ALBERTA OIL SANDS INDUSTRY

QUARTERLY UPDATE

FALL 2014

Reporting on the period: June 16, 2014 to September 26, 2014

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 173 billion barrels of oil reserves, 170 billion barrels are located in Alberta, and about 168 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 168 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.

For the first time in 2012, in situ oil sands production exceeded mined oil sands production in Alberta. In 2013, 53 per cent of the province's oil sands volumes were produced using in situ methods. Alberta will continue 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.

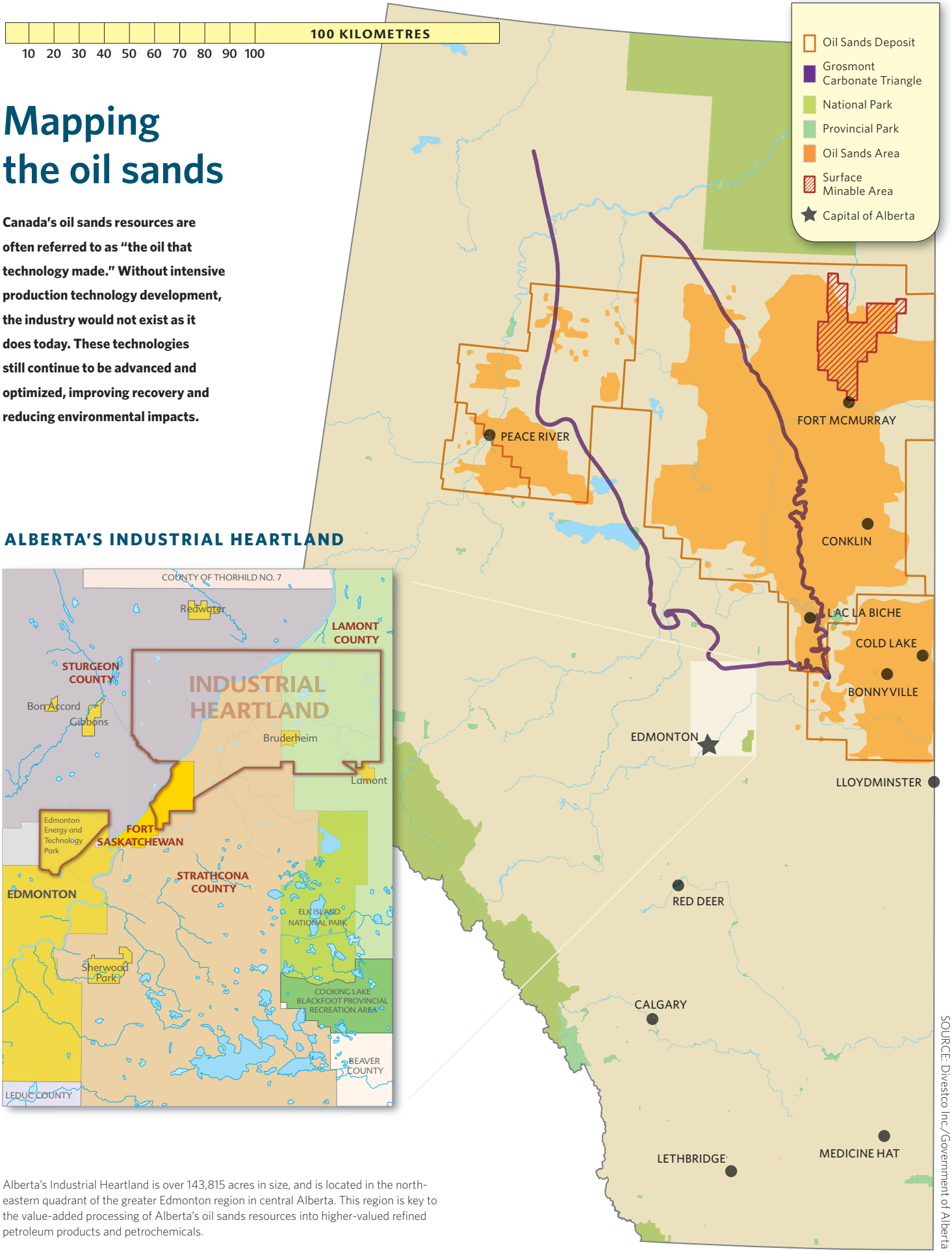
Both SAGD and CSS are used in the Cold Lake and Peace River deposits, while SAGD is the in situ technology of choice in the Athabasca deposit. The selection is based on a number of factors, including geology. The technologies combined currently produce just over one million barrels per day.

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

Alberta Government

NEW PARTNERSHIP WILL SHARE OIL SANDS HISTORY AND GROW TOURISM

A new partnership with Fort McMurray Tourism was announced in July to provide one-stop shopping for tourism and oil sands information at the Oil Sands Discovery Centre in Fort McMurray.

The 20-year agreement, signed in the summer of 2013, took effect when Fort McMurray Tourism relocated its staff and business activities to the Oil Sands Discovery Centre in April 2014. The discovery centre has been expanded to accommodate the addition of a visitor information centre and work space for tourism staff with the cost of renovations shared between Fort McMurray Tourism and the Alberta government. Under the agreement, Fort McMurray Tourism will provide tourism information services as well as oversee and manage operations and programming at the discovery centre.

"This agreement allows us to capitalize on the growing interest in heritage tourism and its potential for continued growth," said former Minister of Culture Heather Klimchuk. "With its marketing expertise and knowledge of the regional tourism sector, Fort McMurray Tourism is the perfect partner to help promote the story of oil sands development in our province while linking visitors from across Alberta and around the world to an array of local vacation opportunities."

An Energy Resources Heritage website was also launched to give a deeper understanding of the province's rich energy resource history. From turn-of-the-century coal mining in the Rocky Mountains to early breakthroughs in oil sands technology, the interactive website takes visitors on an exploration of the history of energy development in Alberta.

NEW DEAL IMPROVES LABOUR MOBILITY FOR APPRENTICES

On August 28, 2014, Alberta and Nova Scotia signed an agreement in principle to ensure apprenticeship training is transferable between both provinces. This agreement will improve the recognition of in-province training, allow for the recognition of apprenticeship work experience hours and enhance labour mobility for apprentices in both provinces.

"This is a win-win for our two provinces—and more importantly, it's a win for our apprentices," said Stephen McNeil, premier of Nova Scotia. "Today's reality is, workers are moving all over the country. Our job is to make sure they have clear pathways to obtaining their certification so they can take full advantage of the good jobs in our region."

Former premier Dave Hancock said, "We want to make it easier for apprentices and skilled workers in Canada to go where the work is. The goal of this agreement with Nova Scotia is to streamline labour mobility, increase access to apprenticeship training and ideally, help Alberta attract more workers to meet the demands of our growing economy."

Under the new agreement, if an apprentice takes pre-apprenticeship training at the Nova Scotia Community College and then moves to Alberta, their training will be recognized. This will save apprentices from writing additional exams or repeating courses.

The two provinces are also working on an agreement that would make the process of moving between Nova Scotia and Alberta easier and less expensive for apprentices to continue their education.

In addition to this agreement, Alberta strongly supports interprovincial mobility of apprentices and journeymen:

- Alberta is working with other provinces and territories through the New West Partnership agreement and the Canadian Council of Directors of Apprenticeship to enhance apprenticeship mobility.
- Alberta recognizes registered apprentices and journeymen from other Canadian jurisdictions at the same level as their home jurisdiction and facilitates the transition of apprentices between provinces.
- Under the provisions of the agreement on internal trade, the Alberta Apprenticeship and Industry Training Board also recognizes the qualifications of journeymen from across Canada.

FORMER MINISTER FAWCETT RESPONDS TO CHANGES TO FEDERAL TEMPORARY FOREIGN WORKER PROGRAM

Former Minister of Jobs, Skills, Training and Labour Kyle Fawcett was concerned that federal changes to the

PHOTO: SYNCRUDE CANADA LTD.

Temporary Foreign Worker Program would hurt Alberta's and Canada's economy, and issued the following statement on June 20, 2014:

"We are comfortable with changes to the Temporary Foreign Worker Program [TFWP] that tighten the program's administration. But introducing caps and using the province's median wage to differentiate low-skill occupations, and reducing the length of time workers can stay, is simply bad economic policy for Alberta. [This] announcement from the federal government is disappointing on a number of levels.

"We recognize that some concerns about the TFWP are valid. Alberta's position is clear: the rules of the TFWP must be enforced, and we have offered to work with the federal government to strengthen compliance measures for employers. While we support many of the enforcement actions being taken today, we note that they are required because the rules were not being adequately enforced by the federal government in the first place.

"Separately, we recognize that employers need to demonstrate that TFWs are actually needed, and we support a fair application process. But introducing hiring caps does not address that issue. As a result, companies may go through an expensive and rigorous process to demonstrate that they actually need foreign workers, only to be denied the opportunity to hire them.

"Unfortunately, the changes announced today are a one-size-fits-all solution and only compound the labour challenges faced by many Alberta businesses. The federal TFWP has been valuable during periods of strong economic growth.

"Alberta is committed to building a permanent workforce to keep pace with our growth. This includes training Albertans who want to work, attracting Canadians to our booming job opportunities and welcoming immigrants from around the world. Even with all of this, Alberta will be short 96,000 workers over the next decade. Our labour pressures are significant and permanent. The TFWP helps temporarily fill short-term needs, so tightening this program further exacerbates the larger challenge."

ALBERTA AIMS INNOVATION AT ECONOMIC DEVELOPMENT

In July 2014, Alberta launched a new innovation council to act as a "system architect" to provide vital oversight and advice to align priorities, advance strategic initiatives and clarify roles and responsibilities while providing advice to government on ways it can enhance research and innovation in the province.

With approximately $800 million annually invested in research and innovation by the Alberta government, the Alberta Innovation Council will provide leadership and evolve innovation in the province.

"We've brought together some of the world's best talent in research, innovation and entrepreneurship from right here in Alberta. The members have impressive knowledge and experience that will help our innovators turn ideas into solutions and our province into a launching pad for opportunity," said former premier Dave Hancock.

The initial Alberta Innovation Council will be chaired by the premier and will be made up of 13 members representing a broad range of experience in research, innovation and technology commercialization. Members come from industry, Campus Alberta and the innovation system.

The Alberta Innovation Council will work with the Alberta Research and Innovation Authority (ARIA) and the Alberta Economic Development Authority (AEDA), which will each designate an adviser to the council. The council will leverage ARIA's international perspective on innovation, use AEDA's focus on the broader economic development process and seek the input of other innovation stakeholders to provide government with recommendations to enhance economic development and prosperity through innovation.

In addition to AEDA and ARIA, the council will also work with the Alberta government ministries of Agriculture and Rural Development, Energy, Environment and Sustainable Resource Development, Health, International and Intergovernmental Relations, Innovation and Advanced Education, and Treasury Board and Finance. Links will be built among these organizations' areas of critical knowledge, such as workforce development, economic indicators and innovation trends, and government's strategic priorities to grow innovation. ■

LABOUR UPDATE

MORE JOBS THAN PEOPLE

The Alberta government's *Short-Term Employment Forecast* for 2014-16 looks at 260 occupations across the wage and skills spectrum and reveals 31 that are expected to be in the highest demand.

Most occupations in the high- and moderately high-demand categories require a college education or apprenticeship training. The report looks at seven variables to determine where demand is heading, including:

- employment growth rates;
- industry forecasts;
- the unemployment rate; and
- vacancy rates from wage and salary surveys.

The forecast is released annually to help bridge the gap between what is happening now in Alberta's economy and where the labour pressure points are expected to be longer term.

It is a complementary tool to *Alberta's Occupational Demand and Supply Outlook*, which forecasts labour shortages for the next 10 years. Alberta's most recent long-term forecast predicts that Alberta will be short 96,000 workers by 2023.

ALBERTA MAKES PROGRESS ON REDUCING LABOUR SHORTAGES

Alberta faces a shortage of 96,000 workers by 2023, according to the most recent *Occupational Demand and Supply Outlook*, down from 114,000 workers by 2021 in the previous forecast.

Released every two years, the outlook is one of the key indicators the Alberta Ministry of Jobs, Skills, Training and Labour will use to help build a skilled workforce capable of meeting the province's labour demands.

The ministry will continue to ensure Albertans have access to the opportunities that Alberta's labour market offers.

Other key projections include the three-year *Short-Term Employment Forecast*, and monthly and annual unemployment reports.

WORKPLACE INJURY RATES HIT ALL-TIME LOW

The latest statistics show a 20-year trend of improved workplace safety.

The rate of Alberta workers being hurt on the job dropped in 2013, according to information provided by the Workers' Compensation Board. In fact, the lost-time claim rate is now at an all-time recorded low.

In addition, the disabling injury rate (DIR) dropped in some of Alberta's key sectors last year: construction, manufacturing, and oil and gas development. The DIR combines information on workers who couldn't work because of their injury or who had their duties modified due to workplace injury or disease.

Despite safety improvements, there were 188 workplace fatalities in 2013. More than half of the fatalities resulted from occupational disease. In some cases, the worker may have been exposed to the disease decades ago.

While the rate of injury went down, the number of disabling injury claims rose slightly as Alberta's workforce grew by 2.9 per cent to 2.1 million.

Occupational health and safety data can be found here.
2013 highlights:

- The lost-time claim rate is now 1.34 per 100 person-years, an all-time recorded low. That's down from 1.40 in 2012.
- The disabling injury rate decreased to 2.67 from 2.72 per 100 person-years in 2012.
- In 2013 there were 54,140 disabling injury claims, the combination of lost-time claims and modified work claims, an increase of two per cent from 53,081 claims in 2012.

PHOTOS: SYNCRUDE CANADA LTD; SUNSHINE OILSANDS LTD.

What's new in the oil sands

BUSINESS

Citing rising costs and market-access issues, Statoil Canada Ltd. says it has decided to postpone the previously planned Corner SAGD project for at least three years. As a result of the Corner decision, the company expects to lay off about 70 employees.

The company says that costs for labour and materials have continued to rise in recent years and are working against the economics of new projects. Additionally, market-access issues also played a role in the decision, squeezing margins and making it difficult for sustainable financial returns.

Osum Oil Sands Corp. has agreed to purchase the Orion oil sands project from Royal Dutch Shell plc for $325 million.

The transaction was expected to close in late July. Shell had put the steam assisted gravity drainage project up for sale in 2012.

"The decision to divest Orion at this time is part of our ongoing efforts to manage our portfolio to allow us to focus on our core in situ assets in the Peace River area," says Shell spokeman Cameron Yost.

Producer concern about cost competitiveness has prompted the Canadian Association of Petroleum Producers (CAPP) to reduce its previous forecast for oil sands output in 2030 by nearly eight per cent.

According to CAPP's 2014 *Crude Oil Forecast, Markets and Transportation* study, oil sands production is expected to grow about 2.5 times to 4.8 million barrels per day (1.6 million barrels per day from mining and 3.2 million barrels per day from in situ projects) by 2030 from 1.95 million barrels per day in 2013 (850,000 barrels per day from mining and 1.1 million from in situ).

However, that figure is 400,000 barrels per day (312,000 barrels per day for in situ and 87,000 barrels per day for mining projects) lower than the 2013 forecast of 5.2 million barrels per day for 2030, reflecting a slower pace of development in response to greater uncertainty about project timing.

CAPP says that for in situ producers in particular, there's uncertainty around future prices for natural gas, which have climbed recently. For some oil sands producers, there's also the issue of capital availability.

The province of Alberta has authorized the Alberta Energy Regulator (AER) to grant approvals to two proposed 10,000-barrel-per-day steam assisted gravity drainage (SAGD) projects to be developed by private companies in the Wabasca-Desmarais region: Koch Exploration Canada L.P.'s Muskwa project and Cavalier Energy Inc.'s Hoole project.

The Muskwa project central processing facility (CPF) is to include two modular processing facilities, each designed for a bitumen production capacity up to 5,000 barrels per day. Installation and commissioning of the first CPF will occur prior to beginning the construction of the second.

At Hoole, Cavalier has plans to expand beyond its newly approved 10,000-barrel-per-day SAGD project in two phases with total production of 80,000 barrels per day. The company expects first production from Phase 1 in 2017.

Aecon Group Inc. announced that it has been awarded a mining contract with an estimated value of $123 million by Fort Hills Energy L.P. for mining site development at the Fort Hills oil sands project. Work is expected to be complete in the second quarter of 2016.

Sunshine Oilsands Ltd. says it has closed a US$200-million debt offering of 10 per cent senior secured notes, which, along with the recent raising of US$150 million in equity funding and the C$20-million sale of non-core lease interests, enables the company to restart construction of the West Ells SAGD project. Sunshine suspended construction last summer on West Ells at approximately 80 per cent complete due to lack of funds.

According to the company, it will now progress the recommencement of construction for achievement of first steam in the first quarter of 2015 and production early in the third quarter of 2015.

TransCanada Corporation has announced that the Alberta Energy Regulator has approved its application to construct and operate the Northern Courier Pipeline Project.

The $800-million project is fully contracted under a long-term agreement with Suncor Energy Inc.'s Fort Hills mining project, which is currently under construction. The approximately 90-kilometre (56-mile) pipeline system will transport bitumen and diluent products between the Fort Hills mine and bitumen extraction facility and Suncor's East Tank Farm. ■

PHOTO: SUNCOR ENERGY INC.

What's new in the oil sands

TECHNOLOGY

Suncor Energy Inc. has selected Honeywell Process Solutions to provide automation systems for the new Fort Hills oil sands mining project.

Honeywell will supply technology to integrate the site's control and safety systems, manage alarms, and provide advanced simulation software to enable critical operations planning and operator training.

As the main automation contractor, Honeywell plans to play a key role in helping the facility achieve its future productivity and operational efficiency goals.

Fort Hills is expected to be operational in late 2017.

Japan Canada Oil Sands Limited (JACOS) has announced that Aquatech International will provide its vertical tube falling film evaporator technology at the Hangingstone steam assisted gravity drainage (SAGD) expansion project. Hangingstone will use the technology to treat and recover over 95 per cent of the blowdown from the once-through steam generators. The water can then be used as makeup boiler feedwater at the production facility. Production at the 20,000-barrel-per-day expansion is expected to begin in 2016.

The Alberta Energy Regulator (AER) has granted approval for Husky Energy Inc. to operate the Sunrise SAGD project with a maximum operating pressure (bottomhole) of 1,750 kilopascals. According to Peters & Co. Limited, the company now has all Sunrise approvals in place. Start-up is expected in the second half of 2014.

Peters & Co. analysts write that operating pressure at Sunrise was an issue because of the amount of overburden over the bitumen reservoir, which is substantially lower than at the nearest SAGD project analog, Suncor Energy Inc. Firebag. Approved maximum operating pressure at the Firebag SAGD project is 3,570 kilopascals.

"The issue of operating pressure is complicated for Sunrise by the presence of fractures that have been identified by Husky in the overlying formations," Peters & Co. says. "These are not faults, but small cracks that could potentially contribute to loss of steam containment if they are interconnected. Husky has provided the regulator with geotechnical reports that conclude that the proposed 1,750-kilopascal operating pressure should not present a risk to steam containment."

And the AER agrees, although it will require Husky to implement additional monitoring systems. Husky will also be required to submit a report by September 30, 2015, and annually thereafter providing an analysis of reservoir containment.

Canada's Oil Sands Innovation Alliance (COSIA) and General Electric (GE) have announced agreements that could see up to $18 million invested in development and deployment of new technologies for water treatment and greenhouse gas (GHG) reduction in the oil sands.

One agreement will see an existing water treatment pilot project at Suncor Energy Inc.'s MacKay River SAGD project—which is currently operated through a partnership between GE, Suncor and Alberta Innovates – Energy and Environment Solutions—become extended into a COSIA joint industry project. This new incarnation of the pilot comes with new support from Devon Canada Corporation and ConocoPhillips Canada Resources Corp.

In a second agreement, six COSIA member companies have signed a memorandum of understanding to pursue other joint industry projects with potential investment of up to roughly $13 million. These projects are expected to develop technologies leading to even further environmental performance improvements, primarily in the areas of GHG reductions and advances in water treatment technology.

In tandem with the COSIA agreements, GE launched a $1-million open innovation challenge targeting oil sands GHG reductions through new uses for waste heat and improved efficiency of steam generation.

Winners of the challenge—which is in two parts, with submissions due in September 2014 and March 2015—can potentially share up to $1 million in seed funding. GE says they will also be eligible to become its suppliers or contractors on future projects.

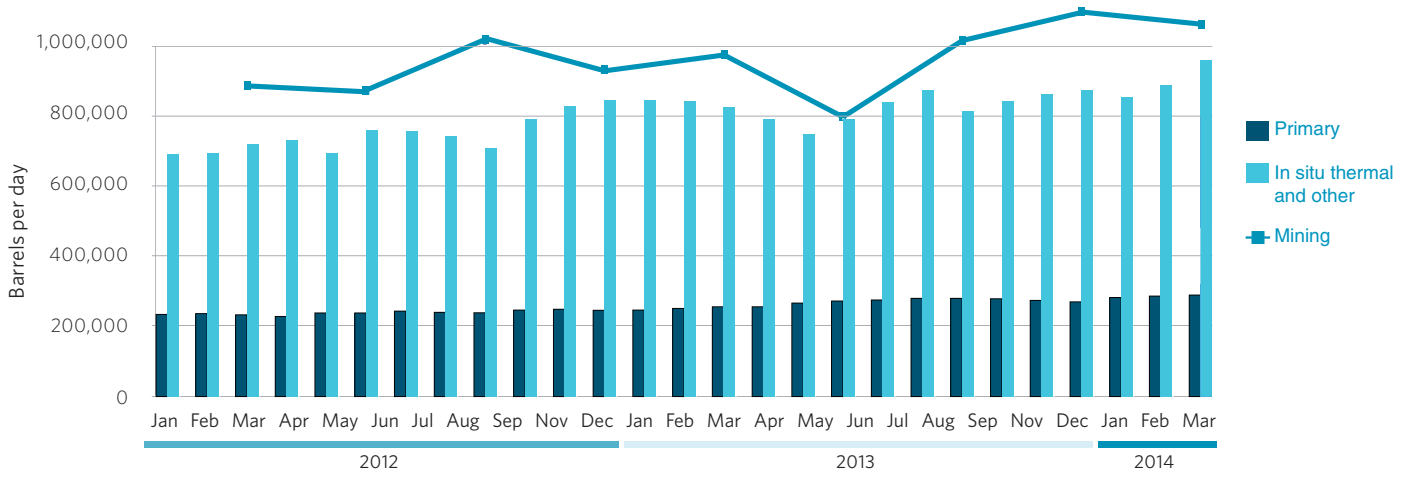
Cenovus Energy Inc. has come up with a new design it believes will allow additional SAGD wells to be drilled faster and much more cheaply from mature well pads. The company has applied for a U.S. patent for multilateral SAGD wells—drilling two or three additional horizontal wells from an existing SAGD wellbore.

In an application filed with the Alberta Energy Regulator, Cenovus requested permission to test a dual-lateral horizontal production well at its Foster Creek SAGD project in northeastern Alberta. The company hoped to drill the two 800-metre horizontal legs in June and bring the well on stream in the coming months. ■

PHOTO: IMPERIAL OIL LIMITED

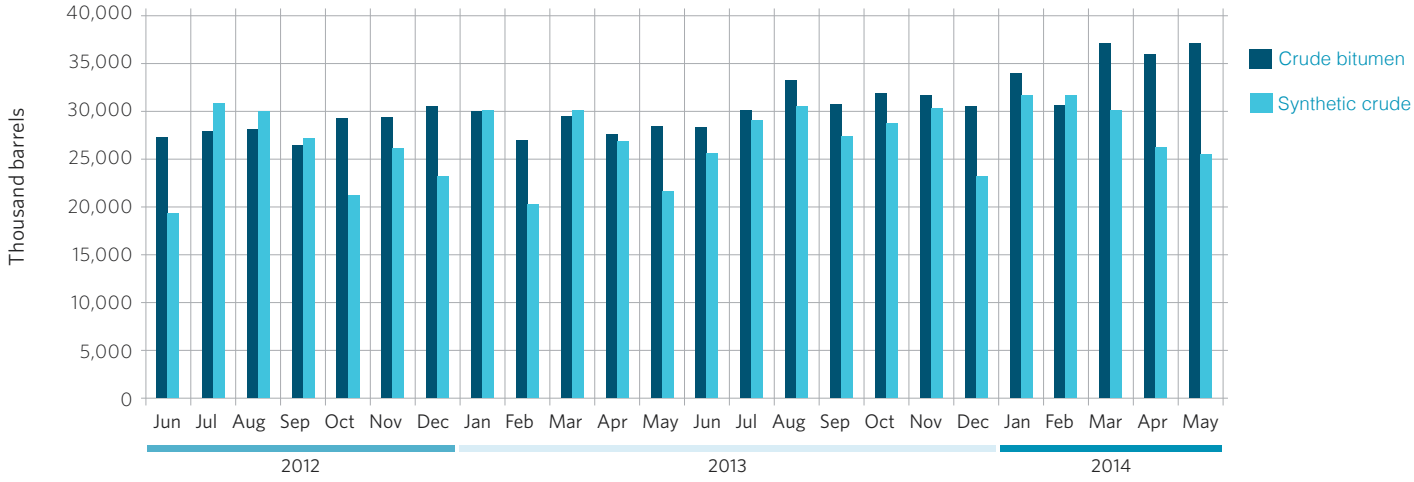
OIL SANDS PRODUCTION DATA

Alberta oil sands production by extraction method



SOURCE: Alberta Energy Regulator

Alberta crude bitumen and synthetic crude production



SOURCE: Alberta Energy Regulator

Oil sands technology legend

See oil sands project status listing on page 10.

ADC USP (Upgrading) Accelerated decontamination, ultra-selective pyrolysis

AIRINJ Air injection

BEST Bitumen extraction solvent technology

C & SC Cyclic and solvent cyclic

C-SAGD Cyclic steam assisted gravity drainage

CSS Cyclic steam stimulation

ET-DSP Electro-thermal dynamic stripping

HCSS Horizontal cyclic steam stimulation

HTL Heavy-to-light upgrading process

In situ Production technology undisclosed; will use drilling and enhanced recovery

LP-SAGD Low-pressure steam assisted gravity drainage

Mining Truck and shovel mining

Orcrude Primary upgrading process

SAGD Steam assisted gravity drainage

SAP Solvent aided process

SC-SAGD Solvent cyclic steam assisted gravity drainage

TAGD Thermal assisted gravity drainage

THAI Toe to heel air injection

UPG Bitumen upgrading

VSD Vertical steam drive

Project listings

Updated status of oil sands projects in Alberta As of September 2014

See oil sands project technology legend on page 9.

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
NORTH ATHABASCA REGION — MINING				
CANADIAN NATURAL RESOURCES LIMITED				
Horizon				
Canadian Natural says that during second quarter 2014, Horizon continued to achieve strong and reliable operating performance, with record quarterly SCO production of approximately 119,200 barrels per day. Horizon production was targeted to be taken offline for approximately 25 days commencing in mid-August to advance the coker tie-in originally planned for 2015. Production levels are targeted to average approximately 127,000 barrels per day once the coker tie-in is complete.				
Phase 1	135,000	2008	Operating	Mining
Reliability - Tranche 2	5,000	2014	Construction	Mining
Phase 2A	12,000	2015	Construction	Mining
Phase 2B	45,000	2016	Construction	Mining
Phase 3	80,000	2017	Construction	Mining
IMPERIAL OIL LIMITED				
Kearl				
Imperial says that April production was significantly lower than the quarterly average due to planned maintenance and reliability improvement repairs. Production growth resumed throughout the rest of the second quarter, averaging 85,000 barrels per day. The Kearl expansion project has advanced to 90 per cent complete and continues to track ahead of schedule relative to its originally planned late 2015 start-up.				
Phase 1	110,000	2013	Operating	Mining
Phase 2	110,000	2015	Construction	Mining
Phase 3	80,000	2020	Approved	Mining
Phase 4 Debottleneck	45,000	TBD	Approved	Mining
SHELL ALBIAN SANDS				
Jackpine				
Phase 1A	100,000	2010	Operating	Mining
Phase 1B	100,000	TBD	Approved	Mining
Expansion	100,000	2017	Approved	Mining
Muskeg River				
Minority partner Marathon Oil Corporation says that volumes in the second quarter of 2014 were slightly below previous guidance as a result of reliability issues at the mine. However, the segment reported income of $55 million for the second quarter of 2014, compared to $20 million in the second quarter of 2013. The increase was primarily a result of improved price realizations and a planned turnaround during the year-ago quarter.				
Commercial	155,000	2002	Operating	Mining
Expansion & Debottlenecking	115,000	TBD	Approved	Mining
Pierre River				
Shell has informed regulators that it is indefinitely halting work on the Pierre River project. The company has asked that the regulatory approval process be suspended.				
Phase 1	100,000	TBD	On Hold	Mining
Phase 2	100,000	TBD	On Hold	Mining
SUNCOR ENERGY INC.				
Base Operations				
Suncor says that increased production and continued focus on cost management enabled the company to achieve cash operating costs in the second quarter of 2014 that were flat with the prior year's quarter despite a 37 per cent increase in production volumes and higher natural gas input costs.				
Millennium Mine	294,000	1967	Operating	Mining
Steepbank Debottleneck Phase 3	4,000	2007	Operating	Mining
Millennium Debottle-necking	23,000	2008	Operating	Mining
North Steepbank Extension	180,000	2012	Operating	Mining
Fort Hills				
Suncor says that Fort Hills project activities continue to focus on detailed engineering, procurement and the ramp-up of field construction activities. Detailed engineering work was approximately 40 per cent complete by the end of the second quarter. Key construction activities during the quarter included foundation concrete pours and commencing with construction of primary extraction separation cells.				
Phase 1	160,000	2017	Construction	Mining
Debottleneck	20,000	TBD	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
SYNCRUDE CANADA LTD.				
Mildred Lake/Aurora				
Canadian Oil Sands Limited says that the second quarter was challenging for Syncrude given overlapping outages on two of its three cokers, but the final unit returned to service by early July. Syncrude says it is now focused on a return to more stable operations and the completion of the Mildred Lake Mine Train Replacement project, which remains on budget and is on track to start up in the fourth quarter of the year.				
Base Mine Stage 1 & 2 Expansion	290,700	1978	Operating	Mining
Stage 3 Expansion	116,300	2006	Operating	Mining
Centrifuge Tailings Management	TBD	TBD	Construction	Mining
Aurora SouthTrain 1	100,000	2016	Approved	Mining
Aurora SouthTrain 2	100,000	2018	Approved	Mining
Mildred Lake Mine Extension (MLX)	TBD	2023	ANN	Mining
TECK RESOURCES LIMITED				
Frontier				
Teck says that the regulatory review process for the Frontier project is expected to continue into 2015, making late 2015 or 2016 the earliest an approval decision and receipt of required permits is expected.				
Phase 1	74,600	2021	Application	Mining
Phase 2	84,000	2024	Application	Mining
Phase 3	79,300	2027	Application	Mining
Phase 4 Equinox	39,400	2030	Application	Mining
TOTAL E&P CANADA LTD.				
Joslyn North Mine				
Total has announced it will delay the Joslyn mine while project owners seek ways to reduce costs.				
Phase 1	100,000	2019	HOLD	Mining
NORTH ATHABASCA REGION — IN SITU				
ATHABASCA OIL CORPORATION				
Birch				
Athabasca will be reducing its workforce by 15 per cent. The layoffs, focused primarily in its Calgary office, will largely affect employees directly or indirectly tied to projects that are not being funded in the near term.				
Phase 1	12,000	TBD	Announced	SAGD
Dover West Carbonates (Leduc)				
A fourth production cycle for the TAGD pilot test was scheduled for the fourth quarter of 2013.				
Phase 1 Demonstration	6,000	2016	Approved	TAGD
Phase 2 Demonstration	6,000	TBD	Application	TAGD
Dover West Sands & Clastics				
Athabasca Oil Corporation is awaiting regulatory approval for the Dover West Sands Phase 1.				
Phase 1	12,000	2016	Application	SAGD
Phase 2	35,000	2019	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 continue.				
Pilot	10,000	TBD	Approved	SAGD
BRION ENERGY CORPORATION				
Dover				
Athabasca Oil Corporation says that it has closed the long-awaited sale of its 40 per cent interest in the Dover oilsands project to Phoenix Energy Holdings Limited, a wholly owned subsidiary of PetroChina International Investment Limited, for net proceeds of $1,184 million.				
Dover Experimental Pilot	2,000	2017	Approved	SAGD
Dover North Phase 1	50,000	2016	Approved	SAGD
Dover North Phase 2	50,000	2018	Approved	SAGD
Dover South Phase 3	50,000	2021	Approved	SAGD
Dover South Phase 4	50,000	2023	Approved	SAGD
Dover South Phase 5	50,000	2025	Approved	SAGD
MacKay River				
Brion says that the module fabrication program is underway for the central processing facility, with some of the largest pieces of equipment arriving at site for assembly. Modules are nearing completion across Alberta and the United States. The structural steel and pipe for the project has been shipped from Texas and China, and many of the concrete foundations have already been poured. Well pads and pipelines are under construction, the pipe road crossings are nearly complete, and the infield right-of-way has been piled. Brion was planning to hydrotest much of the infield pipelines this summer.				
Phase 1	35,000	2015	UC	SAGD
Phase 2	40,000	2018	Approved	SAGD
Phase 3	40,000	2020	Approved	SAGD
Phase 4	35,000	2022	Approved	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
CANADIAN NATURAL RESOURCES LIMITED				
Birch Mountain				
Canadian Natural says Birch is in the planning stages.				
Phase 1	60,000	2019	Announced	SAGD
Phase 2	60,000	2023	Announced	SAGD
CENOVUS ENERGY INC.				
East McMurray				
Cenovus says this project remains part of its portfolio of long-term development opportunities.				
Phase 1	30,000	TBD	Announced	SAGD
Steepbank				
Cenovus says this project remains part of its portfolio of long-term development opportunities.				
Phase 1	30,000	TBD	Announced	SAGD
Telephone Lake				
Regulatory approval for the Telephone Lake project is anticipated in the second half of 2014.				
Phase A	45,000	TBD	Application	SAGD
Phase B	45,000	TBD	Application	SAGD
E-T ENERGY LTD.				
Poplar Creek				
E-T Energy has engaged Sayer Advisors to dispose of its oilsands leases. The company is refocusing both its time and capital on the development of its technology.				
Experimental Pilot	1,000	2012	Suspended	ET-DSP
Phase 1	10,000	TBD	Announced	ET-DSP
Phase 2	40,000	TBD	Announced	ET-DSP
GRIZZLY OIL SANDS ULC				
Thickwood				
The Alberta Energy Regulator says it will defer decisions on applications for in situ oilsands projects in the new "shallow thermal area" of the Athabasca region until it has developed formal regulatory requirements. Grizzly Thickwood is one of five impacted projects.				
Phase 1	6,000	2017	Application	CSS-SAGD
Phase 2	6,000	TBD	Application	CSS-SAGD
HUSKY ENERGY INC.				
Saleski				
Husky filed the regulatory application for its Saleski pilot in early May 2013.				
Carbonate Pilot	3,000	2017	Application	CSS
Sunrise				
Husky says that Sunrise is progressing towards start-up later this year. The well pads, diluent, diluted bitumen and gathering pipelines are moving through the commissioning phase, and major electrical systems for Plant 1A have been completed and energized. Plant 1A is scheduled to be brought online first, followed by Plant 1B approximately six months afterwards.				
Phase 1	60,000	2014	Construction	SAGD
Phase 2A	70,000	2018	Approved	SAGD
Phase 2B	70,000	2020	Approved	SAGD
IMPERIAL OIL LIMITED				
Aspen				
Alberta has issued the final terms of reference for Imperial's Aspen project.				
Phase 1	45,000	2020	Application	SAGD
Phase 2	45,000	TBD	Application	SAGD
Phase 3	45,000	TBD	Application	SAGD
IVANHOE ENERGY				
Tamarack				
Ivanhoe Energy says that it has suspended activity on the Tamarack project based on the uncertainty that there is no timeline defined by the Alberta Energy Regulator for a new regulatory framework for shallow SAGD projects, and that there is no clarity as to a path for approval for its Tamarack application. Until there is greater regulatory certainty as to a path to approval, Ivanhoe will limit Tamarack spending to only essential items.				
Phase 1	20,000	2017	Application	SAGD
Phase 2	20,000	TBD	Announced	SAGD
KOCH EXPLORATION CANADA, L.P.				
Dunkirk				
Alberta has issued the proposed terms of reference for Koch's Dunkirk SAGD project, one of the first steps in the regulatory process.				
Phase 1	30,000	2018	Announced	SAGD
Phase 2	30,000	TBD	Announced	SAGD
MARATHON OIL CORPORATION				
Birchwood				
Marathon says it expects to receive regulatory approval for the Birchwood project by the end of 2014. Upon receiving this approval, the company will further evaluate its development plans.				
Demonstration	12,000	2017	Application	SAGD
OAK POINT ENERGY LTD.				
Lewis				
Oak Point says it will receive partial funding from AIMCo and is confident the project will be fully funded.				
Pilot	1,720	TBD	Approved	SAGD
PROSPER PETROLEUM LTD.				
Rigel				
Prosper Petroleum filed its regulatory application for the Rigel SAGD project in November 2013.				
Phase 1	10,000	2017	Application	SAGD
SILVERWILLOW ENERGY CORPORATION				
Audet				
SilverWillow says it will significantly curtail corporate activity until some of its regulatory and financing uncertainties are resolved.				
Pilot	12,000	2018	Application	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
SOUTHERN PACIFIC RESOURCE CORP.				
STP-McKay				
Southern Pacific has ceased its strategic review process, citing that it was determined that none of the proposals received were acceptable, and it was further concluded that the current best alternative for all stakeholders is to continue with the development of the company's existing assets, initially focused on increasing production rates at STP-McKay.				
Phase 1	12,000	2012	Operating	SAGD
Phase 1 Expansion	6,000	2016	Application	SAGD
Phase 2A	12,000	2018	Application	SAGD
Phase 2B	6,000	2018	Application	SAGD
SUNCOR ENERGY INC.				
Dover				
N-Solv Corporation says it signed a data access agreement making Thai-owned PTTEP a participant in the bitumen extraction solvent technology pilot plant located at Suncor's Dover site.				
Demonstration Plant	500	2013	OP	
Firebag				
During the second quarter of 2014, Suncor, along with five other project partners, approved the construction of a Water Technology Development Centre at the Firebag project, which is scheduled to become operational in early 2017.				
Stage 1	35,000	2004	Operating	SAGD
Stage 2	35,000	2006	Operating	SAGD
Cogeneration and Expansion	25,000	2007	Operating	SAGD
Stage 3	42,500	2011	Operating	SAGD
Stage 4	42,500	2012	Operating	SAGD
Stage 5	62,500	2018	Approved	SAGD
Stage 6	62,500	2019	Approved	SAGD
Stage 3-6 Debottleneck	23,000	TBD	Application	SAGD
Lewis				
After the MacKay River expansion and debottlenecking at both Firebag and MacKay River, Lewis is expected to be Suncor's next area of in situ development focus.				
Phase 1	40,000	TBD	Announced	IN SITU
Phase 2	40,000	TBD	Announced	IN SITU
MacKay River				
Suncor says in April it reached a milestone by achieving first steam on the well pads associated with the MacKay River facility debottleneck project, with first oil expected in the third quarter of 2014. Suncor also continues to work towards a 2014 sanction decision of the MacKay River expansion project.				
Phase 1	33,000	2002	Operating	SAGD
Debottleneck	5,000	2014	Construction	SAGD
MR2	20,000	2017	Approved	SAGD
SUNSHINE OILSANDS LTD.				
Legend Lake				
Sunshine says it is completing field work for its environmental analysis, which will support work for significant commerical expansion.				
Phase A1	10,000	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				
Alberta has issued the final terms of reference for Sunshine's Thickwood expansion project.				
Phase A1	10,000	2015	Approved	SAGD
Phase A2	30,000	2017	Announced	SAGD
Phase B	30,000	2021	Announced	SAGD
West Ells				
Sunshine Oilsands says it has closed funding totalling $370 million, which enables it to restart construction. The company plans to achieve first steam in the first quarter of 2015 and first production in the third quarter of 2015.				
Phase A1	5,000	2015	On Hold	SAGD
Phase A2	5,000	TBD	Approved	SAGD
Phase A3	30,000	TBD	Announced	SAGD
Phase B	20,000	TBD	Announced	SAGD
Phase C1	30,000	TBD	Announced	SAGD
Phase C2	30,000	TBD	Announced	SAGD
SOUTH ATHABASCA REGION — IN SITU				
ATHABASCA OIL CORPORATION				
Hangingstone				
Athabasca says that the drilling and completions program is 100 per cent complete and has delivered better than expected cost and schedule performance. At the end of June 30, 2014, Hangingstone Project 1 was approximately 89 per cent complete with costs closely aligned with the sanctioned budget of $565 million. The teams will be ready to transition from construction near the end of the year to achieve first steam, which remains targeted toward the end of the first quarter of 2015.				
HS-1	12,000	2015	UC	SAGD
HS-2A Debottleneck (1 and 2)	8,000	2017	Application	SAGD
HS-2B Expansion	32,000	2019	Application	SAGD
HS-3	30,000	2021	Application	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
BLACKPEARL RESOURCES INC.				
Blackrod				
BlackPearl says that it converted a second pilot well pair to SAGD operation in March and oil production continues to ramp up. Production in June averaged 253 barrels of oil per day and is currently in excess of 270 barrels of oil per day. The well pair is expected to reach peak production rates of between 500 and 600 barrels of oil per day in nine to 12 months.				
Pilot	800	2011	Operating	SAGD
Phase 1	20,000	2015	Application	SAGD
Phase 2	30,000	2018	Application	SAGD
Phase 3	30,000	2021	Application	SAGD
CANADIAN NATURAL RESOURCES LIMITED				
Gregoire Lake				
Canadian Natural says Gregoire Lake is in the planning stages.				
Phase 1	60,000	TBD	Announced	SAGD
Phase 2	60,000	TBD	Announced	SAGD
Grouse				
Statements of concern about Canadian Natural Resources Limited's proposed Grouse in situ oilsands project must be filed with the company and the Alberta Energy Regulator before noon Sept. 26.				
Commercial	50,000	2018	Application	SAGD
Kirby				
Canadian Natural says that subsequent to the second quarter of 2014, Kirby South experienced temporary mechanical issues at its associated steam generating facility, which has temporarily restricted steam generation capacity. As a result of the temporary steam capacity restriction, the production ramp-up to facility capacity of 40,000 barrels per day is now targeted for the first quarter of 2015.				
KS1 - Kirby South	40,000	2013	Operating	SAGD
KN1 - Kirby North	40,000	2017	Approved	SAGD
KN2 - Kirby North	60,000	2022	Application	SAGD
CAVALIER ENERGY INC.				
Hoole				
Regulatory approval for the first phase of the Hoole project was granted in June 2014. Development of this phase is dependent upon Cavalier Energy securing financing and sanctioning by its board of directors. In July 2014, Cavalier acquired approximately 23 net sections of undeveloped land contiguous with its Hoole lands for $20 million.				
Phase 1	10,000	2017	Application	SAGD
Phase 2	35,000	TBD	Announced	SAGD
Phase 3	35,000	TBD	Announced	SAGD
CENOVUS ENERGY INC.				
Christina Lake				
Cenovus says the Phase F expansion at Christina Lake is on schedule and on budget with about 57 per cent of the project complete. First production is expected in 2016. Cenovus is also working on engineering and procurement for Phase G.				
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	Operating	SAGD
Optimization (Phases C,D,E)	22,000	2015	Approved	SAGD
Phase F	50,000	2016	Construction	SAGD
Phase G	50,000	2017	Approved	SAGD
Phase H	50,000	2019	Application	SAGD
Foster Creek				
Cenovus says first oil was achieved at Phase F in September, now to be followed by ramp up to capacity between 12 and 18 months. Phase G is 73 per cent complete with initial production expected in 2015, and Phase H is 48 per cent complete with first production expected in 2016. Capital costs for the F, G and H expansion phases are trending higher as a result of a decision to incorporate additional learnings from existing operations at Foster Creek and related scope changes.				
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	Operating	SAGD
Phase G	40,000	2015	Construction	SAGD
Phase H	40,000	2016	Construction	SAGD
Phase J	50,000	2019	Application	SAGD
Future Optimization	15,000	TBD	Announced	SAGD
Grand Rapids				
Cenovus has begun decommissioning an existing SAGD central plant facility that it purchased earlier this year and plans to relocate it to the Grand Rapids site for use at Phase A. Meanwhile, work continues on the SAGD pilot project, which has two producing well pairs.				
Pelican Lake Pilot	600	2011	Operating	SAGD
Pelican Upper Grand Rapids Phase A	10,000	2017	Approved	SAGD
Pelican Upper Grand Rapids Phase B	32,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase C	29,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase D	29,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase E	32,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase F	29,000	TBD	Approved	SAGD
Pelican Upper Grand Rapids Phase G	19,000	TBD	Approved	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Narrows Lake				
Cenovus says that work on Phase A was 25 per cent complete at the end of the second quarter and site construction, engineering and procurement are progressing.				
Phase A	45,000	2017	Construction	SAP
Phase B	45,000	TBD	Approved	SAP
Phase C	40,000	TBD	Approved	SAP
West Kirby				
Cenovus says this project remains part of its portfolio of long-term development opportunities.				
Phase 1	30,000	TBD	Announced	SAGD
Winefred Lake				
Cenovus says this project remains part of its portfolio of long-term development opportunities.				
Phase 1	30,000	TBD	Announced	SAGD
CNOOC LIMITED				
Long Lake				
CNOOC has been quoted as saying that Long Lake achieved significant improvement in the first half of 2014, but no specifics are yet available.				
Phase 1	72,000	2008	Operating	SAGD
Kinosis (K1A)	40,000	TBD	Construction	SAGD
Kinosis (K1B)	40,000	TBD	Approved	SAGD
CONNACHER OIL AND GAS LIMITED				
Great Divide				
Connacher says that second-quarter production in 2014 increased 18 per cent versus the same period in 2013, primarily due to production from the company's four new well pairs and four producing infill wells. Connacher drilled nine infill wells at Pod One in the first quarter. Steaming began on two of the infills in early July and these wells are on production. Steaming on the next two was slated to begin in August.				
Pod One	10,000	2007	Operating	SAGD
Algar	10,000	2010	Operating	SAGD
Expansion 1A	12,000	TBD	Approved	SAGD
Expansion 1B	12,000	TBD	Approved	SAGD
CONOCOPHILLIPS CANADA				
Surmont				
ConocoPhillips says that preparations are underway at Surmont for a turnaround in the third quarter of 2014 and Surmont 2 remains on track for first steam in mid-2015.				
Pilot	1,200	1997	Operating	SAGD
Phase 1	30,000	2007	Operating	SAGD
Phase 2	118,000	2015	Construction	SAGD
Phase 3 - Tranche 1	45,000	2020	Announced	SAGD
Phase 3 - Tranche 2	45,000	2021	Announced	SAGD
Phase 3 - Tranche 3	45,000	2023	Announced	SAGD
DEVON CANADA CORPORATION				
Jackfish				
Devon says that first steam at Jackfish 3 was achieved in early July. First oil will occur in the third quarter, with production ramping up throughout 2015.				
Phase 1	35,000	2007	Operating	SAGD
Phase 2	35,000	2011	Operating	SAGD
Phase 3	35,000	2014	Operating	SAGD
Jackfish East				
Expansion	20,000	2018	Announced	SAGD
Pike				
Devon says the Pike project continues to move through the regulatory process.				
1A	35,000	2016	Application	SAGD
1B	35,000	2017	Application	SAGD
1C	35,000	2018	Application	SAGD
GRIZZLY OIL SANDS ULC				
Algar Lake				**Updated: Sep 2014**
Grizzly part-owner Gulfport Energy Corporation says that all 10 well pairs are on full steam circulation, and one has been converted to SAGD production mode. Grizzly continues to see the production ramp-up as expected during steam circulation and anticipates the first phase of this facility to reach its peak production potential of approximately 6,200 barrels of bitumen per day in the second quarter of 2015.				
Phase 1	5,500	2014	Operating	SAGD
Phase 2	5,500	TBD	Approved	SAGD
May River				
Grizzly filed the regulatory application for May River Phase 1 & 2 in December 2012. The company plans to file the regulatory application for a 90,000-barrel-per-day full field development by December 2016.				
Phase 1	6,000	2016	Application	SAGD
Phase 2	6,000	TBD	Application	SAGD
HARVEST OPERATIONS CORP.				
BlackGold				
Harvest says that Phase 1 of the project is approximately 95 per cent complete as of June 30, 2014. Phase 1 completion, commissioning of the CPF and first steam are expected in 2014.				
Phase 1	10,000	2015	Construction	SAGD
Phase 2	20,000	TBD	Application	SAGD
JAPAN CANADA OIL SANDS LIMITED				
Hangingstone				
The Hangingstone expansion will receive its diluent from Inter Pipeline Ltd.'s Polaris pipeline. Additionally, Aquatech has been awarded a contract to provide its evaporator technology for OTSG blowdown treatment.				
Expansion	20,000	2016	Construction	SAGD
Hangingstone Pilot				
Pilot	11,000	1999	Operating	SAGD
KOCH EXPLORATION CANADA L.P.				
Muskwa				
Regulatory approval granted in June 2014.				
Pilot	10,000	2015	Approved	SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
LARICINA ENERGY LTD.				
Germain				
Laricina says the production profile for the Germain project has been revised to reflect a slower-than-forecast production ramp-up from the wells in the bitumen zone and the absence of production from shut-in wells in the basal water zone. The company still plans to plateau at 3,750 barrels per day, but the timing has shifted and is dependent on the timing of well pair re-drills, SC-SAGD performance and available financing for future sustaining well pairs.				
Phase 1 CDP	5,000	2013	Construction	SC-SAGD
Phase 2	30,000	2018	Application	SC-SAGD
Phase 3	60,000	TBD	Application	SC-SAGD
Phase 4	60,000	TBD	Application	SC-SAGD
Saleski				
Laricina says the Saleski pilot continues to provide the path to commerciality for the Grosmont Formation. Repeatable, predictable production and commercial rates from an existing well, along with positive early results from a recently drilled well continue to demonstrate this target is achievable and supports a full-scale Phase 1 development.				
Experimental Pilot	1,800	2011	Operating	Cyclic and SC-SAGD
Phase 1	10,700	2017	Approved	Cyclic SAGD
Phase 2	30,000	TBD	Announced	IN SITU
Phase 3	60,000	TBD	Announced	IN SITU
Phase 4	60,000	2023	Announced	IN SITU
Phase 5	60,000	2026	Announced	IN SITU
Phase 6	60,000	TBD	Announced	IN SITU
MEG ENERGY CORP.				
Christina Lake				
MEG says that in the second quarter, Phase 2B reached planned production volumes seven months after first oil. The company says that exceptional operating performance and higher realized pricing drove record cash flow in the quarter. Internal cash flow is now expected to be the major contributor to future capital funding plans.				
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				
Phase 1	41,000	TBD	Application	SAGD
Phase 2	41,000	TBD	Application	SAGD
Phase 3	41,000	TBD	Application	SAGD
OSUM OIL SANDS CORP.				
Sepiko Kesik				
Osum says it anticipates regulatory approval for Sepiko Kesik in 2015.				
Phase 1	30,000	2018	Application	CSS-SAGD
Phase 2	30,000	2020	Application	CSS-SAGD
PTT EXPLORATION AND PRODUCTION PLC				
Hangingstone				
PTTEP has completed its asset swap with Statoil Canada Ltd. to restructure the ownership of the five areas of the Kai Kos Dehseh project. As a result, PTTEP now owns and operates 100 per cent of Thornbury, Hangingstone and South Leismer areas. PTTEP says the Kai Kos Dehseh project will be renamed the Mariana oilsands project.				
Phase 1	20,000	TBD	Application	SAGD
South Leismer				
Phase 1	20,000	TBD	Application	SAGD
Thornbury				
Phase 1	40,000	TBD	Application	SAGD
Expansion	20,000	TBD	Application	SAGD
RENERGY PETROLEUM CANADA CO., LTD.				
Muskwa				
Renergy Petroleum, an affiliate of Changjiang Investment Group Co., Ltd., has applied to construct and operate a one-year pilot project on an existing wellsite that would test a proprietary steam and CO_2 co-generation and co-injection scheme.				
Muskwa Experimental Pilot	TBD	2015	Application	Steam co-injection
STATOIL CANADA LTD.				
Corner				
Statoil has announced it will delay the Corner project by at least three years, citing rising costs.				
Phase 1	40,000	TBD	Approved	SAGD
Expansion	40,000	TBD	Application	SAGD
Leismer				
Statoil and PTTEP have completed the previously announced Kai Kos Dehseh project asset swap, leaving Statoil the 100 per cent owner and operator of the Leismer and Corner projects.				
Demonstration	10,000	2010	Operating	SAGD
Commercial	10,000	TBD	Approved	SAGD
Expansion	20,000	TBD	Approved	SAGD
Northwest	20,000	TBD	Application	SAGD
SUNCOR ENERGY INC.				
Chard				
Phase 1	40,000	TBD	Announced	In Situ
Meadow Creek				
Phase 1	40,000	TBD	Approved	SAGD
Phase 2	40,000	TBD	Approved	SAGD
SURMONT ENERGY LTD.				
Wildwood				
The Wildwood project is waiting on AER approval. Surmont says that financing is not currently in place, but there are several interested parties in Asia and domestically for either a joint venture or straight investment.				
Phase 1	12,000	2015	Application	SAGD
VALUE CREATION INC.				
Advanced TriStar				
The Alberta Energy Regulator says it will defer decisions on applications for in situ oilsands projects in the new "shallow thermal area" of the Athabasca region until it has developed formal regulatory requirements. Advanced TriStar is one of five impacted projects.				
ATS-1	15,000	2016	Application	SAGD
ATS-2	30,000	2018	Application	SAGD
ATS-3	30,000	2020	Application	SAGD
TriStar				
Value Creation says it is funded for the TriStar project but has not yet decided on a construction timeline.				
Pilot	1,000	TBD	Application	SAGD
COLD LAKE REGION — IN SITU				
BAYTEX ENERGY CORP.				
Gemini				
Baytex says that oil production commenced in early April 2014, and the project is currently producing approximately 1,000 barrels per day, which is in line with expectations. The company continues to analyze reservoir performance to confirm viability of a commercial development plan.				
Pilot	1,200	2014	Operating	SAGD
Commercial	5,000	2017	Approved	SAGD
BIRCHWOOD RESOURCES INC.				
Sage				
Birchwood Resources has initiated Sayer Energy Advisors in a strategic review process.				
Pilot	5,000	TBD	Application	Low pressure SAGD
CANADIAN NATURAL RESOURCES LIMITED				
Primrose & Wolf Lake				
The AER has released the results of an independent technical review of Canadian Natural's causation report into four bitumen flow-to-surface incidents that occurred at Primrose in 2013, determining that the enabling factors were the steaming strategy and wellbore issues. The AER says these flow-to-surface events can be prevented if proper mitigation measures are put in place. However, steaming restrictions in place since June 2013 will remain as the AER's investigation continues and a gradual, step-by-step approach is established for returning to full operations. Canadian Natural and the independent panel will submit final reports to the AER in September 2014.				
Wolf Lake	13,000	1985	Operating	CSS
Primrose South	45,000	1985	Operating	CSS
Primrose North	30,000	2006	Operating	CSS
Primrose East	32,000	2008	Operating	CSS
DEVON CANADA CORPORATION				
Walleye				
Devon says the Walleye project is currently on hold.				
Phase 1	9,000	2017	Application	SAGD
HUSKY ENERGY INC.				
Caribou				
Demonstration	10,000	TBD	Approved	SAGD
Tucker				
Phase 1	30,000	2006	Operating	SAGD
IMPERIAL OIL LIMITED				
Cold Lake				
Imperial says that a cyclic solvent process (CSP) pilot facility is now in operation at Cold Lake. The pilot will evaluate the commerciality of CSP, a non-thermal, bitumen recovery process that does not require steam or water injection. Additionally, work on the Nabiye expansion has advanced to 89 per cent complete.				
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.				
Orion				
Phase 1	10,000	2007	Operating	SAGD
Phase 2	10,000	TBD	Approved	SAGD
Taiga				
OSUM says that Taiga Phase 1 will be advanced in 2015-16 subject to financing.				
Phase 1	23,000	TBD	Approved	CSS & SAGD
Phase 2	22,000	TBD	Approved	CSS & SAGD

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
PENGROWTH ENERGY CORPORATION				
Lindbergh				
Pengrowth says that construction of the Lindbergh commercial facilities is almost complete, with commissioning and first steam expected in the third quarter. The Lindbergh pilot performance continues to exceed expectations and the successful completion of the Lindbergh commercial project is expected to generate a significant increase in production and cash flow starting in 2015.				
Pilot	1,260	2012	Operating	SAGD
Phase 1	11,240	2015	Construction	SAGD
Phase 2 Expansion	17,500	2017	Application	SAGD
Phase 3	20,000	2018	Announced	SAGD
PEACE RIVER REGION — IN SITU				
ANDORA ENERGY CORPORATION				
Sawn Lake				
Andora majority owner Pan Orient Energy says that first oil was achieved at the Sawn Lake SAGD pilot in September 2014.				
Demonstration	1,400	2014	Operating	SAGD
BAYTEX ENERGY CORP.				
Cliffdale				
Baytex says that in the second quarter, thermal operations continued as planned with steam injection at Pad 2 commencing on schedule in early June. A modified injection and completion strategy to improve uniform horizontal well heat distribution is showing early positive results.				
Pilot	2,000	2011	Operating	CSS
Harmon Valley				
Pilot	TBD	2011	Operating	CSS
MURPHY OIL COMPANY LTD.				
Cadotte				
Murphy withdrew its application for the Cadotte VSD pilot in April 2013.				
Pilot	TBD	TBD	Cancelled	VSD
Seal/Cadotte				
Murphy says the two-well pilot is showing promise, with the second well showing the best response. Production in early 2014 had reached as high as 670 barrels per day with a steam to oil ratio of 1.8:1.				
Pilot	TBD	TBD	Operating	CSS
NORTHERN ALBERTA OIL LTD.				
Sawn Lake				
Pilot	700	TBD	Approved	Horizontal CSS
PENN WEST PETROLEUM LTD.				
Harmon Valley South				
Penn West has announced that in 2014 it will divest its oilsands assets in the Peace River region of Alberta as part of a strategy to prioritize light oil development. These assets comprise the Peace River Oil Partnership, which was established in 2010 with an affiliate of China Investment Corporation.				
Pilot	TBD	2014	Operating	Horizontal CSS
Seal Main				
Penn West has announced that in 2014 it will divest its oilsands assets in the Peace River region as part of a strategy to prioritize light oil development.				
Pilot	75	2011	Operating	Horizontal CSS
Commercial	10,000	2015	Application	Horizontal CSS
ROYAL DUTCH SHELL PLC				
Peace River				
Cadotte Lake	12,500	1986	Operating	CSS
Carmon Creek - Phase 1	40,000	2017	Construction	VSD
Carmon Creek - Phase 2	40,000	2018	Approved	VSD
SOUTHERN PACIFIC RESOURCE CORP.				
Red Earth				
Southern Pacific says the cyclic steam stimulation pilot at Red Earth is currently shut in.				
Pilot Expansion	3,000	TBD	Announced	CSS
Commercial	10,000	TBD	Announced	CSS
TOUCHSTONE EXPLORATION INC.				
Dawson				
Touchstone says that two wells were put on production in June following six months of steam injection. The company achieved a combined June 30, 2014 field estimate exit rate of approximately 110 barrels of oil per day.				
Experimental Demonstration	TBD	2014	Operating	CSS
Phase 2	10,000	TBD	Announced	CSS
NORTH ATHABASCA REGION — UPGRADER				
BP P.L.C.				
Terre de Grace				
BP says that ongoing appraisal activities continue.				
Pilot	8,400	TBD	Approved	UPG

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
CANADIAN NATURAL RESOURCES LIMITED				
Horizon				
Canadian Natural says that the Phase 2A expansion of its coker plant has been safely completed and production of synthetic crude oil has resumed. With the expansion, Horizon's production capacity has increased to 127,000 barrels per day from 115,000 barrels per day.				
Phase 1	110,000	2009	Operating	UPG
Reliability - Tranche 2	5,000	2014	Construction	UPG
Phase 2A	12,000	2015	Operating	UPG
Phase 2B	45,000	2016	Construction	UPG
Phase 3	80,000	2017	Construction	UPG
IVANHOE ENERGY				
Tamarack				
Ivanhoe Energy says that it has suspended activity on the Tamarack project based on the uncertainty that there is no timeline defined by the Alberta Energy Regulator for a new regulatory framework for shallow SAGD projects, and that there is no clarity as to a path for approval for its Tamarack application. Until there is greater regulatory certainty as to a path to approval, Ivanhoe will limit Tamarack spending to only essential items.				
Phase 1	34,784	2017	Application	UPG
SUNCOR ENERGY INC.				
Base Operations				
Suncor says that increased production and continued focus on cost management enabled the company to achieve cash operating costs in the second quarter of 2014 that were flat with the prior year's quarter despite a 37 per cent increase in production volumes and higher natural gas input costs.				
U1 and U2	225,000	1967	Operating	UPG
Millennium Vacuum Unit	35,000	2005	Operating	UPG
Millennium Coker Unit	97,000	2008	Operating	UPG
SYNCRUDE CANADA LTD.				
Mildred Lake/Aurora				
Canadian Oil Sands says that the second quarter was challenging for Syncrude given overlapping outages on two of its three cokers, but the final unit returned to service by early July. Syncrude says it is now focused on a return to more stable operations and the completion of the Mildred Lake Mine Train Replacement project, which remains on budget and is on track to start up in the fourth quarter of the year.				
Base Plant Stage 1 & 2 Debottleneck	250,000	1978	Operating	UPG
Stage 3 Expansion (UE-1)	100,000	2006	Operating	UPG
Stage 3 Debottleneck	75,000	TBD	Announced	UPG
SOUTH ATHABASCA REGION — UPGRADER				
CNOOC LIMITED				
Long Lake				
CNOOC has been quoted as saying that Long Lake achieved significant improvement in the first half of 2014, but no specifics are yet available.				
Phase 1	58,500	2009	Operating	UPG
VALUE CREATION INC.				
Advanced TriStar				
The Alberta Energy Regulator says it will defer decisions on applications for in situ oilsands projects in the new "shallow thermal area" of the Athabasca region until it has developed formal regulatory requirements. Advanced TriStar is one of five impacted projects.				
ATS-1	12,750	2016	Application	UPG
ATS-2	25,500	2018	Application	UPG
ATS-3	25,500	2020	Application	UPG
TriStar				
Value Creation says it is funded for the TriStar project but has not yet decided on a construction timeline.				
Pilot	820	TBD	Approved	UPG
INDUSTRIAL HEARTLAND REGION — UPGRADER				
NORTH WEST UPGRADING INC.				
Redwater Upgrader				
More than 650 personnel are engaged at the site, with work continuing on site infrastructure and buildings. Assembly welding of reactor segments is about to begin. Turnover of prepared process unit areas to contractors will be done through summer 2014. Foundation work will continue throughout the second half of 2014 in preparation for module arrival at site commencing late 2014, early 2015.				
Phase 1	50,000	2017	Construction	UPG
Phase 2	50,000	TBD	Approved	UPG
Phase 3	50,000	TBD	Approved	UPG
SHELL ALBIAN SANDS				
Scotford Upgrader				
Minority partner Marathon Oil Corporation says that volumes in the second quarter of 2014 were slightly below previous guidance as a result of reliability issues at the mine. However, the segment reported income of $55 million for the second quarter of 2014, compared to $20 million in the second quarter of 2013. The increase was primarily a result of improved price realizations and a planned turnaround during the same quarter last year. Additionally, Shell reports it has placed the final module for the Quest CCS project at the Scotford Upgrader. It is scheduled for start-up in 2015.				
Commercial	155,000	2003	Operating	UPG
Expansion	100,000	2011	Operating	UPG
VALUE CREATION INC.				
Heartland				
Reports are that Value Creation could be up and running within 18 months of project sanction, but funding remains unclear.				
Phase 1	46,300	TBD	On Hold	UPG
Phase 2	46,300	TBD	Approved	UPG
Phase 3	46,300	TBD	Approved	UPG

GLOSSARY of oil sands terms

Asphaltenes
The heaviest and most concentrated aromatic hydrocarbon fractions of bitumen.

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.

Cogeneration
The simultaneous production of electricity and steam, which is part of the operations of many oil sands projects.

Coking
An upgrading/refining process used to convert the heaviest fraction of bitumen into lighter hydrocarbons by rejecting carbon as coke. Coking can be either delayed coking (semi-batch) or fluid coking (continuous).

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.

Conventional crude oil
Mixture of mainly pentane and heavier hydrocarbons recoverable at a well from an underground reservoir, and liquid at atmospheric pressure and temperature. Unlike bitumen, it flows through a well without stimulation and through a pipeline without processing or dilution.

Cracking
An upgrading/refining process for converting large, heavy molecules into smaller ones. Cracking processes include fluid cracking and hydrocracking.

Cyclic steam stimulation (CSS)
An in situ production method incorporating cycles of steam injection, steam soaking and oil production. The steam reduces the viscosity of the bitumen and allows it to flow to the production well.

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.

Dilbit
Bitumen that has been reduced in viscosity through addition of a diluent such as condensate or naphtha.

Diluent
A light hydrocarbon blended with bitumen to enable pipeline transport. See *Condensate*.

Extraction
A process, unique to the oil sands industry, that 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.

Groundwater
Water accumulations below the Earth's surface that supply fresh water to wells and springs.

Heavy crude oil
Oil with a gravity below 22 degrees API. Heavy crudes must be blended or mixed with condensate to be shipped by pipeline.

Hydrocracking
Refining process for reducing heavy hydrocarbons into lighter fractions, using hydrogen and a catalyst; can also be used in upgrading bitumen.

Hydrotransport
A slurry process that transports water and oil sand through a pipeline to primary separation vessels located in an extraction plant.

Hydrotreater
An upgrading/refining process unit that reduces sulphur and nitrogen levels in crude oil fractions by catalytic addition of hydrogen.

In situ
A Latin phrase meaning "in its original place." In situ recovery refers to various drilling-based methods used to recover deeply buried bitumen deposits.

In situ combustion
An enhanced oil recovery method that works by generating combustion gases (primarily CO and CO_2) downhole, which then "push" 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.

Light crude oil
Liquid petroleum with a gravity of 28 degrees API or higher. A high-quality light crude oil might have a gravity of about 40 degrees API. Upgraded crude oils from the oil sands run around 30–33 degrees API (compared to 32–34 for Light Arab and 37–40 for West Texas Intermediate).

Mature fine tailings
A gel-like material resulting from the processing of clay fines contained within the oil sands.

Oil sands
Bitumen-soaked sand deposits located in three geographic regions of Alberta: Athabasca, Cold Lake and Peace River. The Athabasca deposit is the largest, encompassing more than 42,340 square kilometres. Total in-place 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 in the mineable oil sands region that must be removed before oil sands can be mined.

Permeability
The capacity of a substance (such as rock) to transmit a fluid, such as crude oil, natural gas or water. The degree of permeability depends on the number, size and shape of the pores and/or fractures in the rock and their interconnections. It is measured by the time it takes a fluid of standard viscosity to move a given distance. The unit of permeability is the Darcy.

Petroleum coke
Solid, black hydrocarbon that is left as a residue after the more valuable hydrocarbons have been removed from the bitumen by heating the bitumen to high temperatures.

Primary production
An in situ recovery method that uses natural reservoir energy (such as gas drive, water drive and gravity drainage) to displace hydrocarbons from the reservoir into the wellbore and up to the surface. Primary production uses an artificial lift system in order to reduce the bottomhole pressure or increase the differential pressure to sustain hydrocarbon recovery, since reservoir pressure decreases with production.

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

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.

Surface mining
Operations to recover oil sands by open-pit mining using trucks and shovels. Less than 20 per cent of Alberta's oil sands resources are located close enough to the surface (within 75 metres) for mining to be economic.

Synthetic crude oil
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 is a by-product of removing the bitumen from the oil sand through the extraction process.

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 that 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 in situ process where heat energy (generally steam) is used to reduce the viscosity of bitumen to facilitate recovery.

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).

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
Athabasca Oil Corporation	www.atha.com
Baytex Energy	www.baytex.ab.ca
BlackPearl Resources	www.blackpearlresources.ca
Brion Energy Corporation	www.brionenergy.com
Canadian Natural Resources	www.cnrl.com
Cenovus Energy	www.cenovus.com
Chevron Canada	www.chevron.ca
CNOOC Limited	www.cnoocltd.com
Connacher Oil and Gas	www.connacheroil.com
ConocoPhillips Canada	www.conocophillips.ca
Devon Canada	www.dvn.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.kochexploration.ca
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 Corporation	www.pengrowth.com
Petrobank Energy and Resources	www.petrobank.com
PetroChina	www.petrochina.com.cn/ptr
PTT Exploration and Production	www.pttep.com
Shell Canada	www.shell.ca
Sinopec	www.sinopecgroup.com/group/en
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 Chamber of Resources	www.acr-alberta.com
Alberta Chambers of Commerce	www.abchamber.ca
Alberta Energy	www.energy.gov.ab.ca
Alberta Energy Regulator	www.aer.ca
Alberta Environment and Sustainable Resource Development	www.srd.alberta.ca
Alberta Innovates	www.albertainnovates.ca
Alberta Innovation and Advanced Education	www.eae.alberta.ca
Alberta's Industrial Heartland Association	www.industrialheartland.com
Building Trades of Alberta	www.buildingtradesalberta.ca
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
In Situ Oil Sands Alliance	www.iosa.ca
Lakeland Industry & Community Association	www.lica.ca
Natural Resources Conservation Board	www.nrcb.ca
Oil Sands Community Alliance	www.oscaalberta.ca
Oil Sands Secretariat	www.energy.alberta.ca
Petroleum Technology Alliance Canada	www.ptac.org

For more information, visit us at

www.albertacanada.com