will continue until the end of 2013. Plant start-up is expected in 2015.

The plant will allow Syncrude to focus on reclaiming tailings from its surface mining project near Fort McMurray. A series of centrifuges will be used to separate water from solids in fluid fine tailings. The water will be recycled for use in plant operations, while the solids will be dense enough to be deposited, capped and reclaimed.

Cenovus Energy Inc. says it has developed a drilling rig that can be flown by helicopter to remote areas, cutting out the need to build access roads and generating cost savings of about 25 per cent, or around $100 million per year.

The company has been working on the technology for two years and plans to submit its research to Canada's Oil Sands Innovation Alliance as its contribution to furthering the reduction of the oil sands industry's environmental footprint, says Harbir Chhina, Suncor's executive vice-president of oil sands.

"We don't need to have ice bridges, things like that," Chhina says. "At Borealis, we really couldn't do a [stratigraphic] well drilling program unless we had 40–50 wells because you have to trigger camps and road access. With this rig, we can drill one, two, three, 50 wells—whatever we want."

Husky Energy Inc. plans to file a regulatory application later in 2013 for a pilot test in Alberta's bitumen-rich carbonates.

The company estimates it has a contingent resource of 9.96 billion barrels of bitumen in carbonate rock at Saleski, where it plans to begin production by 2016. In total, Husky holds 975 square kilometres of land in Alberta's bitumen carbonates.

Estimates place the amount of bitumen locked in carbonate rock in the province to be in the range of hundreds of billions of barrels. Because of challenging geology, there has never been commercial production. ■

# OIL SANDS PROJECT TECHNOLOGY GUIDE

### CSS—CYCLIC STEAM STIMULATION

CSS involves injecting high-pressure steam into the reservoir for several weeks, followed by several weeks where the reservoir is left to "soak." The heat softens the bitumen and the water dilutes and separates the bitumen from the sand. The pressure creates cracks and openings through which the bitumen can flow back into the steam injector wells, which are converted to production mode.

### ET-DSP—ELECTRO-THERMAL DYNAMIC STRIPPING

ET-DSP combines the majority of the dominant heat transfer mechanisms to heat and mobilize bitumen in situ. Electrodes are placed in a grid configuration and a production well is located within the centre of each series of electrode wells. The technology has been commercially applied for soil remediation and is expected to reduce greenhouse gas emissions and water use.

### N-SOLV

N-Solv involves the injection of pure, heated solvent vapour into an oil sands reservoir where it condenses, delivering heat to the reservoir and subsequently dissolving the bitumen, with the resulting miscible liquids flowing by gravity to a production well. It is designed to accelerate extraction rates and reduce greenhouse gas emissions.

### PRIMARY PRODUCTION—COLD HEAVY OIL PRODUCTION WITH SAND

Cold heavy oil production with sand (CHOPS) is a non-thermal in situ primary production technology that involves the continuous production of sand using progressing cavity pumps to enhance recovery.

### SAGD—STEAM ASSISTED GRAVITY DRAINAGE

SAGD employs two parallel horizontal wells: one injection well near the top of the reservoir, through which high-pressure steam is continuously injected, and one production well near the bottom of the reservoir into which the softened bitumen continuously flows and can be pumped to the surface. SAGD surface facilities include steam generation, water processing and bitumen treatment. Multiple operators are also now working with solvent co-injection in SAGD to increase recovery and reduce natural gas and water requirements.

### SURFACE MINING

Integrated oil sands mining operations accomplish three main functions: mining the oil sands, separating the bitumen from the sand and upgrading the bitumen so refiners can work with it.

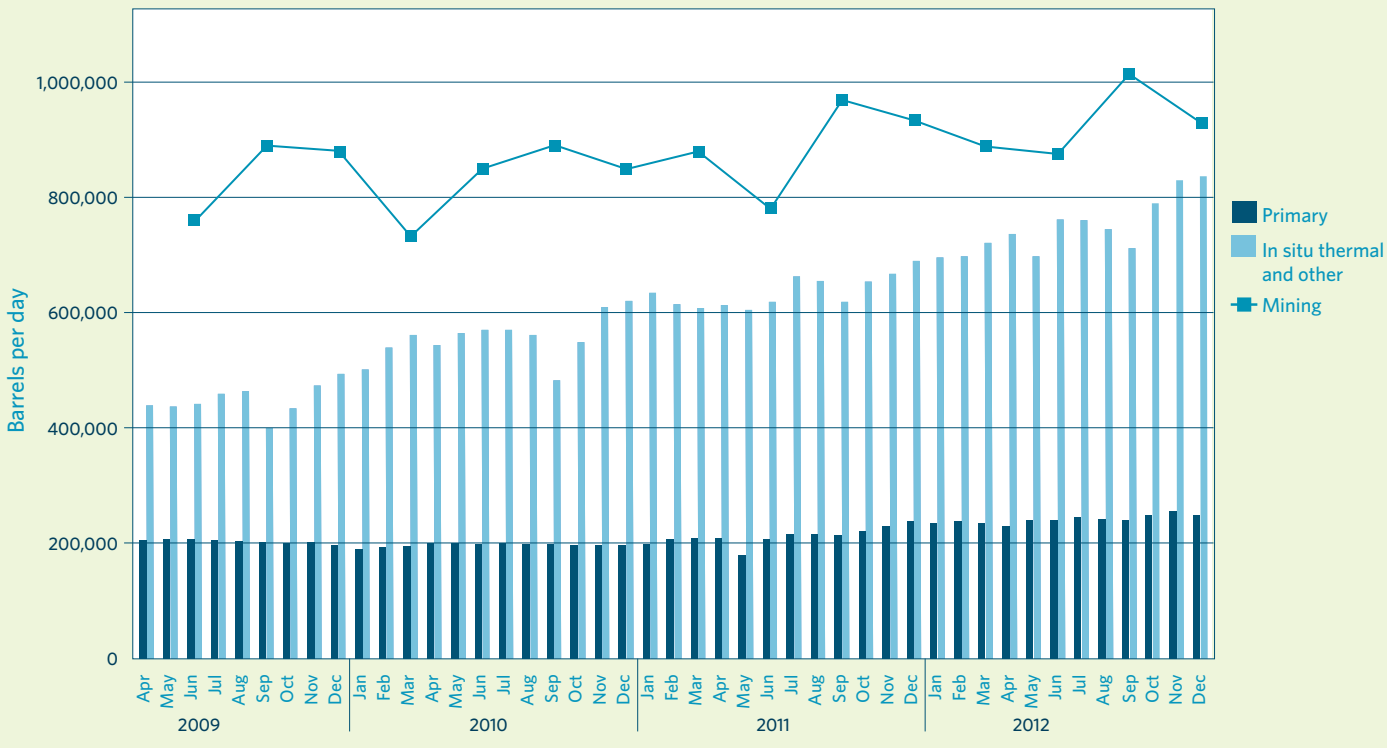
### TAGD—THERMAL ASSISTED GRAVITY DRAINAGE

TAGD is a process being developed for the in situ recovery of bitumen from carbonate formations. TAGD uses an array of downhole heaters installed in horizontal wells to heat the reservoir via thermal conduction.

### THAI—TOE TO HEEL AIR INJECTION

THAI uses a vertical air injection well with a horizontal production well. Rather than steam, THAI technology injects air and then relies on underground combustion of a portion of the oil in the ground to generate the heat required to melt the remainder of the bitumen and allow it to flow into the production well. The process is intended to reduce greenhouse gas emissions and water use.

## Alberta Oil Sands Production by Extraction Method




SOURCE: Energy Resources Conservation Board

# Project listings

## Updated status of oil sands projects in Alberta

As of March 2013

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **NORTH ATHABASCA REGION — MINING** | | | | |
| **CANADIAN NATURAL RESOURCES LIMITED** | | | | |
| **Horizon** | | | | |
| Canadian Natural says it continues its strategy of staged expansion to 250,000 barrels per day and work remains on track. Projects currently under construction are trending at or below estimates. | | | | |
| Phase 1 | 135,000 | 2008 | Operating | Mining |
| Phase 2A | 10,000 | 2014 | Construction | Mining |
| Phase 2B | 45,000 | TBD | Approved | Mining |
| Phase 3 | 80,000 | TBD | Approved | Mining |
| Tranche 2 | 5,000 | 2012 | Operating | Mining |
| **IMPERIAL OIL LIMITED** | | | | |
| **Kearl** | | | | |
| Imperial Oil says construction on Phase 1 is complete and start-up activities are underway. The project is now expected to cost $12.9 billion, a $2-billion increase from previous estimates. At the end of Q4/2012, the company says Kearl Phase 2 was 27 per cent complete. | | | | |
| Phase 1 | 110,000 | 2013 | Construction | Mining |
| Phase 2 | 110,000 | 2015 | Construction | Mining |
| Phase 3 Debottleneck | 70,000 | 2020 | Approved | Mining |
| **SHELL ALBIAN SANDS** | | | | |
| **Jackpine** | | | | |
| A decision from the federal joint review panel on the Jackpine project is expected in May 2013. | | | | |
| Expansion | 100,000 | 2017 | Application | Mining |
| Phase 1A | 100,000 | 2010 | Operating | Mining |
| Phase 1B | 100,000 | TBD | Approved | Mining |
| **Muskeg River** | | | | |
| Commercial | 155,000 | 2002 | Operating | Mining |
| Expansion & Debottlenecking | 115,000 | TBD | Approved | Mining |
| **Pierre River** | | | | |
| A joint review panel of the Canadian Environmental Assessment Agency and the ERCB has been established to review the proposed Pierre River mine project. The timeline for the joint review panel to submit its report is 550 days (18 months) from coming into force in July 2012. | | | | |
| Phase 1 | 100,000 | 2018 | Application | Mining |
| Phase 2 | 100,000 | TBD | Application | Mining |
| **SUNCOR ENERGY INC.** | | | | |
| **Base Operations** | | | | |
| Suncor says that, during Q4/2012, a number of new assets were brought into service to support oil sands operations: the Wood Buffalo pipeline, which connects the company's Athabasca terminal at the base plant in Fort McMurray to other third-party pipeline infrastructure in Cheecham, Alta., and the first two of four new storage tanks in Hardisty, Alta., which will connect to the Enbridge mainline pipeline in 2013. | | | | |
| Millennium Debottlenecking | 23,000 | 2008 | Operating | Mining |
| Millennium Mine | 294,000 | 1967 | Operating | Mining |
| North Steepbank Extension | 180,000 | 2012 | Operating | Mining |
| Steepbank Debottleneck Phase 3 | 4,000 | 2007 | Operating | Mining |
| **Fort Hills** | | | | |
| A sanction decision on Fort Hills is expected in the second half of 2013. | | | | |
| Debottleneck | 25,000 | TBD | Approved | Mining |
| Phase 1 | 165,000 | 2016 | Approved | Mining |
| **Voyageur South** | | | | |
| Suncor considers Voyageur South to be a "longer-term" project and has not confirmed a start-up date. | | | | |
| Phase 1 | 120,000 | TBD | Application | Mining |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **SYNCRUDE CANADA LTD.** | | | | |
| **Mildred Lake/Aurora** | | | | |
| Canadian Oil Sands Limited says Syncrude is expected to produce between 105 million and 115 million barrels in 2013, incoporating a planned turnaourd of Coker 8-1 in the second half of the year. | | | | |
| Aurora South Train 1 | 100,000 | 2016 | Approved | Mining |
| Aurora South Train 2 | 100,000 | 2018 | Approved | Mining |
| Base Mine Stage 1 & 2 Expansion | 290,700 | 1978 | Operating | Mining |
| Stage 3 Expansion | 116,300 | 2006 | Operating | Mining |
| **TECK RESOURCES LIMITED** | | | | |
| **Frontier** | | | | |
| Teck says it received the final supplemental information requests relating to the Frontier regulatory application in Q3/2012 and filed its responses in January 2013. The Canadian Environmental Assessment Agency estimates the federal review schedule for the project application to be approximately two years, so 2015 would be the earliest approval would be granted. A field exploration program is being developed for 2013 to acquire additional resource delineation and geotechnical information to support future engineering studies. | | | | |
| Phase 1 | 75,000 | 2021 | Application | Mining |
| Phase 2 | 80,000 | 2024 | Application | Mining |
| Phase 3 | 80,000 | 2027 | Application | Mining |
| Phase 4 Equinox | 40,000 | 2030 | Application | Mining |
| **TOTAL E&P CANADA LTD.** | | | | |
| **Joslyn North Mine** | | | | |
| Project partner Suncor Energy says an updated timing for the Joslyn sanction decision will be made available when it is ready. | | | | |
| Phase 1 | 100,000 | 2018 | Approved | Mining |
| **NORTH ATHABASCA REGION — IN SITU** | | | | |
| **ATHABASCA OIL CORPORATION** | | | | |
| **Birch** | | | | |
| AOS says $28.9 million was spent at Birch in the first nine months of 2012, mainly on drilling of one water and 22 delineation wells. In addition, the company shot 54 square kilometres of 3-D seismic. Winter delineation drilling and seismic programs are being evaluated for 2013. | | | | |
| Phase 1 | 12,000 | TBD | Announced | SAGD |
| **Dover West Carbonates (Leduc)** | | | | |
| AOS says regulatory approval for the demonstration project is anticipated imminently. The design basis memorandum is complete and the engineering design specification work is well underway. Construction is also ongoing on a TAGD-related heater assembly facility near Strathmore, Alta. | | | | |
| Phase 1 Demonstration | 6,000 | 2015 | Application | TAGD |
| Phase 2 Demonstration | 6,000 | TBD | Application | TAGD |
| **Dover West Sands & Clastics** | | | | |
| In the first nine months of 2012, AOS acquired approximately 30,000 acres of oilsands leases contiguous to its existing Dover West assets. The company says its Dover West Sands project could now eventually support development up to 270,000 barrels per day. Regulatory approval and internal sanction for the first 12,000-barrel-per-day phase are expected in 2013. AOS says it is leveraging work done on FEED for its Hangingstone project for Dover West. | | | | |
| Phase 1 | 12,000 | 2015 | Application | SAGD |
| Phase 2 | 35,000 | 2018 | Announced | SAGD |
| Phase 3 | 35,000 | 2020 | Announced | SAGD |
| Phase 4 | 35,000 | 2022 | Announced | SAGD |
| Phase 5 | 35,000 | 2024 | Announced | SAGD |
| **BP P.L.C.** | | | | |
| **Terre de Grace** | | | | |
| BP says that ongoing appraisal activities include delineation drilling, seismic acquisition and appraisal of water sources. | | | | |
| Pilot | 10,000 | TBD | Approved | SAGD |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **CANADIAN NATURAL RESOURCES LIMITED** | | | | |
| **Birch Mountain** | | | | |
| Canadian Natural says geological scoping is underway. | | | | |
| Phase 1 | 60,000 | 2019 | Announced | SAGD |
| Phase 2 | 60,000 | 2023 | Announced | SAGD |
| **CENOVUS ENERGY INC.** | | | | |
| **East McMurray** | | | | |
| Phase 1 | 30,000 | TBD | Announced | SAGD |
| **Steepbank** | | | | |
| Phase 1 | 30,000 | TBD | Announced | SAGD |
| **Telephone Lake Borealis** | | | | |
| Cenovus says it continues to progress the Telephone Lake regulatory application while it operates its dewatering pilot, with water production and air injection proceeding as planned. Regulatory approval is expected in early 2014. | | | | |
| Phase A | 45,000 | TBD | Application | SAGD |
| Phase B | 45,000 | TBD | Application | SAGD |
| **DOVER OPERATING CORP.** | | | | |
| **Dover** | | | | |
| The ERCB has scheduled a public hearing for the Dover project to be held in Fort McMurray in April. Reportedly, the reason for the hearing is that the Fort McKay First Nation says that without a buffer zone, the project will impact the last remaining traditional land on the west side of the Athabasca River. | | | | |
| Dover North Phase 1 | 50,000 | 2016 | Application | SAGD |
| Dover North Phase 2 | 50,000 | 2018 | Application | SAGD |
| Dover South Phase 3 | 50,000 | 2020 | Application | SAGD |
| Dover South Phase 4 | 50,000 | 2022 | Application | SAGD |
| Dover South Phase 5 | 50,000 | 2024 | Application | SAGD |
| **MacKay River** | | | | |
| The ERCB granted project approval in January 2012. Dover OpCo says construction is underway. | | | | |
| Phase 1 | 35,000 | 2014 | Construction | SAGD |
| Phase 2 | 40,000 | 2017 | Approved | SAGD |
| Phase 3 | 40,000 | 2019 | Approved | SAGD |
| Phase 4 | 35,000 | TBD | Approved | SAGD |
| **E-T ENERGY LTD.** | | | | |
| **Poplar Creek** | | | | |
| E-T Energy has reinstated Bruce McGee as CEO based on his technological expertise as it works on pilot operations to support a new commercial project application. Its previous application was denied by the ERCB in 2012. | | | | |
| Experimental Pilot | 1,000 | 2007 | Operating | ET-DSP |
| Phase 1 | 10,000 | TBD | Announced | ET-DSP |
| Phase 2 | 40,000 | TBD | Announced | ET-DSP |
| **GRIZZLY OIL SANDS ULC** | | | | |
| **Thickwood** | | | | |
| Grizzly filed the regulatory application for the Thickwood project in December 2012. | | | | |
| Phase 1 | 6,000 | 2017 | Application | SAGD |
| Phase 2 | 6,000 | TBD | Application | SAGD |
| **HUSKY ENERGY INC.** | | | | |
| **Saleski** | | | | |
| Husky plans to submit a regulatory application for the Saleski project in 2013. | | | | |
| Carbonate Pilot | TBD | 2016 | Announced | TBD |
| **Sunrise** | | | | |
| Husky says the central processing facility is approaching 50 per cent completion with piling work substantially completed and foundation work proceeding at the site. Major equipment continues to be delivered and placed into position, with approximately half of the modules fabricated and moved to site. Construction of the field facilities is more than 75 per cent complete. The design basis memorandum for the next phase of expansion is expected to be completed in 2013. | | | | |
| Phase 1 | 60,000 | 2014 | Construction | SAGD |
| Phase 2 | 50,000 | 2016 | Approved | SAGD |
| Phase 3 | 50,000 | 2019 | Approved | SAGD |
| Phase 4 | 50,000 | TBD | Approved | SAGD |
| **IMPERIAL OIL LIMITED** | | | | |
| **Aspen** | | | | |
| Phase 1 | 40,000 | TBD | Announced | SAGD |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **IVANHOE ENERGY INC.** | | | | |
| **Tamarack** | | | | |
| Alberta Environment has deemed the environmental impact assessment for the Tamarack project complete. | | | | |
| Phase 1 | 20,000 | 2016 | Application | SAGD |
| Phase 2 | 20,000 | TBD | Application | SAGD |
| **MARATHON OIL CORPORATION** | | | | |
| **Birchwood** | | | | |
| Marathon said that based on results of completed appraisal drilling, a regulatory application would be filed in 2012. | | | | |
| Demonstration | 12,000 | 2016 | Application | SAGD |
| **OAK POINT ENERGY LTD.** | | | | |
| **Lewis** | | | | |
| The ERCB and Alberta Environment have approved Oak Point's Lewis project, which is estimated to cost $65 million. The company expects to begin construction in a couple of months and anticipates first steam in approximately one year. | | | | |
| Pilot | 1,720 | 2014 | Application | SAGD |
| **SILVERWILLOW ENERGY CORPORATION** | | | | |
| **Audet** | | | | |
| SilverWillow is proceeding with design of a 12,000-barrel-per-day project, which analysts at Peters & Co. Limited say implies the company expects at least 120 million barrels are recoverable at the site. The application is expected to be filed this year, and caprock work will be completed. | | | | |
| Pilot | 12,000 | 2016 | Announced | SAGD |
| **SOUTHERN PACIFIC RESOURCE CORP.** | | | | |
| **STP-McKay** | | | | |
| Southern Pacific says it continues to be conservative in the initial stages of converting wells to SAGD, utilizing installed downhole technology to ensure even termperature conformance and chamber development has occurred along the horizontal length of the wells before they are converted. The strategy is designed to ensure long-term integrity of the wellbores. | | | | |
| Phase 1 | 12,000 | 2012 | Operating | SAGD |
| Phase 1 Expansion | 6,000 | 2014 | Application | SAGD |
| Phase 2A | 12,000 | 2017 | Application | SAGD |
| Phase 2B | 6,000 | 2017 | Application | SAGD |
| **SUNCOR ENERGY INC.** | | | | |
| **Dover** | | | | |
| Reports are that first results from a $60-million N-Solv field test are expected in spring 2013. | | | | |
| Demonstration Plant | 500 | 2013 | Construction | SAGD |
| **Firebag** | | | | |
| Suncor reports that Firebag Stage 4 was commissioned ahead of schedule in Q4/2012, and is expected to come in 15 per cent under the estimated budget of $2 billion. Production is expected to reach capacity of 180,000 barrels per day over the next year. | | | | |
| Cogeneration and Expansion | 25,000 | 2007 | Operating | SAGD |
| Stage 1 | 35,000 | 2004 | Operating | SAGD |
| Stage 2 | 35,000 | 2006 | Operating | SAGD |
| Stage 3 | 42,500 | 2011 | Operating | SAGD |
| Stage 3-6 Debottleneck | 23,000 | TBD | Application | SAGD |
| Stage 4 | 42,500 | 2012 | Operating | SAGD |
| Stage 5 | 62,500 | 2018 | Approved | SAGD |
| Stage 6 | 62,500 | 2019 | Approved | SAGD |
| **Lewis** | | | | |
| Phase 1 | 40,000 | TBD | Application | SAGD |
| Phase 2 | 40,000 | TBD | Application | SAGD |
| **MacKay River** | | | | |
| MR2 | 40,000 | 2016 | Application | SAGD |
| Phase 1 | 33,000 | 2002 | Operating | SAGD |
| **SUNSHINE OILSANDS LTD.** | | | | |
| **Harper** | | | | |
| Sunshine says that steam cycle injection operations at Harper have proved thermally induced oil mobility. | | | | |
| Carbonate Pilot | 1,000 | TBD | Operating | SAGD |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **Legend Lake** | | | | |
| Sunshine says regulatory approval for Legend Lake is anticipated in the first half of 2013. | | | | |
| Phase A1 | 20,000 | 2016 | Application | SAGD |
| Phase A2 | 30,000 | TBD | Announced | SAGD |
| Phase B1 | 30,000 | TBD | Announced | SAGD |
| Phase B2 | 30,000 | TBD | Announced | SAGD |
| **Thickwood** | | | | |
| Sunshine says FEED for Thickwood is approximately 10 per cent complete. Approval is anticipated in the first half of 2013. | | | | |
| Phase A1 | 10,000 | 2015 | Application | SAGD |
| Phase A2 | 20,000 | 2018 | Announced | SAGD |
| Phase B | 20,000 | 2021 | Announced | SAGD |
| **West Ells** | | | | |
| Sunshine says construction on West Ells remains on schedule and on budget. The access road is now complete and ready for heavy hauls, and pilings for the central processing facility have commenced. Some of the major equipment is in transit. Civil construction of the central processing facility is 40 per cent complete, with facilities engineering 75 per cent complete. The first SAGD well pair has been spudded. | | | | |
| Phase A1 | 5,000 | 2013 | Construction | SAGD |
| Phase A2 | 5,000 | 2014 | Approved | SAGD |
| Phase A3 | 30,000 | 2018 | Announced | SAGD |
| Phase B | 20,000 | 2025 | Announced | SAGD |
| Phase C1 | 30,000 | TBD | Announced | SAGD |
| Phase C2 | 30,000 | TBD | Announced | SAGD |
| **SOUTH ATHABASCA REGION — IN SITU** | | | | |
| **ALBERTA OILSANDS INC.** | | | | |
| **Clearwater West** | | | | |
| Alberta Oilsands says it has now responded to all outstanding supplemental information requests relating to the Clearwater project application and will continue to work with the ERCB during the coming months to advance approval. | | | | |
| Phase 1 Pilot | 4,350 | TBD | Application | SAGD |
| Phase 2 | 25,000 | 2016 | Announced | SAGD |
| **ATHABASCA OIL CORPORATION** | | | | |
| **Hangingstone** | | | | |
| AOS has sanctioned the first phase of its $536-million Hangingstone SAGD project at a projected cost of $44,700 per flowing barrel. SAGD drilling is expected to commence mid-2013. Alberta Environment has issued the proposed terms of reference for the Hangingstone expansion project, with public comment available until April 4. | | | | |
| Phase 1 | 12,000 | 2014 | Construction | SAGD |
| Phase 2 | 35,000 | 2017 | Announced | SAGD |
| Phase 3 | 35,000 | 2019 | Announced | SAGD |
| **BLACKPEARL RESOURCES INC.** | | | | |
| **Blackrod** | | | | |
| BlackPearl says that detailed engineering design work for the first phase of the commercial Blackrod project began in Q4/2012. The company plans to expand the pilot in 2013, drilling an additional well pair early in the year. | | | | |
| Phase 1 | 20,000 | 2015 | Application | SAGD |
| Phase 2 | 30,000 | 2018 | Application | SAGD |
| Phase 3 | 30,000 | 2021 | Application | SAGD |
| Pilot | 800 | 2011 | Operating | SAGD |
| **CANADIAN NATURAL RESOURCES LIMITED** | | | | |
| **Gregoire Lake** | | | | |
| Canadian Natural says geological scoping is underway. | | | | |
| Phase 1 | 60,000 | TBD | Announced | TBA |
| Phase 2 | 60,000 | TBD | Announced | TBA |
| **Grouse** | | | | |
| Canadian Natural says timing of Grouse has been adjusted to accommodate the potential inclusion of recently acquired lands adjacent to the company's Kirby area and provide a more balanced capital expenditures profile going forward. First steam at Grouse is now expected between 2017 and 2019. | | | | |
| Commercial | 50,000 | TBD | Application | SAGD |
| **Kirby North** | | | | |
| Canadian Natural has budgeted approximately $205 million for Kirby North in 2013 to progress detailed engineering, order modules and construct camp facilities. Project sanction is targeted for the first half of 2013. To accommodate the acquisition of lands adjacent to the Kirby area that Canadian Natural may include in the project, first steam at Phase 1 is now anticipated in 2016. | | | | |
| Phase 1 | 40,000 | 2016 | Application | SAGD |
| Phase 2 | 60,000 | 2019 | Application | SAGD |
| **Kirby South** | | | | |
| Canadian Natural says construction of Phase 1 continues to progress ahead of plan and is now 74 per cent complete, with 89 per cent of capital expenditures committed. | | | | |
| Phase 1 | 40,000 | 2013 | Construction | SAGD |
| Phase 2 | 20,000 | 2020 | Application | SAGD |
| **CAVALIER ENERGY INC.** | | | | |
| **Hoole** | | | | |
| Cavalier submitted the regulatory application for the first phase at Hoole in November 2012. Assuming regulatory approval and favourable market conditions, construction is expected to begin in 2014, with first production in 2015. | | | | |
| Phase 1 | 10,000 | 2016 | Application | SAGD |
| Phase 2 | 35,000 | TBD | Announced | SAGD |
| Phase 3 | 35,000 | TBD | Announced | SAGD |
| **CENOVUS ENERGY INC.** | | | | |
| **Christina Lake** | | | | |
| Cenovus says the overall Phase E expansion is about 65 per cent complete, while the central plant is nearly 87 per cent complete. First production is anticipated in Q3. Piling and foundation work, engineering and major equipment fabrication continue for Phase F and design engineering work is underway for Phase G. | | | | |
| Future Optimization | 12,000 | TBD | Announced | SAGD |
| Phase 1A | 10,000 | 2002 | Operating | SAGD |
| Phase 1B | 8,800 | 2008 | Operating | SAGD |
| Phase C | 40,000 | 2011 | Operating | SAGD |
| Phase D | 40,000 | 2012 | Operating | SAGD |
| Phase E | 40,000 | 2013 | Construction | SAGD |
| Phase F | 50,000 | 2016 | Approved | SAGD |
| Phase G | 50,000 | 2017 | Approved | SAGD |
| Phase H | 50,000 | 2019 | Announced | SAGD |
| **Foster Creek** | | | | |
| Cenovus says that overall progress on the combined Phase F, G and H expansion is about 40 per cent complete, while the Phase F central plant is 67 per cent complete. First production at Phase F is expected in Q3/2014. Spending on piling work, steel fabrication, module assembly and major equipment procurement is underway at Phase G and design engineering continues on Phase H. | | | | |
| Future Optimization | 15,000 | TBD | Announced | SAGD |
| Phase A | 24,000 | 2001 | Operating | SAGD |
| Phase B Debottleneck | 6,000 | 2003 | Operating | SAGD |
| Phase C Stage 1 | 10,000 | 2005 | Operating | SAGD |
| Phase C Stage 2 | 20,000 | 2007 | Operating | SAGD |
| Phase D | 30,000 | 2009 | Operating | SAGD |
| Phase E | 30,000 | 2009 | Operating | SAGD |
| Phase F | 45,000 | 2014 | Construction | SAGD |
| Phase G | 40,000 | 2015 | Approved | SAGD |
| Phase H | 40,000 | 2016 | Approved | SAGD |
| Phase J | 50,000 | 2019 | Announced | SAGD |
| **Narrows Lake** | | | | |
| Site preparation is underway, with construction of the Phase 1 plant scheduled to begin in Q3/2013. | | | | |
| Phase 1 | 45,000 | 2017 | Construction | SAGD |
| Phase 2 | 45,000 | TBD | Approved | SAGD |
| Phase 3 | 40,000 | TBD | Approved | SAGD |
| **Pelican Lake Grand Rapids** | | | | |
| Cenovus says it anticipates regulatory approval for the commercial Grand Rapids pilot in 2013. | | | | |
| Phase A | 60,000 | 2017 | Application | SAGD |
| Phase B | 60,000 | TBD | Application | SAGD |
| Phase C | 60,000 | TBD | Application | SAGD |
| Pilot | 600 | 2011 | Operating | SAGD |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **West Kirby** | | | | |
| Phase 1 | 30,000 | TBD | Announced | SAGD |
| **Winefred Lake** | | | | |
| Phase 1 | 30,000 | TBD | Announced | SAGD |
| **CONNACHER OIL AND GAS LIMITED** | | | | |
| **Great Divide** | | | | |
| Connacher received regulatory approval for the two-phase, 24,000-barrel-per-day expansion at Great Divide in September 2012. The company says the approval allows it to advance its evaluation of project costs, timing and financing alternatives. | | | | |
| Algar Pod 2 | 10,000 | 2010 | Operating | SAGD |
| Expansion 1A | 12,000 | 2014 | Approved | SAGD |
| Expansion 1B | 12,000 | 2016 | Approved | SAGD |
| Pod 1 | 10,000 | 2007 | Operating | SAGD |
| **CONOCOPHILLIPS CANADA LIMITED** | | | | |
| **Surmont** | | | | |
| ConocoPhillips Canada says it plans to lighten its oilsands position, potentially selling off assets including its stake in the Surmont project. | | | | |
| Phase 1 | 27,000 | 2007 | Operating | SAGD |
| Phase 2 | 109,000 | 2015 | Construction | SAGD |
| Pilot | 1,200 | 1997 | Operating | SAGD |
| **DEVON CANADA CORPORATION** | | | | |
| **Jackfish** | | | | |
| Devon says ramp-up of Jackfish 2 is now approximately two-thirds complete, while construction of the Jackfish 3 project is now approximately 40 per cent complete. | | | | |
| Phase 1 | 35,000 | 2007 | Operating | SAGD |
| Phase 2 | 35,000 | 2011 | Operating | SAGD |
| Phase 3 | 35,000 | 2015 | Construction | SAGD |
| **Jackfish East** | | | | |
| Devon says combined production at Jackfish 1 and 2 averaged a record 49,000 barrels per day during Q4/2012. Construction on Jackfish 3 is now approximately 50 per cent complete. | | | | |
| Expansion | 20,000 | 2018 | Announced | SAGD |
| **Pike** | | | | |
| Devon filed the regulatory application for all three phases of the Pike project in June 2012. The company says facility construction and SAGD drilling for the first phase will begin in late 2013 or early 2014, pending corporate approvals. The company has also submitted its environmental impact assessment report for the project. | | | | |
| 1A | 35,000 | 2016 | Application | SAGD |
| 1B | 35,000 | 2017 | Application | SAGD |
| 1C | 35,000 | 2018 | Application | SAGD |
| **GRIZZLY OIL SANDS ULC** | | | | |
| **Algar Lake** | | | | |
| Grizzly has entered into a memorandum of understanding that outlines the rate structure for a 10-year agreement with Canadian National Railway to transport its bitumen to the U.S. Gulf Coast. The Algar Lake project is expected to start up in the first half of 2013. | | | | |
| Phase 1 | 5,500 | 2013 | Construction | SAGD |
| Phase 2 | 5,500 | 2014 | Approved | SAGD |
| **May River** | | | | |
| Grizzly is currently conducting a well delineation program at May River, recently expanding the program to 28 wells, with 25 wells completed. Following the 2012/13 winter drilling season, Grizzly part owner Gulfport Energy says the company will have explored the area sufficiently to support its SAGD project application. | | | | |
| Phase 1 | 6,800 | TBD | Announced | SAGD |
| Phase 2 | 6,800 | TBD | Announced | SAGD |
| **HARVEST OPERATIONS CORP.** | | | | |
| **BlackGold** | | | | |
| Harvest says the engineering, procurement and construction portion of the EPC contract relating to the central processing facility is approximately 83 per cent complete. The facility construction portion of the contract is approximately 43 per cent complete. Production is expected to begin in 2014. | | | | |
| Phase 1 | 10,000 | 2014 | Construction | SAGD |
| Phase 2 | 20,000 | TBD | Application | SAGD |
| **HUSKY ENERGY INC.** | | | | |
| **McMullen** | | | | |
| Husky says that 32 slant wells have been put on cold production at McMullen. Drilling operations for the 2013 program have commenced, with a total of 15 new slant development wells drilled before the end of 2012. At the air injection pilot, first production was achieved from the horizontal producer and ongoing testing continues. | | | | |
| Air Injection Pilot-Experimental | 755 | 2012 | Operating | SAGD |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **JAPAN CANADA OIL SANDS LIMITED** | | | | |
| **Hangingstone** | | | | |
| Japan Canada Oil Sands owner JAPEX has sanctioned the Hangingstone expansion project. Project partner Nexen is expected to sanction its share of the development early in 2013. | | | | |
| Expansion | 20,000 | 2016 | Approved | SAGD |
| **Hangingstone Pilot** | | | | |
| Pilot | 11,000 | 1999 | Operating | SAGD |
| **KOCH EXPLORATION CANADA CORPORATION** | | | | |
| **Muskwa** | | | | |
| Koch's Canadian subsidiaries are seeking a strategic investor to advance development and monetize certain oil sands interests including the Muskwa asset. | | | | |
| Pilot | 10,000 | 2015 | Application | SAGD |
| **LARICINA ENERGY LTD.** | | | | |
| **Germain** | | | | |
| Laricina says construction of Germain is 75–80 per cent complete, and the project will begin taking steam in June. | | | | |
| Phase 1 CDP | 5,000 | 2013 | Construction | SAGD |
| Phase 2 | 30,000 | 2015 | Application | SAGD |
| Phase 3 | 60,000 | TBD | Application | SAGD |
| Phase 4 | 60,000 | TBD | Application | SAGD |
| **Saleski** | | | | |
| Laricina has filed a project update to the Saleski Phase 1 regulatory application to reflect the change of well configuration to a single horizontal well cyclic SAGD from a dual-well SAGD process. | | | | |
| Experimental Pilot | 1,800 | 2011 | Operating | SAGD |
| Phase 1 | 10,700 | 2015 | Application | SAGD |
| **MEG ENERGY CORP.** | | | | |
| **Christina Lake** | | | | |
| MEG says its 2012 exit production volumes exceeded 2012 guidance and achieved record rates. Agreements are now in place to enable substantial volumes to be transported by rail and barge to high-value markets. At Phase 2B, all major components have been fabricated and delivered to site. | | | | |
| Phase 1 Pilot | 3,000 | 2008 | Operating | SAGD |
| Phase 2A | 22,000 | 2009 | Operating | SAGD |
| Phase 2B | 35,000 | 2013 | Construction | SAGD |
| Phase 3A | 50,000 | 2016 | Approved | SAGD |
| Phase 3B | 50,000 | 2018 | Approved | SAGD |
| Phase 3C | 50,000 | 2020 | Approved | SAGD |
| **Surmont** | | | | |
| MEG's environmental impact assessment report for Surmont was filed in late October, while the regulatory application was filed in September. Public consultation is ongoing. | | | | |
| Phase 1 | 41,000 | 2018 | Application | SAGD |
| Phase 2 | 41,000 | TBD | Application | SAGD |
| Phase 3 | 41,000 | TBD | Application | SAGD |
| **NEXEN INC.** | | | | |
| **Long Lake** | | | | |
| The $15.1-billion acquisition of Nexen by CNOOC Limited was completed in February 2013. Nexen will continue to operate as a subsidiary of CNOOC. | | | | |
| Long Lake South (Kinosis) Phase 1 | 40,000 | TBD | Approved | SAGD |
| Long Lake South (Kinosis) Phase 2 | 40,000 | TBD | Approved | SAGD |
| Phase 1 | 72,000 | 2008 | Operating | SAGD |
| Phase 2 | 72,000 | TBD | Approved | SAGD |
| Phase 3 | 72,000 | TBD | Application | SAGD |
| Phase 4 | 72,000 | TBD | Announced | SAGD |
| **OSUM OIL SANDS CORP.** | | | | |
| **Sepiko Kesik** | | | | |
| Alberta Environment has issued the final terms of reference for the Sepiko Kesik project. | | | | |
| Phase 1 | 30,000 | 2018 | Announced | SAGD |
| Phase 2 | 30,000 | TBD | Announced | SAGD |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **STATOIL** | | | | |
| **Kai Kos Dehseh** | | | | |
| Statoil says its next projects will be an expansion to Leismer, and the Corner project. Corner will be sanctioned late in 2013 or early in 2014. | | | | |
| Corner | 40,000 | 2017 | Approved | SAGD |
| Corner Expansion | 40,000 | TBD | Application | SAGD |
| Hangingstone | 20,000 | TBD | Application | SAGD |
| Leismer Commercial | 10,000 | TBD | Approved | SAGD |
| Leismer Demonstration | 10,000 | 2010 | Operating | SAGD |
| Leismer Expansion | 20,000 | TBD | Approved | SAGD |
| Leismer Northwest | 20,000 | TBD | Application | SAGD |
| Leismer South | 20,000 | TBD | Application | SAGD |
| Thornbury | 40,000 | TBD | Application | SAGD |
| Thornbury Expansion | 20,000 | TBD | Application | SAGD |
| **SUNCOR ENERGY INC.** | | | | |
| **Chard** | | | | |
| Phase 1 | 40,000 | TBD | Announced | SAGD |
| **Meadow Creek** | | | | |
| Phase 1 | 40,000 | TBD | Approved | SAGD |
| Phase 2 | 40,000 | TBD | Approved | SAGD |
| **SURMONT ENERGY LTD.** | | | | |
| **Wildwood** | | | | |
| Phase 1 | 12,000 | 2015 | Application | SAGD |
| **VALUE CREATION INC.** | | | | |
| **Advanced TriStar** | | | | |
| Value Creation has submitted an environmental assessment report for the Advanced TriStar project. | | | | |
| ATS-1 | 15,000 | 2016 | Application | SAGD |
| ATS-2 | 30,000 | 2018 | Application | SAGD |
| ATS-3 | 30,000 | 2020 | Application | SAGD |
| **TriStar** | | | | |
| Pilot | 1,000 | 2014 | Application | SAGD |
| **COLD LAKE REGION — IN SITU** | | | | |
| **BAYTEX ENERGY CORP.** | | | | |
| **Cold Lake** | | | | |
| Baytex says it will build facilities and drill one SAGD well pair in 2013. Following successful operations of this pilot, the company will proceed with construction of the 5,000-barrel-per-day first commercial phase in 2014. | | | | |
| Commercial | 5,000 | 2016 | Approved | SAGD |
| Pilot | 1,200 | TBD | Approved | SAGD |
| **BIRCHWOOD RESOURCES INC.** | | | | |
| **Sage** | | | | |
| Birchwood has filed its regulatory application for the $230-million Sage project. Propak Systems of Airdrie, Alta., will execute modular surface facility construction. | | | | |
| Pilot | 5,000 | 2015 | Application | SAGD |
| **CANADIAN NATURAL RESOURCES LIMITED** | | | | |
| **Primrose & Wolf Lake** | | | | |
| Canadian Natural has completed additional pad drilling at Primrose on schedule and drilled on budget. These wells are expected to come on production in 2013. | | | | |
| Primrose East | 32,000 | 2008 | Operating | CSS |
| Primrose North | 30,000 | 2006 | Operating | CSS |
| Primrose South | 45,000 | 1985 | Operating | CSS |
| Wolf Lake | 13,000 | 1985 | Operating | CSS |
| **DEVON CANADA CORPORATION** | | | | |
| **Walleye** | | | | |
| Devon filed its regulatory application for Walleye in June 2012. The company says construction will start in 2013. | | | | |
| Phase 1 | 9,000 | 2016 | Application | SAGD |
| **HUSKY ENERGY INC.** | | | | |
| **Caribou** | | | | |
| Demonstration | 10,000 | TBD | Approved | SAGD |
| **Tucker** | | | | |
| Husky says that, during Q4/2012, drilling commenced on five new Grand Rapids well pairs at Tucker. | | | | |
| Phase 1 | 30,000 | 2006 | Operating | SAGD |
| **IMPERIAL OIL LIMITED** | | | | |
| **Cold Lake** | | | | |
| Imperial says that, at the end of Q4/2012, the Nabiye expansion project was 37 per cent complete. Module construction is underway, and drilling has been completed on two of seven well pads. | | | | |
| Phase 1-10 | 110,000 | 1985 | Operating | CSS |
| Phase 11-13 | 30,000 | 2002 | Operating | CSS |
| Phase 14-16 | 40,000 | 2014 | Construction | CSS |
| **OSUM OIL SANDS CORP.** | | | | |
| **Taiga** | | | | |
| Osum received regulatory approval for the 35,000-barrel-per-day Taiga project. The company says it is now considering financing options. | | | | |
| Phase 1 | 23,000 | 2016 | Approved | SAGD |
| Phase 2 | 22,000 | 2017 | Approved | SAGD |
| **PENGROWTH ENERGY CORPORATION** | | | | |
| **Lindbergh** | | | | |
| Pengrowth has announced it is pursuing assest sales in order to fund development of the Lindbergh commercial project. The company says excellent pilot results and associated reserve potential have provided the confidence to accelerate and expand the first phase of commercial development. | | | | |
| Phase 1 | 12,500 | 2015 | Application | SAGD |
| Phase 2 | 17,500 | 2017 | Announced | SAGD |
| Phase 3 | 20,000 | 2018 | Announced | SAGD |
| Pilot | 1,200 | 2012 | Operating | SAGD |
| **ROYAL DUTCH SHELL PLC** | | | | |
| **Orion** | | | | |
| Shell is looking to sell the Orion property, reportedly to focus on in situ operations at Peace River. | | | | |
| Phase 1 | 10,000 | 2007 | Operating | SAGD |
| Phase 2 | 10,000 | TBD | Approved | SAGD |
| **PEACE RIVER REGION — IN SITU** | | | | |
| **ANDORA ENERGY CORPORATION** | | | | |
| **Sawn Lake** | | | | |
| Andora Energy majority owner Pan Orient Energy says pilot equipment procurement is underway, with production anticipated in Q4/2013. | | | | |
| Demonstration | 1,400 | 2013 | Construction | SAGD |
| **BAYTEX ENERGY CORP.** | | | | |
| **Cliffdale** | | | | |
| Baytex has signed a 10-year agreement with Genalta Power Inc. whereby the majority of excess gas associated with its Peace River heavy oil operations will be delivered to a power generation facility being constructed by Genalta in the area. Baytex says the project will reduce its emissions. | | | | |
| Pilot | 1,900 | 2010 | Operating | |
| **Harmon Valley** | | | | |
| Pilot | TBD | 2011 | Operating | |
| **MURPHY OIL COMPANY LTD.** | | | | |
| **Cadotte** | | | | |
| Pilot | TBD | TBD | Application | |
| **Seal/Cadotte** | | | | |
| Pilot | TBD | 2012 | Operating | |
| **NORTHERN ALBERTA OIL LTD.** | | | | |
| **Sawn Lake** | | | | |
| Company owner Deep Well Oil & Gas says WorleyParsons has launched preliminary engineering work on the Sawn Lake pilot project. The work will include a pilot plan, process flow diagrams, material balances for hydrocarbons, sulphur and water, description of the capacity and content of emissions. | | | | |
| Pilot | 700 | TBD | Approved | CSS |
| **PENN WEST PETROLEUM LTD.** | | | | |
| **Harmon Valley South** | | | | |
| Penn West says that 2013 capital plans will include further assessment of the Harmon Valley South thermal project. | | | | |
| Pilot | TBD | TBD | Approved | CSS |
| **Seal Main** | | | | |
| Penn West says that 2013 capital expenditures will include additional engineering work at the Seal Main pilot and commercial project. | | | | |
| Commercial | 10,000 | 2015 | Application | CSS |
| Pilot | 75 | 2011 | Operating | CSS |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **PETROBANK ENERGY AND RESOURCES LTD.** | | | | |
| **Dawson** | | | | |
| Petrobank is developing cold-production operations on two horizontal wells at Dawson in order to pre-condition the reservoir prior to THAI operations. | | | | |
| Experimental THAI Demonstration | 10,000 | 2013 | Construction | THAI |
| Phase 2 | 10,000 | TBD | Announced | THAI |
| **ROYAL DUTCH SHELL PLC** | | | | |
| **Peace River** | | | | |
| Alberta's environmental assessment director has deemed complete Shell Canada's environmental impact assessment report for the Carmon Creek expansion. | | | | |
| Cadotte Lake | 12,500 | 1986 | Operating | CSS |
| Carmon Creek - Phase 1 | 40,000 | 2015 | Application | CSS |
| Carmon Creek - Phase 2 | 40,000 | 2018 | Application | CSS |
| **SOUTHERN PACIFIC RESOURCE CORP.** | | | | |
| **Red Earth** | | | | |
| Southern Pacific has yet to release its future development plans for the Red Earth project. | | | | |
| Commercial | 10,000 | TBD | Announced | CSS |
| Pilot | 1,000 | 2009 | Operating | CSS |
| Pilot Expansion | 3,000 | TBD | Announced | CSS |
| **SASKATCHEWAN REGION — IN SITU** | | | | |
| **CENOVUS ENERGY INC.** | | | | |
| **Axe Lake** | | | | |
| Cenovus Energy acquired the Axe Lake project in fall 2012. The company has not yet announced plans for the asset, stating only that it is a good "bolt-on" addition to the emerging Telephone Lake project, which is adjacent. | | | | |
| Commercial | 30,000 | TBD | On Hold | Upgrader |
| **NORTH ATHABASCA REGION — UPGRADER** | | | | |
| **BP P.L.C.** | | | | |
| **Terre de Grace** | | | | |
| BP says that ongoing appraisal activities include delineation drilling, seismic acquisition and appraisal of water sources. | | | | |
| Pilot | 8,400 | TBD | Approved | Upgrader |
| **CANADIAN NATURAL RESOURCES LIMITED** | | | | |
| **Horizon** | | | | |
| Canadian Natural says it continues its strategy of staged expansion to 250,000 barrels per day and work remains on track. Projects currently under construction are trending at or below estimates. | | | | |
| Phase 1 | 114,000 | 2009 | Operating | Upgrader |
| Phase 2A | 10,000 | 2014 | Construction | Upgrader |
| Phase 2B | 45,000 | TBD | Approved | Upgrader |
| Phase 3 | 80,000 | TBD | Approved | Upgrader |
| Tranche 2 | 5,000 | 2012 | Operating | Upgrader |
| **IVANHOE ENERGY INC.** | | | | |
| **Tamarack** | | | | |
| Alberta Environment has deemed the environmental impact assessment for the Tamarack project complete. | | | | |
| Phase 1 | 34,784 | 2016 | Application | Upgrader |
| **SUNCOR ENERGY INC.** | | | | |
| **Base Operations** | | | | |
| Suncor says that, during Q4/2012, a number of new assets were brought into service to support oil sands operations: the Wood Buffalo pipeline, which connects the company's Athabasca terminal at the base plant in Fort McMurray to other third-party pipeline infrastructure in Cheecham, Alta., and the first two of four new storage tanks in Hardisty, Alta., which will connect to the Enbridge mainline pipeline in 2013. | | | | |
| Millennium Coker Unit | 97,000 | 2008 | Operating | Upgrader |
| Millennium Vacuum Unit | 35,000 | 2005 | Operating | Upgrader |
| U1 and U2 | 225,000 | 1967 | Operating | Upgrader |

| CURRENT PROJECT | CAPACITY | START-UP | REGULATORY STATUS | TECHNOLOGY |
|---|---|---|---|---|
| **Fort Hills** | | | | |
| A sanction decision on Fort Hills is expected in the second half of 2013. | | | | |
| Phase 1 | 145,000 | TBD | On Hold | Upgrader |
| Phase 2 & 3 | 145,000 | TBD | On Hold | Upgrader |
| **Voyageur Upgrader 3** | | | | |
| Suncor and partner Total have agreed to an immediate minimum-spend program on Voyageur. A go/no-go decision on the project is now expected in Q1/2013. | | | | |
| Phase 1 | 127,000 | 2016 | Approved | Upgrader |
| Phase 2 | 63,000 | TBD | Approved | Upgrader |
| **SYNCRUDE CANADA LTD.** | | | | |
| **Mildred Lake/Aurora** | | | | |
| Canadian Oil Sands Limited says Syncrude is expected to produce between 105 million and 115 million barrels in 2013, incoporating a planned turnaourd of Coker 8-1 in the second half of the year. | | | | |
| Base Plant Stage 1 & 2 Debottleneck | 250,000 | 1978 | Operating | Upgrader |
| Stage 3 Debottleneck | 75,000 | TBD | Announced | Upgrader |
| Stage 3 Expansion (UE-1) | 100,000 | 2006 | Operating | Upgrader |
| **SOUTH ATHABASCA REGION — UPGRADER** | | | | |
| **NEXEN INC.** | | | | |
| **Long Lake** | | | | |
| The $15.1-billion acquisition of Nexen by CNOOC Limited was completed in February 2013. Nexen will continue to operate as a subsidiary of CNOOC. | | | | |
| Phase 1 | 58,500 | 2008 | Operating | Upgrader |
| Phase 2 | 58,500 | TBD | Approved | Upgrader |
| Phase 3 | 58,500 | TBD | Application | Upgrader |
| Phase 4 | 58,500 | TBD | Announced | Upgrader |
| **VALUE CREATION INC.** | | | | |
| **Advanced TriStar** | | | | |
| Value Creation has submitted an environmental assessment report for the Advanced TriStar project. | | | | |
| ATS-1 | 12,750 | 2016 | Application | Upgrader |
| ATS-2 | 25,500 | 2018 | Application | Upgrader |
| ATS-3 | 25,500 | 2020 | Application | Upgrader |
| **TriStar** | | | | |
| Pilot | 840 | 2014 | Application | Upgrader |
| **INDUSTRIAL HEARTLAND REGION — UPGRADER** | | | | |
| **NORTH WEST UPGRADING INC.** | | | | |
| **Redwater Upgrader** | | | | |
| North West Upgrading says its project team has grown to over 350 people, and it is expanding office space in the Town of Redwater. Winter conditions following project sanction have meant that much of the preliminary site preparation work will have to wait until spring 2013, but design work continues by about 1,000 technical staff. Some pipeline relocation work within and near the site is planned for Q1 and early Q2, major civil works contracts will be executed in spring and summer, followed by deep underground piping and foundation work and site mechanical construction. | | | | |
| Phase 1 | 50,000 | 2016 | Approved | Upgrader |
| Phase 2 | 50,000 | TBD | Approved | Upgrader |
| Phase 3 | 50,000 | TBD | Approved | Upgrader |
| **SHELL ALBIAN SANDS** | | | | |
| **Scotford Upgrader 1** | | | | |
| Commercial | 155,000 | 2003 | Operating | Upgrader |
| Expansion | 100,000 | 2011 | Operating | Upgrader |
| **VALUE CREATION INC.** | | | | |
| **Heartland** | | | | |
| Construction was suspended in September 2008. | | | | |
| Phase 1 | 46,300 | TBD | On Hold | Upgrader |
| Phase 2 | 46,300 | TBD | Approved | Upgrader |
| Phase 3 | 46,300 | TBD | Approved | Upgrader |

# Glossary of oil sands terms

**API**

An American Petroleum Institute measure of liquid gravity. Water is 10 degrees API, and a typical light crude is from 35 to 40. Bitumen is 7.5 to 8.5.

**Barrel**

The traditional measurement for crude oil volumes. One barrel equals 42 U.S. gallons (159 litres). There are 6.29 barrels in one cubic metre of oil.

**Bitumen**

Naturally occurring, viscous mixture of hydrocarbons that contains high levels of sulphur and nitrogen compounds. In its natural state, it is not recoverable at a commercial rate through a well because it is too thick to flow. Bitumen typically makes up about 10 per cent by weight of oil sand, but saturation varies.

**Condensate**

Mixture of extremely light hydrocarbons recoverable from gas reservoirs. Condensate is also referred to as a natural gas liquid, and is used as a diluent to reduce bitumen viscosity for pipeline transportation.

**Cyclic steam stimulation (CSS)**

For several weeks, high-pressure steam is injected into the formation to soften the oil sand before being pumped to the surface for separation. The pressure created in the underground environment causes formation cracks that help move the bitumen to producing wells. After a portion of the reservoir has been saturated, the steam is turned off and the reservoir is allowed to soak for several weeks. Then the production phase brings the bitumen to the surface.

**Density**

The heaviness of crude oil, indicating the proportion of large, carbon-rich molecules, generally measured in kilograms per cubic metre ($kg/m^3$) or degrees on the American Petroleum Institute (API) gravity scale; in western Canada, oil up to 900 $kg/m^3$ is considered light-to-medium crude—oil above this density is deemed as heavy oil or bitumen.

**Diluent**

See *Condensate*

**Established recoverable reserves**

Reserves recoverable under current technology, and present and anticipated economic conditions, plus that portion of recoverable reserves that is interpreted to exist, based on geological, geophysical or similar information, with reasonable certainty.

**Established reserves**

Reserves recoverable with current technology, and present and anticipated economic conditions specifically proved by drilling, testing or production, plus the portion of contiguous recoverable reserves that are interpreted to exist from geological, geophysical or similar information with reasonable certainty.

**Extraction**

A process, unique to the oil sands industry, which separates the bitumen from the oil sand using hot water, steam and caustic soda.

**Froth treatment**

The means to recover bitumen from the mixture of water, bitumen and solids "froth" produced in hot-water extraction (in mining-based recovery).

**Gasification**

A process to partially oxidize any hydrocarbon, typically heavy residues, to a mixture of hydrogen and carbon monoxide. Can be used to produce hydrogen and various energy by-products.

**Greenhouse gases**

Gases commonly believed to be connected to climate change and global warming. $CO_2$ is the most common, but greenhouse gases also include other light hydrocarbons (such as methane) and nitrous oxide.

**Initial established reserves**

Established reserves prior to the deduction of any production.

**Initial volume in place**

The volume calculated or interpreted to exist in a reservoir before any volume has been produced.

**In situ**

Latin for "in place." In situ recovery refers to various methods used to recover deeply buried bitumen deposits.

**In situ combustion**

A displacement enhanced oil recovery method. It works by generating combustion gases (primarily CO and $CO_2$) downhole, which then "pushes" the oil towards the recovery well.

**Lease**

A legal document from the province of Alberta giving an operator the right to extract bitumen from the oil sand existing within the specified lease area. The land must be reclaimed and returned to the Crown at the end of operations.

**Muskeg**

A water-soaked layer of decaying plant material, one to three metres thick, found on top of the overburden.

**Oil sands**

Bitumen-soaked sand, located in four geographic regions of Alberta: Athabasca, Wabasca, Cold Lake and Peace River. The Athabasca deposit is the largest, encompassing more than 42,340 square kilometres. Total deposits of bitumen in Alberta are estimated at 1.7 trillion to 2.5 trillion barrels.

**Overburden**

A layer of sand, gravel and shale between the surface and the underlying oil sand. Must be removed before oil sands can be mined. Overburden underlies muskeg in many places.

**Pilot plant**

Small model plant for testing processes under actual production conditions.

**Proven recoverable reserves**

Reserves that have been proven through production or testing to be recoverable with existing technology and under present economic conditions.

**Reclamation**

Returning disturbed land to a stable, biologically productive state. Reclaimed property is returned to the Province of Alberta at the end of operations.

**Remaining established reserves**

Initial reserves less cumulative production.

**Royalty**

The Crown's share of production or revenue. About three-quarters of Canadian crude oil is produced from lands, including the oil sands, on which the Crown holds mineral rights. The lease or permit between the developer and the Crown sets out the arrangements for sharing the risks and rewards.

**Steam assisted gravity drainage (SAGD)**

An in situ production process using two closely spaced horizontal wells: one for steam injection and the other for production of the bitumen/water emulsion.

**Synthetic crude oil (SCO)**

A manufactured crude oil comprised of naphtha, distillate and gas oil-boiling range material. Can range from high-quality, light sweet bottomless crude to heavy, sour blends.

**Tailings**

A combination of water, sand, silt and fine clay particles that are a by-product of removing the bitumen from the oil sand.

**Tailings settling basin**

The primary purpose of the tailings settling basin is to serve as a process vessel allowing time for tailings water to clarify and silt and clay particles to settle, so the water can be reused in extraction. The settling basin also acts as a thickener, preparing mature fine tails for final reclamation.

**Thermal recovery**

Any process by which heat energy is used to reduce the viscosity of bitumen in situ to facilitate recovery.

**Toe to heel air injection (THAI)**

An in situ combustion method for producing heavy oil and oil sand. In this technique, combustion starts from a vertical well, while the oil is produced from a horizontal well having its toe in close proximity to the vertical air-injection well. This production method is a modification of conventional fire flooding techniques in which the flame front from a vertical well pushes the oil to be produced from another vertical well.

**Truck-and-shovel mining**

Large electric or hydraulic shovels are used to remove the oil sand and load very large trucks. The trucks haul the oil sand to dump pockets where it is conveyed or pipelined to the extraction plant. Trucks and shovels are more economic to operate than the bucket-wheel reclaimers and draglines they have replaced at oil sands mines.

**Upgrading**

The process of converting heavy oil or bitumen into synthetic crude either through the removal of carbon (coking) or the addition of hydrogen (hydroconversion).

**Vapour extraction (VAPEX)**

VAPEX is a non-thermal recovery method that involves injecting a gaseous hydrocarbon solvent into the reservoir where it dissolves into the sludge-like oil, which becomes less viscous (or more fluid) before draining into a lower horizontal well and being extracted.

**Viscosity**

The ability of a liquid to flow. The lower the viscosity, the more easily the liquid will flow.

# CONTACTS

## Oil Sands Producers

| | |
|---|---|
| **Alberta Oilsands** | www.aboilsands.ca |
| **Andora Energy** | www.andoraenergy.com |
| **Athabasca Oil Corporation** | www.atha.com |
| **Baytex Energy** | www.baytex.ab.ca |
| **BlackPearl Resources** | www.blackpearlresources.ca |
| **Canadian Natural Resources** | www.cnrl.com |
| **Cenovus Energy** | www.cenovus.com |
| **Chevron Canada** | www.chevron.ca |
| **China National Offshore Oil Corporation** | www.cnoocltd.com |
| **Connacher Oil and Gas** | www.connacheroil.com |
| **ConocoPhillips Canada** | www.conocophillips.ca |
| **Devon Canada** | www.dvn.com |
| **Dover Operating Corp.** | www.doveropco.com |
| **Enerplus Resources Fund** | www.enerplus.com |
| **E-T Energy** | www.e-tenergy.com |
| **Grizzly Oil Sands** | www.grizzlyoilsands.com |
| **Harvest Operations Corp.** | www.harvestenergy.ca |
| **Husky Energy** | www.huskyenergy.ca |
| **Imperial Oil** | www.imperialoil.ca |
| **Ivanhoe Energy** | www.ivanhoeenergy.com |
| **Japan Canada Oil Sands** | www.jacos.com |
| **Koch Exploration Canada** | www.kochind.com |
| **Korea National Oil Corporation** | www.knoc.co.kr |
| **Laricina Energy** | www.laricinaenergy.com |
| **Marathon Oil** | www.marathon.com |
| **MEG Energy** | www.megenergy.com |
| **Nexen** | www.nexeninc.com |
| **North West Upgrading** | www.northwestupgrading.com |
| **N-Solv** | www.n-solv.com |
| **Oak Point Energy** | www.oakpointenergy.ca |
| **Occidental Petroleum Corporation** | www.oxy.com |
| **Osum Oil Sands** | www.osumcorp.com |
| **Pan Orient Energy** | www.panorient.ca |
| **Paramount Resources Ltd.** | www.paramountres.com |
| **Pengrowth Energy Trust** | www.pengrowth.com |
| **Petrobank Energy and Resources** | www.petrobank.com |
| **PetroChina** | www.petrochina.com.cn/Ptr |
| **Shell Canada** | www.shell.ca |
| **Sinopec** | english.sinopec.com |
| **Southern Pacific Resource Corp.** | www.shpacific.com |
| **Statoil Canada** | www.statoil.com |
| **Suncor Energy** | www.suncor.com |
| **Sunshine Oilsands** | www.sunshineoilsands.com |
| **Syncrude** | www.syncrude.ca |
| **Talisman Energy** | www.talisman-energy.com |
| **Teck Resources** | www.teck.com |
| **Total E&P Canada** | www.total-ep-canada.com |
| **Value Creation Group** | www.vctek.com |

## Associations/Organizations

| | |
|---|---|
| **Alberta Building Trades Council** | www.buildingtradesalberta.ca |
| **Alberta Chamber of Resources** | www.acr-alberta.com |
| **Alberta Chambers of Commerce** | www.abchamber.ca |
| **Alberta Energy** | www.energy.gov.ab.ca |
| **Alberta Enterprise and Advanced Education** | www.eae.alberta.ca |
| **Alberta Innovates** | www.albertainnovates.ca |
| **Alberta Environment and Sustainable Resource Development** | www.srd.alberta.ca |
| **Alberta's Industrial Heartland Association** | www.industrialheartland.com |
| **Canada's Oil Sands Innovation Alliance** | www.cosia.ca |
| **Canadian Association of Geophysical Contractors** | www.cagc.ca |
| **Canadian Association of Petroleum Producers** | www.capp.ca |
| **Canadian Heavy Oil Association** | www.choa.ab.ca |
| **Canadian Oil Sands Network for Research and Development** | www.canadianoilsandsnetwork.ca |
| **Energy Resources Conservation Board** | www.ercb.ca |
| **In Situ Oil Sands Alliance** | www.iosa.ca |
| **Lakeland Industry and Community Association** | www.lica.ca |
| **Natural Resources Conservation Board** | www.nrcb.gov.ab.ca |
| **Oil Sands Developers Group** | www.oilsandsdevelopers.ca |
| **Oil Sands Secretariat** | www.energy.alberta.ca |
| **Petroleum Technology Alliance Canada** | www.ptac.org |

For more information, visit us at

**www.albertacanada.com**

PHOTO: SUNCOR ENERGY INC.