HEAVY OIL & OILSANDS GUIDEBOOK X

VOLUME 10 | 2015

INVESTMENT X

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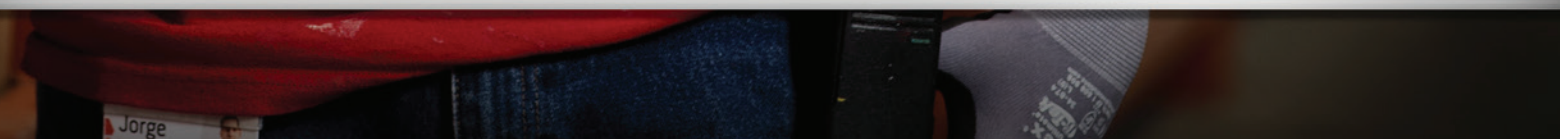


Welcome from the **PREMIER OF ALBERTA**

On behalf of the Government of Alberta, it is my pleasure to welcome readers to the 10th anniversary of the *Heavy Oil & Oilsands Guidebook*—an insightful overview of Canada's heavy oil and oilsands industries.

Heavy oil and oilsands play a key role in the prosperity of Alberta and our entire country. Together with our other natural resources, they are the foundation of an economic success story that drives job growth and a high quality of life for Albertans and Canadians. Our most valuable resources, however, are the people who make these industries thrive.

This guidebook showcases the people, technology, challenges and accomplishments in the ongoing evolution of this remarkable industry, and highlights our commitment to safe and environmentally responsible resource development.

Thank you to the heavy oil and oilsands industries for your many contributions to Alberta and our country.

Jim Prentice
Premier of Alberta

Welcome from the **GOVERNMENT OF SASKATCHEWAN**

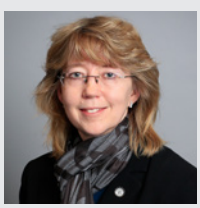
Saskatchewan is, and has always been, a province of exporters. We export almost three quarters of the total value of what we grow, mine or build to markets around the world. Our economy relies significantly upon our natural resources as a driver of growth and investment—and in particular upon our oil and gas industry.

During 2013, Saskatchewan heavy oil production represented approximately 41 per cent of all oil produced in the province. There have also been various investment commitments to oilsands development in recent years, and we are optimistic about the future of these leases and permits.

Saskatchewan's petroleum industry is coming off a benchmark year in 2014. There were 3,657 oil wells drilled and 2,837 horizontal wells drilled in the province—both records. Upstream oil and gas expenditures in Saskatchewan for 2014 are currently estimated to be approximately $6 billion—another record. Additionally, oil production reached an all-time high of 188 million barrels. We obviously have a significant endowment of resources, but we've also worked hard to encourage development of these resources by creating an environment friendly to business and innovation.

Saskatchewan's diverse economy and strong investment climate position us well for the future. We intend to build on this advantage, move forward together and fulfill our potential.

Hon. Bill Boyd
Minister of the Economy



Welcome from the **CANADIAN HEAVY OIL ASSOCIATION**

For 10 years, the Canadian Heavy Oil Association (CHOA) and JuneWarren-Nickle's Energy Group have worked together to publish the *Heavy Oil & Oilsands Guidebook*, and it is exciting to see how this publication has become the premier annual reference guide for our industry.

The Canadian heavy oil industry is constantly changing, and our community members—both newcomers to the sector as well as our established pioneers—use the *Heavy Oil & Oilsands Guidebook* in order to be current and in tune with the state of the industry's producers and innovators, technologies and trends. Over these past 10 years, this publication has seen us through market highs and lows, reinforcing the community's resilience by keeping us focused on the key priorities that keep the industry moving forward, and enabling to innovate, produce and continuously improve.

Guided by insights from the CHOA, this year's *Heavy Oil & Oilsands Guidebook* looks at where the industry is going on several fronts, from economics and innovation to supply chain and market access. We are pleased to be partners in this publication.

Gail J. Powley, P.Eng.
President, Canadian Heavy Oil Association
2014-15

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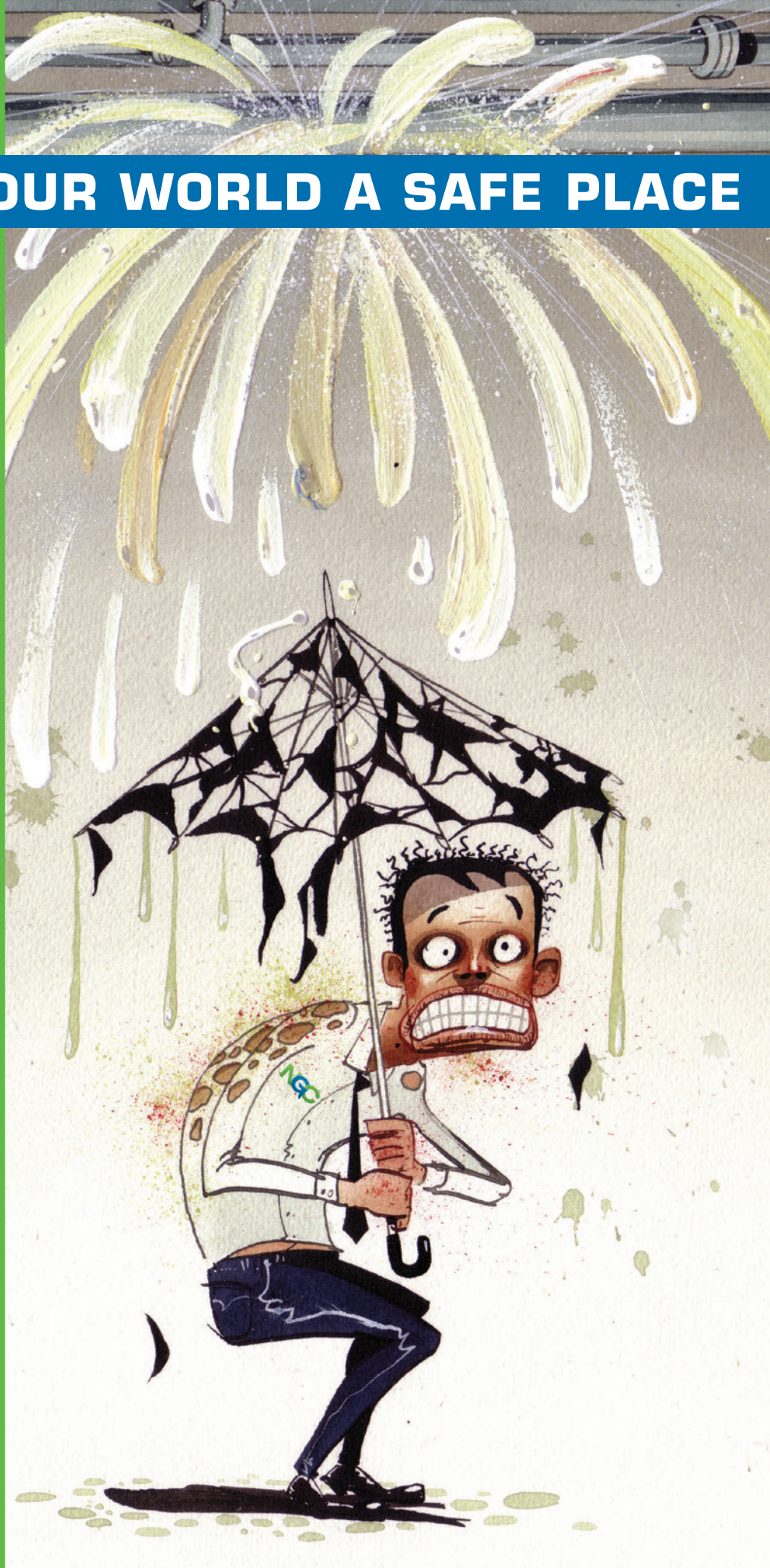

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EDITOR'S NOTE

> "I skate to where the puck is going to be, not where it has been."
>
> — Wayne Gretzky

The oilsands industry is rapidly approaching five decades of commercial operations. Throughout this time—and the nearly 300 years of progressive recognition and development that led up to it—there have always been people in and around the oilsands who have emulated the sentiment of that famous Gretzky quote.

This starts with Wa-Pa-Su himself, the Cree who first brought a sample of oilsands to trade with Europeans from the Hudson's Bay Company. I'm quite sure he knew that this material had potential far beyond just caulking canoes.

The challenges associated with oilsands development have evolved over time, but the way to overcome them has stayed steady. Innovation takes many forms and falls under many disciplines, and in the oilsands industry, it has created a powerful force. But this sector does need to change because the puck is always moving.

So where is the puck going today? To waterless extraction methods for both mining and in situ operations, dry tailings, greenhouse gas emissions equal to or less than conventional oil production, reduced capital and operating costs, integrated supply chains and best-in-class project delivery, an innovation ecosystem that truly enables change, and government oversight that recognizes it must be firm with its stick as well as generous with its carrot in order to affect sustainability.

There is no doubt in my mind that the oilsands industry has a long future ahead of it. While we will see a pause in growth as long as the low price environment persists, this is not going to last. Even if it did, the industry would adapt. It has before and it can again, with people recognizing and implementing transformative technology and strategies to change the game.

It must be a challenging balance to guide innovation in fossil fuel development. At the same time that one must acknowledge there is urgent need for systems to change, one must also believe in all the good this development can bring. A true innovator has to be hopeful and spread that hope. And it's a tough time to be spreading hope about fossil fuels in general—and the oilsands in particular.

But the oilsands industry can tick all the boxes. Operators already adhere to strict environmental regulations, and they can do better. Companies can work better together, and costs can come down. The political stewards of the resource can improve the way they navigate all of its complexities. And maybe, just maybe, we can spread some hope.

Deborah Jaremko

junewarren-nickle's energy group

EDITORIAL

EDITOR
Deborah Jaremko | *djaremko@junewarren-nickles.com*

ASSISTANT EDITOR
Joseph Caouette | *jcaouette@junewarren-nickles.com*

CONTRIBUTING WRITERS
Jim Bentein, Graham Chandler, Melanie Collison, Jared Dziuba, David Godkin, Mark Lowey, R.P. Stastny

EDITORIAL ASSISTANCE MANAGER
Tracey Comeau | *tcomeau@junewarren-nickles.com*

EDITORIAL ASSISTANCE
Sarah Maludzinski, Sarah Miller, Sarah Munn, Jordhana Rempel, Megan Tilley

CANADIAN HEAVY OIL ASSOCIATION EDITORIAL ADVISORY BOARD
Whitney Dueck, Cenovus Energy
Loreen Sherman, Star-Ting
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David Kennedy, Suncor Energy
Gavin Parmar, Suncor Energy
Scott Rempel, Wood Group Mustang

CREATIVE

CREATIVE SERVICES MANAGER
Tamara Polloway-Webb | *tpwebb@junewarren-nickles.com*

CREATIVE LEAD
Cathlene Ozubko

PRODUCTION COORDINATOR
Janelle Johnson | *jjohnson@junewarren-nickles.com*

GRAPHIC DESIGNER
Jeremy Seeman

CREATIVE SERVICES
Christina Borowiecki, Celia Hui, Linnea Lapp, Peter Markiw, Paige Pennifold, Teagan Zwierink

SALES

SENIOR ACCOUNT EXECUTIVES
Nick Drinkwater, Diana Signorile

SALES
Rhonda Helmeczi, Mike Ivanik, Nicole Kiefuik, James Pearce, Blair Van Camp

For advertising inquiries please contact adrequests@junewarren-nickles.com

AD TRAFFIC COORDINATOR—MAGAZINES
Lorraine Ostapovich | *atc@junewarren-nickles.com*

DIRECTORS

PRESIDENT & CEO
Bill Whitelaw | *bwhitelaw@junewarren-nickles.com*

SENIOR VICE-PRESIDENT, ENERGY INTELLIGENCE
Bemal Mehta | *bmehta@junewarren-nickles.com*

VICE-PRESIDENT, SALES OPERATIONS
Donovan Volk | *dvolk@junewarren-nickles.com*

VICE-PRESIDENT, GLACIER BUSINESS DEVELOPMENT & EVENTS
Ian MacGillivray | *imacgillivray@junewarren-nickles.com*

DIRECTOR OF THE DAILY OIL BULLETIN
Stephen Marsters | *smarsters@junewarren-nickles.com*

DIRECTOR OF DIGITAL STRATEGIES
Gord Lindenberg | *glindenberg@junewarren-nickles.com*

DIRECTOR OF CONTENT
Chaz Osburn | *cosburn@junewarren-nickles.com*

DIRECTOR OF PRODUCTION
Audrey Sprinkle | *asprinkle@junewarren-nickles.com*

OFFICES

CALGARY
2nd Flr-816 55 Avenue NE | Calgary, Alberta T2E 6Y4
Tel: 403.209.3500 | Fax: 403.245.8666
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EDMONTON
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MEMBERSHIP

MEMBERSHIP INQUIRIES
Telephone: 1.800.563.2946
Email: circulation@junewarren-nickles.com
Online: junewarren-nickles.com

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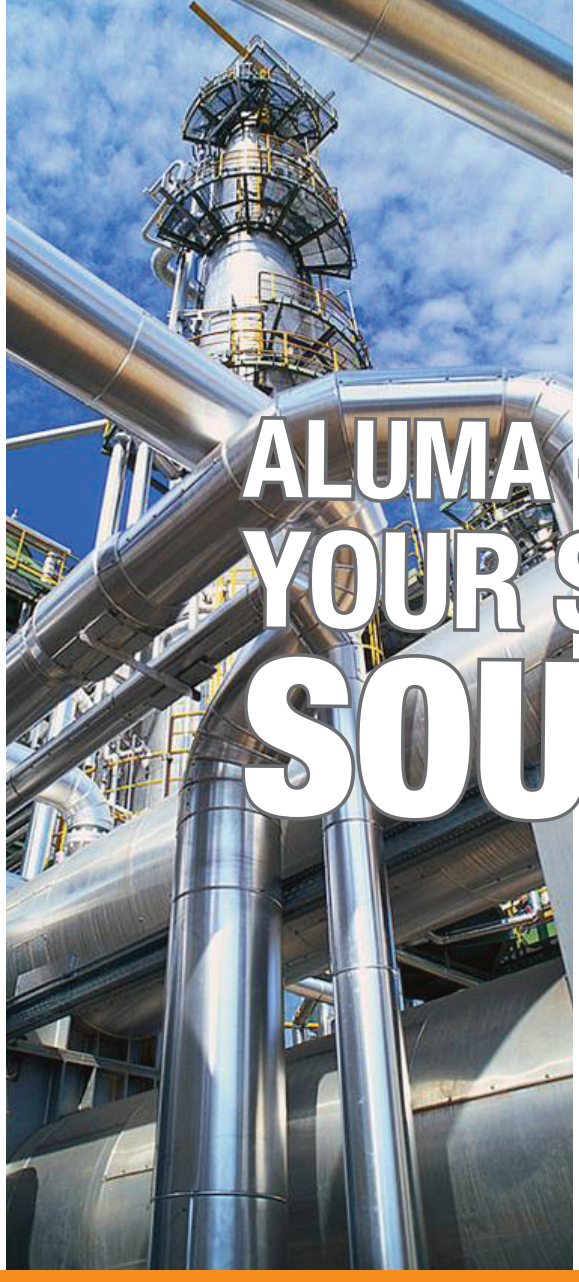

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↓ The oilsands forecast for 2015 looks challenging, but there is light amid all the doom and gloom.

PHOTO: CENOVUS ENERGY

Beyond SURVIVING

OILSANDS OUTLOOK 2015 AND BEYOND

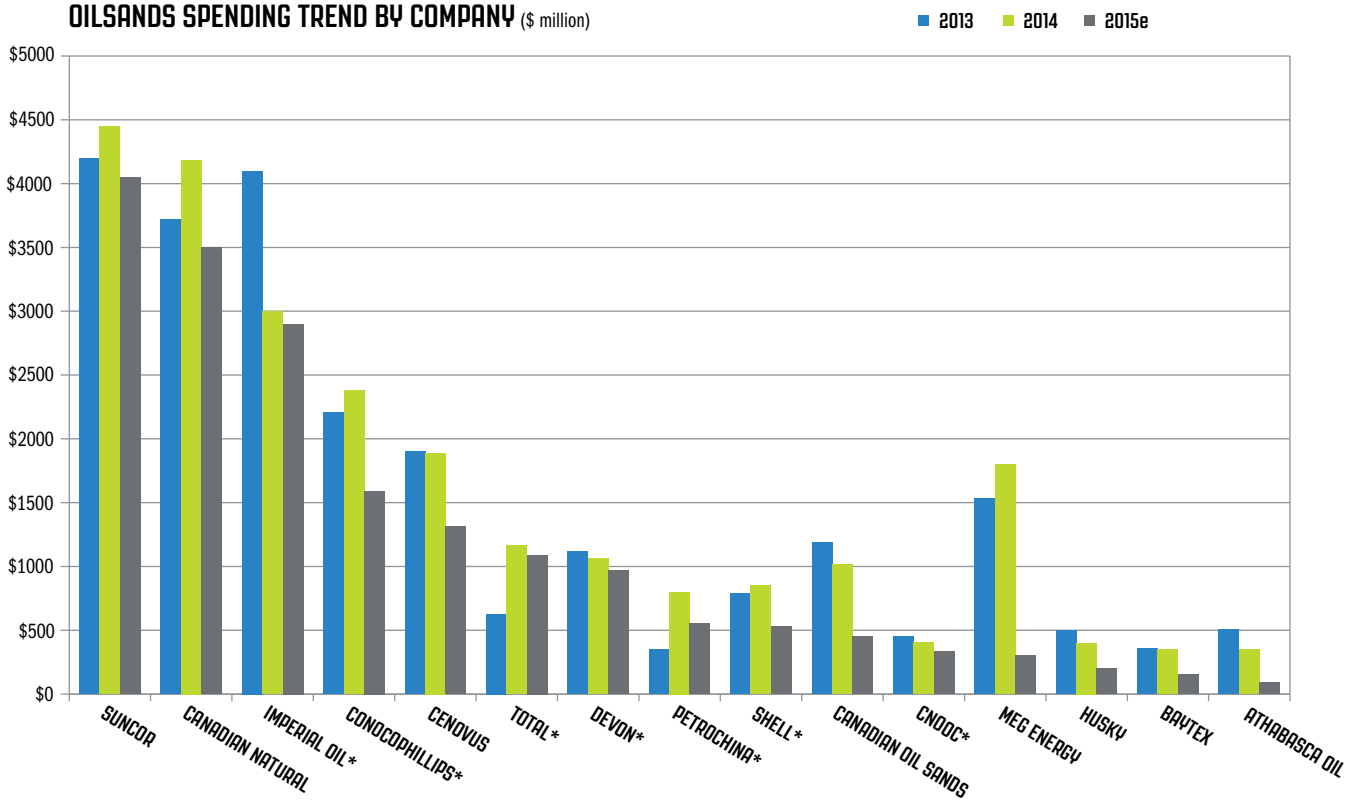
By *Jared Dziuba, BMO Capital Markets*

THE DOWNTURN IN OIL PRICES WILL CREATE A challenging environment for the oilsands business in 2015, and the new reality of prolific shale-driven global supply could also lead to greatly tempered activity and growth through 2020 compared to previous expectations. But there is some light amid all the doom and gloom.

BMO Capital Markets anticipates industry spending to decrease at least 31 per cent to $23.1 billion in 2015, the bulk being focused on maintenance and contracted expansions as opposed to new growth. Despite the spending cuts, production should still expand 10 per cent to 2.4 million bbls/d as several new start-ups come on line; however, industry cash flows will decline 55 per cent to $13 billion, speaking to the gravity of low oil price situation.

Looking beyond 2015, our outlook through 2020 sees approximately $64 billion in capital being deferred, which translates to production reaching 3.7 million bbls/d by 2020 versus 4.8 million bbls/d expected previously. →

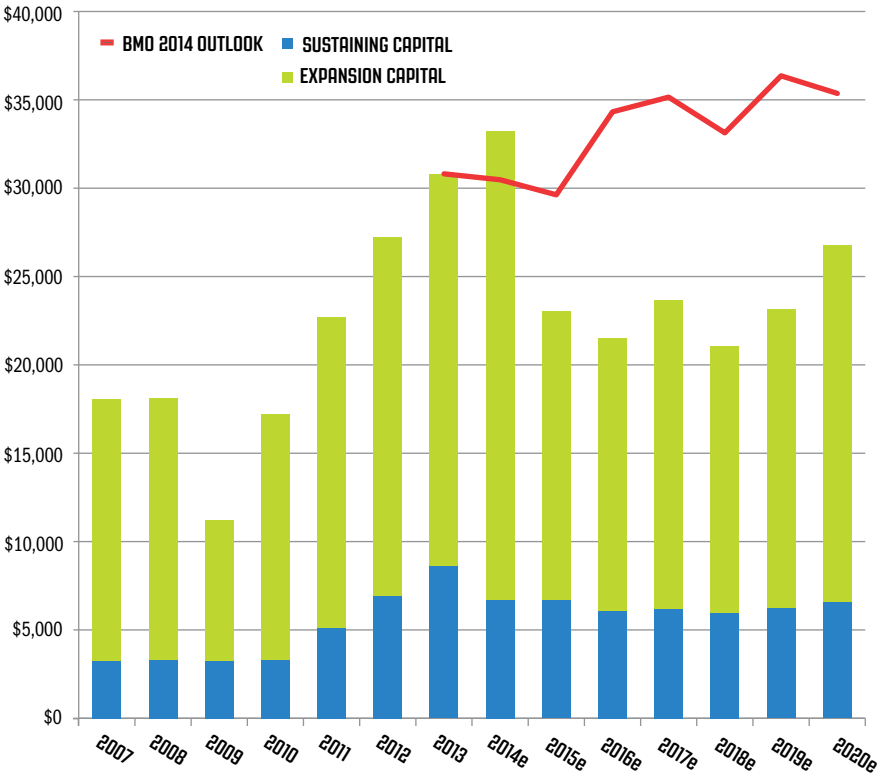
OILSANDS SPENDING TREND BY COMPANY ($ million)



*Denotes estimate based on working interest in forecast project budgets

Source: BMO Capital Markets, Company Reports

CAPITAL SPENDING OUTLOOK BY PROJECT TYPE ($ million)



Source: BMO Capital Markets, Company Reports

That's a significant hit, but it is important to note that the oilsands industry has proven resilient through past downturns, and recent investment sets it up well for eventual recovery in oil prices. Ultimately, the difficult period ahead should act as a much-needed reality check, forcing renewed focus on capital discipline, balancing supply and demand for inputs and easing supply costs. The financial health of the industry is set to improve beyond 2016, as growth investment since 2011 coupled with rising oil prices and modest future spending supports expanding free cash flow.

SPENDING OUTLOOK: A PAUSE IN EXUBERANCE

BMO expects oilsands spending will be $23.1 billion in 2015, roughly 31 per cent lower than the 2014 investment of approximately $33.2 billion, with sustaining and maintenance activity reaching its highest level since 2009 at approximately 30 per cent. Growth capital falls 38 per cent to $16.3 billion, while sustaining activity increases one per cent to $6.7 billion.

The majority of cuts are seen on in situ projects (down 39 per cent to $9.6 billion), while mining and upgrading capital decreases 23 per cent to $13.5 billion. Lower in situ spending reflects several recent project completions, including MEG Christina 2B, Conoco Surmont 2, Devon →

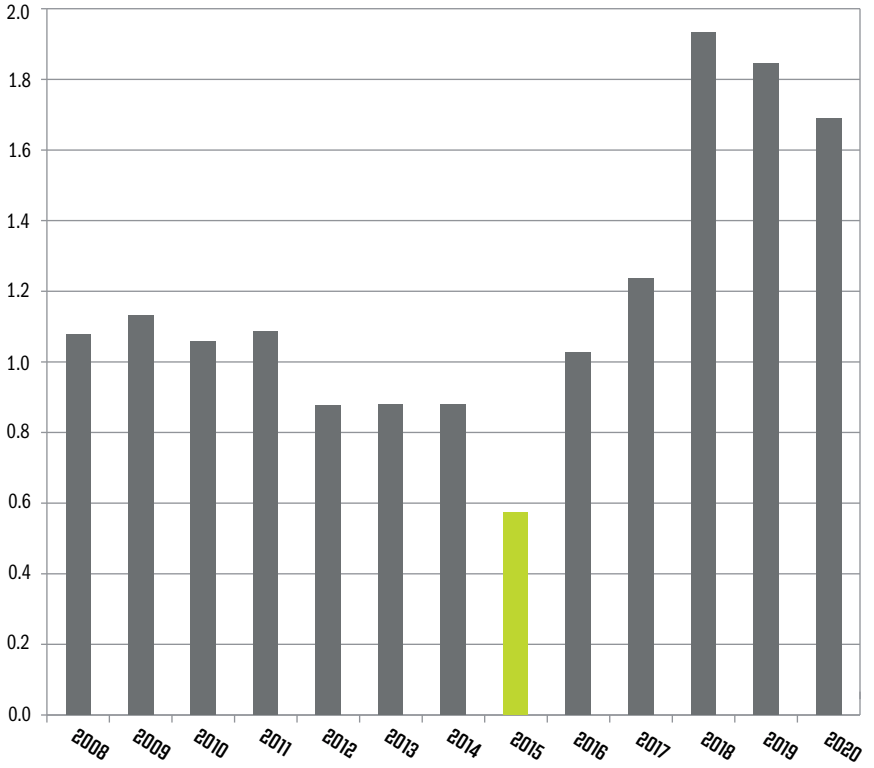
Jackfish 3, Husky/BP Sunrise and Athabasca Hangingstone.

We anticipate more capital cuts if oil prices remain low—in the 2008-09 downturn, spending fell 38 per cent, including a 46 per cent decrease in expansion. The most notable outlays are from Suncor, Canadian Natural and Imperial, while major cuts have been seen from MEG (down 83 per cent), Canadian Oil Sands (down 56 per cent) and Husky (down 50 per cent).

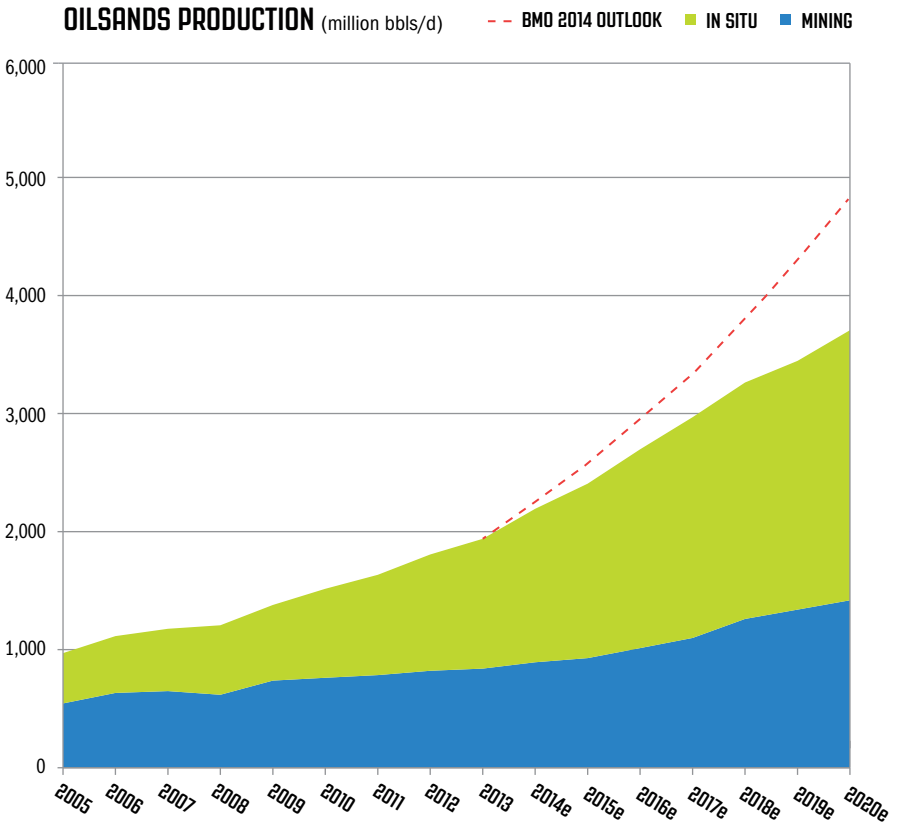
Beyond 2015, our spending outlook through 2020 has fallen by approximately $64 billion or about $10 billion per year from our 2014 assessment. Several projects have been put on hold, including Joslyn (Suncor/Total), Jackpine/Pierre River (Shell), Frontier/Equinox (Teck) and Corner (Statoil), while others have been delayed to the latter part of the decade.

The most meaningful cuts are in mining and upgrading ($40 billion), although $24 billion of in situ activity is also pushed beyond our 2020 view. We expect a gradual pickup in activity with recovery in oil prices toward the end of the decade, although BMO's US$80/bbl Brent long-term crude oil price assumption suggests some higher-cost mining developments are at risk of indefinite deferral.

OILSANDS CASH FLOW/CAPEX COVERAGE



Source: BMO Capital Markets, Company Reports



Source: BMO Capital Markets, Company Reports

FUNDING OUTLOOK

Oil price weakness will temporarily reverse a recent trend toward self-sufficient funding, although the majority of planned spending remains internally sourced. Despite cuts to date, 2015 overspend is at its highest level in recent history and suggests additional reductions are needed for industry to maintain balance sheet health through the downturn. Based on current budgets, BMO estimates 32 per cent of spending will require external funding in 2015 versus 19 per cent in 2014.

Heavy investment up to 2014 and ongoing focus on optimization should still yield meaningful production gains in the coming years, and we forecast volumes to increase 10 per cent in 2015 to 2.4 million bbls/d. The more reserved investment climate will lead to more modest mid-term growth of approximately nine per cent annually, reaching 3.7 million bbls/d by 2020 compared to our previous forecast of 4.8 million bbls/d.

In situ development remains the primary driver of growth, increasing from 1.3 million bbls/d to 2.3 million bbls/d by 2020, including 14 per cent growth in 2015 to 1.5 million bbls/d. Mining output should expand to 1.4 million bbls/d by 2020, including three per cent growth in 2015 to 920,000 bbls/d. →

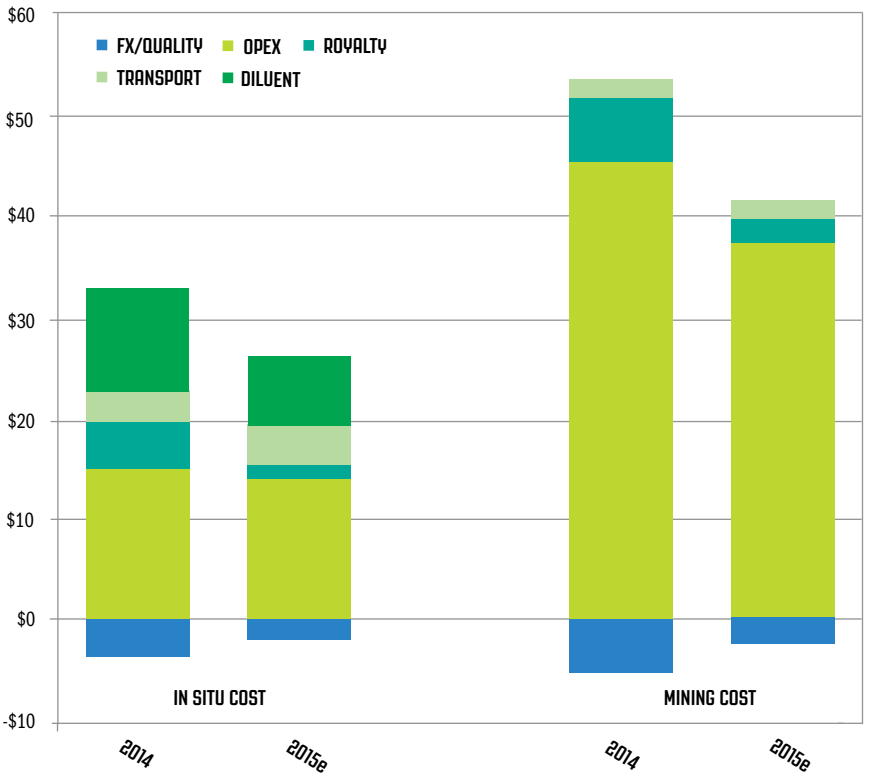
FINANCIAL OUTLOOK: BETTER TIMES AHEAD

The industry's financial health will clearly suffer given the oil price hit to revenues in 2015. But there is a bright side—historically, the business has proven highly resilient. The landlocked nature of Canadian production has made operators relatively adapted to discounted prices, and a lower Canadian dollar as well as lower royalties and input costs meaningfully cushion cash flows at lower oil prices. Cash costs are also relatively low for in situ operators in particular and are poised to drop further on efficiency gains as demonstrated through previous downturns.

We estimate oilsands cash flows could decline 55 per cent in 2015 to $13 billion from $29 billion in 2014. The good news is that we can expect an eventual recovery as low oil prices force conventional producers to curtail production and balance supply with demand. Coupled with ongoing growth in oilsands production and more modest future spending, this should lead to expanding free cash flow beyond 2016. We forecast cumulative industry cash flow of $193 billion through 2020 compared to $139 billion in spending, suggesting free cash flow of approximately $50 billion.

Contrary to some assumptions, oilsands production is unlikely to be curtailed at current or even lower oil prices. This is because cash costs

OILSANDS CASH BREAK-EVEN COSTS 2015 VERSUS 2014 (US$/bbl)



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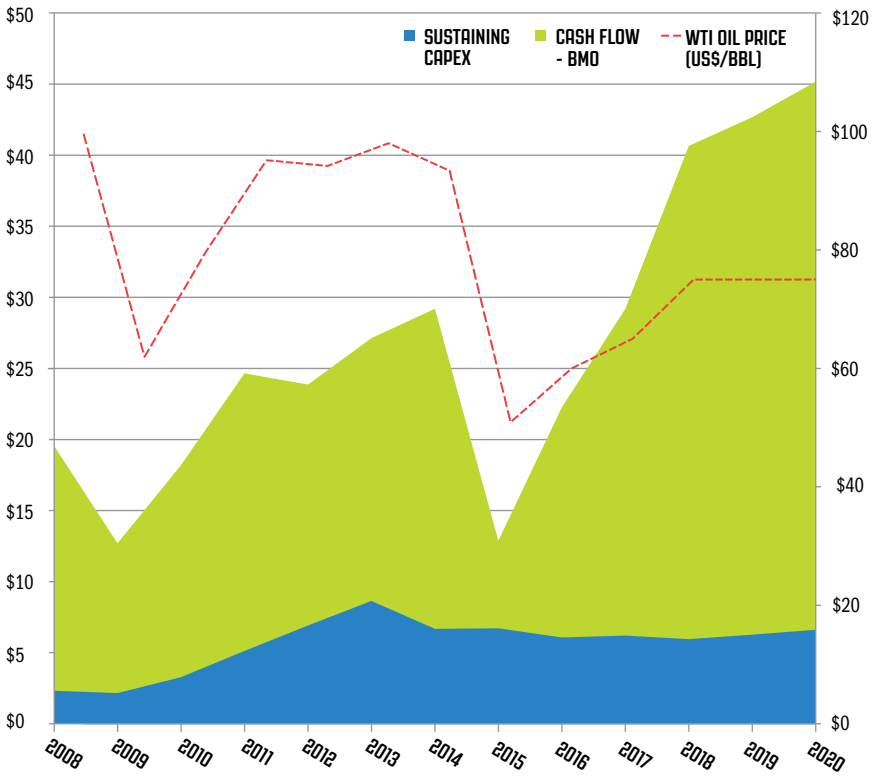
OILSANDS CASH FLOW OUTLOOK ($ billion)



Source: BMO Capital Markets, Company Reports

are generally low and fluctuate with oil prices, there are severe costs and risks to shutting down and restarting facilities, and operators hold long-term investment perspectives.

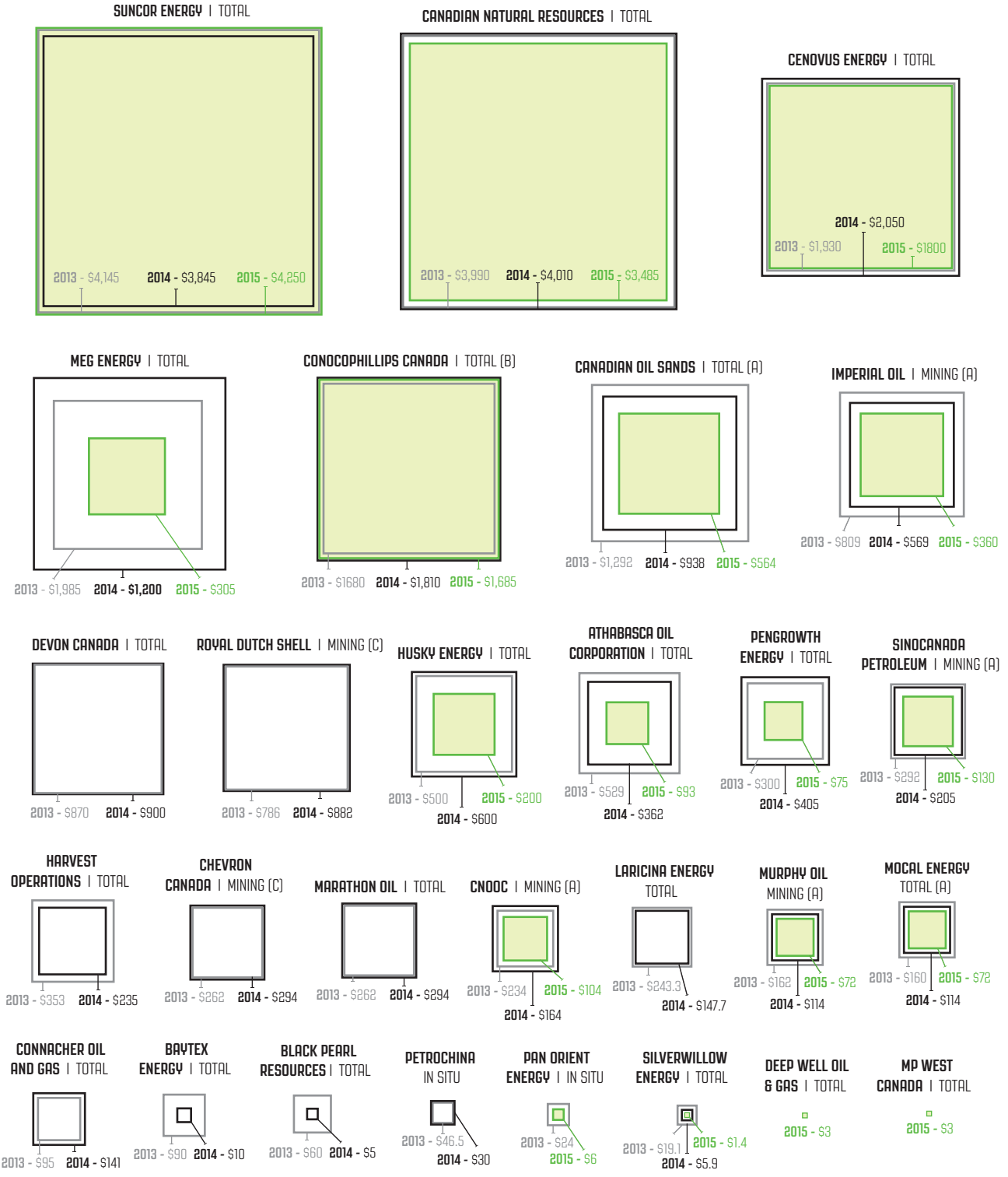
In past downturns, like the crash of 1998, costs have fallen as much as 30 per cent. BMO estimates average WTI-equivalent cash breakeven costs of US$24.66/bbl for in situ and US$39.47/bbl for mining projects, which are notably below current oil prices and reflect an average 18 per cent drop from 2014. Other strategic factors are also considered. Large projects employ thousands of skilled workers who are challenging to secure and would present material severance costs and future human resource constraints. Shutdowns also present risks to facilities as well as the integrity of surface bitumen (mining) and in situ reservoirs.

In the end, oilsands projects are assessed on a full-cycle basis—that is, over 20–50-year project lives, and a relatively short-term downturn is unlikely to motivate drastic steps to stop production. This also means that relatively few developments are at risk of outright cancellation.

We estimate average oilsands supply costs of approximately US$70/bbl, less than US$65/bbl for in situ and US$85/bbl for mining. Supply costs are likely to ease with the anticipated activity slowdown in coming years.

OILSANDS CAPITAL BUDGETS 2013-15 ($ million, includes revisions)

Crude oil pricing dropped in half between July and December 2014, and correspondingly, oilsands producers have paused investments in many new capital projects, although several well-advanced construction projects remain in flight. Capital spending in the oilsands is expected to drop by about 30 per cent overall in 2015. Here is a look at the publicly announced capital budgets for the last three years.



A: Total only includes capital expenditures relating to the Syncrude joint venture.
B: Total only includes capital expenditures relating to the FCCL partnership with Cenovus Energy.
C: Total only includes capital expenditures relating to the Athabasca Oil Sands Project joint venture.

NOTE: List compiles publicly available information at time of press and does not include all oilsands projects or operators. CAPP surveys all of its member companies to create its annual capital expenditure forecast, which for 2015 is $23 billion.

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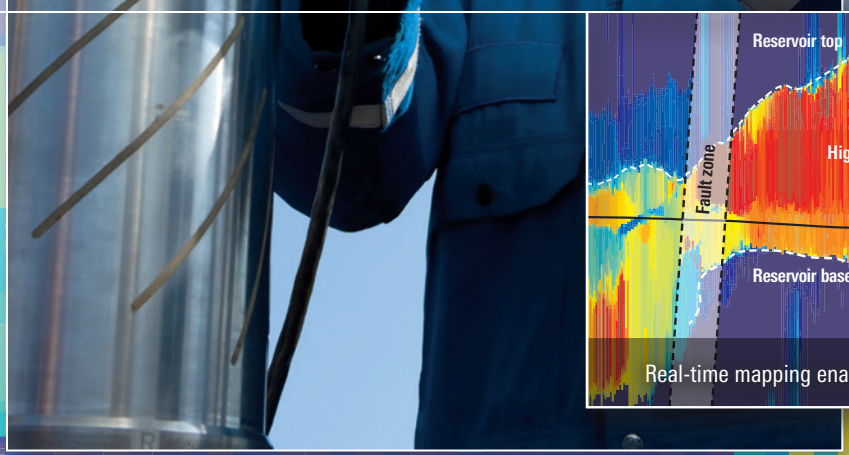

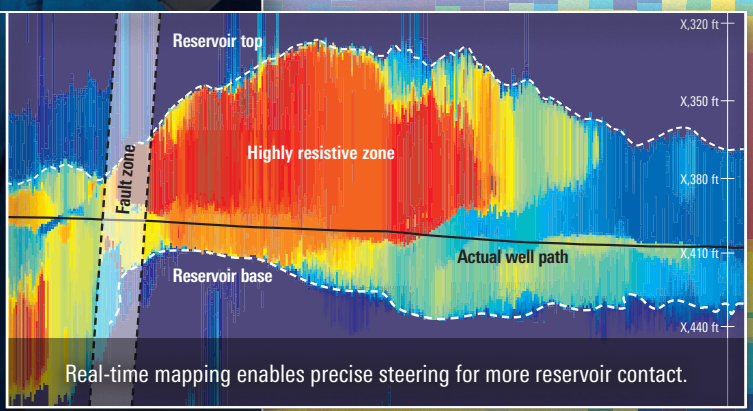

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BARRELLING THROUGH

WITH SUNK COSTS AND A LONG-TERM PRODUCTION HORIZON, OPERATING OILSANDS PROJECTS ARE EXPECTED TO HOLD STEADY THROUGH THE PRICING ROUT

By *Graham Chandler*

PHOTO: SYNCRUDE

WHEN IT COMES TO HOW SINKING WORLD CRUDE prices affect decisions to shut in production, a sort of hierarchy emerges. In January, energy research consultancy Wood Mackenzie ran various levels of Brent crude through its global database of 2,222 oilfields to test the price at which the operating cash flow of each field would go negative. Canadian oilsands projects came in on the low end.

"The point at which producing oilfields become cash negative is key in assessing how far the oil price could fall," says Robert Plummer, corporate research analyst at Wood Mackenzie's U.K. office. "Once the oil price reaches these levels, producers have a sometimes complex decision to continue producing, losing money on every barrel produced, or to halt production, which will reduce supply."

The study's findings: At $50/bbl Brent, just 190,000 bbls/d of oil production becomes cash negative, or 0.2 per cent of global supply. Seventeen countries supply oil that is cash negative at $50, the main contributors being the U.K. and the U.S. The first U.S. wells to go would be low-production onshore stripper wells. At $45/bbl Brent, 400,000 bbls/d is cash negative, or 0.4 per cent of global supply. Half of that is conventional onshore U.S. production. At $40, the analysis found 1.5 million bbls/d to be cash negative, or 1.6 per cent of global supply. At this point, "the biggest contribution is from several oilsands projects in Canada," notes Wood Mackenzie.

"Being cash negative simply means that the production is more costly than the price received," explains Plummer. "This does not necessarily mean that production will be halted."

Lumping oilsands with other types of production carries its risks, acknowledges Wood Mackenzie.

"Whenever we do these benchmarking pieces you have to stick with metrics, and sometimes these metrics can actually punish oilsands," explains Mark Oberstoetter, principal analyst, Canada upstream oil and gas, in the firm's Calgary office.

"We use a discount rate of 10 per cent worldwide, but because oilsands [projects] have a production profile that is very different from a conventional field—a long producing life—that means that discount rate probably punishes an oilsands project more than it would a conventional field, where more of the production is in the earlier years. But in order to compare apples to apples you kind of have to make these rules."

So what situation might prompt an oilsands producer to shut in production?

"It will be different operator by operator depending on what their cash flow situation looks like; it will be different project by project," says Oberstoetter. He doesn't see any major projects shutting down with Brent pricing hovering near $60/bbl, with the long-term nature of both mining and in situ operations, as well as the technological complexities of thermal projects.

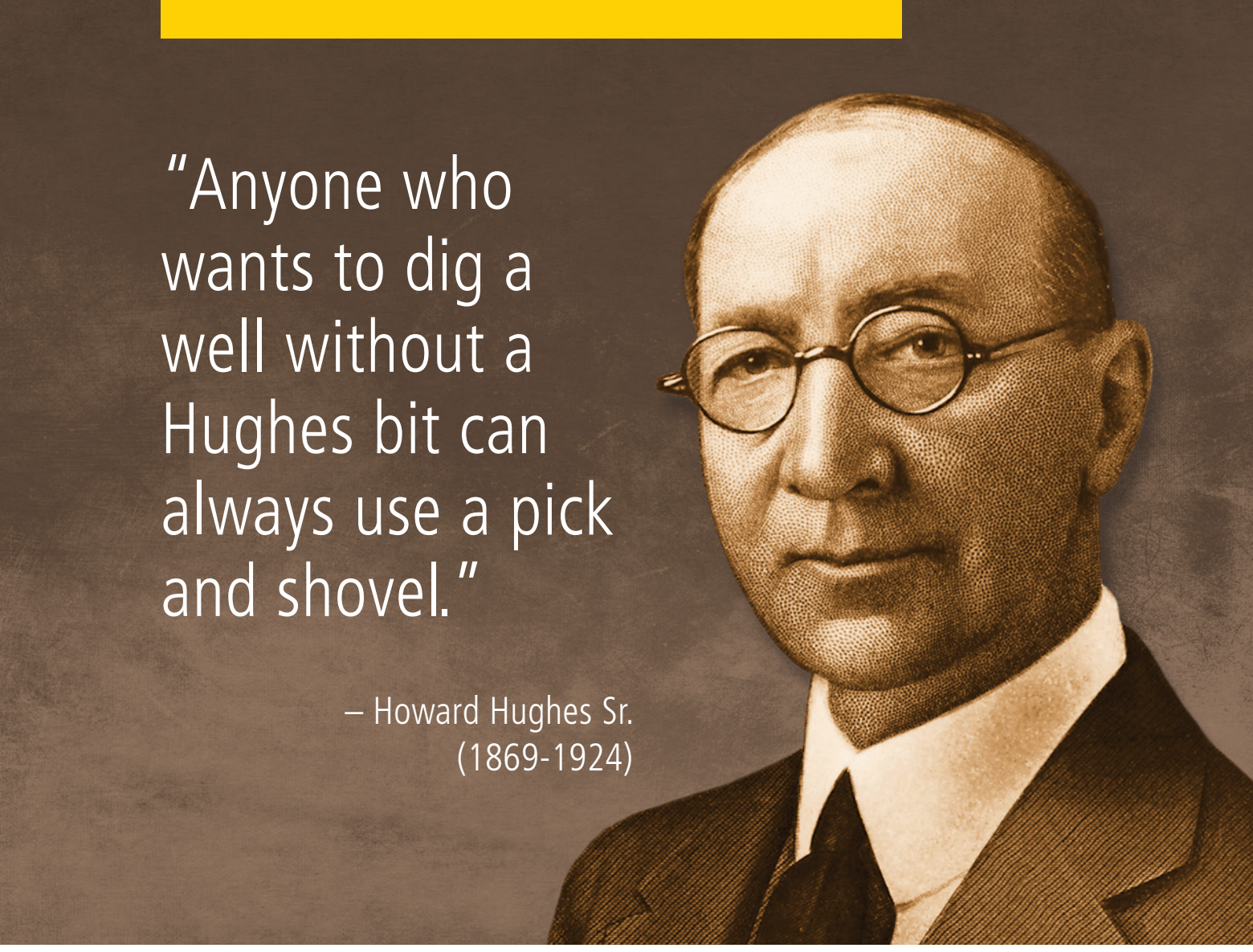
"It is a major issue to decide to shut down a producing field. You are relying on a consistent steam chamber to produce today's barrels and also tomorrow's barrels. If you choose to shut down the steam chamber, you are heavily risking actually getting it back up without doing reservoir damage. It would have to be a very drastic scenario to make that decision." He says operators will often choose to operate at a loss rather than lose their steam chamber.

Hypothetically, Oberstoetter says very low prices for a month or two shouldn't be a problem. "But say for six months, most oilsands [projects] would really start to get in that uncomfortable territory around $35 WTI. You would start to look closely at day to day economics as to whether shut-in makes sense. But then again you're looking at a very sustained low oil price."

Operating costs for SAGD projects can be as low as $12/bbl, Wood Mackenzie notes. For integrated mining/upgrading projects, operating costs are generally around $40/bbl.

As operating projects barrel on, expansions that are underway are also likely to continue. But new projects are unlikely to be sanctioned in the current environment, and the repercussions of that will not be felt for a number of years.

"The production curve is changing a bit," Oberstoetter says. "It's more a 2018-19 impact than this year or next."



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Growth pause

PRODUCTION IMPACTS FROM CAPITAL REDUCTIONS MADE IN 2015 WON'T BE FELT UNTIL 2017 OR LATER

By Deborah Jaremko

↑ In an environment where capital is limited, companies are focusing on strengthening operational efficiencies.

PHOTO: JOEY PODLUBNY

THE FORECAST HAS CHANGED, AND THE brakes are being pumped on the oilsands growth steamroller. For now.

Oilsands production volumes have doubled since 2006, now exceeding 2.1 million bbls/d. The next two years will continue that acceleration; due to the heavy front-end nature of oilsands projects, nearly 550,000 bbls/d of additional production capacity is expected to come online in 2015-16. Then the real effects of the current market deterioration will come to full light.

A significant chunk has been removed from previously anticipated near-term oilsands capacity additions as producers delay new project sanction and construction. But long-term growth expectations remain strong.

In aggregate, Canada's oil output is expected to grow by 810,000 bbls/d between 2014-20, driven primarily by the oilsands. That's according to the International Energy Agency's (IEA's) Medium-Term Oil Market Report 2015. However, lower prices reduced the Canadian supply outlook by about 430,000 bbls/d from the IEA's last report.

According to data collected by *Oilsands Review*, 890,500 bbls/d of oilsands production capacity is currently under construction, including the value-add of 50,000 bbls/d from the Sturgeon Refinery. Of the total, 445,500 bbls/d is from in situ projects, and the remaining 395,000 bbls/d is from mining. According to several industry analysts, including IHS Global Canada, these projects are unlikely to move off the table.

"Projects with capital spending that is well-advanced are likely to proceed to completion," IHS vice-president Steven Kelly writes in a recent edition of the *Journal of the Canadian Heavy Oil Association* (CHOA).

"However, many other projects will be deferred. Small players, single asset companies and novel technology developers are likely finding that their plans are being seriously impacted by this downturn."

In an environment where capital is limited, he says, "companies are focusing on operational excellence, which is about optimization of existing assets through cost management and operational reliability initiatives."

IHS expects to see increases in oilsands production in 2015 and 2016, and "steady gains through →

NEW OILSANDS PROJECTS UNDER CONSTRUCTION

OPERATOR NAME	PROJECT NAME	PHASE NAME	CAPACITY	BUDGET ($ MILLION)	PRODUCTION START
Athabasca Oil Corporation	Hangingstone	HS-1	12,000	$565	2015
Brion Energy	MacKay River	Phase 1	35,000	$1,300	2015
Canadian Natural Resources	Horizon	Phase 2B	45,000	N/Q	2016
		Phase 3	80,000	N/Q	2017
Cenovus Energy	Christina Lake	Optimization (Phases C, D, E)	22,000	N/Q	2015
		Phase F	50,000	N/Q	2016
	Foster Creek	Phase G[1]	30,000	N/Q	2016
		Phase H[1]	30,000	N/Q	2017
ConocoPhillips Canada	Surmont	Phase 2	118,000	$2,490	2015
Harvest Operations	BlackGold	Phase 1[2]	10,000	N/Q	2015
Husky Energy	Sunrise	Phase 1B	30,000	N/Q	2015
Imperial Oil	Kearl	Phase 2[2]	110,000	$8,900	2015
	Cold Lake	Nabiye Expansion[3]	40,000	$2,000	2015
Japan Canada Oil Sands	Hangingstone	Expansion	20,000	$1,400	2016
North West Upgrading	Redwater Upgrader	Phase 1	50,000	$8,500	2017
Pengrowth Energy	Lindbergh	Phase 1 Optimization	3,500	$10	2015
Royal Dutch Shell	Peace River	Carmon Creek - Phase 1	40,000	$3,450	2017
Suncor Energy	Fort Hills	Phase 1	160,000	$15,120	2017
Sunshine Oilsands	West Ells	Phase A1	5,000	$525	2015
		Total	890,500		

1: Cenovus has pushed first production for phases G and H out "by a couple of quarters."

2: Essentially complete.

3: Achieved first steam in January 2015.

OILSANDS PROJECTS RECENTLY PLACED ON HOLD

OPERATOR NAME	PROJECT NAME	PHASE NAME	CAPACITY	BUDGET ($ MILLION)	PRODUCTION START
Canadian Natural Resources	Kirby	KN1 - Kirby North	40,000	$1,450	TBD
Cenovus Energy	Christina Lake	Phase G	50,000	N/Q	TBD
	Foster Creek	Phase J	50,000	N/Q	TBD
	Grand Rapids	All phases	180,000	N/Q	TBD
	Narrows Lake	Phase A	45,000	$1,600	TBD
	Telephone Lake	All phases	90,000	$1,000	TBD
Husky Energy	Sunrise	Phase 2A	35,000	$1,600	TBD
		Phase 2B	35,000	$1,600	TBD
Pengrowth Energy	Lindbergh	Phase 2	34,000	N/Q	TBD
PTT Exploration and Production	Mariana - Hangingstone	Phase 1	20,000	N/Q	TBD
	Mariana - Thornbury	Phase 1	40,000	N/Q	TBD
Statoil	Corner	Phase 1	40,000	N/Q	TBD
Suncor Energy	MacKay River	MR2	20,000	N/Q	TBD
Royal Dutch Shell	Carmon Creek	Phases 3 and 4	TBD	N/Q	TBD
		Total	679,000		

OILSANDS PROJECTS RECENTLY SUSPENDED

OPERATOR NAME	PROJECT NAME	PHASE NAME	CAPACITY	BUDGET ($ MILLION)	PRODUCTION START
Laricina Energy	Germain	Phase 1 Commercial Demonstration Project	5,000	$410	2013
Shell Canada	Pierre River	Phase 1 and 2[1]	100,000	N/Q	TBD

1: Shell Canada told regulators in early 2014 it was halting work on Pierre River.

the end of the decade, to reach 2.9 million bbls/d by 2020."

Kelly says the downturn in oil pricing has changed neither the opportunities nor the challenges that come with oilsands exploitation.

"The same factors that have attracted companies to make the considerable investments required to bring oilsands projects to fruition remain in place: low geopolitical risk, no exploration risk and a long production horizon. On the other hand, the negative factors that have plagued the industry in recent years continue to present challenges."

The two main issues, according to IHS: market access constraints and access to capital.

"We [have] worried a lot about market access and we're going to worry a lot in the next year or two about access to capital," Kelly told attendees at a CHOA technical luncheon in early January. Of the low price environment, he added that "the pendulum has swung and it will swing back."

The ongoing markets issue was also stressed by the Canadian Association of Petroleum Producers (CAPP) in its early 2015 capital forecast announcement.

"We continue to need all forms of transportation in all directions—pipelines in particular—as our industry continues to grow in the years ahead," said CAPP president Tim McMillan, adding that the impacts of the slowdown primarily in Alberta will have cross-nation impacts.

"Purchases will be down, including purchases from the more than 2,300 businesses from coast-to-coast, excluding Alberta, that sell goods and services directly to the oilsands."

Analysts at Wood Mackenzie agree that the oilsands industry remains viable in the long term, although the company expects that low oil prices will reduce oilsands cash flows by $23 billion in 2015-16 combined.

Wood Mackenzie says that decreased investment will show post-2017. The company previously expected bitumen production to reach four million bbls/d by 2020, but has now pushed that out to 2024.

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Syncrude

After decades of operations, the world's second-largest source of synthetic crude oil positions for the future

By Deborah Jaremko

LAST YEAR, THE SEVEN-COMPANY SYNCRUDE JOINT VENture achieved a milestone, marking 50 years since incorporation. It's been a dynamic road, featuring many new technology developments credited to Syncrude along the way, including leadership in the shift from bucket-wheel to truck and shovel mining, hydrotransport and low-energy extraction. This year, Syncrude takes broad steps in two additional new technology areas—tailings centrifugation and wet crushing—proving once again it is at the forefront of major change in the oilsands sector.

"It's easy to forget that this is a technology-based industry, but Syncrude has helped invent this business, and it really is technology that is making this business viable," Syncrude chair Ryan Kubik says in the 50th anniversary celebratory publication, *Cornerstone*. "It's a technological marvel."

Syncrude was incorporated in 1964, but did not start operations until 1978. Recent years have at times been challenging for the project, as it has wrangled with reliability issues and unplanned maintenance. It's not a unique challenge for an integrated oilsands mining operation, but it is a key area of focus as Syncrude positions for the future. And the investment community is watching—in early 2015, Raymond James analyst Chris Cox explained why his firm has been discouraged by the performance of Syncrude majority-owner Canadian Oil Sands.

"With 2014 continuing a track record in recent years of continually disappointing performance from the project, we will be looking for improved operational reliability from Syncrude, in addition to a material rebound in oil prices, before we would become more constructive on shares of Canadian Oil Sands," Cox writes.

Nameplate synthetic crude oil (SCO) production capacity at Syncrude is 350,000 bbls/d. In 2014, the operation produced an average 258,100 bbls/d compared to 267,000 bbls/d in 2013.

Canadian Oil Sands says production in 2014 was reduced by unplanned outages in one of its cokers, sulphur-processing units and a sour water–treatment unit. In 2013, production was impacted by delays completing scheduled turnarounds as well as unplanned outages in extraction units.

As 2014 came to a close, Syncrude was looking ahead to a future with the foundational support of four recently completed major projects. With a combined capital cost of $7.5 billion, the projects are designed to improve reliability and environmental performance, as well as support Syncrude's future years of operations as current mining areas are depleted.

The projects are the Mildred Lake Mine Train Replacement, Aurora North Mine Train Relocation, construction of a consolidated tailings plant at the Aurora North Mine and construction of a tailings centrifuge plant at Mildred Lake.

"With the completion of these major projects, the financing and execution risk of Syncrude's major capital program is largely behind us," Canadian Oil Sands reports.

"The investment in this program provides Syncrude with the infrastructure to produce the remaining ore at its two operating mines and improve its tailings management performance, as well as support new ore production from its Mildred Lake Extension (MLX) project once approved."

Syncrude filed its regulatory application for the $3-billion MLX project in early 2015. "The MLX project will provide a replacement supply of bitumen for upgrading when our existing [Aurora] North Mine approaches the end of its oilsands deposit about a decade from now," explains Syncrude spokesman Will Gibson.

The venture is hoping for regulatory approval during the third quarter of 2017. Mining would begin in 2023, five years before it will celebrate the 50th anniversary of its first barrels of SCO flowing to market in 2028.

PHOTO: SYNCRUDE

Syncrude project dashboard

YEARS IN OPERATION: **37**

SYNTHETIC CRUDE OIL PRODUCTION CAPACITY:

■ =1,000 bbls/d 350,000 bbls/d

2014 AVERAGE PRODUCTION:

■ =1,000 bbls/d 258,100 bbls/d

RECENT INVESTMENT TO IMPROVE RELIABILITY AND ENVIRONMENTAL PERFORMANCE AND EXTEND OPERATIONS: **$7.5 billion**

NEXT PHASE OF GROWTH: **Mildred Lake Extension $3 billion/2023**

ConocoPhillips Canada Surmont 2

Technical solutions for a historic reservoir challenge provide the foundation for the largest SAGD phase ever built

By *Deborah Jaremko*

THE FACT THAT CONOCOPHILLIPS CANADA'S 118,000-bbl/d Surmont 2 project will be the largest single SAGD phase ever delivered may be the least of its achievements. The anticipated realization this year of a project with production capacity more commonly associated with an oilsands mine is clear evidence of the power of technological innovation and the confidence it can bring to oilsands developers.

The Surmont oilsands leases started in the hands of Gulf Canada, but these substantial assets have been held by ConocoPhillips since its acquisition of Gulf in 2001. The initial SAGD evaluation work was conducted in the late 1990s by a successor to the Alberta Oil Sands Technology and Research Authority (AOSTRA).

The concept of SAGD had recently been proven by AOSTRA at its underground test facility (UTF) north of Fort McMurray, but questions remained about its application in other regions.

"[Evaluation work] recognized that SAGD, as developed at the UTF, could not be directly applicable to Surmont," ConocoPhillips explains in its 2007 annual report to the Alberta Innovative Energy Technologies Program (IETP).

The main issue: overlying natural gas in places in contact with bitumen. This creates what is known as thief zones that could fatally interrupt steam chamber development.

Gulf started operating a SAGD pilot at Surmont in 1997. Results were clearly encouraging because ConocoPhillips applied for a 30,000-bbl/d commercial SAGD project at Surmont in 2002 and five years later began operations. The pilot continues to operate, which appears to be evidence that some potential reservoir challenge remains.

"Although a small commercial facility began operation at Surmont in 2007, there are still many unknowns that will affect the development," reads the ConocoPhillips report to IETP, which participated in funding the pilot in 2005.

"The wells at the Surmont pilot have just begun to show signs of contact with the overlying thief zones. Understanding the thief zones is critical to the Surmont development."

While all this field development went on, significant regulatory change was also underway that would ultimately positively impact SAGD development at Surmont. But not everyone was happy about it—the gas over bitumen issue has been highly contentious, and it started at Surmont.

After years of technical review and regulatory hearings, the Alberta regulator issued two decisions, in 2004 and 2005 respectively, that ultimately shut-in gas production in 900 wells in the oilsands.

The Alberta Department of Energy's 2010 technical audit report on gas over bitumen describes the success of ConocoPhillips' operations.

"The Surmont pilot project has been operating since July 1997 and has advanced its findings regarding operating SAGD in a resource with bitumen in contact with top water and a depleted associated gas cap; so much so that ConocoPhillips is operating its commercial project and has filed a 125,000-bbl/d expansion application," reads the report.

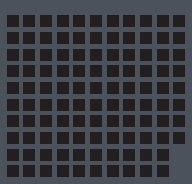
"The key conclusion to date demonstrates that successful SAGD performance requires operations to balance the steam chamber pressure with the thief zone pressure. This results in the need to design operations with three stages of steam chamber pressures."

Essentially, SAGD starts at higher pressures using gas lift. Steam pressures are then progressively reduced and mechanical lift is introduced in order to minimize steam to oil ratios.

Regulatory approval for Surmont 2 was received in 2008, and construction began in 2012. First steam is now expected in mid-2015, and the project is expected to operate for 50 years. As for the pilot? ConocoPhillips says both the test facility and Phase 1 are continuously used to calibrate geological and reservoir models for production forecasts.

PHOTO: CONOCOPHILLIPS CANADA

Surmont 2 project dashboard



118,000-bbl/d SAGD expansion

■ = 1,000 bbls/d

Indicates RESERVOIR MANAGEMENT *can solve* GAS OVER BITUMEN CHALLENGE

FIRST STEAM: MID-2015

BASED ON 18 YEARS of field piloting *and* 8 YEARS of commercial operations

Canadian Natural Resources Kirby South

← Kirby South is located in a portion of the south Athabasca region with some of the highest-performing SAGD projects as its neighbours.

PHOTO: CANADIAN NATURAL RESOURCES

Despite a mechanical hiccup during ramp-up, Canadian Natural's first SAGD project is ticking all the boxes

By Deborah Jaremko

ONE OF ALBERTA'S NEWEST GREENFIELD SAGD PROJECTS is well on its way to achieving nameplate production capacity despite an operational hiccup during ramp-up.

Up until August 2014, Canadian Natural Resources' first greenfield SAGD project, Kirby South, was hitting all of its marks. The $1.2-billion project had been completed on budget and three months ahead of schedule in September 2013.

Located just north of the Cold Lake Air Weapons Range, with high-performing SAGD neighbours including Cenovus Energy's Christina Lake project, MEG Energy's Christina Lake project and Devon Canada's Jackfish SAGD facility, Kirby South is certainly in the right geography—and geology—for success.

According to data from the Alberta Energy Regulator (AER), by December 2013, oil production rates at the nameplate capacity 40,000-bbl/d facility were already exceeding 1,500 bbls/d. Six months later, in June 2014, production had grown to over 17,000 bbls/d with a competitive steam to oil ratio (SOR) of 3.2:1, which incidentally is below the design cumulative SOR of 3.4:1.

But then July brought a bump in the road at the central processing facility, and Canadian Natural continues to feel the operational repercussions.

Excessive metal loss in steam tubes at Kirby South's five steam generators reduced steam availability, which interrupted steam chamber development in the reservoir.

"It's probably a combination of factors," Canadian Natural president Steve Laut said of the potential cause in August 2014.

"It may be design, it may be operating conditions, it may be water quality or it may be a number of other issues. We know what the fix is. We've already got one of the five steam generators repaired. It's not a big thing to do. It's not an expensive thing to do. It just takes time."

Kirby South was originally expected to ramp up to full production by the end of 2014, but in reality exited the year at 22,000 bbls/d, according to the AER. Canadian Natural says the steam-generator issue was resolved in the third quarter of 2014, but the starting and stopping of steam injection on some of the wells appears to have caused downhole mechanical problems, Laut told the company's fourth quarter–earnings conference call in March 2015.

Despite the mechanical issues, actual reservoir performance continues to be strong, the company says, and the evidence proves it. AER data shows that the project's SOR has been less than 3:1 on a continuing basis since July 2014. Canadian Natural reports January 2015 and February 2015 SORs of 2.42 and 2.4, respectively for wells on SAGD. Production averaged 23,400 bbls/d in January and 25,300 bbls/d in February. The project continues its build to nameplate capacity, albeit slower than anticipated. Full 40,000-bbl/d volumes are now expected in the second half of 2015.

For a project with a 30-year lifespan, a few bumps in the road at the start are neither unique nor entirely unexpected. And Canadian Natural still has a lot to celebrate, including the successful delivery of its first SAGD project without a single lost-time incident over the course of approximately 3.5-million man-hours.

Kirby South project dashboard

Canadian Natural Resources' **FIRST VENTURE** into Athabasca SAGD

DECEMBER 2014 STEAM TO OIL RATIO: **2.83 : 1**

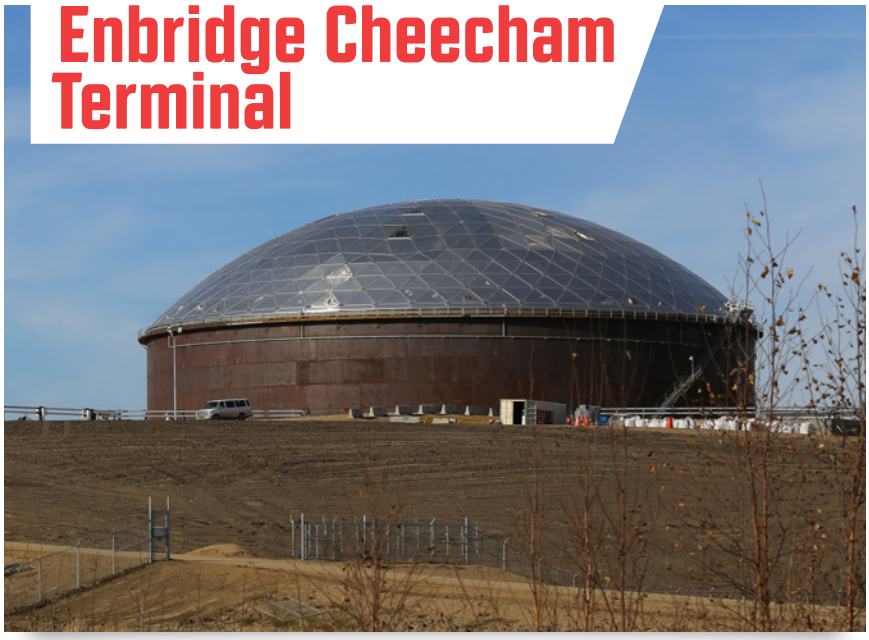
Delivered **ON BUDGET** and **AHEAD OF SCHEDULE**, **ZERO** lost-time injuries

CAPACITY: 40,000 bbls/d (■ = 1,000 bbls/d)

DECEMBER 2014 PRODUCTION: 22,000 bbls/d (■ = 1,000 bbls/d)

CAPITAL COST: $1.2 billion

Enbridge Cheecham Terminal



Exponential growth in capacity for bitumen and diluent storage and handling south of Fort McMurray

By Melanie Collison

THE AREA NORTH OF FORT MCMURRAY USED TO BE THE heart of oilsands production, but the growth of in situ development in the south has resulted in infrastructure build out on an impressive scale.

Chief among these projects is Enbridge's Cheecham Terminal, 70 kilometres southeast of Fort McMurray along Highway 881. Cheecham provides connections between bitumen producers clustered in the area and distribution infrastructure, and it's been growing along with the SAGD facilities that surround it. In 2009, production in the southern Athabasca region was about 80,000 bbls/d. In 2014, those volumes jumped to 395,000 bbls/d. But Cheecham doesn't just provide support to southern producers.

"Cheecham provides a hub-based operation," says Daniel Huntley, manager of area operations for liquid pipelines in Enbridge's Athabasca gathering system. "It provides our customers—producers—with easy access to our main corridor pipelines to Edmonton and Hardisty."

Hardisty, he adds, is the head of the Alberta Clipper Pipeline to Wisconsin.

Three mainline pipelines tie into the Cheecham facility, which houses approximately four million barrels of storage capacity for heavy crude and diluent.

Capacity for diluted bitumen flowing out of Cheecham is 1.12 million bbls/d, says Enbridge spokesman Graham White.

Extending its existing pipelines and adding an incoming diluent line, in partnership with Keyera, Enbridge has been tailoring its facilities primarily to SAGD operations coming on stream. It pegs its expansion investment between 2012 and 2017 at $6.2 billion.

"Cheecham Terminal has expanded vastly in the last number of years," Huntley says.

On the intake side, the expansion includes the construction of gathering pipelines from SAGD projects coming online and the installation of tanks to accommodate incremental bitumen production, stockpile diluent and for blending diluent into bitumen to meet mainline pipe transport specifications.

In 2014, for instance, Enbridge completed a $500-million originating terminal, a 90,000-bbl/d pipeline with expansion potential to more than 270,000 bbls/d and storage expansion at Cheecham for Husky Energy's Sunrise SAGD project, which is located north of Fort McMurray.

Enbridge is also constructing two new 450,000-barrel bitumen-diluent blend tanks and converting an existing tank from blend to diluent for ConocoPhillips Canada's 118,000-bbl/d Surmont 2 project, which will start operations this year.

And among the numerous projects on its drawing boards are plans with Athabasca Oil Corporation and Japan Canada Oil Sands to provide terminalling services to their respective Hanginstone SAGD projects, along with production pipelines to Cheecham Terminal.

Line extensions are also proposed to expand crude collection and transport capacity between Suncor Energy's growing production in the region and Enbridge's mainline hub at Hardisty, running through the Athabasca and Cheecham terminals.

On the delivery side, the Woodland Pipeline Extension project is adding capacity south from Cheecham to Enbridge's Edmonton Terminal. The Waupisoo Pipeline, which originates at Cheecham, has recently been expanded twice to achieve 550,000-bbl/d capacity to Edmonton.

Given the expense and difficulty of acquiring diluent to blend into heavy crude, producers will welcome the planned 449-kilometre Norlite diluent pipe from Enbridge's Stonefell Terminal to the Suncor East Tank farm adjacent to Enbridge's Athabasca Terminal near Fort McMurray.

Norlite is to be completed in 2017 at a cost of approximately $1.4 billion.

Complementing Enbridge's Cheecham Terminal is the nearby South Cheecham Rail and Truck Terminal, a 50-50 joint venture between Enbridge and operator Keyera.

PHOTO: JOEY PODLUBNY

Cheecham Terminal project dashboard

CURRENT OUTPUT CAPACITY: **1.12 million bbls/d**

LOCATION: **70 KILOMETRES southeast of Fort McMurray**

CUSTOMERS SUPPORTED INCLUDE: **Nexen, Husky, ConocoPhillips Canada, Athabasca Oil Corporation, Japan Canada Oil Sands, Suncor, Statoil**

BITUMEN/DILUENT STORAGE CAPACITY: **APPROXIMATELY FOUR MILLION BARRELS**

ESTIMATED EXPANSION INVESTMENT 2012-17: **$6.2 billion**

BP Whiting Refinery

PHOTO: BP

Refinery expansion strengthens U.S. Midwest commitment to Alberta crude

By Melanie Collison

THE IMPACT OF BP'S RECENT $4.2-BILLION UPGRADE OF its Whiting Refinery ripples far from the facility's location in northwest Indiana.

By outfitting Whiting to handle primarily heavy crude from Alberta's oilsands, the huge long-term commitment to the refinery has strengthened the oilsands sector's connections across North America.

Since the upgrade came on stream in 2014, "it has solidified the demand from the U.S. for heavy oil," says Greg Stringham, vice-president of oilsands and markets with the Canadian Association of Petroleum Producers.

"The U.S. Midwest has always been our primary export market, but the Whiting upgrade just deepens that connection. They have shifted from other offshore sources and have found [Canada to be] a good supplier of heavy oil into that refinery. [The investment] is making a commitment to heavy oil."

Market analysts have been crediting the massive upgrade of BP's Whiting Refinery as a major influence in the recent narrowing of the discount on Alberta's heavy oil blend, Western Canadian Select (WCS).

In the past, pipeline congestion and refinery outages have pushed the WCS differential off the price of benchmark WTI past US$40.

"The better the balance between heavy supply and heavy demand, the closer the differential is to transportation costs, and that makes for an efficient market," Stringham explains.

Located at the hub of a vast network of pipelines and railroads on the shore of Lake Michigan, east of Chicago, the Whiting Refinery is the seventh-largest refinery in the U.S. and the largest outside of the Gulf Coast. It is now able to process approximately 400,000 bbls/d of heavy crude. That's 85 per cent of its capacity, up from 20 per cent.

Enbridge Energy Partners, which serves Whiting on its main line from Edmonton, has also invested heavily in expanding its pipeline and storage capacity in the area.

The Whiting project is the foundation of BP's U.S. fuels strategy, according to Iain Conn, former chief executive of BP's refining and marketing segment.

The refinery has unique flexibility in its ability to access and process crude, he says, which demonstrates BP's commitment to operating feedstock-advantaged U.S. refineries that are tied to strong retail markets.

BP's vice-president of refining, Nick Spencer, calls the upgrade a game changer that's dramatically shifting Whiting's competitive position.

In the largest private investment in the history of Indiana, BP replaced the oldest operating units with safer, more efficient and more capable units, and upgraded many of the others—all while the refinery continued to operate.

Its main crude unit, which fractionates crude oil into feed streams for further processing, was reconfigured while the team carried out work on three other major units.

A state-of-the-art petroleum coker, the second-largest Foster Wheeler coker in the world, can process around 102,000 bbls/d. The unit converts residual oil into lighter naphtha, light and heavy gas oils for use in gasoline and diesel production, and petroleum coke, which can be used for power generation and other industrial applications. The old unit was decommissioned.

The refinery now has greater sulphur recovery–processing capacity to handle the heavy sour crude and a gas oil hydrotreater to reduce the sulphur, nitrogen and aromatic hydrocarbons to acceptable levels to allow the subsequent processing of gas oil in Whiting's catalytic cracking units, where gasoline and diesel are produced.

In August, the refinery weathered a setback when a fire in a compressor briefly closed a blending oil unit that removes sulphur from distillate and gas oil streams. More than 225 kilograms of sulphur dioxide was released into the air, but monitors showed levels remained well below maximums allowed by the Environmental Protection Agency.

BP Whiting upgrade project dashboard

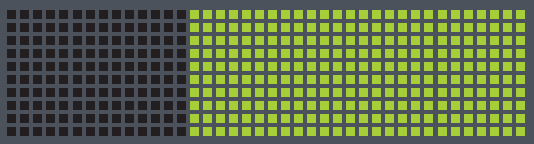
ON STREAM: **Early 2014**

PROJECT COST: **$4.2 billion**

COMPONENTS:

Reconfigured crude distillation unit, addition of new **102,000-bbl/d coker**

SCOPE:



Increases heavy oil processing capacity by **65 per cent**, to approximately **400,000 bbls/d**

■ = 1,000 bbls/d

The **largest private sector investment** in Indiana history

CRUNCHING NUMB3R$

LOW OIL PRICES AMPLIFY THE PURSUIT OF OPERATIONAL EXCELLENCE

By *Jim Bentein*

OILSANDS PRODUCERS HAVE DEFERRED BILLIONS IN NEW CAPITAL SPENDING IN THE wake of depressed crude oil prices, but they've also set their sights on significantly reducing operating costs. It's not new—owners have recently been incorporating more and more cost-cutting strategies in operations—but it has been accelerated.

Syncrude majority-holder Canadian Oil Sands, in particular, has been vocal in its efforts.

"In response to the price environment, Syncrude is undertaking a comprehensive review of costs. An effort was already underway at Syncrude to reduce the cost structure, but this work has intensified to identify near-term opportunities," the company announced in late January.

"The initial efforts have identified potential cost reductions in 2015, net to Canadian Oil Sands, of $260 million to $400 million, or about 10–15 per cent, in operating, development and capital costs."

Extending that figure out to Syncrude itself, based on Canadian Oil Sands' 36.74 per cent ownership, that's over $1 billion in savings expected in 2015.

Cenovus Energy has also recently announced significant sustaining capital reductions. The company says it established a formal process in 2014 to evaluate potential sustainable savings across all of its operations to combat increasing costs, and now expects to achieve $400 million to $500 million in annual operating and capital cost savings by 2018.

LABOUR COSTS

According to Mark Smithdorf, president and chief executive officer of brownfield engineering, procurement and project management specialists HOCS Projects, identifying areas for operational cost savings isn't always about what one might expect.

"There are things you can do to optimize a facility and to reduce costs, but there's an elephant in the room nobody wants to talk about," explains Smithdorf, who says that with HOCS's focus on efficiency and productivity, it tends to get busier when oil prices are low.

"As recently as 10 years ago, [Alberta] could justify multi-billion dollar projects at oil prices of $35/bbl. The single largest cost in Alberta is labour. Labour costs are out of control, and there needs to be an adjustment for us [in order] to be competitive on the global market."

Smithdorf says the oilsands engineering sector has helped play a role in ramping up labour costs by utilizing a man-hour calculation when it charges for work.

INTEGRATING CAPITAL PROJECT PLANS WITH OPERATIONS

Labour issues aside, Smithdorf says that there is a growing need for optimization, debottlenecking and upgrading of existing facilities.

"Reliability is a major challenge in this industry," he says.

He attributes that to the inability of the sector to take a full-cycle approach to the construction of its plants and facilities.

In essence, Smithdorf says, that's because the team devoted to capital projects skimps in areas where operational reliability should be a focus. The capital projects team often doesn't communicate beforehand with those who will be operating the plant.

As a result, with the capital investment group focused on cost containment, there's little concentration during the detailed engineering/procurement stage on making plants operate more efficiently for the long term.

"What happens is [producers] build a SAGD or CSS plant and soon after start-up they bring in a separate team to debottleneck and optimize the plant, operationally and mechanically," he says.

"Also, in many cases, an alarm-management team is required to dumb down the automation system to make it more operator friendly." This might involve removing some redundant equipment, rightsizing valves, pumps or exchangers, or taking other steps to make the plant more operator-friendly.

Smithdorf says the failure of capital investment groups to communicate with the operations team means capital budgets fail to take into account the longer-term sustainability of equipment.

"It's like someone who buys a pair of $20 running shoes instead of a $300 pair," he says. "The cheaper shoes end up costing more because they have to be replaced more often. Capital budgets need to take operations and maintenance into account."

Brian Jewer, project director with Vista Projects, an engineering and procurement company that specializes in the design of thermal heavy oil

← Operators in an Alberta SAGD project control room discuss day-to-day project management. Optimizing oilsands plant reliability has become even more important in the low price environment.

PHOTO: JOEY PODLUBNY

> **"Labour costs are out of control, and there needs to be an adjustment for us [in order] to be competitive on the global market."**
>
> — **Mark Smithdorf**, president and chief executive officer, HOCS Projects

and oilsands facilities, says that technology can help integrate solutions from operations in capital project planning.

For example, Vista uses monitoring technology to help operations and maintenance workers become involved in plant design and to help better assess the performance of plant components.

"We use 3-D modelling to include operations and maintenance workers in the design process," said Jewer. "For instance, they can say where they need a particular arrangement of equipment and pipe rack to improve the plant's operation."

Engineers also conduct a reliability, availability and maintainability analysis during the design process, which he says helps determine the optimum mix of capital investment to improve the reliability of a plant. This involves a life cycle cost analysis—examining not only the capital cost impact but the total cost impact for the operating life of the plant.

"On the current project phases [for Cenovus SAGD plants] we have reduced the detailed engineering percentage of the total installed cost to six to seven per cent, versus an industry average of 10–12 per cent," he said. "This is due not only to templating, but also to eliminating deliverables and streamlining engineering and procurement procedures with Cenovus."

DEBOTTLENECKING

While it is meaningful for companies to plan projects better, operational reliability is an issue that faces a significant portion of the existing installed base of production capacity, which has effectively doubled since 2008.

Part of the answer can be debottlenecking, which Don Clague, vice-president, oilsands and in situ technical and reliability with Suncor Energy, explains:

"When you get this new plant, everything has its nameplate capacity, and what you find is that certain pieces of equipment can actually run past their nameplate capacity. Not all of them can run at the same level, so what we find is that we've always got a bottleneck in the system," Clague says.

"We've always got some pieces of equipment that aren't running at full capacity, and we've got other ones that are running at full capacity. We look at debottlenecking as an opportunity to utilize existing underutilized capacity and try and drive more out of the asset."

CUTTING SUPPLIER COSTS

But again, reducing costs isn't always about equipment—project owners are also asking suppliers to cut costs, reportedly by as much as 30 per cent. But service providers say they didn't just pad in extra margins during the good times, so they don't have much room to back out now. The answer could be a sometimes elusive tool—collaboration.

"The future of oilsands in Alberta is producers and suppliers working together to add value," says Mike Price, president and chief executive officer of WestFab Industries. "Let's work together to share some of that value. Give me an incentive to reduce the cost of your group separator skid package by 20 per cent. You get 10 or 15 per cent. Maybe I get five per cent."

A contract ON SAFETY

OILSANDS INJURY CLAIMS ARE GOING DOWN, BUT COMPANIES DRAWING UPON MORE CONTRACTORS COULD FACE GREATER CHALLENGES IN WORKER WELL-BEING

By *By Jim Bentein*

OILSANDS PRODUCERS MAY COPE WITH lower oil prices by shifting to the use of more contract workers—a move that could seriously compromise on-site safety, according to one risk-assessment expert.

"Companies have safety programs in place for their own workers, but the programs aren't as strongly developed with contract workers," says Ron Visser, a partner with the enterprise risk services division of Deloitte Consultants. "In a low commodity price environment, do [oilsands miners] put as much emphasis on safety? What are they going to do to ensure contract workers are getting trained in safety?"

Admittedly, it's still too soon to tell how this shift to contract workers will impact work-site safety, Visser says. But he notes that contractors tend not to receive the same safety training as permanent employees.

Visser has done consulting work for oilsands clients like Suncor Energy, Canadian Natural Resources and Husky Energy, and he recalls how the industry, in its early days, would draw on workers with farming backgrounds. Familiar with farm equipment, these employees had developed an understanding of the safety issues around machines and work sites. They were very safety conscious.

By contrast, many of today's oilsands workers come from urban backgrounds and require more safety training, as the industry readily understands, he says. In fact, most companies place as much emphasis on work-site safety as they do on environmental responsibility. The oilsands industry sees maintaining a safe workforce as part of its social licence, Visser notes.

However, shifting to the use of more contract workers could jeopardize recent safety gains.

For example, safety data on contract workers is not well developed, according to Visser. Yet companies increasingly manage workplace safety through the use of analytics. This includes capturing incident and injury data, internal operational data and external data to create a predictive model that identifies factors contributing to workplace injury and risk, as well as opportunities for more effective injury management.

A recent report produced by Deloitte, *Predictive Safety: People and Culture. For life.*, highlights that the trend toward the use of more safety analytics has helped create safer workplaces. Drawing upon Alberta workplace incident statistics through to mid-2014, the paper concludes that a safer work environment offers companies a variety of benefits, such as staff retention.

Despite concerns about the rise in contract workers, the report—which Visser helped author—says that there has been a great deal of progress regarding worker safety in the sector. For instance, statistics from the Workers' Compensation Board - Alberta show that total injury claims in the oilsands have declined from 322 in 2009 to 276 in 2013. Lost time claims are also down from 45 in 2009 to 36 in 2013.

But the report argues that the industry can do better "by supporting meaningful training and reporting programs with solid safety culture and analytical tools…that allow you to predict where the conditions will be right for severe injuries."

However challenging it may be—particularly in light of the cost-cutting pressures that come with lower oil prices—the oilsands industry still needs to put an emphasis on building a culture of safety, according to the report.

"We know, for instance, that much of the talent finding its way to the job sites in Fort McMurray brings relatively little prior experience with, thus little awareness of, the hazards of the job," the authors of the paper write. "We know there are sometimes significant language and other cultural barriers. We know there is often unwillingness in some workers to learn."

The authors argue that managing and navigating through these complexities begins with training and carries through to formal programs that feature comprehensive safety communication and clear lines of responsibility. This approach needs to constantly be renewed, and analytics can play an important role in that process.

For instance, they can be used to correlate the level of incident probability with specific training courses and identify which ones bring the largest safety returns. They can also help pinpoint why a worker has a better safety record at one site over another or establish the threshold at which overtime and frequent task changes become safety issues.

OILSANDS SAFETY STATS IMPROVING

	Total injury claims	Lost time claims
2009	332	45
2013	276	36
Per cent reduction	↓ 17%	↓ 20%

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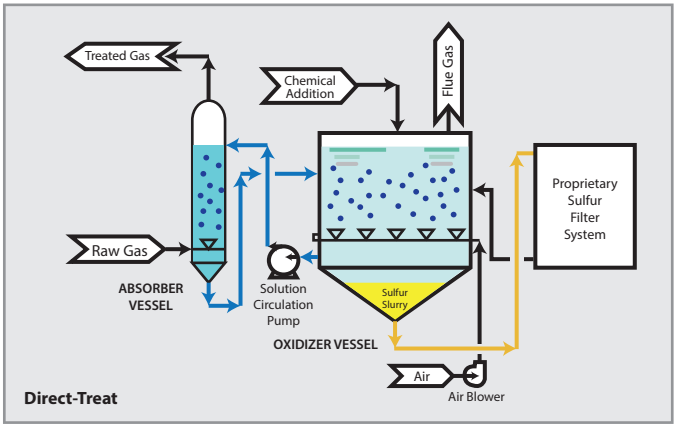
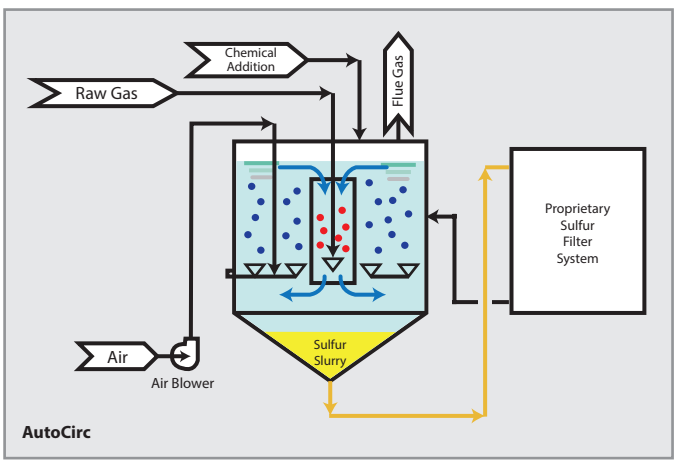


LO-CAT Direct Treatment Scheme

When treated gas cannot be combined with air, a direct-treat design is employed. This is achieved by use of two separate vessels, an absorber and an oxidizer. The absorber treats the sour gas, producing sweet gas in a single pass. The oxidizer serves two purposes: The regeneration of spent catalyst and the concentration of sulfur particles into a slurry. The proprietary sulfur filter system takes the sulfur-rich slurry, washes it and produces an elemental sulfur cake.



LO-CAT AutoCirc Scheme

When treating a gas that can be mixed with air, the AutoCirc design provides significant cost savings in both operating and capital expenses. By combining the absorber and oxidizer in one vessel, the solution circulation pump is eliminated resulting in reduced electrical consumption. The single vessel approach also minimizes footprint.

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Innovation FLOWS

CANADIAN NATURAL RESOURCES VICE-PRESIDENT JOY ROMERO ADDRESSES THE "URGENT" NEED FOR INDUSTRY AND GOVERNMENT TO CONNECT MORE EFFECTIVELY

By Deborah Jaremko

FOR A RESOURCE THAT HAS BEEN REFERRED TO AS "THE oil that technology made," it is no wonder that innovation is seen as a key strategic piece of successful oilsands development. But in order for the oilsands industry to maintain or even build its competitive advantage in an environment with a virtual flood of asset investment opportunities, the process of innovation itself must improve. Urgently.

That's according to Joy Romero, vice-president of technology development for Canadian Natural Resources. She's also the former chair of the Canadian Oilsands Network for Research and Development and a key figure in the structure of Canada's Oil Sands Innovation Alliance (COSIA).

At the fall 2014 Oil Sands Symposium hosted by Petroleum Technology Alliance Canada, Romero noted that while there are a number of industry- and government-led organizations with the mandate to support innovation, the communication pathways between these groups are flawed.

"They are the bodies, but there needs to be blood flowing somewhere. We've got lots of repositories—how do they talk to each other? How do we actually make the data flow? That's not sexy, but if it doesn't work, if it's not there, the rest of this stuff is actually empty," she said.

"We are working on these things, but to get people to listen to this part and to finance it and take it really seriously to really make the information flow, that's not so easy."

Speaking during the early stages of the crude oil pricing trough, Romero added that challenging market dynamics only underline the need for the oilsands to improve.

"The urgency for us to come up with solutions that both reduce our footprint and increase our productivity, and do it for less money, is exactly what we're charged for. There is no time to waste."

Innovating isn't always about coming up with new technologies or strategies, Romero said, citing Canadian Natural's experience with planning for electricity exports to the grid from its Horizon mining and upgrading project. Planning for the facility began in 2001, and the regulatory process began in 2002.

"We wanted to maximize cogeneration and to be able to export off-site. At that time there was supposed to be a corridor from the oilsands to the rest of the province, and that corridor still does not exist," she said.

"[Looking] back on it, how many oilsands facilities have gone in and how many of them could have maximized cogeneration? We would have burnt those [greenhouse gases] once. People don't want those corridors through their backyards, but what if they knew that by having those corridors, we reduced Alberta's greenhouse footprint by 50 per cent? This is innovation that already exists. This is infrastructure that is already there. All we need to do is use it more wisely."

Additionally, Romero argued that what the oilsands really needs is more field-testing capacity for new technologies. Through COSIA, industry is currently constructing the Water Treatment Technology Development Centre, which she says will be "basically heaven" when it comes to field-testing. But other sites need to be developed faster.

"We are trying very hard, and it has been very difficult to do something similar for greenhouse gases. We have company funding and we're looking for provincial and federal funding. It has been almost a two-year journey now."

Industry and government should look now to "innovate how we innovate," she said, in turn providing lessons from the oilsands that can be transferred across Canadian industries.

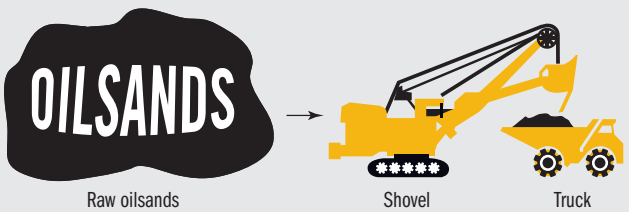
Joy Romero is vice-president of technology development for Canadian Natural Resources. She's a key player in the oilsands innovation ecosystem.

PHOTO: JOEY PODLUBNY

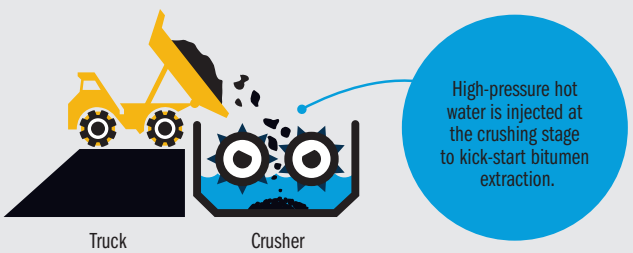
FIVE meaningful new oilsands technologies

By Deborah Jaremko

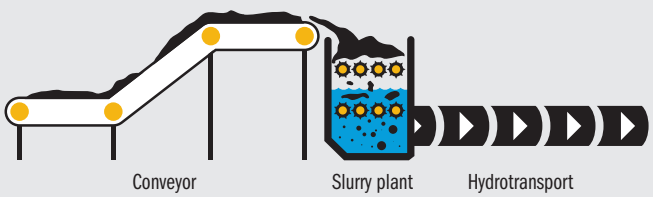
OILSANDS MINING AND EXTRACTION



CRUSHING STAGE



SLURRY STAGE



TREATMENT/MARKET STAGE

IN COMMERCIAL SERVICE: WET CRUSHING

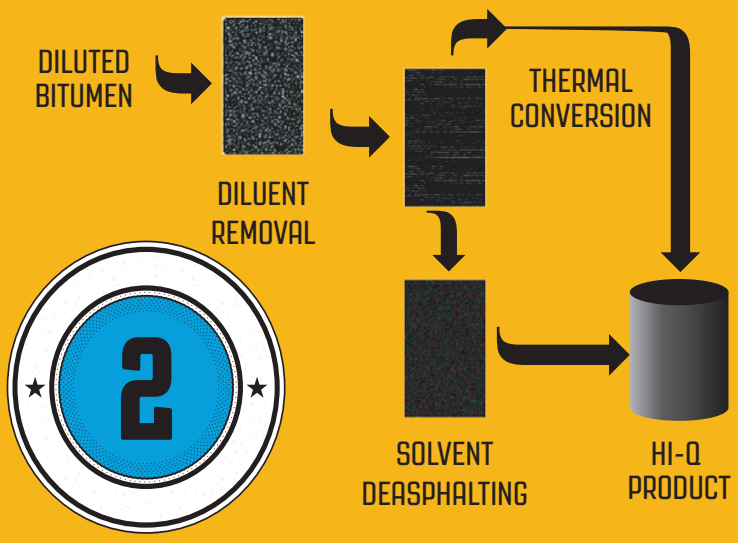
A new innovation designed to improve bitumen mining recovery rates and ease maintenance activities is now operating at Syncrude. In the fourth quarter of 2014, the seven-company joint venture started operations at the Mildred Lake Mine Replacement (MLMR). The heart of this $3.9-billion project is wet crushing technology.

Essentially, wet crushing takes to the next level the system of hydrotransport, which in itself is considered revolutionary by oilsands miners.

In the 1990s, Syncrude led the industry-wide switch to hydrotransport pipelines from long conveyor belts. Previously, chunks of mined ore went through a series of crushers before entering hydrotransport pipelines, where the ore is combined with hot water into a slurry that kick-starts the extraction process. Now, the hot water is being added to the crushing stage, giving even more juice to the separation system.

Syncrude built a full-scale wet crushing pilot in 2006, and the MLMR project started delivering its first oilsands slurry to extraction in October 2014.

IMAGE: SYNCRUDE



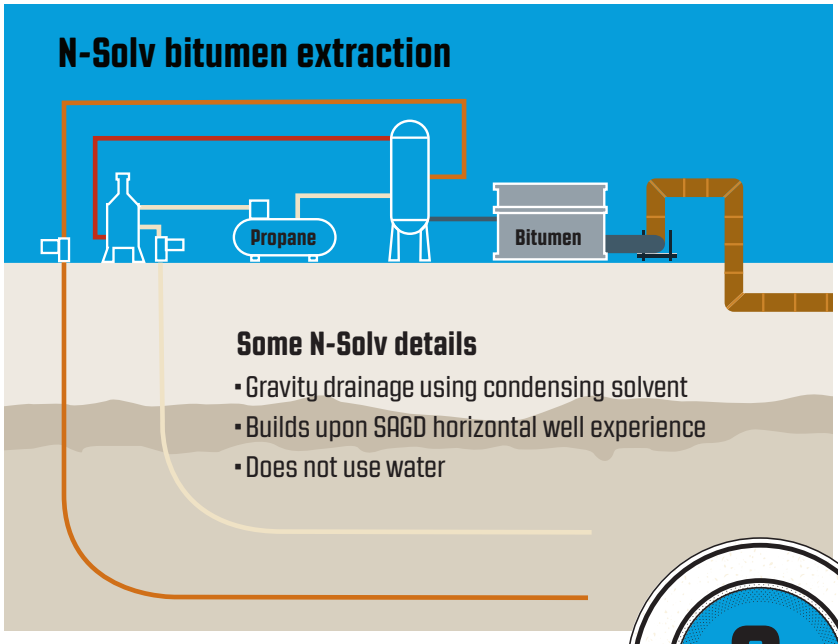
DEMONSTRATION APPROACHING: HI-Q PIPELINING WITHOUT DILUENT

Burgeoning mid-size oilsands producer MEG Energy is adding new technology development to its suite of projects. The company re-defined its approach to growth using a strategy called RISER, where debottlenecking and brownfield expansion at the plant is complemented by infill drilling and non-condensable gas co-injection in the reservoir. Now MEG will build a field pilot for Hi-Q, a technology designed to eliminate diluent requirements.

In 2014, MEG began construction on its Hi-Q field pilot in Alberta's Industrial Heartland region near Edmonton. However, according to company spokesman Brad Bellows, MEG has adjusted the timeline for the project due to capital constraints in the low price environment. Bellows says MEG remains "very much committed" to the Hi-Q pilot and is merely backing off until prices improve.

The company says Hi-Q "has been successfully demonstrated on a smaller scale to modify bitumen blends to a product suitable for shipping by pipeline without diluent, at significantly reduced environmental impacts relative to conventional oilsands upgrading processes."

The process could prove to be a crucial one for an industry facing potential diluent shortages in the decades ahead. While forecasts and policy papers sound the alarm on the need for access to new markets, the rising demand for diluent is equally crucial to the future of the industry. All the pipelines in the world don't mean a thing if the bitumen can't flow. As for crude-by-rail, a technology like Hi-Q could help improve economics by allowing pipeline-connected unit-train facilities to run true "neatbit," or 100 per cent diluent-free bitumen.



MAJOR MILESTONE: PURE-SOLVENT EXTRACTION

The injection or co-injection of solvents along with steam has been described as the in situ oilsands industry's most significant opportunity to reduce greenhouse gas (GHG) emissions. While a number of producers test solvent co-injection and one, Cenovus Energy, moves toward commercial application, a pure-solvent technique has marked a meaningful milestone.

In October 2014, N-Solv announced it had produced 25,000 barrels of oil since start-up in spring 2014 at its bitumen extraction solvent technology pilot at Suncor's Dover site. N-Solv expects that a commercial operation could reduce GHG emissions by 80–85 per cent compared to conventional SAGD. And, the company says, it would deliver 15–20 per cent returns on WTI as low as $40/bbl

N-Solv's 25,000-barrel milestone has proved out a number of expectations. One is that the process can start up and continually produce without water and, once running, is robust and sustainable.

"I would say we've considerably de-risked the project for going to the commercial stage," says Joseph Kuhach, N-Solv's chief executive officer.

The N-Solv process takes advantage of proven SAGD well pair configuration. It involves the injection of a pure, warm solvent vapour (propane or butane) into an oilsands reservoir, where it condenses and dissolves bitumen into the solvent. The modest heat speeds the dissolution process and the resulting miscible liquids flow by gravity to a production well.

"One of the nice things about this technology is you can go commercial at small scales, like 5,000 bbls/d, so we're in the process of looking for [joint venture] partners to advance that as well as potentially licensing with the right arrangement," Kuhach says. "[Within] three to five years, I would expect us to have a plant up and running and producing commercial levels." →

IMAGES: (TOP) MEG ENERGY; (BOTTOM) N-SOLV

COMMERCIAL OPERATIONS IN 2015: QUEST CARBON CAPTURE AND STORAGE

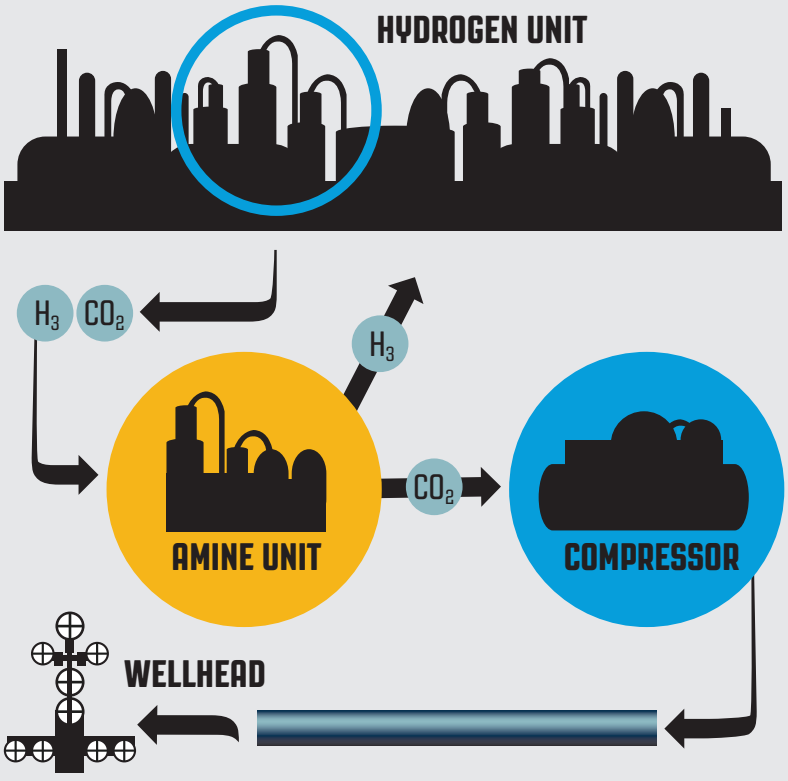
4

The final countdown is on at Quest, the oilsands industry's first carbon capture and storage (CCS) project. Worldwide, CCS is believed to have the potential to manage 15–19 per cent of CO_2 emissions, representing a key technology to achieve emmissions reduction goals while enabling ongoing fossil fuel development.

According to supermajor Royal Dutch Shell, the Quest project is the flagship of its global CCS program.

"I don't think there's a jurisdiction in the world that does not recognize CCS as a valuable option," says Rick Chalaturnyk, a University of Alberta geotechnical engineering professor whose major research interest is the geological storage of greenhouse gases. "Because of Quest, Alberta is going to be extremely well positioned to understand this technology chain beyond most other jurisdictions."

The Quest project is integrated with Shell's Scotford Upgrader, the downstream piece of the company's Athabasca Oil Sands Project, a mining installation it shares with Chevron and Marathon.



The operations team at the $1.35-billion Quest CCS project has at last begun its takeover from the subsurface, design and construction teams, and throughout 2015 the company will conduct commissioning and start up.

Shell expects that by 2020 it will have CCS capacity of 2.76 million tonnes per year. While that is just roughly one per cent of Alberta's total emissions, the figure still represents the equivalent of removing 550,000 cars from the road.

IMAGE: SHELL CANADA

ON THE HORIZON: NANOTECHNOLOGY

5

In October 2014, the University of Calgary (U of C) celebrated the addition of a star energy researcher to its faculty who is targeting the development of nano-scale bitumen extraction processes that require less energy and water and reduce CO_2 emissions.

"Before accepting his position as Canada excellence research chair in materials engineering for unconventional oil reservoirs at the U of C, Steven Bryant was Bank of America centennial professor in the University of Texas at Austin's department of petroleum and geosystems engineering," the U of C says, adding that Bryant was director of two of the university's industrial affiliates programs—one on nanoparticles for subsurface engineering and the other on geological CO_2 storage.

The goal of Bryant's work, the U of C says, is to "bridge the gap between the current technological status of the oilsands industry and where it needs to be to ensure a sustainable, globally competitive future."

The U of C says he will lead a research team combining nanotechnology and materials science research with chemical and petroleum engineering, geoscience and chemistry in an attempt to viscosify steam for in situ bitumen extraction—to make it into a type of foam. This will enable the water to enter the pores of the reservoir more uniformly and release more of the oil.

"The beauty of nanoparticles is that you can also have a level of functionality that you can't get with traditional chemicals, and this opens the door to new ways to produce energy," Bryant says. "For example, as we look to deliver heat to free the oil, we can deploy nanoparticles made of iron oxide into the reservoir and then apply an oscillating magnetic field to heat them up. There is no steam used, so no water. It's based on the biomedical principle of hyperthermia, which is used in cancer treatments, and the collateral damage is extraordinarily minimal."

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COSIA ISSUES TECHNOLOGY CHALLENGES AND SETS A CONCRETE PERFORMANCE GOAL, BUT IS IT ENOUGH?

By *Mark Lowey*

Before Canada's Oil Sands Innovation Alliance (COSIA) was created, the big question facing someone with a new technology for improving the industry's environmental performance was like that song refrain from the movie Ghostbusters: "Who ya gonna call?"

There has always been a "blizzard" of ideas and proposals from third parties, says Dan Wicklum, COSIA's chief executive. But with more than a dozen large oilsands companies—each corporately distinct and with their own risk tolerances and research projects—someone with a good idea had better be prepared to exercise their knuckles.

"You might knock on five people's doors in one company. Potentially, you might have 60 conversations going on at the same time in that sector about how to get your technology tested," Wicklum says.

That landscape started to change in March 2012. That's when chief executive officers of 13 competing companies—representing 90 per cent of oilsands production—came together in Calgary to sign COSIA's founding charter.

In 2014, the group launched its web-based Environmental Technology Assessment Portal (E-TAP). Here, anyone with a new technology idea can fill out a form to submit their proposal online, have it considered and get a reply within 10 business days. More than 300 proposals have come in via E-TAP to date.

"E-TAP is the window into the key technology decision makers across the whole sector," Wicklum says. "So you can get an answer 'Yes' real quick, and frankly, you can get an answer 'No' real quick."

ISSUING A TECHNOLOGY CHALLENGE

And COSIA is not just waiting for random ideas to flow in. Last fall it issued a challenge, explicitly stating the innovation needs required to fill gaps in technology within two of the alliance's four environmental priority areas (EPAs): water and greenhouse gases.

The challenges are written in technical language that is not specific to the oilsands industry, Wicklum explains.

"So a water engineer in Israel can read this document and have a very sound technical understanding of what we need to accomplish. But they don't have to know what oilsands process water is or what SAGD means."

Examples of innovation needs in the water and greenhouse gases EPAs include new technologies to generate steam downhole in a well and replace conventional energy-intensive, surface-based steam generators; reduce fouling in boilers and heat exchanger tubes; and decarbonize natural gas, thereby reducing greenhouse gas emissions.

Wicklum says that challenges are in development for the tailings and land EPAs, but the steering committees for those groups have opted first to develop technology road maps.

To ensure the challenges it identifies will lead to accelerated performance improvement, COSIA sends its entire planning framework, including opportunity areas, innovation gaps and challenges, to its associate members for feedback. These 40 organizations range from global multinationals like General Electric, IBM and

Dan Wicklum, chief executive of Canada's Oil Sands Innovation Alliance, helps GE Canada announce the winners of its $1-million innovation challenge looking for alternative uses for waste heat in SAGD in February 2015. COSIA served as strategic advisers for the competition.

PHOTO: GE

Lockheed Martin—across sectors such as aerospace, manufacturing and information technologies—to local academic institutions.

"We don't have a monopoly on smart people," Wicklum says. "So we've asked these 40 organizations, 'What do you think?' And we've incorporated their feedback into our whole planning framework."

IN SITU FRESH WATER USE: THE FIRST PERFORMANCE GOAL

COSIA reached a milestone in November 2014 when it announced its first performance goal. It states that COSIA companies will strive to reduce freshwater use intensity by 50 per cent by 2022. Achieving the goal would result in operators using 0.2 barrels of fresh water for every barrel of bitumen produced instead of 0.4 barrels of water.

While approximately 90 per cent of the water used for in situ operations is currently recycled, the remaining 10 per cent is lost mainly in the reservoir and due to the need to remove water with high concentrations of salt and other dissolved solids to maintain efficient operations. This water needs to be replaced; over half of this makeup water is saline and is typically sourced from deep saline water zones or aquifers, but there is a freshwater component that needs to be reduced.

COSIA plans to set a performance goal for fresh water used in oilsands mining operations as well, along with goals in the tailings and land EPAs.

"[COSIA] needs to set time-bound, performance-oriented goals that drive outcomes across all its environmental priority areas."

— **Ed Whittingham**, executive director, Pembina Institute

IS COSIA DOING ENOUGH?

Ed Whittingham, executive director of the "tough but fair" Pembina Institute says that COSIA is a step in the right direction.

"An alliance that allows companies to continue to compete for capital and labour, while sharing [intellectual property] around environmental technologies, is an innovative approach," he says. But he adds that COSIA still has a lot of work to do.

"It needs to set time-bound, performance-oriented goals that drive outcomes across all its environmental priority areas. At the same time, COSIA is not a magic wand to justify approval of new projects when we're already exceeding key ecological thresholds in the oilsands."

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THE network perspective

WHY LOW PRICES ARE AN OPPORTUNITY TO BUILD COLLABORATIVE OWNER/VENDOR RELATIONSHIPS

By *Melanie Collison*

OILSANDS PROJECT SUPPLIERS SPAN THE CONTINENT. TOGETHER, PRODUCERS DEAL with 2,400 companies across Canada and 1,940 in the U.S., from every state except Hawaii. Ongoing capital cost escalation in recent years has called into question the competitiveness of those supply chains, and now, with low oil prices challenging new development, everyone is feeling the strain.

"[Producers] are looking for ways to remain competitive, for innovative ideas that can make them more efficient in these challenging times," says Greg Stringham, vice-president, oilsands and markets, with the Canadian Association of Petroleum Producers. He says that now is the time for conversations about maintaining long-term relationships.

Companies willing to put their cards on the table to build those relationships are making trust a guiding principle. Rather than nitpicking about transactions or purchase orders, they're investing time into aligning goals, risks, incentives and sometimes data systems to become long-term supply chain partners in a business approach known as collaborative supply chain management.

"The market's wild swings amplify the issues," says Steve Bass, supply chain director with Devon Canada. "We're vulnerable when the plug is pulled. Decisions can go offshore, and there's a high risk to local companies."

The antidote to uncertainty is unquestionably collaboration, but "Collaboration is a harder road to go down because it forces the parties beyond a transactional discussion where you either win or lose," Bass says.

Collaborative supply chain relationships largely come about between two companies with a satisfactory history of doing business, observes Tim McLaren. Once a tenured professor in information systems and supply chain management at Ryerson University, McLaren decided to change his status to adjunct professor and move to Korva Consulting in Calgary to work primarily with oil and gas companies.

Collaborative supply chain management "is a supplier and buyer saying, 'Let's take this to a partnership level,'" McLaren says. "They have meetings where they decide they could probably both benefit and have lower costs if they do more business together. With a trusted supplier or partner, we start sharing our plans and ideas. We come to understand each other's needs."

EVOLVING THE COLLABORATION MODEL

The collaboration model has been evolving over the past 20 years.

According to Robert Porter Lynch, founder of the Association of Strategic Alliance Professionals and chief executive officer of The Warren Company, there are three different modes of thinking about how money is made and how leadership should occur: adversarial, transactional and collaborative.

Lynch—who is based in Florida but has been visiting Alberta for two decades teaching businesses about strategic alliances, collaboration and building trust—says that adversarial thinking poisons the well.

"A lot of people who are transactional and adversarial get the upper hand and put risk-mitigation strategies in place. They don't trust anybody; they act like they're negotiating over the last dollar on the face of the planet. [Adversarial thinking] adds layers of bureaucracy, legal agreements and distrust. It combines a lack of reward for high performance with penalizing poor performance. The whole system is dysfunctional."

Lynch recently authored a white paper on collaborative supply chain management for oilsands megaprojects with University of Calgary project management professor George Jergeas.

This year, he is working with a group of oilsands executives to use the current pricing setback as an opportunity.

"We've got a crisis. People change in a crisis. Let's take our projects that we started in an adversarial manner, reconfigure the planning, the relationships and the incentives, and how we're going to work them, so when the price comes back up we're positioned to take advantage of that," Lynch says. →

↓ Ongoing capital cost escalation in recent years has called the competitiveness of the oilsands supply chain into question, and the low oil price environment has intensified the issue.

PHOTO: ENTREC

"Nobody wants to go over time and over budget. Nobody says, 'I can't wait to lose $1 million an hour.'"

Lynch says that people can get trapped in old-line thinking that may have worked on a home construction project, but the world of mega-projects is not the place to do low bidding.

"You've got to aim for a high-performance team. You can spot a collaborative person right from the get-go if you know what you're looking for," he says. "You can map a person or company, then select people you're going to allow to bid. You get subcontractors who know how to work as a team, then actually train people to get into alignment, understand strategies to work in a high-trust environment, create operating principles that bond them and work across organizational boundaries so the hand-offs are really smooth."

According to Gord Leder, president of Acheson, Alta.-based Leder Steel, finding partners who will collaborate comes with having genuine relationships.

"You have to be open, honest and relational. This is who I am—there's no cards underneath the table. I like to get out on a golf course, spend four or five hours with an individual. I'll learn if they have a temper, learn more than if we spend 45 minutes across the desk or go for lunch," says Leder, who works regularly with suppliers across Canada.

"It's the days when things are difficult, challenging and stressful that you're the real you. It would be nice to see everybody at their worst from the start, but you don't, you see them at their best first and then the gloves come off, say, when there's a change order. That's where the real you comes out."

TRUST ARCHITECTURE

Lynch and Jergeas's white paper looks closely at Devon Canada's collaborative supply chain successes at its Jackfish 3 SAGD project, which came in on time and on budget and has attracted considerable industry attention.

"For years I've been collecting best practices on how organizations work together," Lynch says. "Devon's Jackfish 3 is an excellent example of changing the thinking, methodology, skill sets and patterns of interaction in the oil industry. It meets all the criteria for best practices."

Lynch is teaching oilsands executives what he calls trust architecture, or how to apply sound behavioural principles and rigorous systems thinking to align parties' commercial interests and reach goals together. In this system, fairness, ethics and respect rule.

"The only way you get change in the future is if you can find senior executives to sponsor it and individuals in the organization who want to champion the roll out," Lynch says.

Top-level buy-in is essential because there's risk involved.

Devon's Bass explains, "Both parties need to be putting something on the table that they wouldn't have done before. Otherwise it's just negotiating or a transaction."

They may be sharing growth plans or technical details, or linking software that integrates their data to reduce inventory levels, for instance.

It's fundamental to collaborative success "to say what you're going to do and do what you say," Bass says. "Be consistent with behaviours and values. We hold each other accountable in a collaborative relationship.

"The traditional model of buying and contracting, holding you liable—and maybe suing you—is an arm's-length, even adversarial, style. But creating relationships is not new in the oilpatch. It goes back to the beginning when you'd shake hands on a deal."

Trust requires honesty, of course. Suppliers must be transparent about their capacity and capabilities, or risk not being able to deliver the value they made a commitment to.

If there's a gap, that's an opportunity for community development, such as new training.

THE TWO-WAY NATURE OF COLLABORATION

Collaborating overlaps with going beyond creating profit to creating shared value, as put forward by Michael Porter in a paradigm-changing essay in the *Harvard Business Review* in 2011.

SUPPLIERS TO CANADA'S OILSANDS FROM OUTSIDE ALBERTA

(# of companies by region)

CANADA

UNITED STATES

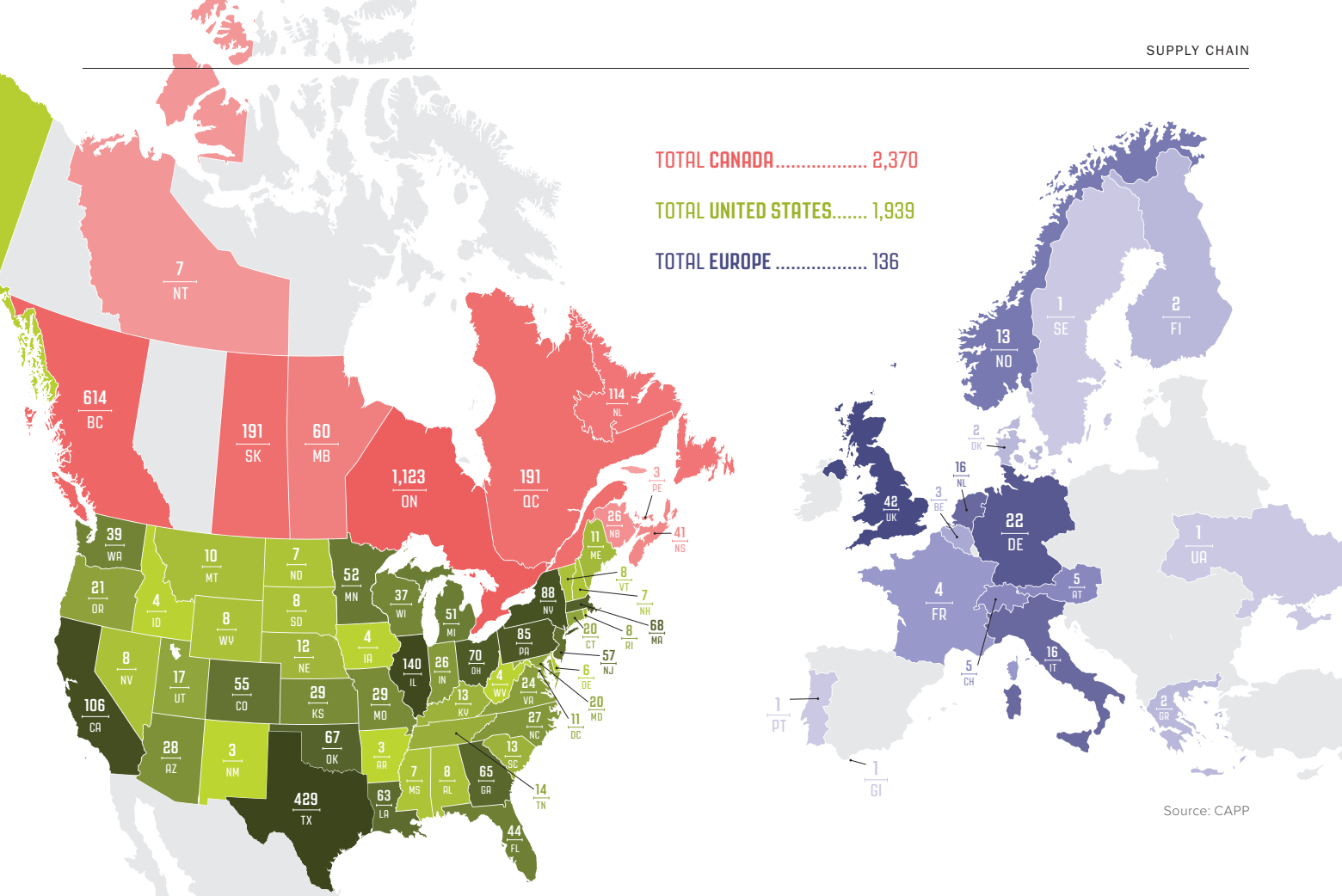
EUROPE

LOW # SUPPLIERS — HIGH # SUPPLIERS

Porter insists that placing societal issues at the core instead of the periphery—aligning social progress with corporate self-interest in a concrete and highly tangible way—creates economic value, as well as value for society, by addressing society's needs and challenges.

Corporate commitment to development mitigates the inevitable power imbalances.

McLaren emphasizes the two-way nature of collaboration. The buyer has to understand the supplier's capability, quality, pricing and needs.



Source: CAPP

The contractor has to decide whether the buyer is going to be a good customer or a critic, dependable or always looking for price cuts or likely to cancel business.

It's a little like dating.

"Every relationship has a life cycle to it. Some are long-term and fruitful but take a long time to build. Others might progress a lot more quickly, but you find out the match isn't there," he says. "Underlying that is that the economy is changing, the availability of resources is always changing. It's always a moving target. Some relationships get stronger, and we leverage them as much as possible; others we want to wean ourselves out of."

A buyer won't develop time-consuming deep relationships with all suppliers, but will assess which are strategic connections and which are purely commodity suppliers.

The focus then is on investing time in relationships with potentially high value.

That's what gets collaborators through hard times, while other organizations falter.

↑ This analysis by the Canadian Association of Petroleum Producers examines geological areas in the western world that play a significant role in the oilsands supply chain.

Understanding SAGD CAPEX

the details of a $574 MILLION capital project

ONE OF THE BEAUTIES OF THE SAGD PROCESS IS THAT IT CAN BE DEPLOYED IN RELATIVELY small increments. But everything is relative, and in the oilsands nothing is truly small. Global engineering, procurement and construction management firm Wood Group Mustang outlines the pieces of a 10,000-bbl/d SAGD project that sums up to $574 million.

OPEX SUMMARY

STEADY STATE OPEX SUMMARY

Natural gas, power, diluent losses, chemical	$11.30/BBL BITUMEN
Other site operations and maintenance costs	$5.40/BBL BITUMEN
Diluent (at $70/bbl)	$15.40/BBL BITUMEN
Transportation (trucking 16 API dilbit)	$9.00/BBL BITUMEN
TOTAL	**$41.10/BBL BITUMEN**

(at nameplate production, excludes sustaining production capital projects costs)

$41.10/BBL BITUMEN
TOTAL OPERATING COSTS

ASSUMPTIONS

GENERAL

Location	Near Wabasca-Desmarais, Alta.
Technology	SAGD
Plant nameplate capacity	10,000 bbls/d
Normal steam to oil ratio	3.53:1
Design oil rate	11,300 bbls/stream-day

WELL PADS

- Two well pads
- 20 well pairs
- 10-metre spacing between well pairs

EXCLUSIONS

- Taxes, insurance and mineral leases
- Delineation wells and exploration costs
- Future abandonment and reclamation costs

10,000-BBL/D IN SITU PROJECT CAPITAL COSTS BREAKDOWN

CAPEX SUMMARY

SURFACE FACILITIES CAPITAL COSTS

Direct costs

Total direct central processing facility costs	$175,979,000
Total direct well pad costs	$35,340,000
Total direct off-site costs	$45,580,000
Total direct facility costs	**$256,899,000**
Total indirect costs	**$81,919,000**
Subtotal surface facilities	**$338,818,000**
Contingency	$46,757,000
TOTAL SURFACE FACILITIES COSTS	**$385,575,000**

SUBSURFACE CAPITAL COSTS

Drilling and completions

20 SAGD well pairs with downhole pumps and observation wells	$108,000,000
Two source wells, two disposal wells, one potable well	$3,190,000
Contingency	$5,400,000
TOTAL SUBSURFACE COSTS	**$116,590,000**

OTHER PROJECT CAPITAL COSTS

Permits, regulatory and environmental costs	$1,200,000
Capital contributions to electrical transmission and distribution companies	$2,900,000
Warehoused capital spares	$3,750,000
Commissioning costs	$15,340,000
Start-up and ramp-up operating costs to break-even oil production[1]	$49,020,000
TOTAL OTHER PROJECT COSTS	**$72,210,000**

1 Most companies don't include this as a project cost, but it is an important factor to consider.

$574,375,000
TOTAL PROJECT CAPITAL COSTS

Source: Wood Group Mustang

CENTRAL PROCESSING FACILITY COMPONENTS

- Oil treating
- De-oiling
- Water treating
- Steam generation
- Tank farms
- Truck loading and unloading stations
- Electrical buildings
- Pipe racks
- Vapour recovery unit/flare system
- Glycol system
- Site-wide infrastructure
- Operations building/warehouse and maintenance building

OILSANDS MANUFACTURING: Getting the help you need

FROM NEW TECHNOLOGY IMPLEMENTATION TO STAFFING, SERVICES ABOUND TO IMPROVE PRODUCTIVITY

By *David Godkin*

YOU'VE HEARD ABOUT PROGRAMS TO HELP YOU INTEGRATE NEW TECHNOLOGIES TO INCREASE THE PRO-ductivity of your manufacturing operations, but what about the engineering skills the National Research Council can help you tap into? Or funding grants available through the Jobs, Skills, Training and Labour department of the Alberta government? Those are just a few of the many resources available to Alberta companies willing to take the next step.

YOU CAN'T GROW WHAT YOU CAN'T MEASURE

Tools for measuring productivity are well known—inventory turnover, tool time, return on investment—but how companies effectively measure productivity is another matter. That's where Edmonton-based Go Productivity comes in. The formerly government-funded group says it has tools to help mid-size Alberta companies improve productivity measurement, in turn, ensuring everyone from the plant floor to the executive office is tracking and collecting data so that it fits into project schedules.

Go Productivity says that another crucial service is helping oilpatch manufacturers identify operational strengths and weaknesses.

"We've done plant floor layouts at manufacturing facilities, for example," says marketing manager Jeff Baker. "We can go in there, help them map out their processes and see where they might eliminate waste." Questions include: Where are the log jams on your plant floor occurring? Have you considered moving machinery that interrupts process flow to another location?

"If a company comes to us and says, 'I've got too much inventory. I need more space,' we might say to them, 'Actually, you're probably producing too much at this point,' or, 'You might better manage your operational flows so that you actually reduce the space you need.'"

TAMING YOUR INNER LUDDITE

Few skills are more important in oilsands manufacturing than metal fabrication. Trouble is, says Patricio Mendez, director of the Canadian Centre for Welding and Joining in Edmonton, most of the people in Alberta who weld boilers, pressure vessels and pressure

PHOTOS: JOEY PODLUBNY

piping prefer conventional shielded metal arc welding, also known as stick welding, to newer technologies.

"Their productivity is very low, but it's what most people are familiar with, so its use is self-perpetuating," says Mendez. "By using stick, it's pretty much like we're welding in the 1950s."

The aim of the Alberta Metal Fabrication Innovation Program is to pull those people and companies into the 21st century by introducing new automated technologies such as metal inert gas (MIG) welding. MIG is considered to be semi-automated. It reduces the number of stick electrodes that must be replaced, is faster and eliminates grinding. Robotic and orbital welding are also faster and more flexible welding technologies.

But the main obstacle, says Mendez, continues to be risk aversion. Managers worry about the costs of retraining employees and the downtime required while shifting to the new technology.

Through seminars and hands-on introduction of these new technologies, he says the program has helped more than 100 companies overcome their hesitation and improve productivity.

DON'T BE AFRAID TO ASK FOR HELP

Ask any start-up company what success looks like, and they'll likely tell you strong financing, high employment growth and revenues. The good news, says Chris Lerohl, business development manager at TEC Edmonton, is companies seeking guidance from the business accelerator have seen significant growth in all three categories after one year.

TEC is a joint venture between the University of Alberta (U of A) and Edmonton Economic Development. Lerohl says that among the services TEC offers are opportunities for companies to sit down with "executives in residence" to learn how they successfully grew their businesses, as well as the opportunity to connect companies that have specific problems with a technical advisory panel made up of legal, accounting, financial and marketing leaders to help generate solutions.

"They act kind of like a board of directors, working through these issues with the client in the room. It's also free, which makes it a pretty phenomenal service."

Another TEC service is the UA SolVe program, which is designed to help connect companies with university research resources. Case in point, with the assistance of experts in fluid mechanics and design at the U of A, Ron Szepesy developed the SureShot machine shop pump.

"There's also hundreds of millions of dollars in equipment at the U of A that is sometimes difficult for industry to access," says Lerohl. "Researchers we work with often have access to that equipment as well."

NOW, STEP ON THE GAS

Innovate Calgary is another business accelerator. Its new Kinetica program was recently launched with a mandate to help energy technology developers identify operational gaps from business planning and strategic partnerships to supply chain management. "We do the gap assessment," explains Kevin Frankowski, Kinetica program lead. "We say, 'Here are the three top gaps,' and then show them a customized program on how we'd work with them on addressing them."

COMPLETE THE LABOUR LOOP

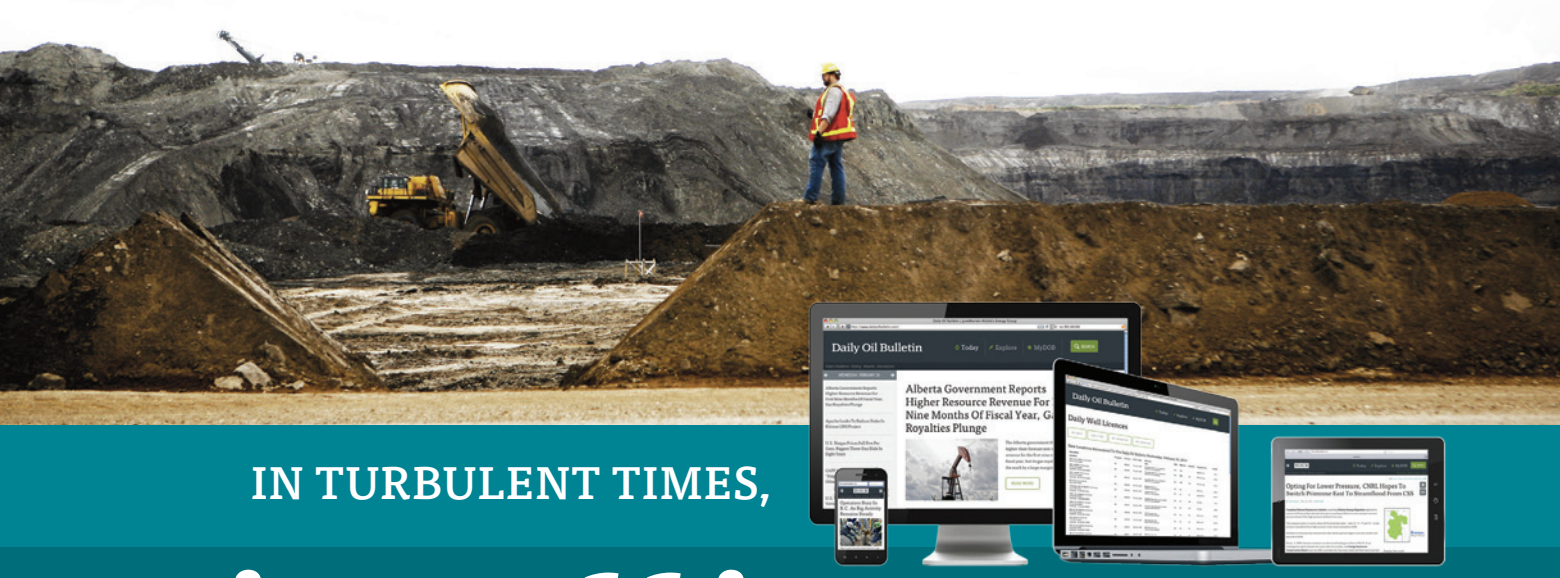
Finding skilled operators to monitor boilers and pressure vessels is vital to oilsands manufacturing, notes Andy Neigel, chief executive officer of CAREERS: The Next Generation. Through CAREERS' paid internship program, students as early as grade 10 can be linked to employers in any of the 57 certified trades.

PHOTO: JOEY PODLUBNY

"What's really in it for you is you can build a loyal, motivated, productive [and] skilled workforce under your own terms to meet your expectations at a time when the skilled workforce is critical to your success," says Neigel.

Don't forget the Canadian military. Many military skills can be easily transferred to industry—from mechanical engineers to heavy equipment operators, says Melanie Mitra, chief executive officer of Prospect Human Services in Calgary. Mitra says that Prospect's Base to Business Program helps companies build the capacity to attract and retain veterans. "In many cases we are designing customized military employment strategies for companies."

Veterans can come with capabilities that are harder to find, she says, like trade safety, critical thinking and decision making skills and experience working on tight timelines, over long hours and under adverse conditions. Since May 2012, Prospect has placed more than 225 veterans and military staff with Alberta companies, including many in the oilsands.



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A question of VALUE

PROPONENTS OF MORE UPGRADING IN ALBERTA FIND MIXED RESULTS IN TWO NEW ECONOMIC STUDIES

By *Graham Chandler*

Doug Bertsch, vice-president of regulatory and stakeholder affairs with North West Upgrading, tours the Sturgeon Refinery construction site in early 2015. Sturgeon is the first new refinery to be built in North America in nearly 30 years, and it will run entirely on bitumen feedstock.

PHOTO: JOEY PODLUBNY

As reported opposition against exporting Alberta's raw bitumen mounts, so have calls to find value-add opportunities in the province. Many wonder, "Why not process more of our resources here and create more jobs and profits close to home?" Two recent reports attempt to answer that question, and the results are not entirely promising for supporters of more local processing.

The more recent of the two reports, *Refining Bitumen: Costs, Benefits and Analysis*—released in December 2014 by the Canadian Energy Research Institute (CERI)—has some concerns about the economics of building a greenfield refinery in Alberta's Industrial Heartland.

"It would be a hard sell, especially to the industry," says Dinara Millington, CERI's vice-president of research and co-author of the report.

The report notes that any plant would require significant capital investment in order to process heavy crudes, which do not naturally have high yields of gasoline and diesel. Refineries also tend to be located close to the markets for their products.

"Some of the reasons behind this are that it is less expensive to transport crude oil than refined products, the specifications for gasoline vary across the world, and countries prefer energy security for refined products," the report reads. A refinery would need to overcome significant barriers to succeed, such as variations in product specifications and environmental regulations between jurisdictions, and a short time frame before refined products begin to degrade during transit.

Using the upcoming Sturgeon Refinery as a proxy, the study assumes a 93 per cent average utilization rate and output of 80,670 bbls/d over a 50-year life. Half of that output would be low-sulphur diesel consumed in domestic markets and priced regionally. Importantly, CERI considered both economic and environmental impacts in its cost-benefit analysis.

Because the Sturgeon plan includes carbon capture technology, another revenue source would be CO_2 sales. Capital costs are estimated at $8.5 billion for Phase 1 development; total →

↑ Modules waiting for placement at the Sturgeon Refinery site. The project has ongoing financial backing from the Government of Alberta.

annual operating costs are set at $164 million. CERI assumes overall capital investment would be met through two sources, similar to other large-scale industrial development: 40 per cent borrowed and 60 per cent from equity.

With those assumptions, the net present value (NPV) of a greenfield refinery with carbon capture capabilities worked out to a net benefit of almost $533 million. CERI also considers the effect of several variables on the NPV, including the absence of a carbon capture and storage (CCS) unit, the discount rate, oil and diesel prices, capital and operating costs and financing.

For example, omitting carbon capture decreases the capital costs and increases emissions, and the result is a $1.5-billion rise in NPV, for a total of nearly $2 billion.

"Removing the CCS unit makes the refinery even more economic because of the substantial increase in [NPV] despite the fact that the refinery will have higher emissions and therefore incur higher social and carbon costs," the report says.

> **"In the Gulf of Mexico [upgrading and refining] project costs would be one-and-a-half to two times smaller than Alberta."**
>
> — **Dinara Millington**, vice-president, research, Canadian Energy Research Institute

Crude oil and diesel prices are also factors, with the latter having the larger impact. In fact, dropping diesel and oil prices by 20 per cent over the project life made its NPV negative. Most significantly for today's economic environment, if the average oil price drops below $85, the project would be a net cost to society. CERI's analysis was completed when WTI was $77/bbl.

And here's the killer: "At an $85/bbl oil price the project breaks even—that is, the [NPV] is zero at the assumed 15 per cent rate of return," Millington says.

In the other study, the Alberta Federation of Labour engaged CEG, a global consultancy in competition, disputes and regulation, to carry out a similar exercise. The resulting report, *In-Province Upgrading Economics of a Greenfield Oil Sands Refinery*, was released eight months before the CERI document in April 2014. Unlike the CERI analysis, the study does not include social aspects of the project in a cost-benefit analysis.

Still, the CEG analysis is detailed and runs three WTI price scenarios—the report was prepared before the start of the current price collapse. The lowest price used is $80/bbl, which gives the hypothetical project an NPV of $12.1 billion.

The report does not indicate a break-even oil price, but the author notes, "Based on existing capital cost estimates and arms-length purchase of feedstock at market prices, the project appears to be attractive under all crude oil price cases."

Little can be said about a refinery's feasibility in the current economic climate without the study running lower price scenarios, however. Moreover, social costs need to be factored in, as they were with the CERI case.

And for both studies, there is still the potential competition from Gulf Coast refineries.

"Labour shortages and capital cost escalation and just general inflation in the oil and gas sector would also contribute to the higher costs as opposed to building a similar project in the Gulf of Mexico, where the project costs would be one-and-a-half to two times smaller than Alberta," Millington says.

PHOTO: JOEY PODLUBNY

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The U.S. Gulf Coast is the largest crude oil refining cluster in the world, and it is largely geared toward heavy oil. For years Canadian producers have been working toward achieving meaningful access to this market. Now they have it.

PHOTO© PHILLIPS 66

SIGNIFICANT VOLUMES OF CANADIAN CRUDE FINALLY REACH THE WORLD'S BIGGEST HEAVY OIL MARKET, BUT CHALLENGES LOOM

By *Graham Chandler*

IT'S NOT KEYSTONE XL, BUT IT SURE HELPS.

In January 2015, Alberta Premier Jim Prentice was in Texas attending a symbolic event: the official opening of two new pipeline projects that connect Canada to what has been called its natural market. It's the U.S. Gulf Coast (USGC) refining cluster, and Canada's oilsands industry has been looking at it through a bull's eye for years.

"The completion of these pipelines creates the first large-volume, direct link of Canadian crude to the U.S. Gulf Coast where North America's largest concentration of heavy oil refineries is located," Prentice said.

"At the Flanagan South and Seaway Twin opening, I saw first-hand how these new pipelines will help bring significant benefit to Alberta and its oil producers."

Enbridge's 600,000-bbl/d Flanagan South Pipeline runs from Pontiac, Ill., to Cushing, Okla., while the Seaway Pipeline, which Enbridge owns in a 50/50 partnership with Enterprise Products Partners, goes from Cushing to Freeport, Texas, on the USGC. Enbridge reversed the flow on the original Seaway line in 2012 and increased capacity to about 400,000 bbls/d in 2013. With the twinning now complete, Seaway has a capacity of 850,000 bbls/d.

Together with the 800,000-bbl/d southern leg of Keystone XL, which was completed in early 2014, a whopping 1.65 million bbls/d of new capacity has been created to move various grades of crude—including Canadian heavy and Bakken light—from the previously bottlenecked Cushing hub into the USGC. Along with that comes expanded new pipeline access into the U.S. and a surplus of rail-handling capacity. For heavy oil differentials, this has all been good news, even serving to somewhat insulate Canadian producers from the global drop in crude oil pricing.

"Absolute price levels for Canadian crude oil have some protection via a relatively decent outlook for crude oil price differentials and a Canadian dollar exchange rate that remains favourable," reads an early 2015 report from FirstEnergy Capital.

"Our view of pricing differentials has not changed given the crude oil price meltdown. Between expanded new pipeline access into the United States and a surplus of rail-handling capacity, we expect that competitive forces between these two modes of transportation for oil barrels will ensure that differentials do not widen to any great degree. Rail transportation costs will act as a rough ceiling for the price differential, and these costs are likely to come down to some degree as we move forward."

At press time, the differential hovered near $13. As Canada has continued to struggle with market access issues in recent years, that spread has spiked to above $40.

USGC MARKET COMPETITION

The good news may have a short life, however, threatened in the form of new competition for USGC market share.

"Canadian barrels must compete with other heavy imports arriving on the USGC, particularly from Latin America," says Dominic Haywood, oil analyst at Energy Aspects, an independent research consultancy located in London.

"But it's better that they compete with something rather than remaining landlocked up in Canada and forced to offer huge discounts so that it is economic for shippers to move Canadian volumes on rail."

Haywood says there has been strong appetite for Canadian volumes on the USGC, and Canadian heavies have pushed out a significant amount of Latin American crude from the area's refiners.

"Don't forget that this material also serves refineries in the Midwest too," he says. "We expect this to continue. Ultimately, the U.S. likes to deal with Canada. The crude is good quality, the stream is reliable and transporting via pipe straight to the refinery gate is preferable to having your hydrocarbons floating across the water from Latin America."

But, Haywood says, this may not last. "The worry is that if Latin American countries start to become even more fiscally unstable and are happy to sell their crude for whatever it takes, just to realize some revenue from the stream, that they begin to aggressively discount versus Canadian barrels on the USGC."

However, he sees this as unlikely. "Many Latin American producers are looking to Asia to secure market share at the moment and are making a concerted effort to move away from the U.S. in an effort to place barrels elsewhere at a better price."

A bigger threat may be that some refiners see Saudi Arabia medium crude as a more direct substitute for Mexican and Venezuelan crudes, according to a January Reuters report.

STAYING IN THE STATES

The USGC is the largest crude oil refining complex in the world, and most, if not all, oil that is processed there ends up being consumed in the U.S., according to a recent report by IHS. This goes against claims made by Keystone XL opponents, including U.S. President Barack Obama, who, prior to using his veto power against the pipeline, said it would be "Canadian oil passing through the United States to be sold on the world market."

Aaron Brady, senior director at IHS, disagrees.

"There is a common misunderstanding that somehow most or all of the oil shipped to the U.S. Gulf Coast via the Keystone XL pipeline would be exported to other countries," he says.

"The reality is that the U.S. Gulf Coast is the world's largest single refining market for heavy crudes such as oilsands, making it unlikely these barrels would be exported offshore. And the overwhelming majority of refined products produced in the Gulf are consumed in the United States, regardless of the crude source."

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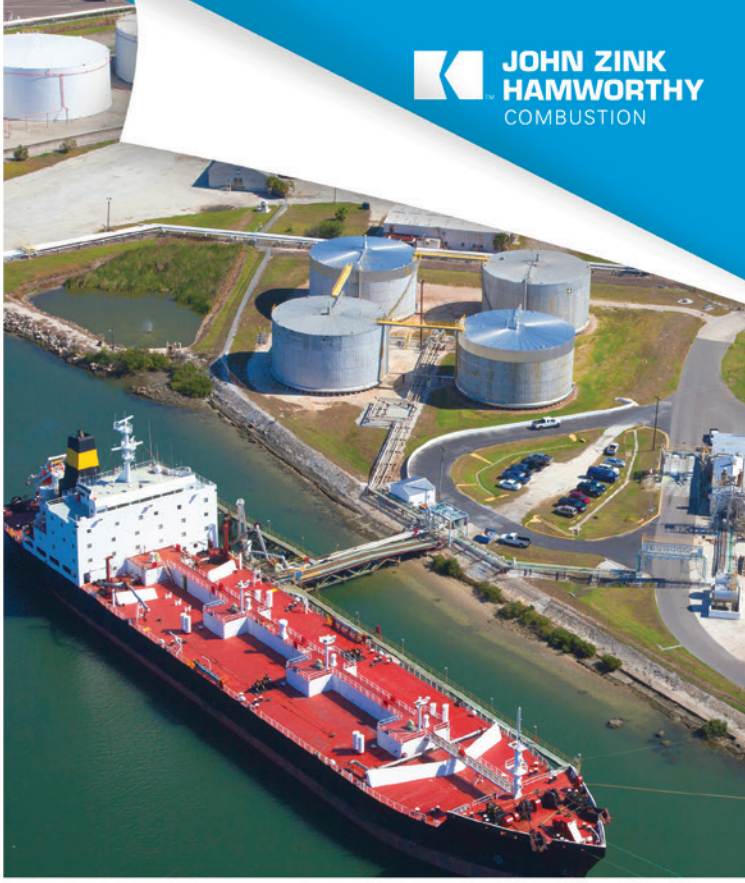

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EXPANDING outlets

NEW PIPELINE, RAIL, BARGE AND TANKER WORK TAKES CANADIAN CRUDE TO THE NEW MARKETS IT HAS BEEN SO DESPERATELY SEEKING

By Deborah Jaremko

"THERE ARE NO PIPELINE BOTTLENECKS AT Cushing anymore." Those words, spoken last year by Martin King, vice-president of institutional research at FirstEnergy Capital, encapsulate the realization of a critical goal for North American oil producers, particularly in the oilsands.

Cushing, Okla., is the heart of PADD II, the main market for Canadian crude. A glut of oil in the region in recent years from combined light, tight oil production and oilsands volumes has amplified the need for new markets. That's why we have the big pipeline projects on the books: Keystone XL, Energy East, the Trans Mountain expansion and Northern Gateway.

At least one of these projects is still needed in the coming years, but for now, the market access strategies that have been undertaken are working. Of course, it isn't just the expanded pipeline connection between PADD II and the U.S. Gulf Coast: it's other transportation methods like rail and, increasingly, barge.

The increased availability of supply outlets for Canadian crude has come as companies re-evaluate how they look at transportation and marketing, resulting in a significant organizational shift within the business itself.

"We used to sell our crude as an industry in Edmonton, and refiners in the PADD II area would acquire that crude, but as more supply from the upstream came on and as pipelines were slow to getting approved, we realized that our business was changing," says Bill McCaffrey, president and chief executive officer of MEG Energy. MEG's hub-and-spoke bitumen marketing strategy includes pipelines, rail and barge.

"We needed to find solutions to access broader markets, to get around constraints, so that's where we put our heads together and started working on it. I think we're doing a good job on that, and I think industry is doing a good job on it too. Collectively, I think it is helping improve the economics of our whole industry, and I think it will attract more investment into this market once [markets] actually get to see performance in terms of improved cash flows and netbacks."

In its review of the Canadian energy market in 2014, the National Energy Board (NEB) highlights the effect of improved market access.

"Canadian crude oil prices increased at the beginning of the year, peaked during the summer—due to favourable market access conditions and record demand in major U.S. refinery markets—then decreased as global crude oil benchmark prices collapsed," reads the NEB report, which was released in mid-February.

"Heavy crude oil price discounts, which peaked in early 2013, decreased consistently as the year progressed and are expected to remain at current low levels until production growth surpasses existing transportation capacity."

The NEB also indicated that Canadian oil producers are slowly becoming less bound to their single market outlet, the U.S.

"Prior to 2013, Canadian crude exports to destinations other than the U.S. were relatively minor and were predominately either light crude shipments from offshore Newfoundland and Labrador to Europe, or Alberta crude shipped from Trans Mountain's Burnaby, B.C., marine terminal to Asia. However, in the past two years, volumes from Atlantic Canada that historically would have been sent to refineries in eastern Canada and the U.S. have been sent elsewhere, displaced by growing U.S. supply. Canadian crude exports to Europe have grown to account for over three per cent of total exports, and exports to South America have also increased considerably."

Tidewater oil exports are also starting to come from the West.

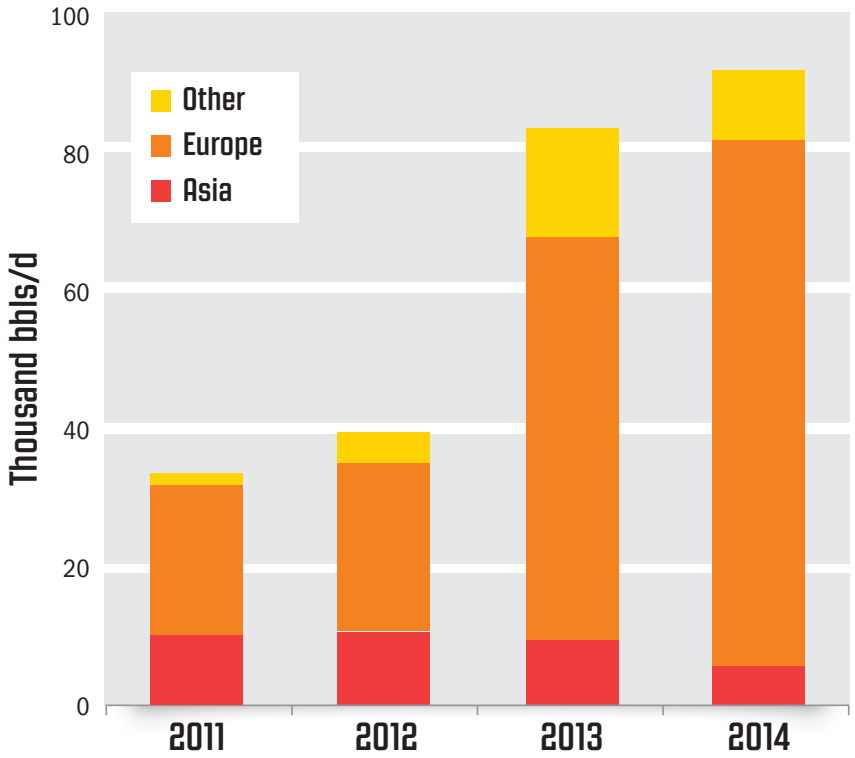
"In September 2014, Suncor loaded its first tanker of heavy crude on the Canadian east coast," the NEB says. "Western Canadian heavy crude was railed from Alberta to a port near Montreal, where it was loaded on a tanker and delivered to Italy. Canadian crudes have also been shipped from American ports to markets in countries such as Spain and Switzerland."

While the political environment for Canadian crude within North America deteriorated with

Rail engineers operate Grizzly Oil Sands' Windell crude-by-rail terminal south of Fort McMurray. Rail transportation, while higher-cost than pipelines, has provided somewhat of a cushion to heavy oil producers in the low price environment by enabling better market access.

PHOTO: JOEY PODLUBNY

Crude oil exports from Canada to non-U.S. destinations



*2014 includes only data from January to October

SOURCE: NATIONAL ENERGY BOARD

U.S. President Barack Obama's recent veto of the Keystone XL Pipeline, circumstances have taken a major step forward in Europe.

"In October 2014, the European Union proposed amendments to its Fuel Quality Directive that would remove discriminatory treatment of oilsands crude and products," the NEB explains. Early in 2015, those amendments passed.

"This is an important signal for Canada as it means our oil will not face discrimination in Europe," Tim McMillan, president of the Canadian Association of Petroleum Producers (CAPP), said in response to the decision.

"It also opens the door further for Canadian companies to compete on a level playing field for new markets in Europe and abroad."

CAPP describes the industry's current market access strategy as "by all means, in all directions." And it's a shift in thinking CAPP doesn't expect to go away.

"People are looking at rail, they are looking at barging and they are looking at marine," says Greg Stringham, CAPP's vice-president of oilsands and markets.

"Those will all feed into what I see as being elements of a longer-term transportation portfolio, where in the past the oilsands industry has [had] one market, one means, so we've been going to the U.S. by pipe. We're now looking at all methods to all markets."

Bitbricks

SEMI-SOLID BLOCKS OF BITUMEN COULD OFFER A SAFER RAIL TRANSPORTATION OPTION

By *R.P. Stastny*

IT'S IRONIC THAT THE SUCCESS ENVIRONMENTALISTS celebrated in blocking pipeline proposals for transporting bitumen to the U.S. Gulf Coast actually spurred the exponential growth of a potentially even riskier form of conveyance: rail. Now crude-by-rail is here to stay because it's much more than a stopgap solution to pipeline capacity constraints. Safety, however, has become a concern as derailments capture the spotlight.

About half a year ago, Ian Gates, professor and department head of chemical and petroleum engineering at the University of Calgary's Schulich School of Engineering, considered the risks of shipping bitumen by rail. Seeing that bitumen is modified with diluent to make it flow through pipes, it occurred to him that it could also be modified the other way to make it more solid and, therefore, safer for rail transport.

"The idea here is to essentially use the bitumen itself to build self-sealing bricks or balls by creating a super-viscous skin that contains liquid bitumen inside," Gates says. "The bitumen itself becomes the package. There's no waste, no plastic, no paper to deal with. The process is then reversed at the other end, and all of it becomes liquid bitumen again."

Gates' team currently makes 20–30-centimetre blocks and bowling ball–sized spheres of bitumen in the laboratory. Experiments, in which these packages are dropped from waist height, show them to be resilient enough to presumably withstand the impact of a train derailment.

"It has some give," Gates says. "It doesn't bounce like rubber, but it's capable of absorbing some impact. The coating itself is actually a very viscous liquid."

Bitumen bricks are also designed to float (raw bitumen in some situations doesn't, which is a concern for pipeline proposals with numerous water crossings).

The chemistry involved in making bitumen bricks is still a closely guarded secret until Gates finishes signing patents.

"Within a year and a half, hopefully, we'll have a commercial solution using this technology."

— **Ian Gates**, department head, chemical and petroleum engineering, University of Calgary Schulich School of Engineering

As for costs, he says the process will add about $1.50/boe, possibly less with scaled production. While adding costs to what is already a more expensive mode of transport than pipelining seems to run in the wrong direction, no one expects oil prices to remain at $50/bbl indefinitely. When prices firm up, Gates says the industry sponsors of this project are prepared to use this technology because the extra cost for safety is also partially offset by simpler handling. There is no need for heated railcars or loading facilities or infrastructure to strip and recycle diluent.

"You can use regular coal-loading conveyor belt systems for loading," Gates says. "If the bricks freeze into solid blocks during transport in the winter, all the better."

The economics of transportation will likely phase out bitumen balls in favour of bricks to eliminate paying for void spaces between the balls. So far, Gates' team has successfully made bricks in the range of two to three metres in size.

"The hope is that we could get up to maybe a 10-metre scale for commercial operations," he says. "Eventually I'd like to also see if we could build a bitumen brick that could hold a volatile oil."

For now though, all efforts are directed toward building a brick-making machine that is capable of supplying a shipping terminal that handles the equivalent of 100,000 bbls/d.

"We're hoping to have the metre-scale brick process scaled up within six to nine months," Gates says. "We would be following that up with what I would call a semi-commercial-scale process, which would take about one year to design and get going. So I think within a year and a half, hopefully, we'll have a commercial solution using this technology."

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GLEN PERRY

Vice-President, Marketing ⓧ Grizzly Oil Sands

GLEN PERRY IS ON THE LEADING EDGE OF OILSANDS market access solutions—first with the original Alberta to Texas pipeline proposal, then as a major promoter of crude-by-rail. Now, he's looking to optimize the end-point of that transmission.

Why do you think Canada's crude oil market would benefit from increased movement of crude-by-rail to the West Coast for export?

It's a thousand miles from Edmonton to the West Coast and 2,500 to the U.S. Gulf Coast. The cost of shipping crude by rail is almost directly related to distance, so rail to the West Coast cuts the cost, and when you get there the price of Canadian oil is almost the same as any other because you can go around the planet for $3/bbl. If you can get to tidewater for half the cost, [the West Coast] is where you should go.

"We need the people of Canada to come to a different attitude—that building infrastructure is a good idea, a good process."

When you want to build a pipeline, economies of scale come in, but what if you have only 50,000 bbls/d to move? Gateway would require about 500,000 bbls/d. There currently are 170,000 bbls/d leaving Canada by rail. With the price downturn and Canada being one of the highest-cost sources of incremental oil in the world, there's no guarantee we'll ever produce more. If the pipeline were built and carried one-third its capacity, the cost would be triple.

By rail, the cost for the first barrel is about the same as the last barrel, and railing heavy oil to the West Coast is actually cheaper than a pipeline because it doesn't require costly diluent. We can solve our transport issues with rail and build a pipeline later when prices are higher and it's not a huge risk.

What changes would be required to make meaningful rail shipments to the coast more viable?

Oil is being railed to the West Coast now, going to terminals in Washington state. We lose probably $5/bbl having it go through American ports.

For it to be viable, the attitude would have to change. There's a lot of social opposition from activists and environmentalists, and it trickles down to government and the regulators. As long as you have that type of opposition and a lack of regulatory progress, no company can do anything.

Rail transport is easy, but there are no terminals to get oil onto a ship. Somebody needs to get a site and permits and build a $500-million terminal, but wherever would be good for a terminal there are also a lot of people who don't want that kind of industrial activity.

How do you think we can expect to see results?

We need the people of Canada to come to a different attitude—that building infrastructure is a good idea, a good process. The country needs the jobs and the money. The Canadian economy has to compete in the world. The Canadian dollar drops because of the drop in the oil price, and everything we have—including our savings—is worthless. If we go down the road of paying a lot for green energy and get nothing for what we pull out of the ground, this country is in trouble.

I believe there's a silent majority in Canada in favour of building infrastructure, [but] they're getting drowned out by the overwhelmingly raucous minority. The silent majority has to speak up and educate the rest for us to see results.

PHOTO: CHARLES HOPE

KATE EASTON

Senior Adviser, Oilsands Planning ⓧ ConocoPhilips Canada

"With a longer time horizon we can take much bigger steps. Technological advancements can dramatically change how we manage CO_2."

KATE EASTON IS CONOCOPHILLIPS CANADA'S REPRESENTATIVE TO CANADA'S OIL Sands Innovation Alliance (COSIA). She coordinates the company's effort to improve environmental performance through innovation.

Why do you feel industry and society should not be afraid of fossil fuels, and in particular, the oilsands?

Fossil fuels have created the way of life we have today—a very good standard of living worldwide. As global demand for energy grows, all sources will be needed to keep the standard we have. The use of renewables will continue to increase, but fossil fuels, including oilsands and unconventional fuels, will play an important role to meet that demand.

In Canada we have some of the best regulations in the world for protecting the environment and we're constantly reducing greenhouse gas emissions, increasing water recycling and reducing our impact on the land. Things have gone in a positive direction in Canada in terms of producing responsibly.

Where can the industry focus to alleviate the fear?

In the near term, we're working with our existing facilities and reducing intensity through efficiency and technology. [ConocoPhillips has] met our requirements under Alberta's emissions regulations and, in some cases, exceeded them.

But the real opportunity, and what we think industry should focus on, is the opportunity for innovation. With a longer time horizon we can take much bigger steps. Technological advancements can dramatically change how we manage CO_2.

Here's an example of an advance we've started implementing—vacuum-insulated tubing, so we lose less heat on the way to the reservoir. It allows us to reduce our greenhouse gas emissions intensity.

What needs to change in order for this to be achieved?

A number of things. We need to continue significant financial investment, which has a lot of risk attached because there's always a risk technologies won't work. We will always need skilled people and a great deal of technological innovation.

We need to see responsible stewardship from policy makers, producers and consumers. Consumers can influence policy makers and can contribute their own ideas through COSIA for review.

The biggest thing is to connect ideas through collaboration. Not only are oilsands producers working with each other, we're connecting with companies in other fields to transfer in their ideas.

ConocoPhillips is working on lighter hydrocarbons to aid our bitumen extraction process to reduce our energy requirement. What we're after is a reduction in the steam to oil ratio. This requires a detailed understanding of reservoirs. Other companies are looking at lighter hydrocarbons for this as well.

We're in discussion with others about working together to bring about a reduction of greenhouse gases faster. The reservoir is the most competitive secret part of the operation, and we're now talking about sharing technologies in this area for [greenhouse gas] reduction. We're just at the beginning of this cooperation, but it's exciting to see.

PHOTO: CHARLES HOPE

STEVE BASS

Director of Supply Chain X Devon Canada

THE OILSANDS INDUSTRY HAS AN URGENT NEED TO reduce capital costs in order to stay competitive. Recently, Devon Canada achieved the rare milestone of finishing a major oilsands project under budget and ahead of schedule. Steve Bass led the supply chain process.

The collaborative supply chain approach allowed Devon to complete its Jackfish 3 SAGD project under budget and ahead of schedule. Why don't more players in the oilsands collaborate on integrated project delivery?

Collaboration truly delves into how we create value, so you have to understand the drivers of value in each company. You have to park the ego at the door. Understand we're going to be truthful [and] table discussions in a respectful way. You request each party to bring their most innovative ideas to the space, and you come out with a higher-yielding value based on an approach that is much more open and direct.

Since our presentation on collaborative supply chain management at the Canadian Energy Supply Chain Forum in November, we've had a lot of feedback. People have come to see us from government and industry associations. They see threats and risks from the global competition picture—global competition for fabricated items, or steel, putting modules together in other countries and shipping them to oilsands projects.

The market's wild swings amplify the issues; we're vulnerable when the plug is pulled. Decisions can go offshore, and there's a high risk to local companies. Collaboration is a harder road to go down because it forces the parties beyond a transactional discussion.

There's an association starting up, representing Alberta, currently centred in the oilsands. This appeals to longer-term thinkers about success in the oilsands.

What needs to change to improve capital efficiency in the oilsands sector in a meaningful way?

My personal vision is that we create sufficient momentum that government bodies, industry parties and associations can work together to figure out how to move Alberta into a higher level of performance, beyond the individual contract or project or company level.

It's got to be a bigger picture of success. It requires a change in thinking about how we go to the market. It has the potential to make Alberta something really special in the world. We could easily be criticized for having a bigger vision, but look at the projects that have collaborated

"You have to park the ego at the door."

to achieve success—Shell, Suncor, Conoco and others. We're starting to hear from a number of participants in the industry who are all saying something similar. If we can get to grips with this, Alberta has a great, bright future.

The risk is that if we don't learn and grow, everything [will be] made offshore, oil goes south and Alberta would be the lower labour grade. Alberta would be asked to put goods together that other people have built.

We're trying to create a brighter vision for Alberta and for the rest of Canada because it is a Canadian discussion. We use Ontario fabricators and steel production, [as well as] labour from B.C. and the East Coast.

In these dark times you've got to see it as a glass half full. This is exactly the time we need to find our voice and start to be heard.

PHOTO: CHARLES HOPE

KEN FRIESEN

Lead, Oil and Gas Practice ⓧ GE Canada

GE IS ONE OF THE BIGGEST COMPANIES ON THE PLANET, and through its multiple business verticals, it plays a variety of roles in the oilsands. In recent years GE has also become one of the most visible voices on the opportunity presented by oilsands innovation.

GE recently boosted its presence in the oilsands market. Why?

We've been active in the oilsands for decades as a valued supplier of power and electrical equipment; it's just that people are hearing about us more. There are a lot of people willing to criticize oilsands development, so we're being more vocal about how innovation and technology can help with the environmental and economic challenges and how we extract the resource in a safe way for Canadians—and the world. I think we've got a unique voice to offer on the side of technology and science, innovation, improvement and safety.

GE bought a number of water treatment companies in the late '90s and early 2000s that have technologies we can bring to bear. We have an alternative de-oiling technology we are testing that will reduce the capital cost of building central processing facilities and reduce energy consumption and greenhouse gas emissions. In collaboration with industry members, we are spending $18 million over three years to develop and test it.

We also have investments in high-temperature electric submersible pumps [and] the industrial Internet.

GE is positioning itself as a leader in equipping technologies with the ability to think and act predictively in the field to enable operators to have more information at their fingertips remotely and make the right decisions.

Why have major players, such as Suncor chief executive officer Steve Williams, put so much importance on GE's arrival at the table?

I can't speak for him or anyone else, but we do have a lot to bring to oilsands operators. Very few companies in the world have GE's breadth and depth of technologies and R&D capabilities across multiple disciplines. We cross-pollinate from other sectors, for example, applying imaging technology from our health care business to pipeline integrity.

"I think we've got a unique voice to offer on the side of technology and science, innovation, improvement and safety."

What are your priority areas?

- Continued investment associated with water use to tackle economic and environmental challenges;
- The industrial Internet—minds plus machines plus big data analytics; [and]
- Investing in local industry experts who understand the oilsands challenges and can look at GE's treasure chest of technologies and figure out how to apply those technologies to our customers' challenges. They make technology transfer and innovation happen through the customer innovation centre we opened in Calgary two years ago.

PHOTO: MAX YATSENKO

ROSANNE KYLE

Partner ✕ Mandell Pinder LLP

MULTIPLE LEGAL ACTIONS ARE PITTING FIRST NATIONS INTERESTS AGAINST OILSANDS pipeline development. Based in Vancouver, Rosanne Kyle has represented First Nations in these cases and understands their side.

Why is there so much more legal opposition today from First Nations toward pipeline development than previously?

Pipelines are now being proposed for areas where there are no treaties, specifically in B.C.

Before settlers took up lands, the British Crown required treaties. In the text of treaties, First Nations were required to surrender their aboriginal title. Some rights were recognized, though, so where treaties were settled, there is some certainty.

Last summer, with its Tsilhqot'in decision, the B.C. Supreme Court identified 1,750 square kilometres of land and confirmed that where there are no treaties, aboriginal title still exists—it's just a question of where and how much land.

If a First Nation has aboriginal title in lands, it has the right to exclusively use and manage those lands. It has the right to say no to a pipeline project, and many have been asserting that right.

This is the major reason we're seeing more legal opposition than historically, but there is also the question of access to tidal water because of the risks associated with oil tankers along the shorelines.

Tankers threaten traditional practices such as marine harvesting, which is done in small boats that don't handle waves and wakes well, aside from the unpleasant aesthetic experience. First Nations' governance systems are centred around resource management and traditional practice, and they fear these things will be put at risk and knowledge lost if they don't defend their rights.

First Nations along the coast are not the parties who would benefit from pipelines, but are the ones who would bear the risk. They had relatives affected by Valdez. There's a sense that their way of life would be sacrificed, that their aboriginal rights are considered secondary to the interests of people in other parts of the country.

What would it mean for energy development and pipelines if current cases are won against the federal government?

Most First Nations are not anti-development. They're involved in resource development in their territories, particularly where there's economic benefit to them and they have a voice in how and where projects proceed and how risks are mitigated and managed. For them to support a project, they need to feel the risks are manageable and acceptable.

Energy development will continue, but may have to be done differently to lower the risk of catastrophic impact, for instance, refining bitumen in Canada rather than loading diluted bitumen onto tankers at the coast. The pace of development may have to change in the interests of sustainability and lowering risks.

A key piece is for companies to acknowledge First Nations' aboriginal and treaty rights and seriously address their concerns rather than dismissing them, given that they're constitutional rights. Government needs to address their issues and concerns proactively and sincerely. It's First Nations' very way of being under threat, not just economic decisions at issue.

PHOTO: HIGHLINE WEST

"If there isn't reconciliation [between government and First Nations], there will be more litigation."

Why is there confidence they'll win in court?

First Nations have confidence in their aboriginal rights and their customs, laws and protocols dealing with resources in their territories. They know the Constitution of Canada does not allow their rights to be ignored.

The Tsilhqot'in decision recognized aboriginal title in B.C., so the nations have case precedent on their side. They know the Supreme Court of Canada has commented many times [that] there needs to be reconciliation of First Nations and Crown sovereignty, a way found to coexist without First Nations giving up their rights or government giving up its ability to regulate. Reconciliation can't be achieved without recognition by government and companies of First Nations' rights, and attempts to address their concerns. If there isn't reconciliation, there will be more litigation.

Oilsands 777

COSIA HAS SHARED NEARLY 800 DISTINCT TECHNOLOGIES AND CURRENTLY HAS $400 MILLION OF ENVIRONMENTAL INNOVATION PROJECTS IN FLIGHT

By Mark Lowey

CANADA'S OIL SANDS INNOVATION Alliance (COSIA) may have only just recently announced its first concrete performance target, but that doesn't mean that over the three years since its creation, nothing else has been going on.

Since 2012, COSIA member companies have shared 777 distinct technologies and innovations that cost more than $950 million to develop. The group currently has 228 active projects representing a total of $400 million.

"The companies are sharing real technologies that are getting used," says Dan Wicklum, COSIA's chief executive. "Companies are delivering real, on-the-ground, regional performance improvement."

The joint-industry projects cut across all four of COSIA's environmental priority areas (EPAs): tailings, water, land and greenhouse gases. By far, the largest project right now is the $165-million Water Technology Development Centre (WTDC), which is being built in the heart of the Athabasca oilsands region.

Testing new SAGD water treatment technologies at field scale is extremely difficult, Wicklum says, because tying a novel technology into an operating SAGD plant could interfere with bitumen production.

The new WTDC will be "hot coupled" to Suncor Energy's Firebag SAGD project, benefiting from being linked to an operating facility, without disturbing it. The WTDC project also includes COSIA companies Canadian Natural Resources, Devon Canada, Nexen, Shell Canada and Husky. It is expected to be operational in 2017. Steve Williams, Suncor president and chief executive officer, says the group expects to "see strong benefits by conducting different tests simultaneously, using process fluids in real-world conditions to pilot new technologies and prove their commercial viability."

Here are some highlights of other COSIA joint-industry projects in the four EPAs.

TAILINGS

Tailings EPA director Jonathan Matthews says the main tailings challenge is to stabilize deposits in order to prepare those areas for reclamation. In 2014, COSIA had 42 active projects costing $75 million. To date, COSIA companies have shared a total of 117 technologies valued at $626 million in this area.

One of the most significant and advanced technologies is tailings centrifuging. Initially developed for the oilsands by the CanmetENERGY research facility in Devon, Alta., in the early 2000s, centrifuging technology was introduced at Syncrude via a small-scale one-week test in 2007, followed by increasingly large pilot plants in 2008 and 2010. In the first half of 2015, Syncrude will start up its $1.9-billion commercial centrifuge plant.

The process involves removing clay fluids from a tailings pond, adding a water treatment chemical and then spinning the material in large, high-speed centrifuges. Like a washing machine, the centrifuge spins out the water, leaving a clay-like cake mixture. The water is sent back to the tailings pond for reuse, and the clay remnants are deposited in reclamation areas where the material is strong enough to support vehicle or pedestrian traffic within 12 months.

↑ Syncrude's $1.9-billion tailings centrifuge project, under construction in fall 2013. As a member of COSIA, Syncrude has shared this new technology with the other mining producers, and it is now being adapted by Shell.

As a COSIA member, Syncrude shared the technology with the group, and as a result, Shell is in the final stages of preparation for commercial deployment, building centrifuges into its Jackpine Mine operations.

"The deployment of that centrifuge technology is accelerated by years compared to what would have happened without COSIA," Wicklum notes.

PHOTO: GREG HALINDA

WATER

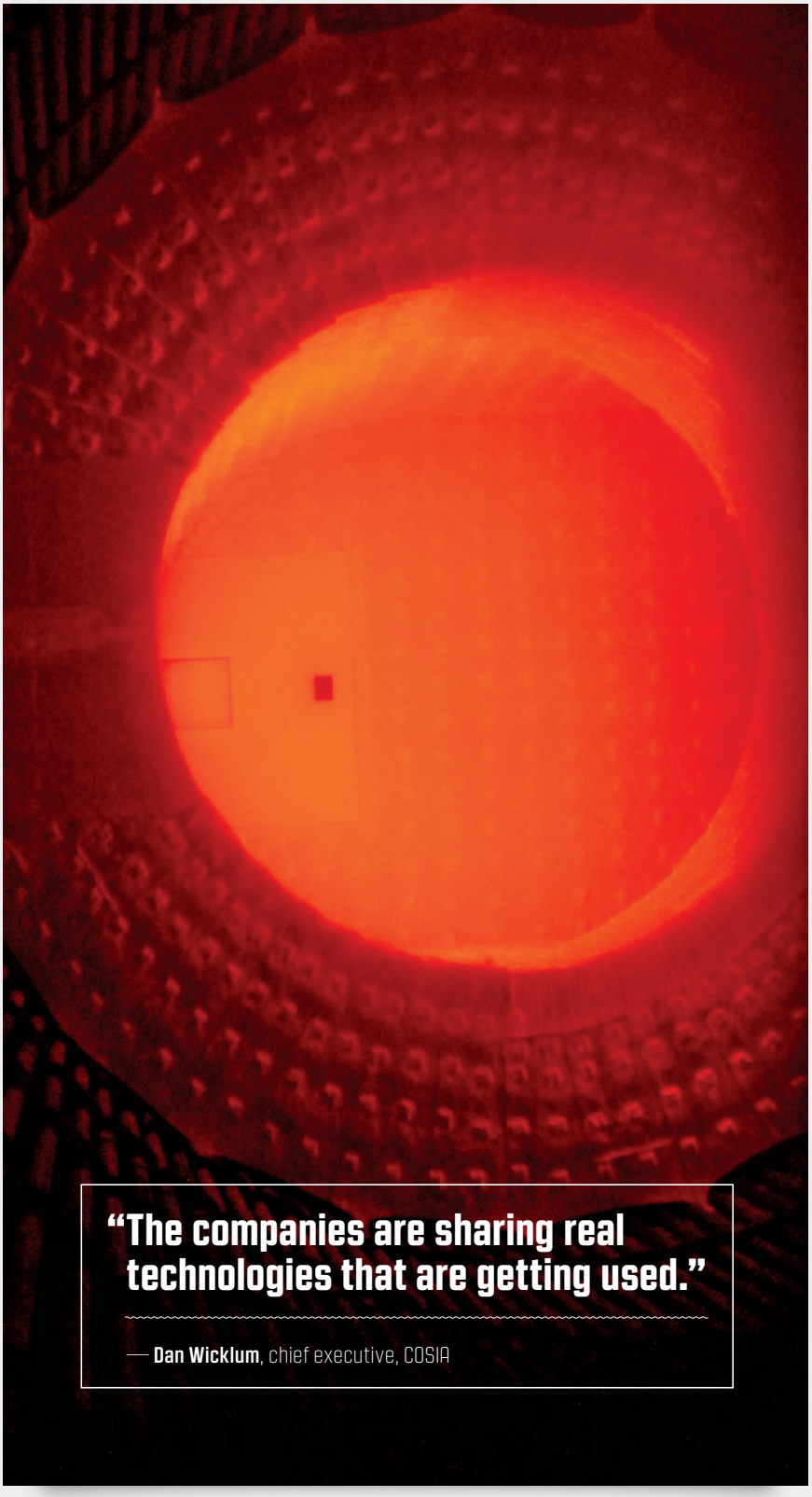
There were 43 active projects costing more than $230 million in the water priority area in 2014. To date, COSIA companies have shared a total of 171 technologies valued at $232 million in this EPA.

Water is the target of COSIA's first performance goal—to reduce freshwater use intensity by 50 per cent by 2022 at in situ operations.

Water EPA director John Brogly says the most promising opportunities for achieving that goal are improving water treatment processes, improving steam quality and steam generation, reducing boiler-blowdown waste and improving waste-water disposal techniques.

In SAGD, steam is produced by forcing water through a vertical tube and heating the outside of the tube. In the rifled tubes project, led by Devon Canada and Suncor, fine spiral grooves are inscribed inside the tubes—like the rifling grooves inside a gun barrel that make the bullet spin, stabilizing it and improving its accuracy. Rifling a steam-generation tube spins the water to the outside so it is more uniformly heated, resulting in more even and effective steam generation. The innovation could reduce water use by 15 per cent, reduce greenhouse gas emissions by one to six per cent and reduce the amount of waste water by 50 per cent, COSIA says.

The Regional Water Management Initiative, led by Suncor, is a project designed to encourage better long-term water usage systems in the oilsands region through collaborative water management. A key focus is sharing treated tailings water from mining operations with SAGD operators so that one company's waste water becomes another company's process water.



"The companies are sharing real technologies that are getting used."

— **Dan Wicklum**, chief executive, COSIA

→ The view inside a once-through steam generator: COSIA says that introducing technologies that improve the efficiency of the steam generation process will be one of the keys to reach its first performance goal, which is reducing freshwater use by 50 per cent by 2022.

PHOTO: JOEY PODLUBNY

The Algar Historic Restoration Project included innovative winter planting techniques, which have been recognized as a major step forward in reclamation efforts.

LAND

Land EPA director Jenna Dunlop notes that this priority area has a very broad scope aimed at minimizing the impact of both mining and in situ projects on the land as well as on any biological community and shallow water/soils/surface vegetation, along with reclamation of tailings.

There were 117 active projects costing $70.5 million in 2014. To date, COSIA companies have shared a total of 365 different technologies valued at $130 million in this area.

The Algar Historic Restoration Project—a collaboration of six COSIA companies, the Province of Alberta and the local forestry industry to restore endangered caribou habitat—received a prestigious Alberta Emerald Award in 2014. The work included planting trees and shrubs using innovative winter planting techniques along the linear footprint—about 570 square kilometres—within the Algar region southwest of Fort McMurray.

The Algar Historic Restoration Project received a prestigious Alberta Emerald Award in 2014.

A related project, the Regional Industry Caribou Collaboration, led by Devon Canada, is a regional effort to collect the data necessary to manage cumulative impacts of oilsands development on caribou in the Cold Lake, Alta., and eastern Athabasca River ranges.

PHOTO: JOEY PODLUBNY

GREENHOUSE GASES

The Algae Carbon Conversion project, led by Canadian Natural Resources, involves mixing CO_2 emissions with algae to produce biofuel and biomass. Canadian Natural's Horizon oilsands upgrader is seen here.

PHOTO: CANADIAN NATURAL RESOURCES

According to director Wayne Hillier, a main focus of the greenhouse gases EPA is to change CO_2 emissions from a waste material into a usable product. There were 26 active projects costing $15 million in 2014. To date, COSIA companies have shared a total of 124 technologies costing $200 million in this area.

The Algae Carbon Conversion project, led by Canadian Natural Resources in partnership with the National Research Council of Canada and Pond Biofuels, involves mixing CO_2 emissions with algae to produce biofuel and biomass products.

The technology will be tested at a planned pilot-scale biorefinery that puts an oilsands plant's CO_2 and waste heat into large tanks with algae and treated waste water.

LED lights are then used to promote photosynthesis, and the algae are pressed to release bio-oil that can be used as jet fuel or blended into heavy oil or synthetic crude oil. Leftover biomass can be used to feed livestock and for land reclamation.

Initial engineering has been completed on the project, which could cut emissions by 15 per cent at Canadian Natural's Horizon mine and by 30 per cent or more at the company's Primrose operations—reducing more than 1.5-million tonnes of CO_2 equivalent emissions overall.

OILSANDS PROJECT STATUS

moreOnline

Canadian Oilsands Navigator

navigator.oilsandsreview.com

For more detailed project data, visit ***oilsandsreview.com***. To explore oilsands projects using our interactive web tool, visit the Canadian Oilsands Navigator.

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
OPERATING PROJECTS UNDER CONSTRUCTION					
Athabasca Oil Corporation					
Hangingstone					
HS-1	South Athabasca	SAGD	12,000	$565	2015
Brion Energy					
MacKay River					
Phase 1	North Athabasca	SAGD	35,000	$1,300	2015
Canadian Natural Resources					
Horizon					
Phase 2B	North Athabasca	UPG	45,000	N/Q	2016
Phase 3	North Athabasca	UPG	80,000	N/Q	2017
Cenovus Energy					
Christina Lake					
Optimization (Phases C, D, E)	South Athabasca	SAGD	22,000	N/Q	2015
Phase F	South Athabasca	SAGD	50,000	N/Q	2016
Foster Creek					
Phase G	South Athabasca	SAGD	30,000	N/Q	2016
Phase H	South Athabasca	SAGD	30,000	N/Q	2017
ConocoPhillips Canada					
Surmont					
Phase 2	South Athabasca	SAGD	118,000	$2,490	2015
Husky Energy					
Sunrise					
Phase 1B	North Athabasca	SAGD	30,000	N/Q	2015
Imperial Oil					
Kearl					
Phase 2	North Athabasca	MINING	110,000	$8,900	2015
Japan Canada Oil Sands					
Hangingstone					
Expansion	South Athabasca	SAGD	20,000	$1,400	2016
North West Upgrading					
Redwater Upgrader					
Phase 1	Industrial Heartland	UPG	50,000	$8,500	2017
Pengrowth Energy					
Lindbergh					
Phase 1 Optimization	Cold Lake	SAGD	3,500	$10	2015
Royal Dutch Shell					
Peace River					
Carmon Creek - Phase 1	Peace River	VSD	40,000	$3,450	2017
Suncor Energy					
Fort Hills					
Phase 1	North Athabasca	MINING	160,000	$15,120	2017
Sunshine Oilsands					
West Ells					
Phase A1	North Athabasca	SAGD	5,000	$525	2015

PHASE	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
OILSANDS PROJECTS RECENTLY PLACED ON HOLD					
Canadian Natural Resources					
Kirby					
KN1 - Kirby North	South Athabasca	SAGD	40,000	$1,450	TBD
Cenovus Energy					
Christina Lake					
Phase G	South Athabasca	SAGD	50,000	N/Q	TBD
Foster Creek					
Phase J	South Athabasca	SAGD	50,000	$1,400	TBD
Grand Rapids					
Pelican Upper Grand Rapids Phase A	South Athabasca	SAP	10,000	N/Q	TBD
Narrows Lake					
Phase A	South Athabasca	SAP	45,000	$1,600	TBD
Telephone Lake					
Phase A	North Athabasca	SAGD	45,000	$1,000	TBD
Husky Energy					
Sunrise					
Phase 2A	North Athabasca	SAGD	35,000	$1,600	TBD
Phase 2B	North Athabasca	SAGD	35,000	$1,600	TBD
Laricina Energy					
Germain					
Phase 2	South Athabasca	SC-SAGD	30,000	$1,200	TBD
Saleski					
Phase 1	South Athabasca	C-SAGD	10,700	$520	2017
PTT Exploration and Production					
Mariana - Hangingstone					
Phase 1	South Athabasca	SAGD	20,000	N/Q	TBD
Mariana - South Leismer					
Phase 1	South Athabasca	SAGD	20,000	N/Q	TBD
Mariana - Thornbury					
Phase 1	South Athabasca	SAGD	40,000	N/Q	TBD
Expansion	South Athabasca	SAGD	20,000	N/Q	TBD
Statoil					
Corner					
Phase 1	South Athabasca	SAGD	40,000	N/Q	TBD
Suncor Energy					
MacKay River					
MR2	North Athabasca	SAGD	20,000	N/Q	TBD

PHASE	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
OILSANDS PROJECTS RECENTLY SUSPENDED					
Laricina Energy					
Germain					
Phase 1 CDP	South Athabasca	SC-SAGD	5,000	$410	2013
Shell Canada					
Pierre River					
Phases 1 and 2	North Athabasca	MINING	200,000	N/Q	TBD

OPERATING OILSANDS PROJECTS

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
Andora Energy					
Sawn Lake					
Demonstration	Peace River	SAGD	1,400	$33	2014
Baytex Energy					
Cliffdale					
Pilot	Peace River	CSS	2,000	$55	2011
Gemini					
Pilot	Cold Lake	SAGD	1,200	N/Q	2014
Harmon Valley					
Pilot	Peace River	CSS	N/Q	N/Q	2011
BlackPearl Resources					
Blackrod					
Pilot	South Athabasca	SAGD	800	$25	2011
Canadian Natural Resources					
Horizon					
Phase 1	North Athabasca	MINING	135,000	$9,700	2008
Phase 1	North Athabasca	UPG	110,000	$2,200	2009
Reliability - Tranche 2	North Athabasca	MINING	5,000	N/Q	2014
Reliability - Tranche 2	North Athabasca	UPG	5,000	$1,090	2014
Phase 2A	North Athabasca	MINING	12,000	N/Q	2014
Phase 2A	North Athabasca	UPG	12,000	N/Q	2014
Kirby					
KS1 - Kirby South	South Athabasca	SAGD	40,000	$1,250	2013
Primrose and Wolf Lake					
Wolf Lake	Cold Lake	CSS	13,000	N/Q	1985
Primrose South	Cold Lake	CSS	45,000	N/Q	1985
Primrose North	Cold Lake	CSS	30,000	N/Q	2006
Primrose East	Cold Lake	CSS	32,000	$600	2008
Cenovus Energy					
Christina Lake					
Phase 1A	South Athabasca	SAGD	10,000	N/Q	2002
Phase 1B	South Athabasca	SAGD	8,800	N/Q	2008
Phase C	South Athabasca	SAGD	40,000	$800	2011
Phase D	South Athabasca	SAGD	40,000	N/Q	2012
Phase E	South Athabasca	SAGD	40,000	$2,700	2013
Foster Creek					
Phase A	South Athabasca	SAGD	24,000	N/Q	2001
Phase B Debottleneck	South Athabasca	SAGD	6,000	N/Q	2003
Phase C Stage 1	South Athabasca	SAGD	10,000	N/Q	2005
Phase C Stage 2	South Athabasca	SAGD	20,000	N/Q	2007
Phase D	South Athabasca	SAGD	30,000	N/Q	2009
Phase E	South Athabasca	SAGD	30,000	N/Q	2009
Phase F	South Athabasca	SAGD	30,000	$2,000	2014
Grand Rapids					
Pelican Lake Pilot	South Athabasca	SAGD	600	N/Q	2011
CNOOC					
Long Lake					
Phase 1	South Athabasca	SAGD	72,000	$6,100	2008
Phase 1	South Athabasca	ORCRUDE	58,500	N/Q	2009
Kinosis (K1A)	South Athabasca	SAGD	20,000	N/Q	2014
Connacher Oil and Gas					
Great Divide					
Pod One	South Athabasca	SAGD	10,000	$200	2007
Algar	South Athabasca	SAGD	10,000	$326	2010
ConocoPhillips Canada					
Surmont					
Pilot	South Athabasca	SAGD	1,200	N/Q	1997
Phase 1	South Athabasca	SAGD	30,000	$1,400	2007
Devon Canada					
Jackfish					
Phase 1	South Athabasca	SAGD	35,000	$650	2007
Phase 2	South Athabasca	SAGD	35,000	$1,050	2011
Phase 3	South Athabasca	SAGD	35,000	$1,500	2014
Grizzly Oil Sands					
Algar Lake					
Phase 1	South Athabasca	SAGD	6,000	$240	2014
Harvest Operations					
BlackGold					
Phase 1	South Athabasca	SAGD	10,000	$460	2015
Husky Energy					
McMullen					
Experimental Thermal Conduction Pilot	South Athabasca	AIRINJ	755	$15	2012
Sunrise					
Phase 1A	North Athabasca	SAGD	30,000	$3,200	2015
Tucker					
Phase 1	Cold Lake	SAGD	30,000	$500	2006
Imperial Oil					
Cold Lake					
Phases 1–0	Cold Lake	CSS	110,000	N/Q	1985
Phases 11–13	Cold Lake	CSS	30,000	$630	2002
Experimental SA-SAGD	Cold Lake	SA-SAGD	N/Q	N/Q	2013
Phases 14–16	Cold Lake	CSS	40,000	$2,000	2015
Kearl					
Phase 1	North Athabasca	MINING	110,000	$12,900	2013
Japan Canada Oil Sands					
Hangingstone Pilot					
Pilot	South Athabasca	SAGD	11,000	N/Q	1999
Laricina Energy					
Saleski					
Experimental Pilot	South Athabasca	C and SC	1,800	$45	2011
MEG Energy					
Christina Lake					
Phase 1 Pilot	South Athabasca	SAGD	3,000	N/Q	2008
Phase 2A	South Athabasca	SAGD	22,000	N/Q	2009
Phase 2B	South Athabasca	SAGD	55,000	$1,400	2013
Murphy Oil Company					
Seal/Cadotte					
Pilot	Peace River	HCSS	N/Q	N/Q	TBD
Osum Oil Sands					
Orion					
Phase 1	Cold Lake	SAGD	10,000	$235	2007
Pengrowth Energy					
Lindbergh					
Pilot	Cold Lake	SAGD	1,260	$25	2012
Phase 1	Cold Lake	SAGD	11,240	$630	2015

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
Penn West Petroleum					
Harmon Valley South					
Pilot	Peace River	HCSS	N/Q	N/Q	2014
Seal Main					
Pilot	Peace River	HCSS	75	N/Q	2011
Royal Dutch Shell					
Peace River					
Cadotte Lake	Peace River	CSS	12,500	N/Q	1986
Shell Albian Sands					
Jackpine					
Phase 1A	North Athabasca	MINING	100,000	N/Q	2010
Muskeg River					
Commercial	North Athabasca	MINING	155,000	$1,800	2002
Scotford Upgrader					
Commercial	Industrial Heartland	UPG	155,000	$1,900	2003
Expansion	Industrial Heartland	UPG	100,000	N/Q	2011
Southern Pacific Resource					
STP-McKay					
Phase 1	North Athabasca	SAGD	12,000	$468	2012
Statoil					
Corner					
Expansion	South Athabasca	SAGD	40,000	N/Q	TBD
Leismer					
Demonstration	South Athabasca	SAGD	10,000	$300	2010
Commercial	South Athabasca	SAGD	10,000	N/Q	2011
Suncor Energy					
Base Operations					
Millennium Mine	North Athabasca	MINING	294,000	N/Q	1967
U1 and U2	North Athabasca	UPG	225,000	$190	1967
Millennium Vacuum Unit	North Athabasca	UPG	35,000	$425	2005
Steepbank Debottleneck Phase 3	North Athabasca	MINING	4,000	N/Q	2007
Millennium Debottlenecking	North Athabasca	MINING	23,000	N/Q	2008
Millennium Coker Unit	North Athabasca	UPG	97,000	$2,300	2008
North Steepbank Extension	North Athabasca	MINING	180,000	$400	2012
Dover					
Demonstration Plant	North Athabasca	BEST	500	$70	2014
Firebag					
Stage 1	North Athabasca	SAGD	35,000	N/Q	2004
Stage 2	North Athabasca	SAGD	35,000	N/Q	2006
Cogeneration and Expansion	North Athabasca	SAGD	25,000	N/Q	2007
Stage 3	North Athabasca	SAGD	42,500	$4,400	2011
Stage 4	North Athabasca	SAGD	42,500	$1,700	2012
MacKay River					
Phase 1	North Athabasca	SAGD	33,000	$175	2002
Debottleneck	North Athabasca	SAGD	5,000	N/Q	2014
Syncrude Canada					
Mildred Lake/Aurora					
Base Mine Stage 1 and 2 Expansion	North Athabasca	MINING	290,700	N/Q	1978
Base Plant Stage 1 and 2 Debottleneck	North Athabasca	UPG	250,000	N/Q	1978
Stage 3 Expansion	North Athabasca	MINING	116,300	$8,400	2006
Stage 3 Expansion (UE-1)	North Athabasca	UPG	100,000	N/Q	2006
Touchstone Exploration					
Dawson					
Experimental Demonstration	Peace River	CSS	N/Q	N/Q	2014

OILSANDS PROJECTS WITH REGULATORY APPROVAL

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
Athabasca Oil Corporation					
Dover West Carbonates (Leduc)					
Phase 1 Demonstration	North Athabasca	TAGD	6,000	N/Q	2016
Hangingstone East					
Halfway Creek Exploratory Program	South Athabasca	SAGD	10,000	N/Q	2014
Baytex Energy					
Gemini					
Commercial	Cold Lake	SAGD	5,000	N/Q	2017
BP					
Terre de Grace					
Pilot	North Athabasca	SAGD	10,000	$4,000	TBD
Pilot	North Athabasca	ADC USP	8,400	N/Q	TBD
Brion Energy					
Dover					
Dover Experimental Pilot	North Athabasca	SAGD	2,000	N/Q	2017
Dover North Phase 1	North Athabasca	SAGD	50,000	$2,500	TBD
Dover North Phase 2	North Athabasca	SAGD	50,000	N/Q	TBD
Dover South Phase 3	North Athabasca	SAGD	50,000	N/Q	2021
Dover South Phase 4	North Athabasca	SAGD	50,000	N/Q	2023
Dover South Phase 5	North Athabasca	SAGD	50,000	N/Q	2025
MacKay River					
Phase 2	North Athabasca	SAGD	40,000	N/Q	2018
Phase 3	North Athabasca	SAGD	40,000	N/Q	2020
Phase 4	North Athabasca	SAGD	35,000	N/Q	2022
Canadian Natural Resources					
Kirby					
KN2 - Kirby North	South Athabasca	SAGD	60,000	N/Q	2022
Cavalier Energy					
Hoole					
Phase 1	South Athabasca	SAGD	10,000	$455	2017
Cenovus Energy					
Christina Lake					
Phase G	South Athabasca	SAGD	50,000	N/Q	2017
Grand Rapids					
Pelican Upper Grand Rapids Phase A	South Athabasca	SAGD	10,000	N/Q	TBD
Pelican Upper Grand Rapids Phase B	South Athabasca	SAGD	32,000	N/Q	TBD
Pelican Upper Grand Rapids Phase C	South Athabasca	SAGD	29,000	N/Q	TBD
Pelican Upper Grand Rapids Phase D	South Athabasca	SAGD	29,000	N/Q	TBD
Pelican Upper Grand Rapids Phase E	South Athabasca	SAGD	32,000	N/Q	TBD
Pelican Upper Grand Rapids Phase F	South Athabasca	SAGD	29,000	N/Q	TBD
Pelican Upper Grand Rapids Phase G	South Athabasca	SAGD	19,000	N/Q	TBD

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
Narrows Lake					
Phase B	South Athabasca	SAP	45,000	N/Q	TBD
Phase C	South Athabasca	SAP	40,000	N/Q	TBD
Telephone Lake					
Phase B	North Athabasca	SAGD	45,000	N/Q	TBD
CNOOC					
Long Lake					
Kinosis (K1B)	South Athabasca	SAGD	40,000	N/Q	TBD
Phase 2	South Athabasca	SAGD	72,000	N/Q	TBD
Phase 2	South Athabasca	ORCRUDE	58,500	N/Q	TBD
Connacher Oil and Gas					
Great Divide					
Expansion 1A	South Athabasca	SAGD	12,000	$600	TBD
Expansion 1B	South Athabasca	SAGD	12,000	N/Q	TBD
Devon Canada					
Pike					
1A	South Athabasca	SAGD	35,000	$3,800	2016
1B	South Athabasca	SAGD	35,000	N/Q	2017
1C	South Athabasca	SAGD	35,000	N/Q	2018
Grizzly Oil Sands					
Algar Lake					
Phase 2	South Athabasca	SAGD	6,000	$200	TBD
Harvest Operations					
BlackGold					
Phase 2	South Athabasca	SAGD	20,000	$540	TBD
Husky Energy					
Caribou					
Demonstration	Cold Lake	SAGD	10,000	N/Q	TBD
Sunrise					
Future Phases	North Athabasca	SAGD	70,000	N/Q	TBD
Imperial Oil					
Kearl					
Phase 3	North Athabasca	MINING	80,000	N/Q	2020
Phase 4 Debottleneck	North Athabasca	MINING	45,000	N/Q	TBD
Koch Exploration Canada					
Muskwa					
Pilot	South Athabasca	SAGD	10,000	$800	TBD
Laricina Energy					
Saleski					
Phase 1	South Athabasca	C-SAGD	10,700	$520	2017
MEG Energy					
Christina Lake					
Phase 3A	South Athabasca	SAGD	50,000	$500	2016
Phase 3B	South Athabasca	SAGD	50,000	N/Q	2018
Phase 3C	South Athabasca	SAGD	50,000	N/Q	2020
North West Upgrading					
Redwater Upgrader					
Phase 2	Industrial Heartland	UPG	50,000	N/Q	TBD
Phase 3	Industrial Heartland	UPG	50,000	N/Q	TBD
Northern Alberta Oil					
Sawn Lake					
Pilot	Peace River	HCSS	700	N/Q	TBD
Oak Point Energy					
Lewis					
Pilot	North Athabasca	SAGD	1,720	$65	TBD
Osum Oil Sands					
Orion					
Phase 2	Cold Lake	SAGD	10,000	N/Q	TBD
Taiga					
Phase 1	Cold Lake	CSS-SAGD	12,500	$1,570	TBD
Phase 2	Cold Lake	CSS-SAGD	12,500	N/Q	TBD
Phase 3	Cold Lake	CSS-SAGD	20,000	N/Q	TBD
Royal Dutch Shell					
Peace River					
Carmon Creek Phase 2	Peace River	VSD	40,000	N/Q	TBD
Shell Albian Sands					
Jackpine					
Phase 1B	North Athabasca	MINING	100,000	N/Q	TBD
Expansion	North Athabasca	MINING	100,000	N/Q	2017
Muskeg River					
Expansion and Debottlenecking	North Athabasca	MINING	115,000	N/Q	TBD
Statoil					
Leismer					
Expansion	South Athabasca	SAGD	20,000	N/Q	TBD
Suncor Energy					
Firebag					
Stage 5	North Athabasca	SAGD	62,500	N/Q	2018
Stage 6	North Athabasca	SAGD	62,500	N/Q	2019
Fort Hills					
Debottlenecking	North Athabasca	MINING	20,000	N/Q	TBD
Meadow Creek East					
Phase 1	South Athabasca	SAGD	20,000	N/Q	2020
Phase 2	South Athabasca	SAGD	30,000	N/Q	2022
Phase 3	South Athabasca	SAGD	30,000	N/Q	TBD
Sunshine Oilsands					
Thickwood					
Phase A1	North Athabasca	SAGD	10,000	$375	TBD
West Ells					
Phase A2	North Athabasca	SAGD	5,000	N/Q	TBD
Syncrude Canada					
Mildred Lake/Aurora					
Aurora South Train 1	North Athabasca	MINING	100,000	N/Q	TBD
Aurora South Train 2	North Athabasca	MINING	100,000	N/Q	TBD
Value Creation					
Heartland					
Phase 2	Industrial Heartland	UPG	46,300	N/Q	TBD
Phase 3	Industrial Heartland	UPG	46,300	N/Q	TBD
TriStar					
Pilot	South Athabasca	SAGD	1,000	$50	TBD
Pilot	South Athabasca	ADC USP	820	N/Q	TBD

OILSANDS PROJECTS WITH REGULATORY APPLICATION FILED

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
Athabasca Oil Corporation					
Dover West Carbonates (Leduc)					
Phase 2 Demonstration	North Athabasca	TAGD	6,000	N/Q	TBD
Dover West Sands and Clastics					
Phase 1	North Athabasca	SAGD	12,000	$480	TBD
Hangingstone					
HS-2A Debottlenecking (1 and 2)	South Athabasca	SAGD	8,000	N/Q	2017
HS-2B Expansion	South Athabasca	SAGD	32,000	N/Q	2019
HS-3	South Athabasca	SAGD	30,000	N/Q	2021
Hangingstone Pilot					
Experimental Combustion Pilot	South Athabasca	COGD	1,000	$50	TBD
Birchwood Resources					
Sage					
Pilot	Cold Lake	LP-SAGD	5,000	$230	TBD
BlackPearl Resources					
Blackrod					
Phase 1	South Athabasca	SAGD	20,000	$800	TBD
Phase 2	South Athabasca	SAGD	30,000	N/Q	2018
Phase 3	South Athabasca	SAGD	30,000	N/Q	2021
Canadian Natural Resources					
Grouse					
Commercial	South Athabasca	SAGD	40,000	$1,530	2020
Cenovus Energy					
Christina Lake					
Phase H	South Athabasca	SAGD	50,000	N/Q	TBD
CNOOC					
Long Lake					
Phase 3	South Athabasca	SAGD	72,000	N/Q	TBD
Phase 3	South Athabasca	ORCRUDE	58,500	N/Q	TBD
ConocoPhillips Canada					
Surmont					
Phase 3 - Tranche 1	South Athabasca	SAGD	45,000	$6,200	2020
Phase 3 - Tranche 2	South Athabasca	SAGD	45,000	N/Q	2021
Phase 3 - Tranche 3	South Athabasca	SAGD	45,000	N/Q	2023
Devon Canada					
Walleye					
Phase 1	Cold Lake	SAGD	9,000	$450	TBD
Grizzly Oil Sands					
May River					
Phase 1	South Athabasca	SAGD	6,000	$450	TBD
Phase 2	South Athabasca	SAGD	6,000	N/Q	TBD
Thickwood					
Phase 1	North Athabasca	CSS-SAGD	6,000	$220	TBD
Phase 2	North Athabasca	CSS-SAGD	6,000	$200	TBD
Husky Energy					
Saleski					
Carbonate Pilot	North Athabasca	CSS	3,000	$300	2017
Imperial Oil					
Aspen					
Phase 1	North Athabasca	SAGD	45,000	$7,000	2020
Phase 2	North Athabasca	SAGD	45,000	N/Q	TBD
Phase 3	North Athabasca	SAGD	45,000	N/Q	TBD
Ivanhoe Energy					
Tamarack					
Phase 1	North Athabasca	SAGD	20,000	$820	TBD
Phase 1	North Athabasca	HTL	34,784	$550	TBD
Phase 2	North Athabasca	SAGD	20,000	N/Q	TBD
Koch Exploration Canada					
Dunkirk					
Commercial Demonstration	North Athabasca	SAGD	2,000	$123	2017
Laricina Energy					
Germain					
Phase 3	South Athabasca	SC-SAGD	60,000	N/Q	TBD
Phase 4	South Athabasca	SC-SAGD	60,000	N/Q	TBD
Marathon Oil					
Birchwood					
Demonstration	North Athabasca	SAGD	12,000	$510	2017
MEG Energy					
Surmont					
Phase 1	South Athabasca	SAGD	40,000	N/Q	TBD
Phase 2	South Athabasca	SAGD	40,000	N/Q	TBD
Phase 3	South Athabasca	SAGD	40,000	N/Q	TBD
Osum Oil Sands					
Sepiko Kesik					
Phase 1	South Athabasca	CSS-SAGD	30,000	N/Q	2018
Phase 2	South Athabasca	CSS-SAGD	30,000	N/Q	2020
Pengrowth Energy					
Lindbergh					
Phase 2 Expansion	Cold Lake	SAGD	34,000	$672	2017
Penn West Petroleum					
Seal Main					
Commercial	Peace River	HCSS	10,000	N/Q	TBD
Prosper Petroleum					
Rigel					
Phase 1	North Athabasca	SAGD	10,000	$390	2017
Renergy Petroleum (Canada)					
Muskwa					
Muskwa Experimental Pilot	South Athabasca	SCCC	N/Q	N/Q	2015
SilverWillow Energy					
Audet					
Pilot	North Athabasca	SAGD	12,000	$550	2018
Southern Pacific Resource					
STP-McKay					
Phase 1 Expansion	North Athabasca	SAGD	6,000	$150	2016
Phase 2A	North Athabasca	SAGD	12,000	$100	2018
Phase 2B	North Athabasca	SAGD	6,000	N/Q	2018
Suncor Energy					
Firebag					
Stages 3–6 Debottlenecking	North Athabasca	SAGD	23,000	N/Q	TBD
Voyageur South					
Phase 1	North Athabasca	MINING	120,000	$4,400	TBD
Sunshine Oilsands					
Legend Lake					
Phase A1	North Athabasca	SAGD	10,000	$419	TBD
Surmont Energy					
Wildwood					
Phase 1	South Athabasca	SAGD	12,000	$500	TBD
Syncrude Canada					
Mildred Lake/Aurora					
Mildred Lake Mine Extension (MLX)	North Athabasca	MINING	184,000	$3,000	2023

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
Teck Resources					
Frontier					
Phase 1	North Athabasca	MINING	74,600	$14,500	2021
Phase 2	North Athabasca	MINING	84,000	N/Q	2024
Phase 3	North Athabasca	MINING	79,300	$8,400	2027
Phase 4 Equinox	North Athabasca	MINING	39,400	N/Q	2030
Value Creation					
Advanced TriStar					
ATS-1	South Athabasca	SAGD	15,000	N/Q	2016
ATS-1	South Athabasca	ADC USP	12,750	N/Q	2016
ATS-2	South Athabasca	SAGD	30,000	N/Q	2018
ATS-2	South Athabasca	ADC USP	25,500	N/Q	2018
ATS-3	South Athabasca	SAGD	30,000	N/Q	2020
ATS-3	South Athabasca	ADC USP	25,500	N/Q	2020

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
ANNOUNCED OILSANDS PROJECTS					
Athabasca Oil Corporation					
Birch					
Phase 1	North Athabasca	SAGD	12,000	N/Q	TBD
Dover West Sands and Clastics					
Phase 2	North Athabasca	SAGD	35,000	N/Q	2019
Phase 3	North Athabasca	SAGD	35,000	N/Q	2020
Phase 4	North Athabasca	SAGD	35,000	N/Q	2022
Phase 5	North Athabasca	SAGD	35,000	N/Q	2024
BP					
Terre de Grace					
Phase 1	North Athabasca	SAGD	40,000	N/Q	TBD
Phase 1	North Athabasca	ADC USP	33,600	N/Q	TBD
Phase 2	North Athabasca	SAGD	40,000	N/Q	TBD
Phase 2	North Athabasca	ADC USP	33,600	N/Q	TBD
Canadian Natural Resources					
Birch Mountain					
Phase 1	North Athabasca	SAGD	60,000	N/Q	2019
Phase 2	North Athabasca	SAGD	60,000	N/Q	2023
Gregoire Lake					
Phase 1	South Athabasca	SAGD	60,000	N/Q	TBD
Phase 2	South Athabasca	SAGD	60,000	N/Q	TBD
Phase 3	South Athabasca	SAGD	30,000	N/Q	TBD
Phase 4	South Athabasca	SAGD	30,000	N/Q	TBD
Horizon					
Phase 4	North Athabasca	MINING	145,000	N/Q	TBD
Phase 4	North Athabasca	UPG	125,000	N/Q	TBD
Phase 5	North Athabasca	MINING	162,000	N/Q	TBD
Phase 5	North Athabasca	UPG	140,000	N/Q	TBD
Leismer					
Commercial	South Athabasca	IN SITU	30,000	N/Q	2020
Cavalier Energy					
Hoole					
Phase 2A	South Athabasca	SAGD	35,000	$1,400	TBD
Phase 2B	South Athabasca	SAGD	35,000	$1,300	TBD

PHASE NAME	REGION	TECHNOLOGY	CAPACITY (BBLS/D)	BUDGETS ($ MILLION)	PRODUCTION START
Cenovus Energy					
East McMurray					
Phase 1	North Athabasca	SAGD	30,000	N/Q	TBD
Foster Creek					
Future Optimization (Phases F, G, H)	South Athabasca	SAGD	35,000	N/Q	TBD
Future Optimization	South Athabasca	SAGD	15,000	N/Q	TBD
Steepbank					
Phase 1	North Athabasca	SAGD	30,000	N/Q	TBD
West Kirby					
Phase 1	South Athabasca	SAGD	30,000	N/Q	TBD
Winefred Lake					
Phase 1	South Athabasca	SAGD	30,000	N/Q	TBD
Devon Canada					
Jackfish East					
Expansion	South Athabasca	SAGD	20,000	N/Q	2018
Koch Exploration Canada					
Dunkirk					
Phase 1	North Athabasca	SAGD	30,000	N/Q	2018
Phase 2	North Athabasca	SAGD	30,000	N/Q	TBD
Laricina Energy					
Saleski					
Phase 2	South Athabasca	IN SITU	30,000	N/Q	TBD
Phase 3	South Athabasca	IN SITU	60,000	N/Q	TBD
Phase 4	South Athabasca	IN SITU	60,000	N/Q	TBD
Phase 5	South Athabasca	IN SITU	60,000	N/Q	TBD
Phase 6	South Athabasca	IN SITU	60,000	N/Q	TBD
Suncor Energy					
Chard					
Phase 1	South Athabasca	IN SITU	40,000	N/Q	TBD
Lewis					
Phase 1	North Athabasca	IN SITU	40,000	N/Q	TBD
Phase 2	North Athabasca	IN SITU	40,000	N/Q	TBD
Sunshine Oilsands					
Legend Lake					
Phase A2	North Athabasca	SAGD	30,000	N/Q	TBD
Phase B1	North Athabasca	SAGD	30,000	N/Q	TBD
Phase B2	North Athabasca	SAGD	30,000	N/Q	TBD
Thickwood					
Phase A2	North Athabasca	SAGD	30,000	$620	TBD
Phase B	North Athabasca	SAGD	30,000	$620	TBD
West Ells					
Phase A3	North Athabasca	SAGD	30,000	N/Q	TBD
Phase B	North Athabasca	SAGD	20,000	N/Q	TBD
Phase C1	North Athabasca	SAGD	30,000	N/Q	TBD
Phase C2	North Athabasca	SAGD	30,000	N/Q	TBD
Syncrude Canada					
Mildred Lake/Aurora					
Stage 3 Debottlenecking	North Athabasca	UPG	75,000	N/Q	TBD
Touchstone Exploration					
Dawson					
Phase 2	Peace River	THAI	10,000	N/Q	TBD

OILSANDS DATA

AVERAGE MONTHLY OILSANDS PRODUCTION 2014:

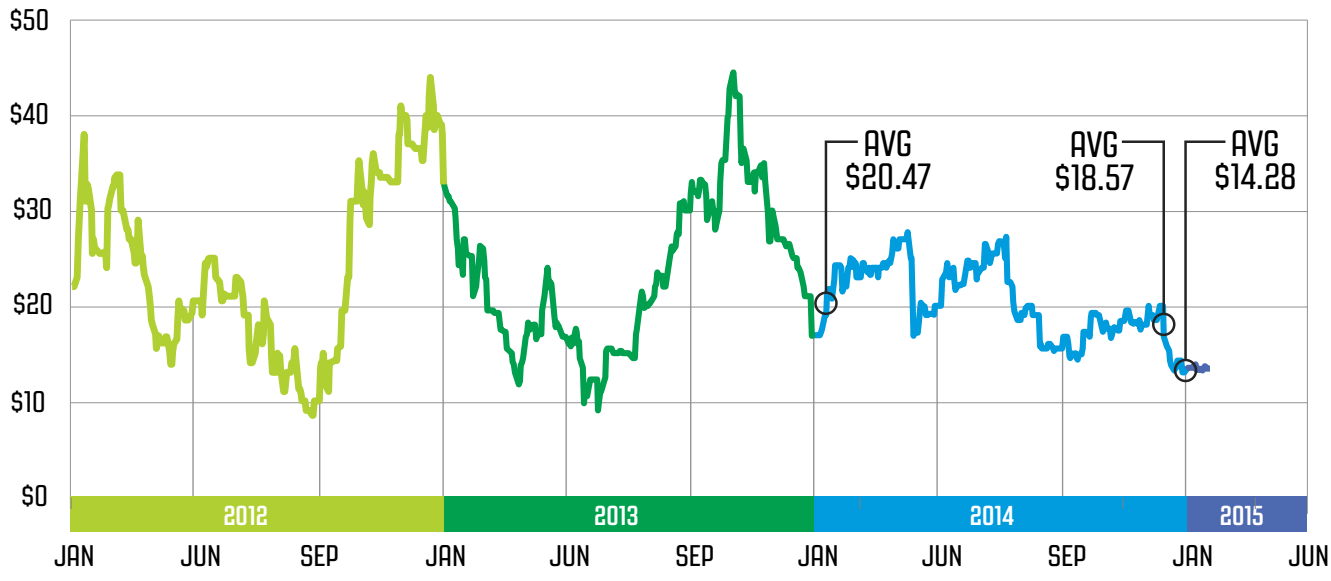
2.251

million bbls/d

(bitumen and synthetic crude oil)

SOURCE: ALBERTA ENERGY REGULATOR

PRICE DIFFERENTIAL: West Texas Intermediate light–Western Canadian Select heavy



SOURCE: FIRSTENERGY CAPITAL

MINED BITUMEN AND SYNTHETIC CRUDE OIL PRODUCTION Monthly average January–October 2014 (bbls/d)

BITUMEN

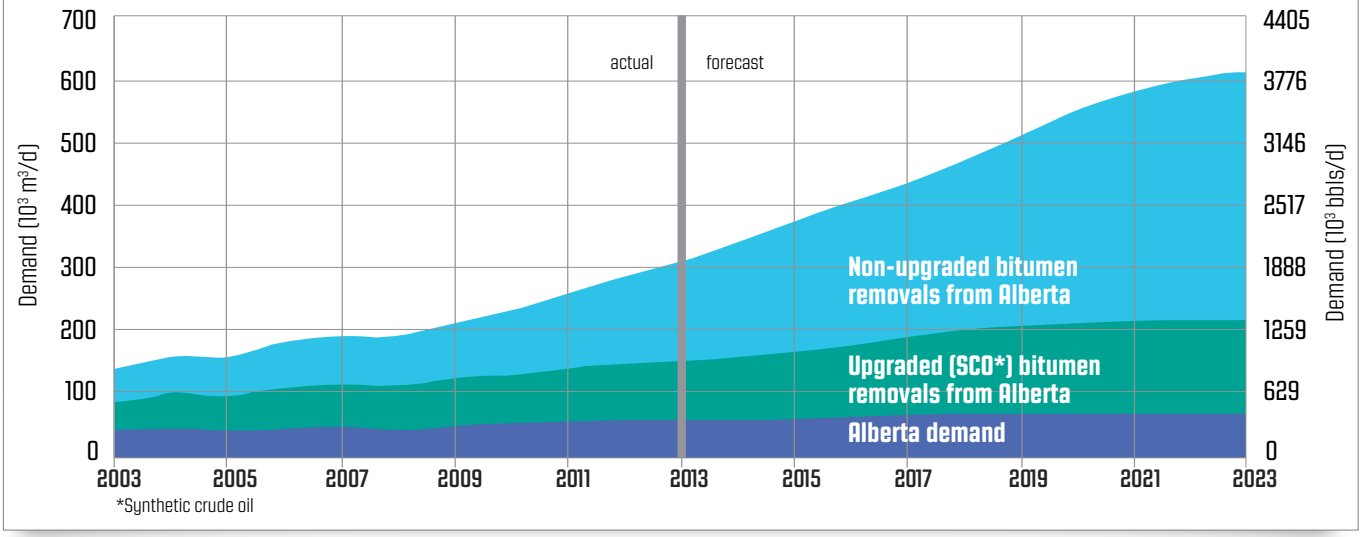
COMPANY	PROJECT	MONTHLY AVERAGE (BBLS/D)
Suncor Energy	Base Operations	272,855.16
Syncrude Canada	Aurora North and South	176,303.31
Syncrude Canada	Mildred Lake	133,468.49
Shell Canada	Muskeg River	129,398.49
Canadian Natural Resources	Horizon	125,394.42
Shell Canada	Jackpine	112,979.18
Imperial Oil	Kearl	84,341.75

SYNTHETIC CRUDE OIL

COMPANY	PROJECT	MONTHLY AVERAGE (BBLS/D)
Suncor Energy	Base Operations	290,697.82
Syncrude Canada	Mildred Lake	260,632.18
Shell Canada	Scotford Upgrader	244,182.75
Canadian Natural Resources	Horizon	107,608.03
CNOOC	Long Lake	38,669.82

SOURCE: ALBERTA ENERGY REGULATOR

ALBERTA OILSANDS PRODUCTION CONSUMED IN-PROVINCE AND EXPORTED



SOURCE: ALBERTA ENERGY REGULATOR

ALBERTA THERMAL OILSANDS PROJECTS
Monthly average steam to oil ratio 2014

OPERATOR	PROJECT	MONTHLY AVERAGE
Cenovus Energy	Christina Lake	1.74
Baytex Energy	Cliffdale Pilot	2.33
ConocoPhillips Canada	Surmont	2.36
MEG Energy	Christina Lake	2.48
Pengrowth Energy	Lindbergh Pilot	2.60
Cenovus Energy	Foster Creek	2.61
Devon Canada	Jackfish	2.67
Suncor Energy	Firebag	2.77
Suncor Energy	MacKay River	2.86
Osum Oil Sands	Orion	3.14
Cenovus Energy	Grand Rapids Pilot	3.38
Statoil	Leismer Demonstration	3.41
BlackPearl Resources	Blackrod	3.51
Canadian Natural Resources	Primrose and Wolf Lake	3.63
Imperial Oil	Cold Lake	3.70
Connacher Oil and Gas	Great Divide	3.85
ConocoPhillips Canada	Surmont Pilot	4.12
Baytex Energy	Gemini	4.31
CNOOC	Long Lake	4.53
Japan Canada Oil Sands	Hangingstone Pilot	4.84
Canadian Natural Resources	Kirby South	4.85
Southern Pacific Resource	STP McKay	5.34
Royal Dutch Shell	Peace River/Carmon Creek	5.92
Husky Energy	Tucker	6.46
Murphy Oil Company	Seal/Cadotte Pilot	13.28
Laricina Energy	Germain	25.43
Grizzly Oil Sands	Algar Lake	29.68
Penn West Petroleum	Seal Main Pilot	693.57

SOURCE: ALBERTA ENERGY REGULATOR

THERMAL OILSANDS PRODUCTION
Monthly average 2014 (bbls/d)

COMPANY	PROJECT	MONTHLY AVERAGE
Suncor Energy	Firebag	172,802.1
Imperial Oil	Cold Lake	145,893.2
Cenovus Energy	Christina Lake	138,094.6
Cenovus Energy	Foster Creek	118,264.7
Canadian Natural Resources	Primrose and Wolf Lake	91,423.4
MEG Energy	Christina Lake	71,113.5
Devon Canada	Jackfish	65,797.7
CNOOC	Long Lake	42,910.7
ConocoPhillips Canada	Surmont	27,232.7
Suncor Energy	MacKay River	26,640.3
Canadian Natural Resources	Kirby-South	15,140.3
Connacher Oil and Gas	Great Divide	14,138.5
Statoil	Leismer Demonstration	13,255.4
Husky Energy	Tucker	10,830.2
Osum Oil Sands	Orion	7,296.7
Japan Canada Oil Sands	Hangingstone Pilot	5,733.5
Royal Dutch Shell	Peace River/Carmon Creek	4,287.4
Southern Pacific Resource	STP-McKay	2,010.8
Pengrowth Energy	Lindbergh Pilot	1,685.6
Grizzly Oil Sands	Algar Lake	855.4
Baytex Energy	Cliffdale Pilot	659.4
Imperial Oil	Experimental SA-SAGD Cold Lake	569
Laricina Energy	Germain	529.9
Baytex Energy	Gemini	477.7
Laricina Energy	Saleski Pilot	451.9
BlackPearl Resources	Blackrod	398.6
ConocoPhillips Canada	Surmont Pilot	356.1
Cenovus Energy	Grand Rapids Pilot	276.5
Penn West Petroleum	Seal Main Pilot	250
Murphy Oil Company	Seal/Cadotte Pilot	154.7
Penn West Petroleum	Harmon Valley South Pilot	101.3
Andora Energy	Sawn Lake	97.1
Touchstone Exploration	Dawson Pilot	37.9
Baytex Energy	Harmon Valley Pilot	22.6
Harvest Operations	BlackGold	1.3
TOTAL COMMERCIAL		977,178.1

SOURCE: ALBERTA ENERGY REGULATOR

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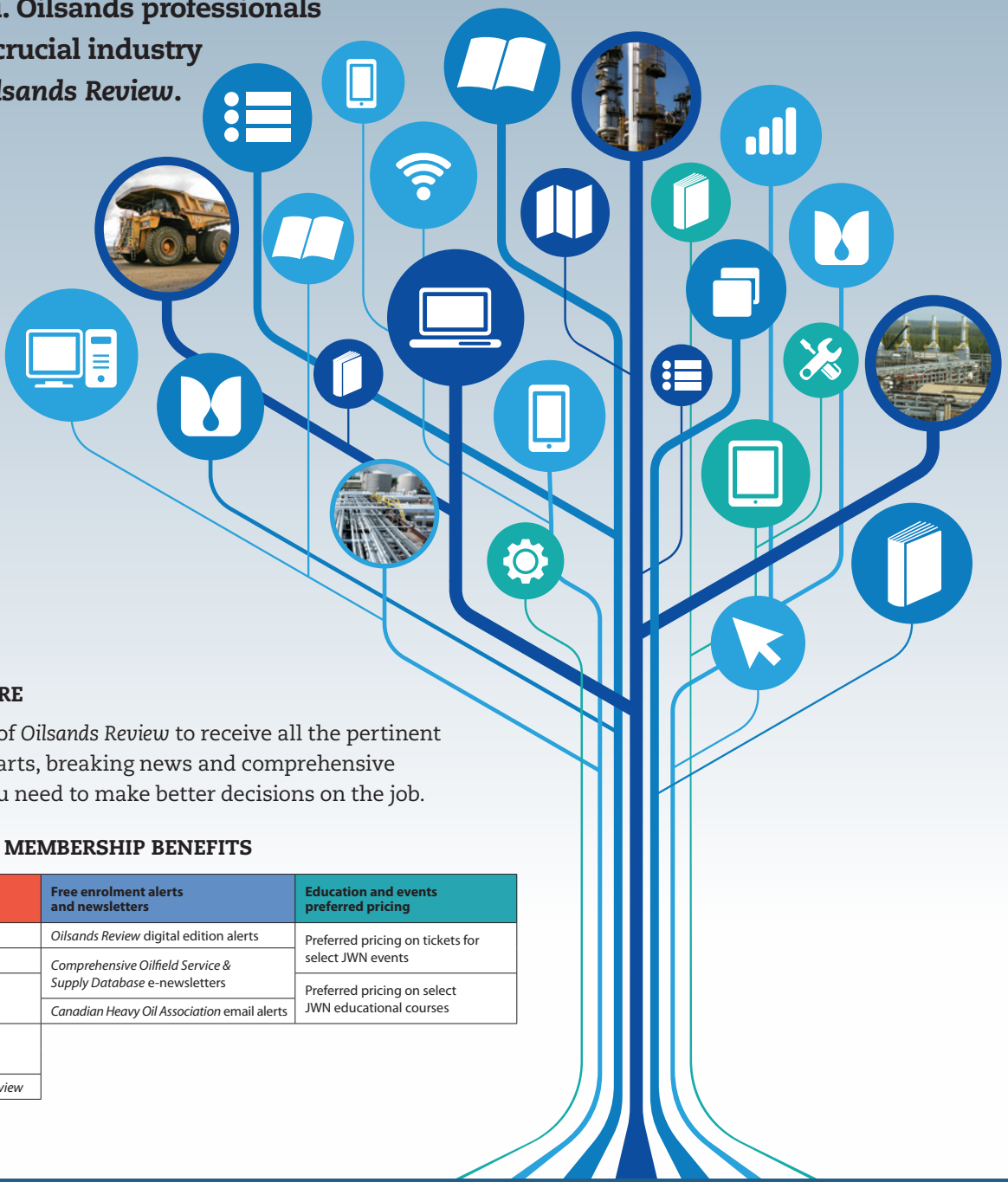

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↑ Construction is nearing completion on Shell Canada's Quest project, the first carbon capture and storage installation to be based entirely on oilsands CO_2 volumes. Quest is located at the company's Scotford Upgrader near Edmonton.

PHOTO: SHELL CANADA

PRODUCERS

LEASE HOLDERS

Bounty Developments Ltd
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Britt Land Services
Fort St John, BC
www.brittland.com

Grizzly Oil Sands ULC
Calgary, AB
www.grizzlyoilsands.com

Joslyn Energy Development Incorporated
Calgary, AB
www.joslynenergy.com

LandSolutions LP
Calgary, AB
www.landsolutions.ca

Petroland Services (1986) Ltd
Calgary, AB
www.petroland.ca

Primary Petroleum Corporation
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www.primarypetroleum.com

Rockford Land Ltd
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SilverWillow Energy Corp
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www.swenergy.ca

Standard Land Company Inc
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Athabasca Oil Corporation
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www.atha.com

Athabasca Oil Sands Corp
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www.aosc.com

Atlas Energy Ltd
Calgary, AB
www.atlasenergy.ca

BA Energy Inc
Calgary, AB
www.vctek.com

Baytex Energy Ltd
Calgary, AB
www.baytex.ab.ca

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BlackPearl Resources Inc
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www.blackpearlresources.ca

Bonavista Energy Corp
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www.bonavistaenergy.com

Border Petroleum
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www.borderpetroleum.com

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www.bountydev.com

BP Canada Energy Group ULC
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www.bp.com

Brion Energy Corporation
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www.brionenergy.com

Canadian Natural Resources Limited
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www.cnrl.com

Canadian Oil Sands Trust
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www.cdnoilsands.com

Canol Resources Ltd
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www.connacheroil.com

ConocoPhillips Canada Limited
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www.conocophillips.com

Deep Well Oil & Gas Inc
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www.deepwelloil.com

Devon Canada Corporation
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www.dvn.com

Encana Corp
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www.encana.com

Enerplus Corporation
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Equal Energy Ltd
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www.equalenergy.ca

E-T Energy Ltd
Calgary, AB
www.e-tenergy.com

ExxonMobil Canada Ltd
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www.exxonmobil.com

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www.freeholdtrust.com

Grizzly Oil Sands ULC
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www.grizzlyoilsands.com

Habanero Resources Inc
Vancouver, BC
www.habaneroresources.com

Harvard Energy
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www.harvardenergy.com

Harvest Operations Corp
Calgary, AB
www.harvestenergy.ca

Hunt Oil Company of Canada, Inc
Calgary, AB
www.huntoil.com

Husky Energy Inc
Calgary, AB
www.huskyenergy.ca

Imperial Oil Resources Limited
Calgary, AB
www.imperialoil.ca

Indian Oil & Gas Canada
Tsuu T'ina, AB
www.iogc.gc.ca

Ivanhoe Energy
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www.ivanhoeenergy.com

Japan Canada Oil Sands Limited
Fort McMurray, AB
www.jacos.com

Koch Oil Sands Operating ULC
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www.kochind.com

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www.murphyoilcorp.com

Nexen
Calgary, AB
www.nexencnoocltd.com

North West Upgrading Inc
Calgary, AB
www.northwestupgrading.com

NorthWest Redwater Partnership
Calgary, AB
www.nwrpartnership.com

N-Solv Corp
Calgary, AB
www.n-solv.com

Oak Point Energy
Calgary, AB
www.oakpointenergy.ca

OSUM Oil Sands Corp
Calgary, AB
www.osumcorp.com

Pan Pacific Oils Ltd
Calgary, AB
www.panpacificoils.com

Paramount Resources Ltd
Calgary, AB
www.paramountres.com

Pembina Pipeline Corporation
Calgary, AB
www.pembina.com

Pengrowth Energy Corporation
Calgary, AB
www.pengrowth.com

Penn West Petroleum Ltd
Calgary, AB
www.pennwest.com

Perpetual Energy Inc
Calgary, AB
www.perpetualenergyinc.com

Petrolama Energy Canada Inc
Calgary, AB
www.petrolama.com

Petromin Resources Ltd
Vancouver, BC
www.petromin.ca

PTTEP Canada Ltd
Calgary, AB
www.pttepcanada.com/contact

Rock Energy Inc
Calgary, AB
www.rockenergy.ca

Shell Canada Limited
Calgary, AB
www.shell.ca

SilverWillow Energy Corp
Calgary, AB
www.swenergy.ca

Sinopec Daylight Energy Ltd
Calgary, AB
www.sinopeccanada.com

Spyglass Resources Corp
Calgary, AB
www.spyglassresources.com

Statoil Canada Ltd
Calgary, AB
www.statoil.com

Strata Oil & Gas
Calgary, AB
www.strataoil.com

Suncor Energy Inc
Calgary, AB
www.suncor.com

Sunshine Oilsands Ltd
Calgary, AB
www.sunshineoilsands.com

Surmont Energy Ltd
Calgary, AB
www.surmontenergy.com

Syncrude Canada Ltd
Fort McMurray, AB
www.syncrude.ca

Talisman Energy Inc
Calgary, AB
www.talisman-energy.com

Teck Resources Ltd
Vancouver, BC
www.teck.com

Total E&P
Paris, France
www.total.com

Total E&P Canada Ltd
Calgary, AB
www.total-ep-canada.com

Value Creation Inc
Calgary, AB
www.vctek.com

Williams Energy (Canada) Inc
Calgary, AB
www.williams.com

SERVICE & SUPPLY

ACCOMMODATIONS

Alta-Fab Structures Ltd
Nisku, AB
www.altafab.com

ARAMARK Remote Workplace Services
Edmonton, AB
www.aramark.ca

Athabasca Open Camp and RV Park
Athabasca, AB
www.athabascaopencamp.com

Best Western Wainwright Inn & Suites
Wainwright, AB
www.bestwesternwainwright.com

C & V Portable Accommodations Ltd
Rocky View County, AB
www.cvportable.com

Canada North Camps
Wabasca, AB
www.canadanorthcamps.com

Christina Lake Lodge
Edmonton, AB
www.christinalakelodge.com

Clean Harbors Lodging Services
Acheson, AB
www.cleanharbors.com

Clearwater Suites Hotel
Fort McMurray, AB
www.fortmcmurrayhotels.ca

Edmonton Destination Hotels - South Side
Edmonton, AB
www.tanneryoung.com

Egremont Hotel, The
Egremont, AB
www.egremont-hotel.com

Gold Eagle Lodge
North Battleford, SK
www.goldeaglelodge.com

Holiday Inn Express & Suites Bonnyville
Bonnyville, AB
www.hibonnyville.com

Jennifer's Open Camp
Wabasca, AB
www.northcampgroup.com

Mountain West Camp Services
Edmonton, AB
www.gomountainwest.com

Nakoda on the Lake
Morley, AB
www.nakodalodge.com

Neighbourhood Inn
Bonnyville, AB
www.neighbourhoodinn.com

Noralta Lodge Ltd
Fort McMurray, AB
www.noraltalodge.com

Northgate Industries Ltd
Edmonton, AB
www.northgateindustries.com

Podollan Rez-idence
Fort McMurray, AB
www.podollan.com

Red Earth Accommodations Ltd (R.E.A.L.)
Red Earth Creek, AB
www.get-real.ca

Red Earth Lodge Ltd
Red Earth Creek, AB
www.redearthlodge.ca

Redrock Camps Inc
Calgary, AB
www.redrockcamps.com

Right Choice Camps & Catering
Edmonton, AB
www.rightchoicecamps.ca

Sawridge Inn & Conference Centre
Fort McMurray, AB
www.sawridgeinnfortmcmurray.com

Super 8 Motel
Vermilion, AB
www.super8.com

Super 8 Motel
North Battleford, SK
www.super8.com

Third Mission Heritage Suites
Peace River, AB
www.thirdmission.ca

Travelodge Canada
Calgary, AB
www.travelodge.ca

Western Budget Motel
Bonnyville, AB
www.westernbudgetmotel.com

AIR CHARTER SERVICES

Airco Aircraft Charters Ltd
Edmonton, AB
www.aircocharters.com

Black Swan Helicopters
Berwyn, AB
www.blackswanhelicopters.com

Can-West Corporate Air Charters Ltd
Slave Lake, AB
www.canwestair.com

Delta Helicopters Ltd
Sturgeon County, AB
www.deltahelicopters.com

Emirates Airlines
Toronto, ON
www.emirates.com

McMurray Aviation
Fort McMurray, AB
www.mcmurrayaviation.com

Northern Air Charter Inc
Peace River, AB
www.flynorthernair.com

OpsMobil
Calgary, AB
www.opsmobil.com

Phoenix Heli-Flight
Fort McMurray, AB
www.phoenixheliflight.com

Remote Helicopters
Slave Lake, AB
www.remotehelicopters.com

Wood Buffalo Helicopters
Fort McMurray, AB
www.WoodBuffaloHelicopters.ca

BUILDING PRODUCTS & SERVICES

Aecon Mining
Fort McMurray, AB
www.aecon.com

All Weather Shelters Inc
Edmonton, AB
www.allweather-shelters.com

Aluma Systems Canada
Concord, ON
www.aluma.com

Aluma Systems Inc
Edmonton, AB
www.aluma.com

Armtec Ltd Partnership
Acheson, AB
www.armtec.com

ATCO Structures & Logistics Ltd
Calgary, AB
www.atcosl.com

ATCO Sustainable Communities
Calgary, AB
www.atcosc.com

Badger Daylighting
Red Deer, AB
www.badgerinc.com

Bexson Construction Ltd
Lloydminster, AB
www.bexsonconstruction.com

Bigshow Scaffolding & Shrink Wrapping
Edmonton, AB
www.bigshow.ca

Cam-Trac Inspection Services
Morinville, AB
www.camtrac.ca

Chinook Industrial Ltd
Calgary, AB
www.chinook.ca

ClearSpan Fabric Structures
South Windsor CT
www.clearspan.com

Comec Industrial Services LP
Bonnyville, AB
www.comec.ca

Container West
Richmond, BC
www.containerwest.com

Cornerstone Industrial Ltd
Edmonton, AB
www.cornerstoneindustrial.ca

D & G Polyethylene Products Ltd
Neilburg, SK
www.dgpolyproducts.com

Fisher Building Systems Inc
Lloydminster, SK
www.fisherbuildingsystems.com

HAMMERSTONE Corporation
Fort McMurray, AB
www.hammerstonecorp.com

Hart Construction (911478 Alberta Ltd)
Tofield, AB
www.hartconstruction.ca

MakLoc Buildings Inc
Nisku, AB
www.makloc.com

Matakana Scaffolding Inc
Edmonton, AB
www.matakanascaff.com

Mid-City Roofing & Wall Systems Ltd
Edmonton, AB
www.metroroofinggroup.com

Norseman Structures
Saskatoon, SK
www.norsemanstructures.com

Rolled Alloys-Canada, Inc
Edmonton, AB
www.rolledalloys.ca

Safway Services Canada Inc
Fort Saskatchewan, AB
www.safway.com

Skyway Canada Limited
Edmonton, AB
www.skywaycanada.ca

Sprung Structures
Aldersyde, AB
www.sprung.com

Stuart Olson Dominion Construction Ltd
Edmonton, AB
www.sodcl.com

Sunny Corner Enterprises Inc
Edmonton AB
www.sunnycorner.ca

Triple M Housing
Lethbridge, AB
www.triplemhousing.com

Universal Fabric Structures
Telford PA
www.ufsinc.com

Valard Powerline Contractor
Grande Prairie, AB
www.valard.com

Vertical Building Solutions
Grande Prairie, AB
www.verticalbuildings.com

COMPLETION PRODUCTS & SERVICES

Baker Hughes Canada Company
Fort McMurray, AB
www.bakerhughes.com

Logan Completion Systems
Lloydminster, AB
www.logancompletionsystems.com

Logan Completion Systems
Calgary, AB
www.logancompletionsystems.com

NEXEO Solutions
Edmonton, AB
www.nexeosolutions.com

NPS - Alberta Oil Tool
Edmonton, AB
www.albertaoiltool.com

Prodahl Environmental Services Ltd
Lloydminster, SK
www.prodahlenv.ca

Pro-Rod
Calgary, AB
www.prorod.com

Quadra Chemicals (Western) Ltd
Calgary, AB
www.quadrachemicals.com

RG Industries Ltd
Edmonton, AB
www.rodguideindustries.com

RGL Reservoir Management
Calgary, AB
www.rglrm.com

Rock Solid Nitrogen Services Ltd
Vermilion, AB
www.rocksolidcompanies.ca

Select Energy Systems Inc
Calgary, AB
www.selectesi.com

W E Greer Ltd
Edmonton, AB
www.wegreer.com

Weatherford Canada Partnership
Lloydminster, AB
www.weatherford.com

CONSTRUCTION

Aecon Industrial
Sherwood Park, AB
www.aecon.com

Babcock & Wilcox Canada Ltd
Edmonton, AB
www.babcock.com

Benoit Oilfield Construction (1997) Ltd
Chauvin, AB
www.benoitoilfield.ca

Bird Construction Company
Edmonton, AB
www.birdindustrial.ca

Border City Concrete Ltd
Lloydminster, SK
www.bordercityconcrete.com

Border Paving Ltd
Camrose, AB
www.borderpaving.com

Brock Canada
Edmonton, AB
www.brockcanada.com

Canam-Buildings
Boucherville, QC
www.canam-construction.com

CAP Quantity Surveying Ltd
Edmonton, AB
www.capqs.ca

Carmacks Enterprises Ltd
Nisku, AB
www.carmacksent.com

Casman Group of Companies
Fort McMurray, AB
www.casman.ca

CBS Construction Ltd
Fort McMurray, AB
www.cbsconstruction.ca

CEMATRIX (Canada) Inc
Calgary, AB
www.cematrix.com

Centerfire
Fort McMurray, AB
www.centerfire.ca

Christian Labour Association of Canada
Calgary, AB
www.clac.ca

Consolidated Gypsum Supply Ltd
Edmonton, AB
www.consolidatedgypsum.ca

Copp's Services Inc
Red Deer County, AB
www.coppsinc.ca

Corgan Industrial Ltd
Fort McMurray, AB
www.corgan.ca

D R C Construction Ltd
Bonnyville, AB
www.drcoilfieldconstruction.com

Danny's Picker Service Ltd
Slave Lake, AB
www.dannyspicker.com

Datum Energy Projects Inc
Medicine Hat, AB
www.datumenergyprojects.com

Dipper Oilfield Developments
Lac La Biche, AB
www.dipperoilfield.com

Entrance Technology Inc
Edmonton, AB
www.entrancetech.ca

Fall Protection Group
Calgary, AB
www.fallprogroup.com

FAM Canada Inc
Calgary, AB
www.fam-canada.com

Finning (Canada)
Edmonton, AB
www.finning.ca

Force Pile Driving Inc
Red Deer, AB
www.forcepiledriving.com

Genron
Fort McMurray, AB
www.genron.ca

Gisborne Group
Nisku, AB
www.gisborne.com

H. Wilson Industries Ltd
Fort McMurray, AB
www.wilson-industries.com

Hammer's Gravel Supplies Ltd
Viking, AB
www.hammersgravel.ca

Helical Pier Systems Ltd
Fort Saskatchewan, AB
www.helicalpiersystems.com

IPAC Services Corporation
Clairmont, AB
www.ipacservices.com

IRISNDT Corp
Edmonton, AB
www.irisndt.com

Jacobs Engineering Group
Calgary, AB
www.jacobs.com

JLG Ball Enterprises
Boyle, AB
www.jlgball.com

KBR Canada Ltd
Edmonton, AB
www.kbr.com

KMC Mining Corp
Edmonton, AB
www.kmcmining.com

Ledcor Group of Companies
Vancouver, BC
www.ledcor.com

Lehigh Hanson Canada Region
Edmonton, AB
www.inlandcanada.com

Lockerbie & Hole Contracting
Edmonton, AB
www.lockerbiehole.com

MacNair Construction Products Ltd
Edmonton, AB
www.mcpl.ca

Mainroad
Surrey, BC
www.mainroad.ca

Melloy Industrial Services Inc
Nisku, AB
www.melloy.com

NEC Contractors Ltd
Lac La Biche, AB
www.neccontractors.com

Nuna Innovations Inc
Squamish, BC
www.nunainnovations.com

OEC Industrial Project Services Ltd
Calgary, AB
www.oecindustrial.ca

PCL Energy Inc
Edmonton, AB
www.pcl.com

PCL Industrial Management Inc
Edmonton, AB
www.pcl.com

PCL Pipe Fabrication & Module Construction Facilities
Nisku, AB
www.pcl.com

Reda Enterprises Ltd
Bonnyville, AB
www.redaent.ca

Reinhart Group of Companies
Lloydminster, AB
www.reinhartpm.com

Seisland Surveys Ltd
Calgary, AB
www.seisland.com

Seko Construction Ltd
Fort McMurray, AB
www.sekoconstruction.com

SeNa Constructors Inc
Fort McMurray, AB
www.senaco.ca

Simplex/UAH Universal Air Hydraulics
Nisku, AB
www.uahl.ca

Site Energy Services
Fort McMurray, AB
www.siteenergy.com

Site Energy Services
Sherwood Park, AB
www.siteenergy.com

Snelgrove, R & Sons Ltd
Vermilion, AB
www.snelgrovesons.com

Supermetal Structures Inc
Leduc, AB
www.supermetal.com

Sureway Construction Management Ltd
Edmonton, AB
www.surewaygroup.ca

Surmont Sand Gravel Ltd
Fort McMurray, AB
www.surmont.ca

Swamp Cats Ltd
Lac La Biche, AB
www.swampcats.ca

T B G Contracting Ltd
Fort McMurray, AB
www.tbgcontracting.com

Tartan Canada Corporation
Calgary, AB
www.tartan.ca

Tartan Canada Corporation
Edmonton, AB
www.tartan.ca

Thermal Energy Services Inc
Devon, AB
www.thermalenergy.ca

Thiel Scaffolding Canada
Spruce Grove, AB
www.vanthielunited.nl

Tuccaro Group of Companies
Fort McMurray, AB
www.tuccaroinc.com

Voice Construction Ltd
Edmonton, AB
www.voiceconstruction.com

Ward's Hydraulic Services Ltd
Fort McMurray, AB
www.wardshydraulic.com

Whitemud Ironworks Limited
Edmonton, AB
www.whitemud.com

Wilco Contractors Northwest Inc
Fort McMurray, AB
www.wilco.ca

WSP Canada Inc
Sherwood Park, AB
www.wspgroup.com

CONTRACTORS–GENERAL OILFIELD

Arnett & Burgess Pipeliners Ltd
Calgary, AB
www.abpipeliners.com

Battle River Oilfield Construction Ltd
Manning, AB
www.battleriveroilfield.com

Bear Slashing Inc
Bonnyville, AB
www.bearslashing.com

BFL Energy Services Ltd
Bonnyville, AB
www.bflenergy.ca

Black Gold Drilling
Nampa, AB
www.blackgolddrilling.com

Christina River Enterprises (1987) Ltd
Fort McMurray, AB
www.christinariverenterprises.ca

Consun Contracting Ltd
Fort McMurray, AB
www.consun.ca

Denmax Energy Services
Wainwright, AB
www.denmax.ca

E Construction Ltd
Edmonton, AB
www.ecltd.ca

Enmax Corporation
Calgary, AB
www.enmax.com

Fort McKay Group of Companies
Fort McMurray, AB
www.fortmckay.com

GEM Grant Energy Maintenance
High Prairie, AB
www.grantenergy.ca

Gill's Vacuum Service Ltd
Kinsella, AB
www.gillsvacuum.ca

Glen Armstrong Construction Ltd
Peace River, AB
www.glenarmstrongconstruction.com

Heavy North
Fort McMurray, AB
www.heavynorth.com

Lorenzen's Oilfield Service Ltd
Manning, AB
www.lorenzensoilfield.com

Macmillan Construction Ltd
Peace River, AB
www.maccon.ca

Northsite Contractors Ltd
Grimshaw, AB
www.northsitecontractors.com

Pantheon Petro Projects Inc
Calgary, AB
www.pantheonpetro.ca

Permasteel Projects Ltd
Edmonton, AB
www.permasteel.com

Peter Kiewit Infrastructure Co
Edmonton, AB
www.kiewit.ca

Phoenix Industrial
Edmonton, AB
www.phoenixindustrial.ca

Precision Contractors Ltd
Lloydminster, AB
www.precisioncontractors.com

Pyramid Corporation
Nisku, AB
www.pyramidcorporation.com

Quinn Contracting Ltd
Blackfalds, AB
www.quinncontracting.ca

Rody Contracting Ltd
Edmonton, AB
www.rodycontractingltd.com

Shamrock Valley Enterprises Ltd
Elk Point, AB
www.shamrockvalley.ca

SRS Industrial Services
Edmonton, AB
www.specializedrigging.com

Stony Valley Contracting
Fort McMurray, AB
www.stonyvalley.ca

Stuber's Cat Service Ltd
Barrhead, AB
www.stubers.ca

Swamp Mats
Calgary, AB
www.swampmats.ca

Thompson Bros (Constr) LP
Spruce Grove, AB
www.thompsonbros.com

URS Corp
Lloydminster, AB
www.urs.com

West Can Seal Coating Inc
Didsbury, AB
www.west-cansealcoating.com

West Penetone Inc
Edmonton, AB
www.westpenetone.com/en

DRILLING PRODUCTS & SERVICES

Aable Directional Boring
Olds, AB
www.aabledirectional.com

AIM Pumps & Procurement Inc
Edmonton, AB
www.aimpumps.com

AKITA Drilling Ltd
Calgary, AB
www.akita-drilling.com

Alfa Laval Inc
Calgary, AB
www.alfalaval.ca

Amcana Drilling Bits Inc
Calgary, AB
www.amcanadrillingbits.com

Apex Oilfield Services (2000) Inc
Calgary, AB
www.apexoil.ca

Arch Distribution Inc
Edmonton, AB
www.archdistribution.com

Avatt Inc
Edmonton, AB
www.avatt.ca

Boart Longyear Drilling Services
Calgary, AB
www.boartlongyear.com

Canadian Mat Systems Inc
Edmonton, AB
www.matsystems.ca

Carnwood Wireline Service Ltd
Edmonton, AB
www.carnwood.com

Cheyenne Rig Repair & Supply Ltd
Gibbons, AB
www.chevron.ca

Citadel Drilling Ltd
Calgary, AB
www.citadeldrilling.com

Clean Harbors
Red Deer, AB
www.cleanharbors.com

Climax Bit & Tool Corp
Calgary, AB
www.climaxbitandtool.com

Core Drilling Corp
Calgary, AB
www.coredrillingcorp.com

CWS Fiberglass Technology Ltd
Calgary, AB
www.cwsfiberglass.com

D & D Oilfield Rentals
Blackfoot, AB
www.ddoil.net

Drillform Technical Services Ltd
Calgary, AB
www.drillform.com

Edcon Power Tongs and Oilfield Services Ltd
Lac La Biche, AB
www.edconpowertongs.com

EMCO Corporation - Waterworks & Geosynthetics
Fort McMurray, AB
www.emcoltd.com

Essential Coil Well Service
Calgary, AB
www.essentialenergy.ca

FMC Technologies Inc
Tupelo, MS
www.fmctechnologies.com

Frontier Project Management Ltd
Calgary, AB
www.frontierpm.ca

Garritty And Baker Geotechnical Drilling Inc
Edmonton, AB
www.gbdrilling.com

GE Oil & Gas
Calgary, AB
www.ge-energy.com

General Downhole Technologies
Calgary, AB
www.generaldownhole.com

Gosselin Pipe & Steel Ltd
Wainwright, AB
www.gosselinpipe.com

Hallmark Tubulars Ltd
Calgary, AB
www.hallmarksolutions.ca

Hobo Exploration Inc
Calgary, AB
www.hoboexploration.com

Hunting Energy Services (Canada) Ltd
Calgary, AB
www.huntingplc.com

Hurricane Industries Ltd
Lloydminster, AB
www.hurricanefoam.com

Import Tool Corp Ltd
Calgary, AB
www.importtool.com

Intercept Energy Services Inc
Edmonton, AB
www.interceptenergy.ca

Intricate Group Inc
Calgary, AB
www.intricategroup.com

J & L Supply Co Ltd
Calgary, AB
www.jandlsupply.com

JayNart Directional Drilling Ltd
Redwater, AB
www.jaynartdrilling.ca

J.E.D. Anchors & Environmental Ltd
Eckville, AB
www.jed-drilling.com

K & S Power Tongs Ltd
Lloydminster, AB
www.kspowertongs.com

Kodiak Wireline Services Partnership
Morinville, AB
www.kodiakservices.ca

M-I SWACO
Calgary, AB
www.miswaco.com

Nabors Canada
Calgary, AB
www.naborscanada.com

National Energy Equipment Inc
Mississauga, ON
www.nee.ca

New Discovery Directional Services Ltd
Calgary, AB
www.discoverydirectional.com

New Wave Energy Services
Calgary, AB
www.newwavees.com

Newpark Canada Inc
Calgary, AB
www.newpark.ca

Newsco International Energy Services Inc
Calgary, AB
www.newsco.ca

NOV Downhole
Calgary, AB
www.nov.com/downhole

NOV FluidControl/Brandt Product Sales
Calgary, AB
www.nov.com

Nucleus Energy Services
Calgary, AB
www.nucleusenergy.com

Pinnacle Drilling Products LP
Calgary, AB
www.pinnacledrilling.ca

Precision Drilling
Calgary, AB
www.precisiondrilling.com

Predator Drilling Inc
Red Deer County, AB
www.predatordrilling.com

Q'Max Solutions Inc
Calgary, AB
www.qmaxsolutions.com

RBI Canada 2000 Inc
Calgary, AB
www.rbi-canada.com

Remote Wireline Services
Morinville, AB
www.remotewireline.com

RGL Reservoir Management Inc
Calgary, AB
www.rglrm.com

Ryan Directional Services Inc
Calgary, AB
www.ryanenergy.com

Savanna Drilling
Calgary, AB
www.savannaenergy.com

SECURE Energy Services
Calgary, AB
www.secure-energy.com

Shield Wireline Ltd
Lloydminster, AB
www.shieldwireline.ca

Sicotte Drilling Tools
Edmonton, AB
www.sicottedrillingtools.com

Smith Services
Calgary, AB
www.slb.com

Stream-Flo Industries Ltd
Calgary, AB
www.streamflo.com

Summit Wireline Inc
Lloydminster, SK
www.summitwirelineinc.com

Superheat FGH Canada, Inc
Edmonton, AB
www.superheatfgh.com

Tallrig International Inc
Lloydminster, AB
www.tallrig.ca

Tartan Controls Inc
Calgary, AB
www.tartancontrols.com

Tendeka
Calgary, AB
www.tendeka.com

Thor Drilling Corp
Calgary, AB
www.thordrilling.com

Titus Tools Inc
Lloydminster, AB
www.titustools.com

TMK IPSCO
Calgary, AB
www.tmk-ipsco.com

Tornado Technologies Inc
Rocky View, AB
www.tornadotech.com

Trendon Bit Service
Redcliff, AB
www.trendon.ca

Treo Drilling Services LP
Calgary, AB
www.treodrilling.com

Trinidad Drilling Ltd
Calgary, AB
www.trinidaddrilling.com

Tryton Tool Services
Lloydminster, AB
www.trytontoolservices.com

Val's Drilling Ltd
Airdrie, AB
www.vdrill.com

Varel Rock Bits Canada Inc
Edmonton, AB
www.varelrockbits.com

Variperm Canada Limited
Calgary, AB
www.variperm.com

Volant Products Inc
Edmonton, AB
www.volantproducts.ca

Wellhead Distributors Int'l Ltd.
Edmonton, AB
www.wellheaddistributors.com

Welltec Canada Inc
Calgary, AB
www.welltec.com

Welltec Wireline Services
Bonnyville, AB
www.welltec.com

West Rock Energy Consultants Ltd
Calgary, AB
www.westrock-energy.com

WestRock Geo Inc
Calgary, AB
www.westrockgeo.com

ELECTRICAL-INSTRUMENTATION/CONTROLS

ABB Inc
Calgary, AB
www.abb.com

Ainsworth Inc
Calgary, AB
www.ainsworth.com

Aircom Instrumentation Ltd
Edmonton, AB
www.aircominstrumentation.com

All-Tek Industrial
Lloydminster, AB
www.all-tek.ca

APEX Distribution Inc
Slave Lake, AB
www.apexdistribution.com

Apex Valve Services
Bonnyville, AB
www.apexdistribution.com

Applied Rigaku Technologies Inc
Austin, TX
www.RigakuEDXRF.com

B J Electric Supplies Ltd
Edmonton, AB
www.bjelectric.ca

Baldor – A Member of the ABB Group
Edmonton, AB
www.ebaldor.ca

Baldor Dodge Reliance
Fort McMurray, AB
www.baldor.com

Battle River Electric Ltd
Wainwright, AB
www.battleriverelectric.com

Bayzik Oilsands Electric
Fort McMurray, AB
www.bayzikelectric.com

Benchmark Instrumentation & Analytical Services Inc
Edmonton, AB
www.benchmarkinc.ca

Bentek Systems Ltd
Calgary, AB
www.scadalink.com

Bi-Systems Electric & Controls Ltd
Lloydminster, AB
www.bi-systems.ca

Brews Supply
Calgary, AB
www.brewssupply.com

Canonbie Contracting Ltd
Sherwood Park, AB
www.canonbie.ca

Carbon Controls Ltd
Calgary, AB
www.carboncontrolsltd.com

Cat Rental Store
Edmonton, AB
www.catrents.ca

Centurion Energy Services Ltd
Fort McMurray, AB
www.centurionenergy.ca

CG Industrial Specialties Ltd
Edmonton, AB
www.cgis.ca

Chemco Electrical Contractors Ltd
Fort McMurray, AB
www.chemco-elec.com

Concept Controls Inc
Calgary, AB
www.conceptcontrols.com

CSA International
Edmonton, AB
www.csa-international.org

DAGR Industrial Lighting Ltd
Calgary, AB
www.dagrlighting.com

EECOL Electric
Calgary, AB
www.eecol.com

Emes Electric Ltd
Slave Lake, AB
www.emeselectric.com

Endress + Hauser Canada
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Hirschfeld Industries
San Angelo, TX
www.hirschfeld.com

Hotsy Water Blast Manufacturing LP
Edmonton, AB
www.HotsyAB.com

Inproheat Industries Ltd
Calgary, AB
www.inproheat.com

JV Driver Projects Inc
Leduc, AB
www.jvdriver.com

Koenders Manufacturing (1997) Ltd
Englefeld, SK
www.koendersmfg.com

KTI Corporation
Houston, TX
www.kticorp.com

Lemax Machine & Welding Ltd
Fort McMurray, AB
www.empind.com

Liebherr-Canada Ltd
Acheson, AB
www.liebherr.com

Magnum Energy Services Ltd
Bonnyville, AB
www.magnumenergyservicesltd.com

MaXfield Inc
Calgary, AB
www.maxfield.ca

MaXXiMaT
Nisku, AB
www.maxximat.com

Metal Fabricators & Welding Ltd
Edmonton, AB
www.metalfab.ca

Metaltek Machining Ltd
Lloydminster, AB
www.metaltekmachining.com

Murland Projects Inc
Lloydminster, AB
www.murland.ca

Nardei Fabricators Ltd
Calgary, AB
www.nardei.com

NGC Product Solutions Ltd
Calgary, AB
www.ngc-ps.com

NorthWest Fabricators Ltd
Athabasca, AB
www.nwfltd.net

Orion Machining & Manufacturing Inc
Lloydminster, AB
www.orionmachining.com

Peerless Engineering Sales Ltd
Edmonton, AB
www.peerlessengineering.com

Penfabco Ltd
Edmonton, AB
www.penfabco.com

Plainsman Mfg Inc
Edmonton, AB
www.plainsmanmfg.com

Powell Canada Inc
Edmonton, AB
www.powellind.ca

Propak Systems Ltd
Airdrie, AB
www.propakenergy.com

PSC Pressure Systems Company Inc
Concord, ON
www.pscclean.com

PWM Steel Services Ltd
Lloydminster, AB
www.pwmsteel.com

R & R Stress Relieving Service Ltd
Nisku, AB
www.rrstress.com

Sabre Machining Ltd
Lloydminster, AB
www.sabremachining.com

Standard Machine Ltd/ Hamilton Gear
Saskatoon, SK
www.standardmachine.ca

Strad Energy Services-Manufacturing
Nisku, AB
www.stradenergy.com

Supreme Group
Edmonton, AB
www.supremesteel.com

TIW WESTERN Inc
Calgary, AB
www.tiwwestern.com

Tomco Production Services Ltd
Bonnyville, AB
www.tomco.ca

United Fabrication & Welding Ltd
Two Hills, AB
www.unitedfab.ca

VaporTech Energy Services Inc
Edmonton, AB
www.vaportechinc.com

Wabash Mfg Inc
Westlock, AB
www.wabash.ca

Waiward Steel Fabricators Ltd
Edmonton, AB
www.waiward.com

Weldco-Beales Manufacturing Alberta Ltd
Edmonton, AB
www.weldco-beales.com

Westech Industrial Ltd
Calgary, AB
www.westech-ind.com

Westech Vac Systems
Nisku, AB
www.westechvac.com

Western Truck Body Mfg
Edmonton, AB
www.westerntruckbody.com

Whitemud Ironworks Group Inc
Edmonton, AB
www.whitemud.com

(WWL) Weaver Welding Ltd
Peace River, AB
www.weaverwelding.ca

ZCL Composites Inc
Edmonton, AB
www.zcl.com

PIPELINE PRODUCTS & SERVICES

Canadian Engineering & Inspection Ltd
Edmonton, AB
www.caneil.ca

A H McElroy Sales & Service (Canada) Ltd
Edmonton, AB
www.ahmcelroy.com

Access Pipeline Inc
Calgary, AB
www.accesspipeline.com

Alberta Line Find Inc
Brooks, AB
www.linefind.com

ATCO Pipelines
Calgary, AB
www.atcopipelines.com

Baker Hughes Canada Company
Bonnyville, AB
www.bakerhughes.com

Bandit Pipeline
Lloydminster, AB
www.banditpipeline.com

Bayou Perma-Pipe Canada Ltd
Calgary, AB
www.bayoupermapipe.com

Bendtec Inc
Duluth, MN
www.bendtec.com

Brenntag Canada Inc
Calgary, AB
www.brenntag.ca

CIDRA Oilsands Ltd
Wallingford, CT
www.cidra.com

Clean Harbors
Grimshaw, AB
www.cleanharbors.com

Comco Pipe & Supply Ltd
Fort McMurray, AB
www.comcopipe.com

Core Linepipe
Calgary, AB
www.corelinepipe.com

Crane Supply Inc
Calgary, AB
www.cranesupply.com

Doran Stewart Oilfield Services
Rocky Mountain House, AB
www.doranstewart.com

Edgen Murray Canada
Edmonton, AB
www.edgenmurray.com

Enbridge Inc
Calgary, AB
www.enbridge.com

Evraz Inc NA Canada
Calgary, AB
www.evrazna.com

Exact Oilfield Developing Ltd
Slave Lake, AB
www.exactoilfield.com

Flexpipe Systems
Calgary, AB
www.flexpipesystems.com

FlexSteel Pipeline Technologies Inc
Houston, TX
www.flexsteelpipe.com

Fullkote Pipeline Services (1996) Ltd
Lacombe, AB
www.fullkote.com

Global Fusion Coating Inc
Wainwright, AB
www.globalfusioncoating.com

Global Steel Ltd
Calgary, AB
www.globalsteel.ca

Hex-Hut Shelter Systems Ltd
Calgary, AB
www.hex-hut.com

Houlder Construction
Grimshaw, AB
www.houlderconstruction.com

Hy-Pro Plastics Inc
Calgary, AB
www.hyproplastics.com

Kinder Morgan Canada Inc
Calgary, AB
www.kindermorgan.com

Krantz Contracting Ltd
Manning, AB
www.kclcontracting.ca

Lincoln County Oilfield Services Ltd
Athabasca, AB
www.lcos.ca

Line Finders Ltd
Marshall, SK
www.linefindersltd.com

LTD Oilfield Services Inc
Redwater, AB
www.ltdoil.com

Maverick Oilfield Services Ltd
Provost, AB
www.mavoil.com

MISTRAS Group Inc
Princeton Jct, NJ
www.mistrasgroup.com

North American Construction Group
Edmonton, AB
www.nacg.ca

O.J. Pipelines Canada
Nisku, AB
www.ojpipelines.com

PICA
Edmonton, AB
www.picacorp.com

Pipetech Corporation Ltd
Calgary, AB
www.pipetechcorp.com

Proline Pipe Equipment Inc
Edmonton, AB
www.proline-global.com

Red Flame Industries
Red Deer, AB
www.redflame.ca

Saddle Tech. Inc
Athabasca, AB
www.saddletech.ca

Sharp Underground
Wainwright, AB
www.sharpunderground.com

Shaw Pipe Protection Ltd
Calgary, AB
www.shawpipe.ca

ShawCor CSI Services
Nisku, AB
www.shawcorcsi.com

Specialty Polymer Coatings Inc
Langley, BC
www.spc-net.com

Stats Group Process & Pipeline Integrity Solutions
Edmonton, AB
www.statsgroup.com

Summit Tubulars Corp
Calgary, AB
www.summit-tubulars.com

Tartan Canada Corporation
Redwater, AB
www.tartan.ca

T.D. Williamson Canada ULC
Edmonton, AB
www.tdwilliamson.com

TransCanada Corporation
Calgary, AB
www.transcanada.com

Triple D Bending
Calgary, AB
www.pipebending.com

Viking Power Dozer Ltd
Viking, AB
www.powerdozer.com

Wachs Canada Ltd
Edmonton, AB
www.ehwachs.com

Waschuk Equipment Rentals
Red Deer, AB
www.waschukpipeline.com

WhiteStar Tubulars
Edmonton, AB
www.whitestartubulars.com

Willbros Canada
Edmonton, AB
www.willbroscanada.com

Wolseley Engineered Pipe Group
Edmonton, AB
www.wolseleyinc.ca

PRODUCTION PRODUCTS & SERVICES

Absolute Combustion International Inc
Calgary, AB
www.absolutecombustion.com

A-Fire Burner Systems
Lloydminster, AB
www.a-fire.ca

Alstom Group Canada Inc
Calgary, AB
www.alstom.com

Altex Industries Inc
Edmonton, AB
www.altexindustriesinc.com

Apex Equipment Ltd
Calgary, AB
www.apexequipmentltd.com

Argo Sales Ltd
Calgary, AB
www.argosales.com

Ariet Oil & Gas Solutions Inc
Calgary, AB
www.ariet.ca

Armour Valve Ltd
Calgary, AB
www.armourvalve.com

Baker Hughes Canada Company
Calgary, AB
www.bakerhughes.com

Baytex Energy Corp
Calgary, AB
www.baytex.ab.ca

Bucyrus Canada Limited
Edmonton, AB
www.bucyrus.com

Canada Pump & Power
Ardrossan, AB
www.mightypumps.com

Canadian Advanced ESP Inc
Edmonton, AB
www.cai-esp.com

Canadian Dewatering LP
Edmonton, AB
www.canadiandewatering.com

Canwell Enviro-Industries Ltd
Calgary, AB
www.canwell.com

Caradan Chemicals Inc
Wainwright, AB
www.caradanchemicals.com

CCI Thermal Technologies Inc
Edmonton, AB
www.ccithermal.com

Chamco Industries Ltd
Calgary, AB
www.chamco.com

CHEP Catalyst & Chemical Containers
Lloydminster, AB
www.chep.com

Christie Corrosion Control (1983) Ltd
Lloydminster, AB
www.christiecorrosion.com

Commercial Truck Equipment Corp
Calgary, AB
www.commercialtruckequipment.com

Cougar Pump Supply & Service Ltd
Wainwright, AB
www.cougarpump.ca

Dasco ESP
Calgary, AB
www.dascoesp.com

E S Fox Ltd
Edmonton, AB
www.esfox.com

Electric Motor Service Limited
Fort McMurray, AB
www.emsl.ca

Ensol Systems Inc
Surrey, BC
www.ensolsystems.com

Express Integrated Technologies Canada
Calgary, AB
www.ExpressTechTulsa.com

Fleetwood Air Equipment Ltd
Edmonton, AB
www.fleetair.ca

FMC Technologies
Calgary, AB
www.fmctechnologies.com

Gas Drive
Calgary, AB
www.gasdriveglobal.com

Gateway Compression Inc
St Albert, AB
www.gatewaycompress.com

GE Oil & Gas Artificial Lift
Calgary, AB
www.geoilandgas.com

GEA Mechanical Equipment Canada Inc
Burlington, ON
www.gea-westfalia.ca

GIW Industries
Grovetown, GA
www.giwindustries.com

Grenco Energy Services Inc
Edmonton, AB
www.grenco.com

Grithog Sand Control Systems Ltd
Lloydminster, AB
www.grithog.com

Guest Control Systems
Lloydminster, AB
www.guestcontrols.com

Halliburton Group Canada
Calgary, AB
www.halliburton.com

HC Starck North American Trading LLC
Newton, MA
www.thermalspray.org

Hiltap Fittings Ltd
Calgary, AB
www.hiltap.com

Holyoke Contracting Ltd
Bonnyville, AB
www.holyokecontracting.com

Hot Tools
Lloydminster, AB
www.2hottools.ca

ICS Group-Oil & Gas Heating
Fort McMurray, AB
www.icsgroup.ca

ITW Devcon
Danvers, MA
www.devcon.com

Kenilworth Combustion Ltd
Vermilion, AB
www.kenilworth.ca

Kootenay Industries Ltd
Calgary, AB
www.kootenayindustries.com

Krupp Canada Inc
Calgary, AB
www.krupp.ca

LOA Consulting Ltd
Edmonton, AB
www.loaconsulting.ca

Lufkin Industries Inc
Calgary, AB
www.lufkin.com

Marking Services Canada Ltd
Leduc, AB
www.markserv.com

Nalco Champion
Calgary, AB
www.nalcochampion.com

National Process Equipment
Calgary, AB
www.natpro.com

NETZSCH Canada Inc
Calgary, AB
www.netzsch.ca

Northern Industrial Insulation Contractors Inc
Edmonton, AB
www.northern-insulation.ca

Oil Lift Technology Inc
Calgary, AB
www.npsdover.com/oilliftechnology

Origin Industries Ltd
Calgary, AB
www.originindustries.ca

P & H MinePro Services of Canada
Calgary, AB
www.minepro.com

Prime Pump Industries
Calgary, AB
www.primepump.ca

ProMinent Fluid Controls Ltd
Guelph, ON
www.prominent.ca

Pro-Rod Coiled Rod Solutions
Edmonton, AB
www.prorod.com

Quadrise Canada Corp
Calgary, AB
www.quadrisecanada.com

Quinn Pumps
Red Deer, AB
www.quinnpumps.com

RamEx Exchanger Inc
Fort Saskatchewan, AB
www.ramex.ca

Rivard Enterprises Ltd
Fort McMurray, AB
www.rivardenterprises2004.com

RJV Gas Field Services
Vegreville, AB
www.rjvgas.com

Rocanda Enterprises Ltd
Mississauga, ON
www.rocanda.com

Sandale Utility Products
Calgary, AB
www.sandale.ca

Saskatchewan Research Council (SRC)
Saskatoon, SK
www.src.sk.ca/energy

Seven Lakes Oilfield Services Corp
Cold Lake, AB
www.sevenlakesoilfield.com

SlurryFlo Valve Corp
Edmonton, AB
www.slurryflo.com

Smith-Cameron Process Solutions
Edmonton, AB
www.smithcameron.com

Source Environmental Corrosion Corp
Lloydminster, AB
www.sourcecorrosion.com

StonCor Group
Whitby, ON
www.stoncor.ca

Summit Valve & Controls Inc
Edmonton, AB
www.summitvalve.com

Texacana Turbines Inc
Calgary, AB
www.texacanaturbines.com

Tex-Fin Inc
Houston, TX
www.tex-fin.com

The Pickford Group Ltd
Edmonton, AB
www.pickford.com

Thermex Engineered Systems Inc
Abbotsford, BC
www.thermex-systems.com

Thermo Design Engineering Ltd
Calgary, AB
www.thermodesign.com

Thermon Canada Inc
Edmonton, AB
www.thermon.com

Tracerco Process Diagnostics
Edmonton, AB
www.tracerco.com

Universal Industries
Lloydminster, AB
www.uic.ca

Wajax Equipment
Edmonton, AB
www.wajaxequipment.com

Weir Minerals Canada
Calgary, AB
www.weirminerals.com

Westcomm Pump & Equipment Ltd
Calgary, AB
www.westcommpump.com

Wild Rows Pump & Compression Ltd
Lloydminster, AB
www.wildrowspump.com

Zazula Process Equipment Ltd
Calgary, AB
www.zazula.com

ZIRCO (1989) Ltd
Calgary, AB
www.zirco.com

RIG-MOVING

Allnite Trucking Ltd
Boyle, AB
www.allnitetrucking.com

Calnash Trucking Ltd
Lac La Biche, AB
www.calnashtrucking.com

ENTREC Corporation
Fort McMurray, AB
www.entrec.com

ENTREC Corporation
Calgary, AB
www.entrec.com

H & E Oilfield Services Ltd
Wainwright, AB
www.heoil.com

Mammoet Canada
Edmonton, AB
www.mammoet.com

Marvin Sheehan Services – MSS
Grimshaw, AB
www.msstrucking.com

Mullen Trucking Inc
Aldersyde, AB
www.mullentrucking.com

Premay Equipment Ltd
Edmonton, AB
www.premay.com

SAFETY PRODUCTS & SERVICES

Alberta Traffic Supply Ltd
Edmonton, AB
www.atstrafficgroup.com

Alliance Borealis Canada Corp
Calgary, AB
www.abcanada.com

Ansell Canada Inc
Cowansville, QC
www.ansellcanada.ca

Arctic Response Canada Ltd
Sherwood Park, AB
www.arcticresponse.ca

ASTEC Safety Inc
Lloydminster, AB
www.astecsafety.com

ATCO EnergySense
Calgary, AB
www.atcoenergysense.com

Audits & Safety Services
Peace River, AB
www.peaceriversafetytraining.com

Bigstone Industrial Medical Services
Wabasca, AB
www.bigstonehealth.ca

Bootie Butler (Protexer)
Knoxville, TN
www.bootiebutlershoecovers.com

Bulwark Protective Apparel Ltd
Edmonton, AB
www.bulwark.com

Bumper To Bumper
High Prairie, AB
www.bumpertobumper.com

Burtex Incorporated
Edmonton, AB
www.burtex.ca

BW Technologies by Honeywell
Calgary, AB
www.gasmonitors.com

Cal Source Safety Training Center
Edmonton, AB
www.cal-source.com

Canadian Linen & Uniform Service
Edmonton, AB
www.canadianuniform.com

Canadian Online Safety Training Association-COSTA
Calgary, AB
www.costatraining.ca

CannAmm Occupational Testing Services
Edmonton, AB
www.cannamm.com

Cansafe Inc
Lloydminster, SK
www.cansafesafety.com

Cansal Safety Inc
Fort McMurray, AB
www.cansal.ca

Checkers Industrial Safety Products Inc
Broomfield, CO
www.checkersindustrial.com

ComplyWorks Ltd
Calgary, AB
www.complyworks.com

CTS Industries Ltd
Edmonton, AB
www.cts-industries.com

D C Safety and Welding Supplies
Slave Lake, AB
www.directcurrentmobile.com

ElectroGas Monitors Ltd
Red Deer, AB
www.electrogasmonitors.com

Fire Power Oilfield Firefighting Ltd
Calgary, AB
www.firepower.ca

Firehawk Energy Services Ltd
Calgary, AB
www.firehawkenergy.com

Firemaster Oilfield Services Inc
Red Deer, AB
www.firemaster.ca

First Response Emergency Services Ltd
Calgary, AB
www.first-emergency.com

Fort McMurray Industrial Cleaners Ltd
Fort McMurray, AB
www.fmicfr.ca

Geroline Inc
Pelham, ON
www.geroline.ca

Goodfish Lake Development Corporation
Goodfish Lake, AB
www.gfldc.ca

Government of Alberta Apprenticeship & Industry Training
Fort McMurray, AB
www.tradesecrets.gov.ab.ca

Highmark Safety Solutions
Calgary, AB
www.highmarksafety.ca

Honeywell Analytics
Calgary, AB
www.honeywellanalytics.com

Honeywell Safety Products
Edmonton, AB
www.honeywellsafety.com

Horizon Enterprises Inc
Sherwood Park, AB
www.horizoncanada.net

HSE Integrated Ltd
Fort McMurray, AB
www.hseintegrated.com

Imagewear
Edmonton, AB
www.imagewear.ca

Industrial Life Support
Slave Lake, AB
www.industriallifesupport.com

Industrial Paramedic Services Ltd
Calgary, AB
www.ipsems.com

iSafety Services
Edmonton, AB
www.isafety.ca

Lea-Der Coatings
Spruce Grove, AB
www.lea-der.com

Levitt-Safety
Edmonton, AB
www.levitt-safety.com

Max Mechanical
Bonnyville, AB
www.maxmechanical.ca

MISafety Inc
Nisku, AB
www.misafety.ca

Mobile Safety Training
Edmonton, AB
www.mobilesafety.ca

MSA Canada
Toronto, ON
www.msasafety.com

North Guard Fall Protection Inc
Edmonton, AB
www.northguard.ca

Northern Factory Workwear
Lloydminster, AB
www.factoryworkwear.ca

Peace Safety & Environmental Training
Peace River, AB
www.peacesafety.ca

Primco Dene (EMS) LP
Cold Lake, AB
www.primcodene.com

Pro Train 360
Edmonton, AB
www.protrain360.com

Protocol Rescue Ltd
Edmonton, AB
www.protocolrescue.com

Rapid Response EMT Services Ltd
Bonnyville, AB
www.rapid-response.ca

RedGuard
Wichita, KS
www.abox4u.net

Revolution Fire Protection
Edmonton, AB
www.revolutionfire.com

Roda Deaco
Edmonton, AB
www.rodadeaco.com

Safe-Net Safety Service
Cold Lake, AB
www.safe-net.ca

SafeTech Consulting Group Ltd
Edmonton, AB
www.safetech.ca

Safety BOSS Inc
Calgary, AB
www.safetyboss.com

Safety Builders Consulting Corp
Stony Plain, AB
www.safetybuilders.com

Safety Buzz
Bonnyville, AB
www.safety-buzz.com

Safety Direct Ltd
Sherwood Park, AB
www.safetydirect.ca

Safety Link
Grimshaw, AB
www.safetylink.org

Schram Crane & Rigging Ltd
Wetaskiwin, AB
www.schramcrane.ab.ca

SimplexGrinnell
Fort McMurray, AB
www.simplexgrinnell.ca

Slave Safety Supply Ltd
Slave Lake, AB
www.slavesafety.com

Sling-Choker/Soucie Salo Ltd
Fort McMurray, AB
www.slingsoucie.com

SmogBuster Inc
Edmonton, AB
www.smogbuster.com

SPI Health & Safety
Bonnyville, AB
www.superior-safety.ca

Sprouse Fire & Safety
Edmonton, AB
www.sprousefire.com

STARS (Shock Trauma Air Rescue Society)
Calgary, AB
www.stars.ca

Sum Canada Enterprises Ltd
Fort McMurray, AB
www.sumcan.com

Tailored Safety Ltd
Fort McMurray, AB
www.tailoredsafetyltd.ca

Target Safety Services Ltd
Lloydminster, AB
www.targetsafety.ca

Total Safety
Leduc, AB
www.totalsafety.com

United Safety Ltd
Airdrie, AB
www.UnitedSafety.net

Wapose Medical Services Inc
Fort McMurray, AB
www.waposeems.ca

SERVICE COMPANIES–INTEGRATED SERVICES

ATCO Ltd
Calgary, AB
www.atco.com

Baker Hughes Canada Company
Calgary, AB
www.bakerhughes.com

CEDA International
Calgary, AB
www.cedagroup.com

ClearStream Energy Holdings
Sherwood Park, AB
www.clearstreamenergy.ca

Commissioning Agents International Canada, Ltd
Calgary, AB
www.commissioningagents.com

Davis LLP
Edmonton, AB
www.davis.ca

Ensign Drilling
Nisku, AB
www.ensignenergy.com

Exergy Engineers & Constructors Inc
Calgary, AB
www.exergy.ca

Ferus Inc
Calgary, AB
www.ferus.ca

FourQuest Energy
Edmonton, AB
www.fourquest.com

Genoil Inc
Calgary, AB
www.genoil.ca

Gibson Energy
Calgary, AB
www.gibsons.com

Halliburton
Calgary, AB
www.halliburton.com

Hydrodig
Bentley, AB
www.hydrodig.com

Jacobs Canada Inc
Calgary, AB
www.jacobs.com

KAEFER Integrated Services Ltd
Calgary, AB
www.kaefer.com

Kirby Hayes Incorporated
Lloydminster, AB
www.kirbyhayes.com

Kudu Industries Inc
Calgary, AB
www.kudupump.com

McDaniel & Associates Consultants Ltd
Calgary, AB
www.mcdan.com

McElhanney Land Surveys Ltd
Calgary, AB
www.mcelhanney.com

Mikisew Group of Companies
Edmonton, AB
www.mikisewgroup.com

Nine Energy Service
Calgary, AB
www.nineenergyservice.com

Powell Canada Inc
Edmonton, AB
www.powellind.ca

Pro Energy
Red Deer, AB
www.proenergy.ca

Sanjel Corporation
Calgary, AB
www.sanjel.com

Schlumberger
Calgary, AB
www.slb.com

Strad Energy Services
Calgary, AB
www.stradenergy.com

Sulzer Turbo Services Canada Ltd
Edmonton, AB
www.sulzerts.com

Superior Industries Inc
Cold Lake, AB
www.superior-industries.com

TELUS
Calgary, AB
www.telus.com/energysector

Tenaris
Houston, TX
www.tenaris.com

Tervita
Calgary, AB
www.tervita.com

Titanium Corporation Inc
Calgary, AB
www.titaniumcorporation.com

Total Energy
North Salem, NY
www.totalenergy.com

Trican Well Service
Calgary, AB
www.trican.ca

Tridon Communications
Fort McMurray, AB
www.tridon.com

Tristar Resource Management Ltd
Calgary, AB
www.tstar.ca

URS
Calgary, AB
www.ursflint.com

Vertex Resource Group Ltd
Sherwood Park, AB
www.vertex.ca

Weatherford Canada Partnership
Calgary, AB
www.weatherford.com

SPECIALTY SERVICES

Acuren Group Inc
Fort McMurray, AB
www.acuren.com

Alcatel-Lucent
Calgary, AB
www.alcatel-lucent.com

ALS Environmental
Calgary, AB
www.alsglobal.com

AltaLink
Calgary, AB
www.altalink.ca

Altus Geomatics Limited Partnership
Edmonton, AB
www.altusgeomatics.com

APL-Advanced Paramedic Ltd
Peace River, AB
www.advancedparamedic.com

Apollo Machine & Welding Ltd
Leduc, AB
www.apollomachine.com

Asset Performance Canada
Calgary, AB
www.ap-canada.ca

ATCO Energy Solutions Ltd (AESL)
Calgary, AB
www.atcoenergysolutions.com

ATCO Group
Calgary, AB
www.atco.com

Attack Energy Services Ltd
High Prairie, AB
www.attackenergyservices.com

AVEVA Canada
Calgary, AB
www.aveva.com

Badger Daylighting Inc
Fort McMurray, AB
www.badgerinc.com

Bakos (N.D.T.) Inspection (1989) Ltd
Lac La Biche, AB
www.albertandt.com

Brother's Specialized Coating Systems Ltd
Edmonton, AB
www.brotherscoating.com

Bruin Instruments Corp
Edmonton, AB
www.bruinpumps.com

Cancen Oil Processors Inc
Edmonton, AB
www.cancenoil.com

Carreau Oilfield Specialties
Edmonton, AB
www.carreauoilfield.com

Tervita
Calgary, AB
www.tervita.com

CG Hylton Inc
Calgary, AB
www.hylton.ca

CGG Services (Canada) Inc
Calgary, AB
www.cgg.com

Challenger Geomatics Ltd
Edmonton, AB
www.challengergeomatics.com

Clean Harbors
Edmonton, AB
www.cleanharbors.com

Contava Inc
Calgary, AB
www.contava.com

CP Rail
Calgary, AB
www.cpr.ca

Daniel's Drafting & Consulting Ltd
Mundare, AB
www.danielsdrafting.com

Das Nitrogen Services Inc
Vegreville, AB
www.dasn2.com

Design Group Staffing Inc
Edmonton, AB
www.dgstaff.com

deSIGNS by Tam Ltd
High Prairie, AB
www.designsbytam.ca

Dynalife DX Diagnostic Laboratory Service
Edmonton, AB
www.dynalifedx.com

Dynasoft Communications Inc
Lloydminster, AB
www.dynasoft2000.com

E.I. du Pont Canada Company
Kingston, ON
www.dupont.com

Emerald Associates Inc
Calgary, AB
www.emerald-associates.com

Empire Iron Works Ltd
Edmonton, AB
www.empireiron.com

Environmental Refuelling Systems Inc
Edmonton, AB
www.envirofuel.ca

EPCOR Alberta
Calgary, AB
www.epcor.ca

ES Denbina Petroleum Consulting Services
Calgary, AB
www.members.shaw.ca/denbina

Gaffney, Cline & Associates
Calgary, AB
www.gaffney-cline.com

Garda Security Group Inc
Montreal, QC
www.gardaglobal.com

geoLOGIC Systems Ltd
Calgary, AB
www.geologic.com

G4S Secure Solutions (Canada) Ltd
Toronto, ON
www.g4s.ca

Global Thermoelectric
Calgary, AB
www.globalte.com

Go Asphalt Ltd
Edmonton, AB
www.goasphalt.ca

Greatario Covers Inc
Innerkip, ON
www.greatario.com

Guardian
Edmonton, AB
www.guardianoil.com

Hardbanding Solutions
Cleveland OH
www.hardbandingsolutions.com

Heavy Equipment Repair Ltd
Slave Lake, AB
www.heavyequipmentrepair.ca

Hitachi Consulting
Calgary, AB
www.hitachiconsulting.com

Hydra-Tech International Corp
Calgary, AB
www.hydra-tech.net

Ian Murray & Company Ltd
Calgary, AB
www.imcprojects.ca

IKM Testing (Canada) Ltd
Paradise, NL
www.ikm.no

Iracore International
Hibbing, MN
www.irproducts.com

Instrument Database Solutions
Calgary, AB
www.idscontact.ca

Intergraph Canada Ltd
Calgary, AB
www.intergraph.com

International Cooling Tower Inc
Edmonton, AB
www.ICTower.com

IRED Thermal Group Ltd
Edmonton, AB
www.iredthermal.com

Lac La Biche Regional Community Development Corp
Lac La Biche, AB
www.laclabicheregion.com

Merichem Company
Houston, TX
www.merichem.com

Michelin North America (Canada) Inc
Laval, QC
www.michelin.ca

MMD Mineral Sizing (Canada) Inc
Edmonton, AB
www.mmdsizers.com

Mobile Augers & Research Ltd
Edmonton, AB
www.mobileaugers.com

Norcan Fluid Power
Saskatoon, SK
www.norcanfluidpower.com

Norspec Filtration Ltd
Edmonton, AB
www.norspec.com

Northern Transportation Company Limited
Edmonton, AB
www.ntcl.com

OilCareers.Com
Calgary, AB
www.oilcareers.com

Oilsands Shovel Products
Fort McMurray, AB
www.oilsandsshovelproducts.ca

OTS Ltd
Sydney, NS
www.otsl.ca

Owen Oil Tools
Red Deer County, AB
www.corelab.com/pe/owen

Patriot Solar Group
Albion, MI
www.PatriotSolarGroup.com

Penetrators Canada Inc
Red Deer, AB
www.maxperf.ca

POLARIS Laboratories
Edmonton, AB
www.polarislabs.ca

Precision Scale
Edmonton, AB
www.precisionscale.com

Quorum Business Solutions Inc
Calgary, AB
www.qbsol.com

Ranger Inspection (2012) Ltd
Calgary, AB
www.rangerinspection.com

Roplast GmbH
Lingen, Germany
www.rosen-group.com

Saint-Gobain Abrasives Canada Inc
Hamilton, ON
www.carborundumabrasives.com

Shaw Business
Calgary, AB
www.shaw.ca/sbs

SIF Superior Industrial Frictions Ltd
Edmonton, AB
www.sifbrake.com

Singletouch
Calgary, AB
www.singletouch.com

SITECH Western Canada Solutions Ltd
Edmonton, AB
www.sitech-wc.ca

Specialty Products Research & Supply (SPRS)
Edmonton, AB
www.sprs.ca

Star-Ting Incorporated
Calgary, AB
www.star-ting.com

Strategy West Inc
Calgary, AB
www.strategywest.com

Team Industrial Services
Slave Lake, AB
www.teamindustrialservices.com

Team Snubbing Services Inc
Rocky Mountain House, AB
www.teamsnubbing.com

Tervita
Bonnyville, AB
www.tervita.com

The Surveillance Shop Ltd
Calgary, AB
www.survshop.com

Thunder Bay Port Authority
Thunder Bay, ON
www.portofthunderbay.ca

TISI Canada Inc
Edmonton, AB
www.teaminc.com

Veolia Water Solutions & Technologies
Plainfield, IL
www.veoliawaterst.com

Viewpoint Medical Assessment Services Inc
Calgary, AB
www.viewpointmedical.ca

Wipro Technologies - Edmonton
Edmonton, AB
www.wipro.com

X-Act Technologies Ltd
Calgary, AB
www.xact.ca

Young EnergyServe Inc
Rocky View, AB
www.youngenergy.ca

Zybertech
Calgary, AB
www.zybertech.com

SUPPLIES–RENTALS & SALES

Accufast Inc
Edmonton, AB
www.accufastinc.com

Acklands-Grainger Inc
Fort McMurray, AB
www.acklandsgrainger.com

AFD Petroleum Ltd
Edmonton, AB
www.afdpetroleum.com

Air Liquide Canada Inc
Edmonton, AB
www.airliquide.ca

Apex Advanced Solutions Inc
Edmonton, AB
www.apex-advanced.com

Apex Distribution Inc
Slave Lake, AB
www.apexdistribution.com

Armitage Resource Management Co
Calgary, AB
www.armcoindustrial.com

ARW Truck Equipment Ltd
Calgary, AB
www.arwtruck.com

B W Rig Supply
Nisku, AB
www.hyduke.com

BakerCorp
Edmonton, AB
www.bakercorp.com

Baron Oilfield Supply
High Prairie, AB
www.baronoilfield.ca

Benoit Rentals Ltd
Chauvin, AB
www.benoitrentals.com

B.G.E. Service & Supply Ltd
Edmonton, AB
www.thefiltershop.com

BIW Connector Systems
St Albert, AB
www.ittcannon.com

Black Cat Blades Ltd
Edmonton, AB
www.blackcatblades.com

Bobcat of Fort McMurray
Fort McMurray, AB
www.bobcat.com

Bray Sales - Alberta
Edmonton, AB
www.bray.com

Cameron Valves & Measurement
Calgary, AB
www.c-a-m.com

Camex Equipment Sales & Rentals Inc
Nisku, AB
www.camex.com

Canada Towers Inc
Calgary, AB
www.canadatowers.com

CARBER Testing Alberta Inc
Fort McMurray, AB
www.carbertesting.com

Cat Rental Store
Edmonton, AB
www.catrents.ca

CISI Insulation
Calgary, AB
www.cisialberta.ca

Classic Oilfield Service Ltd
Lloydminster, AB
www.classoil.com

Cold Weather Technologies
Lloydminster, AB
www.coldweathertech.com

Commercial Solutions Inc
Nisku, AB
www.csinet.ca

Communications Cold Lake Inc
Cold Lake, AB
www.cclnetworks.com

Communications Group
Red Deer, AB
www.commgroup.net

Continental Chain & Rigging Ltd
Edmonton, AB
www.continentalchain.com

Continental Natural Gas & Liquids Inc
Calgary, AB
www.cng-l.com

Deran Oilfield Services Ltd
Lac La Biche, AB
www.deranoilfield.ca

Dezurik
Edmonton, AB
www.dezurik.com

Dicks Boiler Ltd
Blairmore, AB
www.dicksboiler.ca

DistributionNOW
Calgary, AB
www.distributionnow.com

Douglas Coatings Ltd
Fort McMurray, AB
www.douglascoatings.ca

Edmonton Valve & Fitting Inc
Edmonton, AB
www.edmonton.swagelok.com

EneRig Supply
Bashaw, AB
www.enerigsupply.com

Enerpac
Menomonee Falls WI
www.enerpac.com

Exhaust Masters
Lloydminster, AB
www.exhaustmasters.ca

Fabco Plastics Western Ltd
Edmonton, AB
www.fabcoplastics.com

First Choice Equipment Rentals & Waste Management
Edmonton, AB
www.fcer.ca

Fluid Clarification Inc (FCI)
Calgary, AB
www.fluidclarification.com

Frontier Power Products Ltd
Edmonton, AB
www.frontierpower.com

Gladiator Equipment Inc
Leduc, AB
www.gladiatorequipment.com

Goodall Canada Inc
Edmonton, AB
www.goodall-canada.com

Harber Coatings Inc
Calgary, AB
www.harbercoatings.com

Hazloc Heaters
Calgary, AB
www.HazlocHeaters.com

Hertz Equipment Rental
Edmonton, AB
www.hertzequip.com

Hose Solutions Inc
Scottsdale, AZ
www.allhoses.com

Hydro Engineering Inc
Salt Lake City, UT
www.hydroblaster.com

HYTORC Sales & Service
St Albert, AB
www.hytorcwest.ca

Inland Industrial Supply Ltd
Fort McMurray, AB
www.inlandindustrial.ca

In-Situ Machining Solutions Ltd
Spruce Grove, AB
www.insitumachining.com

ITM Instruments Inc
Calgary, AB
www.itm.com

ITT Goulds Pumps
Calgary, AB
www.gouldspumps.com

Jarvis Enterprises Ltd
Calgary, AB
www.jarvisenterprisesltd.ca

Jet-Lube Of Canada Ltd
Edmonton, AB
www.jetlubecanada.com

KASI Technologies Inc
Edmonton, AB
www.kasi.ca

Keddco Mfg Ltd
Edmonton, AB
www.keddco.com

Kelro Pump & Mechanical Ltd
Lloydminster, AB
www.kelro.com

Kenwood Electronics Canada Inc
Mississauga, ON
www.kenwood.ca

Ketek Group Inc
Fort McMurray, AB
www.ketek.ca

Klassen Specialty Hydraulics Inc
Rosedale, BC
www.klassenhydraulics.com

Kramer Ltd
Regina, SK
www.kramer.ca

Lafarge Canada Inc
Calgary, AB
www.lafarge-na.com

Lamons
Edmonton, AB
www.lamons.com

Lampson Canada Ltd
Beiseker, AB
www.lampsoncrane.com

LaPrairie Crane
Fort McMurray, AB
www.laprairiegroup.com

Liftex Equipment Rentals Inc
Edmonton, AB
www.liftex.ca

Lloydminster Nut & Bolt
Lloydminster, AB
www.lloydminsternutandbolt.ca

Lonetech
Grimshaw, AB
www.lonetech.com

Lube-Power Inc
Shelby Township, MI
www.lubepower.com

McCann Equipment Ltd
Edmonton, AB
www.torquetools.com

Meltric Corporation
Franklin, WI
www.meltric.com

Midway Distributors Ltd
Lloydminster, AB
www.midwaydistributors.com

Milwaukee Electric Tool (Canada) Ltd
Vaughan, ON
www.milwaukeetool.com

MRC Canada ULC
Calgary, AB
www.mrcglobal.com

Mutual Propane Ltd
Lac La Biche, AB
www.mutualpropane.ab.ca

Neptune Automated Wheel Wash Systems
Hot Springs National Park AR
www.neptunesystems.org

Northwell Rentals (Lloydminster) Inc
Lloydminster, AB
www.northwellrentals.com

OC Trailer Rentals Ltd
Edmonton, AB
www.octrailerrentals.ca

Oil Boss Rentals Inc
Rocky Mountain House, AB
www.oilbossrentals.com

Olympus NDT
Waltham, MA
www.olympus-ims.com

Pall (Canada) Ltd
Mississauga, ON
www.pall.com

Pason Systems Corp
Calgary, AB
www.pason.com

PECOFacet Canada
Calgary, AB
www.pecofacet.com

Perm Instruments Inc
Calgary, AB
www.perminstruments.com

Phoenix Fence
Edmonton, AB
www.phoenixfence.ca

Platinum Grover Int Inc
Calgary, AB
www.platinumgrover.com

Polar Pipe and Fittings
Edmonton, AB
www.polarpipe.ca

Precision Bolting Ltd
Edmonton, AB
www.precisionbolting.com

Process Combustion Systems (2000) Inc
Calgary, AB
www.processcombustion.com

PROMORE
Calgary, AB
www.promore.com

Propell Oilfield Equipment
Calgary, AB
www.propell.ca

QI Supply Ltd
Edmonton, AB
www.qisupply.com

R-Cat Oilfield Corp
Calgary, AB
www.rcat.ca

REDCO Equipment Sales Ltd
Edmonton, AB
www.redcovalves.com

Relay Distributing
Lloydminster, SK
www.relaydistributing.ca

Rentco Equipment Ltd
Peace River, AB
www.rentcoequipment.com

RIDGID Professional Tools
Elyria, OH
www.ridgid.com

Roughrider International Ltd
Fort McMurray, AB
www.roughriderinternational.com

Sabre Communications Inc
Lloydminster, SK
www.sabrecom.ca

Score TransCanada Ltd
Edmonton, AB
www.score-group.com

Sil Industrial Minerals
Edmonton, AB
www.sil.ab.ca

Silvertip Rentals and Fishing Tools
Slave Lake, AB
www.silvertiprentals.com

Silverwood Toyota Import Specialists
Lloydminster, AB
www.silverwoodtoyota.com

Stewart Sales & Rentals
Lac La Biche, AB
www.stewartsalesandrentals.ca

TB3 Supply Inc
Edmonton, AB
www.tb3supply.ca

Tenaris Steel
Calgary, AB
www.tenaris.com

Topco Oilsite Products Ltd
Calgary, AB
www.topcooilsite.com

Total Oilfield Rentals LP
Red Earth Creek, AB
www.totaloilfield.ca

Trailer Canada Inc
St Paul, AB
www.trailercanada.com

Tryton
Lloydminster, AB
www.trytontoolservices.com

Unified Alloys
Edmonton, AB
www.unifiedalloys.com

United Rentals
Sherwood Park, AB
www.unitedrentals.com

United Rentals
Fort McMurray, AB
www.unitedrentals.com

Van Leeuwen Pipe & Tube (Canada)
Edmonton, AB
www.vanleeuwen.com

Victory Equipment Rentals
Edmonton, AB
www.rentvictory.com

Voith Turbo
Mississauga, ON
www.voith.com

Wajax Industrial Components
Nisku, AB
www.wajaxindustrial.com

Waskatenau Motors
Waskatenau, AB
www.waskatenaumotors.com

Western Brokers
Edmonton, AB
www.westernbrokers.ca

Westlund
Lloydminster, AB
www.westlund.ca

Westlund
Edmonton, AB
www.westlund.ca

Wetland Equipment Co Ltd
Thibodaux, LA
www.wetlandequipmentco.com

Wolseley Industrial Canada Inc
Edmonton, AB
www.wolseleyinc.ca

Xylem Inc
Pointe-Claire, QC
www.xyleminc.com

Your Safety & Workwear Store & Westlock Dry Cleaners
Westlock, AB
www.safetyandworkwear.ca

TRUCKING

Affinity Oilfield Services Ltd
Bonnyville, AB
www.affinityoilfield.com

Aim Transport
Lloydminster, SK
www.baytex.ab.ca

All Fired Up Contracting Ltd
Slave Lake, AB
www.allfiredupcontracting.com

Attack Oilfield Services Inc
Manning, AB
www.attackoilfield.com

Axani Bros Trucking
Cold Lake, AB
www.axanibrostruckingab.ca

B & R Eckel's Transport Ltd
Bonnyville, AB
www.breckels.com

Bearstone Oilfield Services
Slave Lake, AB
www.bearstoneenviro.com

Big Rig Towing & Recovery Ltd
Calgary, AB
www.bigrigtowing.com

Blue Ray Trucking Ltd
Bonnyville, AB
www.blueraytrucking.com

BOS Oilfield Service Ltd
Glendon, AB
www.bos-solutions.com

Bry-Tan Trucking Ltd
Lloydminster, SK
www.bry-tantrucking.ca

Calmont Truck Rentals & Leasing
Edmonton, AB
www.calmont.ca

Canada Cartage
Edmonton, AB
www.canadacartage.com

Cen-Alta Oilfield Trucking Ltd
Legal, AB
www.cen-altaoilfieldtrucking.com

Cervus Equipment Peterbilt
Lloydminster, SK
www.peterbilt.cervusequipment.com

C.H. Robinson Project Logistics
Calgary, AB
www.chrprojectlogistics.com

Chief Hauling Contractors Inc
Fort McMurray, AB
www.chiefhauling.com

Cold Lake Ford
Cold Lake, AB
www.coldlakeford.com

Competition Trailer Sales
Calgary, AB
www.competitiontrailersales.com

Continental Cartage Inc
Fort McMurray, AB
www.continentalcartage.com

Desran Holdings Ltd
Perryvale, AB
www.desranholdings.com

DFI
Edmonton, AB
www.dfi.ca

Diamond B Transport
Lloydminster, AB
www.diamondbtransport.com

Ditch Hitch
Calgary, AB
www.ditchhitch.com

Docktor Freight Solutions Corp
Calgary, AB
www.dfscorp.com

Docktor Oilfield Transport Corp
Drayton Valley, AB
www.docktortransport.com

DRIVING FORCE
Edmonton, AB
www.drivingforce.ca

DT Planetaries Inc
Edmonton, AB
www.dthubs.com

Edmonton Trailer Sales & Leasing Ltd
Acheson, AB
www.edmontontrailer.com

EJR Trucking Inc
Lac La Biche, AB
www.ejrtrucking.ca

Eric Auger & Sons Contracting
Wabasca, AB
www.ericaugerandsons.ca

Formula Powell LP
Lloydminster, AB
www.formulapowell.com

G Force Diesel Service Ltd
Lloydminster, SK
www.gforcediesel.com

G Force Oilfield Services Inc
Bonnyville, AB
www.gforceoilfield.com

Gear Centre The
Fort McMurray, AB
www.gearcentre.com

Grimshaw Trucking LP
Edmonton, AB
www.grimshaw-trucking.com

Heavy Crude Hauling LP
Lloydminster, AB
www.heavycrudehauling.com

HM Advance Transport Ltd
Lloydminster, AB
www.hmadvancetransport.com

Hoffman's Tank Truck Service Ltd
Elk Point, AB
www.hoffmansoilfield.com

HWT
Edmonton, AB
www.hwtransport.com

Inter-Rail Transport Ltd
Edmonton, AB
www.inter-railtransport.com

Jaymar Hauling (88) Ltd
Slave Lake, AB
www.jaymarhauling.com

Joe Martin & Sons Ltd
Edmonton, AB
www.jmsltd.ca

Lac La Biche Transport Ltd
Lac La Biche, AB
www.laclabichetransport.ca

Larson Fluid Hauling
Lloydminster, AB
www.larsonmgtinc.com

Leading Edge Hot Shot & Picker Service
Manning, AB
www.leadedge.ca

Ledcor Industrial Maintenance Ltd
Edmonton, AB
www.ledcor.com

Manitoulin Transport
Fort McMurray, AB
www.manitoulintransport.com

Matco Transportation Systems
Edmonton, AB
www.matco.ca

McMurray Serv-U Expediting Ltd
Fort McMurray, AB
www.mcmurrayservu.com

NCSG Crane & Heavy Haul Trans Tech Inc
Acheson, AB
www.ncsg.com

NCSG Crane & Heavy Haul Services
Acheson, AB
www.ncsg.com

Nitro Heavy Hauling Ltd
Lloydminster, AB
www.nitroheavyhauling.com

Pioneer Truck Lines Ltd
Edmonton, AB
www.pioneertrucklines.com

Prax Enterprises
Slave Lake, AB
www.praxenterprises.com

Q-Line Trucking Ltd
Saskatoon, SK
www.qlinetrucking.com

Q-Tek Tankers Ltd
Viking, AB
www.q-tek.ca

Quality Asphalt Ltd
Slave Lake, AB
www.qualitypavingltd.com

Quantum Winch
Bonnyville, AB
www.quantumwinches.com

Red Planet Trucking Ltd
Red Earth Creek, AB
www.redplanettrucking.com

Rene's Vacuum Service Inc
Sturgeon County, AB
www.renesvacuum.com

Rick's Oilfield Hauling
Redwater, AB
www.ricksoilfield.ca

Ridgid Oilfield Servicing Ltd
Lloydminster, AB
www.rigidoilfield.com

RJ Hoffman Holdings Ltd
Lloydminster, AB
www.rjhoffman.com

Roadrunner Water Hauling Ltd
Innisfree, AB
www.roadrunnerhauling.ca

Rock Solid Group of Companies
Vermilion, AB
www.rocksolidcompanies.ca

Rosenau Transport Ltd
Edmonton, AB
www.rosenau.org

Sandpiper Truck Services Ltd
Lloydminster, AB
www.sandpipertruck.com

Shale Industrial Ltd
Fort McMurray, AB
www.shaleindustrial.com

Silverman Oilfield Services Ltd
Neilburg, SK
www.silverman-oil.com

Slave Lake Specialties
Slave Lake, AB
www.slavelakespecialties.ca

SLH Picker Service & Pile Driving
Slave Lake, AB
www.slhs.ca

Southview Trucking Ltd
Vermilion, AB
www.southviewtrucking.com

Spectra Oilfield Services
Lloydminster, AB
www.spectraoilfield.ca

Steel View Oil Pressure Services Ltd
Chauvin, AB
www.stlview.ca

Sundog Energy Services Ltd
Calgary, AB
www.sdenergy.ca

Triple K Oilfield Services Inc
Red Earth Creek, AB
www.triplekoilfield.ca

Triple Random Inc
Acheson, AB
www.triplerandom.com

Truck Evolution
Edmonton, AB
www.truckevolution.ca

Ulmer Chev Olds
Lloydminster, AB
www.ulmerchev.com

Vacuum Trucks Of Canada
Calgary, AB
www.vacuumtruckscanada.com

Wellside Services
Grimshaw, AB
www.wellsideservices.weebly.com

West Oilfield
Calgary, AB
www.westoilfield.com

W-K Trucking Inc
Mundare, AB
www.wktrucking.com

X-Cel Energy Services Ltd
High Prairie, AB
www.xcelenergyab.com

Xtreme Air Ltd
St Paul, AB
www.xtremeair.ca

WELL SERVICE

Cadieux Oilfield Services
Lac La Biche, AB
www.cadieuxoilfield.com

CanServ Well Services Ltd
Calgary, AB
www.canservltd.ca

D & D Insulating
Fort McMurray, AB
www.dndinsulators.ca

Datalog Technology Inc
Calgary, AB
www.datalogtechnology.com

DLM Oilfield Enterprises Ltd
Bonnyville, AB
www.dlmoilfield.com

Enerpro Insulation Ltd
Edmonton, AB
www.enerproinsulation.com

Garrison Oilwell Servicing Ltd
Lloydminster, SK
www.garrisonoilwell.com

LeaseLink Services Ltd
Cold Lake, AB
www.leaselinkservices.com

MADDON Oilfield Services
Vegreville, AB
www.maddon.ca

Park Derochie Inc
Edmonton, AB
www.ParkDerochie.com

Parker Kaefer Western Ltd
Edmonton, AB
www.parkerkaefer.com

Pimee Well Servicing Ltd
Kehewin, AB
www.pimee.com

Polycore Tubular Linings Corp/Conestoga Pipe & Supply
Calgary, AB
www.polycore.ca

Precision Well Servicing
Lloydminster, AB
www.precisiondrilling.com

Pro Insul Limited
Edmonton, AB
www.proinsul.com

Qinterra Technologies
Calgary, AB
www.qinterra.com

R R C Insulation Services Ltd
Gibbons, AB
www.rrcinsulation.ca

Raider Well Servicing Ltd
Lloydminster, AB
www.raiderwellservicing.ca

RD Scan Inc
Bonnyville, AB
www.rdscan.biz

R'ohan Rig Services Ltd
Lloydminster, AB
www.rohanltd.com

Serpa Petroleum Consulting Ltd
Calgary, AB
www.serpaconsulting.com

The Frac Notice Team
Calgary, AB
www.fracnotice.com

Thermal Insulation Association of Alberta
Calgary, AB
www.tiaa.cc

NETWORKING

ASSOCIATIONS/ ORGANIZATIONS

Alberta Chamber of Resources
Edmonton, AB
www.acr-alberta.com

Alberta Chambers of Commerce
Edmonton, AB
www.abchamber.ca

Alberta Construction Safety Association
Edmonton, AB
www.acsa-safety.org

Alberta Ironworkers Apprenticeship and Training Plan
Edmonton, AB
www.ironworkers720.com

Alberta Land Surveyors' Association
Edmonton, AB
www.alsa.ab.ca

Alberta Sand & Gravel Association
Edmonton, AB
www.asga.ab.ca

Alberta Urban Municipalities Association
Edmonton, AB
www.auma.ca

APEGA
Edmonton, AB
www.apega.ca

APEGS
Regina, SK
www.apegs.sk.ca

ASET-Association of Science & Engineering Technology Professionals of Alberta
Edmonton, AB
www.aset.ab.ca

Bonnyville Chamber of Commerce
Bonnyville, AB
www.bonnyvillechamber.com

Cactus Corridor Economic Development Corporation
Hanna, AB
www.cactuscorridor.com

Calgary Chamber of Commerce
Calgary, AB
www.calgarychamber.com

Canadian Association of Geophysical Contractors (CAGC)
Calgary, AB
www.cagc.ca

Canadian Association of Oilwell Drilling Contractors
Calgary, AB
www.caodc.ca

Canadian Association of Petroleum Land Administration (CAPLA)
Calgary, AB
www.caplacanada.org

Canadian Association of Petroleum Landmen
Calgary, AB
www.landman.ca

Canadian Association of Petroleum Producers (CAPP)
Calgary, AB
www.capp.ca

Canadian Energy Pipeline Association (CEPA)
Calgary, AB
www.cepa.com

Canadian Energy Research Institute
Calgary, AB
www.ceri.ca

Canadian Heavy Oil Association
Calgary, AB
www.choa.ab.ca

Canadian Society for Chemical Engineering (CSChE)
Saskatoon, SK
www.chemeng.ca

Canadian Society of Exploration Geophysicists (CSEG)
Calgary, AB
www.cseg.ca

Canadian Society of Petroleum Geologists (CSPG)
Calgary, AB
www.cspg.org

Canadian Standards Association
Edmonton, AB
www.csagroup.org

Canadian Well Logging Society
Calgary, AB
www.cwls.org

Central Alberta Economic Partnership Ltd (CAEP)
Red Deer, AB
www.centralalberta.ab.ca

Certified Management Accountants Of Alberta
Calgary, AB
www.cma-alberta.com

Clean Air Strategic Alliance (CASA)
Edmonton, AB
www.casahome.org

Coal Association of Canada
Calgary, AB
www.coal.ca

Construction Labour Relations
Calgary, AB
www.clra.org

Construction Owners Association of Alberta
Edmonton, AB
www.coaa.ab.ca

Cumulative Environmental Management Association (CEMA)
Fort McMurray, AB
www.cemaonline.ca

Edmonton Chamber of Commerce
Edmonton, AB
www.edmontonchamber.com

Environmental Services Association of Alberta (ESAA)
Edmonton, AB
www.esaa.org

EPAC (Explorers & Producers Association of Canada)
Calgary, AB
www.explorersandproducers.ca

Executrade
Edmonton, AB
www.executrade.com

Fort McMurray Chamber of Commerce
Fort McMurray, AB
www.fortmcmurraychamber.ca

Fort McMurray Construction Asscociation
Fort McMurray, AB
www.fmca.net

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www.fhoa.ca

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Calgary, AB
www.genesisexecutive.ca

Geoscientists Canada
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www.ccpg.ca

International Energy Foundation
Okotoks, AB
www.ief-energy.org

International Union of Painters & Allied Trades
Edmonton, AB
www.iupat.ab.ca

Lakeland Industry & Community Association
Bonnyville, AB
www.lica.ca

Lloydminster Chamber of Commerce
Lloydminster, AB
www.lloydminsterchamber.com

Manufacturers' Health & Safety Association
Rocky View, AB
www.mhsa.ab.ca

Merit Contractors Association
Edmonton, AB
www.meritalberta.com

Oil Sands Environmental Research Network (OSERN)
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www.osrin.ualberta.ca

Oil Sands Safety Association (OSSA)
Fort McMurray, AB
www.ossa-wb.ca

Peace River and District Chamber of Commerce
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www.peaceriverchamber.com

Petroleum Joint Venture Assocation (PJVA)
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www.pjva.ca

Petroleum Services Association of Canada
Calgary, AB
www.psac.ca

Petroleum Technology Alliance Canada (PTAC)
Calgary, AB
www.ptac.org

Progressive Contractors Association of Canada - PCAC
Edmonton, AB
www.pcac.ca

Society of Petroleum Engineers
Calgary, AB
www.spe.org

Special Areas Board
Hanna, AB
www.specialareas.ab.ca

Supply Chain Management Association Alberta
Edmonton, AB
www.scmaab.ca

Workers' Compensation Board-Alberta
Edmonton, AB
www.wcb.ab.ca

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www.athabascau.ca

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www.cict.ca

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www.devry.ca

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www.schulich.ucalgary.ca/eip

Environmental Resource Management Certificate Program
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www.extension.ualberta.ca

GPRC
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www.gprc.ab.ca

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www.itctrng.com

Institute For Sustainable Energy, Environment & Economy
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www.iseee.ca

Keyano College
Fort McMurray, AB
www.keyano.ca

Lakeland College
Vermilion, AB
www.lakelandc.ab.ca

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Lloydminster Heavy Oil Show
Lloydminster, AB
www.lhos.ca

MacEwan University
Edmonton, AB
www.macewan.ca

Mount Royal University
Calgary, AB
www.mtroyal.ab.ca

NAIT Corporate and International Training
Edmonton, AB
www.nait.ca/cit

North West Regional College
North Battleford, SK
www.nwrc.sk.ca

Northern Lakes College
Slave Lake, AB
www.northernlakescollege.ca

Northern Lights College
Dawson Creek, BC
www.nlc.bc.ca

PDAC Mining Matters
Toronto, ON
www.pdac.ca/mining-matters

Petroleum Institute for Continuing Education (PEICE)
Calgary, AB
www.peice.com

Petroleum Technology Research Centre (PTRC)
Regina, SK
www.ptrc.ca

Portage College
Lac La Biche, AB
www.portagecollege.ca

SAIT Polytechnic
Calgary, AB
www.sait.ca

University of Alberta, School of Energy and the Environment
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www.see.ualberta.ca

University of Calgary
Calgary, AB
www.ucalgary.ca

University Of Lethbridge
Lethbridge, AB
www.uleth.ca

University of Regina Faculty of Engineering
Regina, SK
www.uregina.ca/engg

University of Saskatchewan Dept. of Civil & Geological Engineering
Saskatoon, SK
www.engineering.usask.ca/cge
www.engr.usask.ca

GOVERNMENT

Alberta Energy
Edmonton, AB
www.energy.gov.ab.ca

Alberta Energy Regulator (AER)
Calgary, AB
www.aer.ca

Alberta Environment & Sustainable Resources Development
Edmonton, AB
www.srd.alberta.ca

Alberta Geological Survey
Edmonton, AB
www.ags.gov.ab.ca

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www.bio.albertainnovates.ca

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www.ai-ees.ca

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www.albertatechfutures.ca

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www.international.gov.ab.ca

Alberta International & Intergovernmental Relations, IIR
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www.international.alberta.ca

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Alberta Utilities Commission (AUC)
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www.auc.ab.ca

Alberta's Industrial Heartland Association
Fort Saskatchewan, AB
www.industrialheartland.com

BC Ministry of Energy and Mines
Victoria, BC
www.gov.bc.ca/ener

Calgary Economic Development
Calgary, AB
www.calgaryeconomicdevelopment.com

CANMET Mining & Mineral Sciences Laboratories
Ottawa, ON
www.nrcan.gc.ca

CanmetENERGY
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www.nrcan.gc.ca

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www.fortsask .ca

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www.countyofnorthernlights.com

Crown Investments Corporation of Saskatchewan
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www.cicorp.sk.ca

Department of Foreign Affairs, Trade and Development
Calgary, AB
www.tradecommissioner.gc.ca

Edmonton Economic Development Corporation (EEDC)
Edmonton, AB
www.edmonton.com

Environment Canada
Gatineau, QC
www.ec.gc.ca

Government of Alberta, IIR
Edmonton, AB
www.international.alberta.ca

Government of Alberta, Oil Sands Sustainable Development Secretariat
Edmonton, AB
www.energy.alberta.ca

National Energy Board
Calgary, AB
www.neb-one.gc.ca

Natural Resources Canada
Ottawa, ON
www.nrcan-rncan.gc.ca

Northern Alberta Development Council
Peace River, AB
www.nadc.gov.ab.ca

Regional Municipality of Wood Buffalo
Fort McMurray, AB
www.woodbuffalo.ab.ca

Saskatchewan Ministry of the Economy
Regina, SK
www.economy.gov.sk.ca

Town of Bon Accord
Bon Accord, AB
www.bonaccord.ca

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www.cmcghg.com

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www.ccemc.ca

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www.oilandgasinquirer.com

Oil & Gas Network
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www.oilgas.net

Oil Sands Community Alliance (OSCA)
Fort McMurray, AB
www.oscaalberta.ca

Oil Sands Discovery Centre
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www.oilsandsdiscovery.com

Oilsands Review
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