

Guidebook and Directory







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Dear Readers,

On behalf of the Canadian Heavy Oil Association (CHOA), I wish to express how extremely pleased we are to participate in Western Gold: Heavy Oil and Oilsands in Canada, a complement to Alberta's Heavy Oil and Oilsands, which was published last year.

As you read through the pages of Western Gold, it is our hope that this publication provides a sense of the diversity and dynamics of our heavy oil and oilsands industry. This is an industry that has been developed, and will continue to be sustained, through technological innovation. Much of this innovation has been achieved through effective partnerships between the producing, service, research, and regulatory sectors.

The primary mandate of the CHOA is to provide opportunities to exchange ideas through technical, social, and educational forums. Our ongoing partnership with the Government of Alberta and JuneWarren Publishing is another way that we continue to meet our mandate.

I wish to congratulate our partners on the success of this publication, and I look forward to our ongoing involvement.

W.D. (Bill) MacFarlane, P.Eng.

President | Canadian Heavy Oil Association



Greetings from the Ministers of International, Intergovernmental and Aboriginal Relations and Alberta Energy

Alberta has the energy—175 billion barrels of currently recoverable oil reserves—and the expertise and capabilities to develop heavy oil and oilsands resources around the world. As one of the world's leading oil and gas producers, Alberta produces more than 80 per cent of Canada's natural gas, almost 42 per cent of its conventional crude oil, and 100 per cent of its bitumen and synthetic crude oil.

Alberta's oil industry operates in some of the most challenging and remote locations in the world, overcoming conditions like temperature extremes, permafrost, and muskeg. Meeting these challenges requires the ingenuity to develop new technologies such as three-dimensional geophysical survey, reservoir engineering, satellite thermal mapping, and advances in sour gas equipment. Alberta also takes an innovative approach when laying pipelines, transporting resources over vast distances, and developing resources while minimizing the environmental footprint.

In addition, the province is working to achieve a competitive hydrocarbon upgrading industry through refining and petrochemical plants that expand the market for bitumen resource and produce higher-value products in the province.

Under the leadership of Premier Ed Stelmach, the province has a plan that will ensure that the economy and pace of development continue to thrive. Doing business with Alberta simply makes sense. We have the expertise, innovation, and vision to help countries increase their efficiencies and reduce costs.

Alberta is proud to partner with the Canadian Heavy Oil Association to market Alberta's heavy oil capabilities around the world. I hope this publication provides a glimpse of what Alberta has to offer and that you take advantage of our province's energy.

Sincerely,

Guy Boutilier

Minister of International,

Intergovernmental and Aboriginal Relations Mel Knight Minister of Energy



Greetings from Saskatchewan Industry and Resources

As Minister of Industry and Resources for the Province of Saskatchewan, I am pleased to provide an overview of the province's heavy oil industry in Western Gold: Heavy Oil and Oilsands in Canada.

Saskatchewan has a booming energy sector. The province is Canada's second largest oil producer, and third largest producer of natural gas. The oil and gas industry employs over 26,000 people in direct and indirect employment and, as our top industry, is a major contributor to the Saskatchewan economy.

Crude oil as been produced in Saskatchewan since the 1940s, and has developed into an industry that not only has an abundance of oil but also the infrastructure needed to support it. In place is an excellent transportation network, refining and upgrading capacity, research and development expertise, and a competitive fiscal and regulatory environment.

Oil production in Saskatchewan has more than doubled since 1990, with production in 2005 totalling more than 150 million barrels. Heavy oil production now accounts for more than 50 per cent of total oil production.

To increase the amount of recoverable heavy oil, the Government of Saskatchewan and the industry have invested heavily into new research and technologies. The Petroleum Technology Research Centre in Regina has become a world leader in developing technologies and partnerships to improve the extraction of this precious resource.

One of Saskatchewan's most prominent projects is the Weyburn CO2 Enhanced Oil Recovery Project operated by EnCana Corporation in Weyburn. As a result of carbon dioxide injection, an additional 155 million barrels of oil are expected to be recovered. The project is not only extracting more oil, but is also making major strides when it comes to protecting our environment by storing underground more than 26 million tonnes of carbon dioxide.

The heavy oil potential in Saskatchewan is excellent. Initial heavy oil in place is estimated at 19.5 billion barrels, with less than 10 per cent recoverable using current technologies. With the right technologies, a significant portion of that heavy oil will be recoverable in the future.

Saskatchewan's oilsands industry is still in the early exploratory stage. However, preliminary exploration results have been very positive, and it is expected there will be further interest in the industry as it develops.

There are many opportunities for the oil and gas, and oilsands industry in Saskatchewan. We have in place the infrastructure and expertise, an abundance of resources, a competitive business and tax environment, as well as a cost of living and quality of life that cannot be matched.

I invite you to check out what Saskatchewan has to offer—click on our website at www.ir.gov.sk.ca or contact the Department of Industry and Resources for more information.

Eric Cline, Q.C.

Minister of Saskatchewan Industry and Resources



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Our roots in the oil industry trace back to the days of the Alaska Pipeline, where we owned and operated K&W Transportation in Anchorage, AK. One thing hasn't changed since those days, we are still providing complete, turn-key transportation solutions to our customers and we continue to be a recognized transportation leader for many of them.





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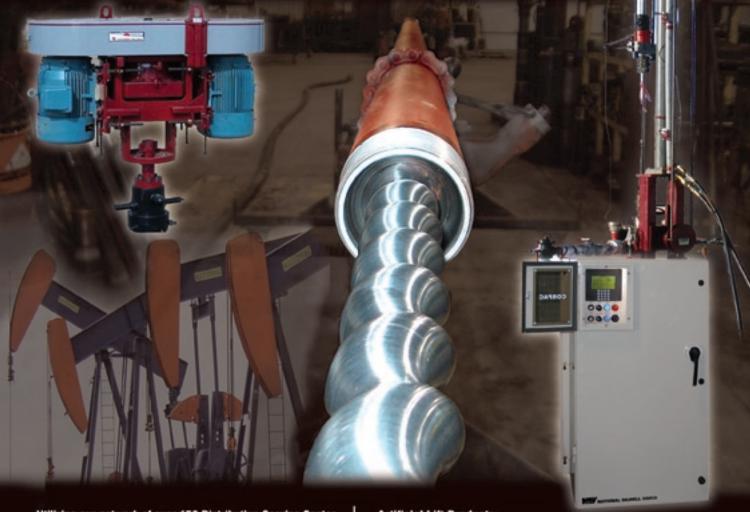
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It's Gold Out West



Editor, Deborah Jaremko and Publisher, Agnes Zalewski

Last year, JuneWarren Publishing worked with the Alberta Government and the Canadian Heavy Oil Association (CHOA) to bring you Alberta's Heavy Oil and Oil Sands: Unlocking 176 billion barrels, a guidebook and directory. This year, we've broadened our horizons and bring you its companion—Western Gold: Heavy Oil and Oilsands in Canada.

In Western Gold, you will go beyond Alberta and into Saskatchewan, as we enhance our coverage of the conventional heavy oil industry. With the recent global attention to the oilsands, one might overlook the continued importance of conventional heavy oil in Canada, but it too is making tremendous strides, both in production and technological advances.

In the pages of Western Gold, you will not only read all about various production technologies—such as steam assisted gravity drainage, in situ

combustion, and VAPEX—used to extract or upgrade both oilsands and heavy oil, but through our visual companions, you will also clearly see the process, both above and below ground.

You will also learn about the six regions closest to the heavy oil and oilsands industry, and how they are changing and growing because of heavy oil and oilsands development. The Regional Municipality of Wood Buffalo, of course, comes first to mind, as it is by far the closest to the heart of the oilsands, but communities all around Alberta have their own unique relationships with the industry. Around Cold Lake and Bonnyville, it has been a development staple for decades, and production is increasing. At Peace River, local companies are expanding in situ facilities that have operated for years. At Lloydminster, which straddles the border between Alberta and Saskatchewan, heavy oil has built a city, and continues to offer production, service, and supply opportunities. Alberta's Industrial Heartland—near Edmonton—is emerging as the upgrading, refining, and petrochemical centre of the province, if not the country. And finally, a number of projects are in the works in Saskatchewan that will change the face of that province.

In Western Gold, you will be exposed to each major operating oilsands and heavy oil company, as well as those that are entering the industry or growing production. From pioneering Suncor Energy to incoming Korea National Oil Corp., we've got them all.

But the heavy oil and oilsands industry is about more than producing companies. It is also about stakeholders, economics, regulations, governments, and industry associations. In Western Gold, you will find profiles of 15 of the most influential people associated with heavy oil and oilsands. From producers, to financial gurus, to environmentalists, we deliver their expert opinions about the future of the industry.

In last year's guidebook and directory, you read a sampling of oilsands and heavy oil research underway primarily at the University of Calgary. This year, we have also rounded up information from the University of Alberta, as well as the Alberta Research Council (ARC). Karl Clark, inventor of the hot water extraction process that enabled commercial oilsands mining, was one of the first employees at ARC. Here, you will learn what technologies the organization is working on today.

In addition to all this, you will find feature articles on environmental issues facing the oilsands industry, the regulatory process companies must undergo prior to commencing heavy oil or oilsands operations, how Canadian technology is being exported around the world, and what the City of Edmonton is planning for next year's World Heavy Oil Conference.

Canada's heavy oil and oilsands industry has grown into a key element of global energy supply. With Western Gold in hand, you will be prepared to take part.

gnes Zalewski Publisher, Western Gold

Deborah Jaremko Editor, Western Gold

Welcome to

The low-down on western Canada's heavy oil and oilsands industry

BY DEBORAH JAREMKO

t is not what is conventionally considered an appealing target for fossil fuel production. It is viscous, difficult to work with, and requires substantial processing to maximize its value. However, thanks to political stability and massive development potential, western Canada's heavy oil and oilsands resource has become a key piece in the energy supply puzzle for the entire world.

The Canadian Association of Petroleum Producers (CAPP) says while Canada is currently the globe's ninth largest oil producer, growth in the oilsands industry alone will push the country to fifth on the list, behind Iran and ahead of China.

"That makes us a major world power," says Greg Stringham, CAPP's vice-president of markets and fiscal policy. "Ten years ago, it was a trickle, but there is no reason it can't continue to grow from here. Oilsands costs have come down significantly, and it is very competitive with conventional oil and gas now."

With all the attention being paid to the oilsands industry, one might overlook the importance of conventional heavy oil in Canada. Heavy oil production has a long history, and although it is technically remaining flat or declining, it is forecast to continue long into the future.

In 2006, CAPP reports conventional heavy oil production in Alberta and Saskatchewan was 452,000 barrels per day. The association forecasts that by 2014 production will still be over 280,000 barrels per day—remaining a substantial element of Canada's energy supply. This will likely be complimented by research and development around optimization and post-primary operations that will continue to support and expand this important resource.

Although in situ production technologies are playing an increasingly important role in oilsands development, the mining story is far from over. The three existing operations—Suncor, Syncrude, and the Athabasca Oil Sands Project—are significantly expanding production, and there are five new mines under development, including Canadian Natural Resources' Horizon installation, which is currently under construction. If all goes as planned, these mines together could ultimately produce up to three million barrels per day.

As operations expand, technologies are changing in order to optimize production and reduce environmental impacts. Operators are reducing sulphur emissions, working on ways to better manage tailings, and even planning to reduce the size of truck and shovel fleets, looking instead to mobile crushing systems.

World Jur



Oilsands and heavy oil development currently underway is said to be nothing compared to the ultimate potential if so-called "inaccessible" deposits could be unlocked.

There is an estimated 447 billion barrels in carbonate formations, 400 billion in reservoirs considered too thin for in situ projects, 36 billion in reservoirs with insufficient caprock for high-pressure thermal operations, 27 billion in reservoirs considered too deep for mining and too shallow for SAGD, and 14 billion with a low-pressure gas cap that makes SAGD inefficient. As well, there are small deposits in Saskatchewan.

Interest in carbonates is quickly growing. In March 2005, junior BlackRock Ventures (which has since been purchased by Shell) announced successful production from carbonates, an achievement the company said was the first of its kind in Canada without the use of steam.

In spring 2006, Royal Dutch Shell spent \$465 million to acquire a substantial land position in the "carbonate triangle," an area that at the time had never seen a drilling rig. Now, Husky Energy has leapt into the carbonate play, with its Caribou and Saleski projects. Junior Laricina Energy is also chasing carbonate potential.

In Saskatchewan, junior Oilsands Quest announced in spring 2007 that its exploration program has proved a high case of up to 1.5 billion barrels of original bitumen in place. As the company says, "this could be the start of something big."

Mineable oilsands reserves in Alberta are massive, but in a testament to the size of the opportunity, this represents just 20 per cent of the resource. About 80 per cent of bitumen in place is too deep for economic mining operations, and must be produced in situ. Right now, operators primarily use three in situ production techniques: cold heavy oil production with sand (CHOPS), cyclic steam stimulation (CSS), which Imperial Oil pioneered at Cold Lake and is now being used by Shell and CNRL, and steam assisted gravity drainage (SAGD), which was the result of extensive collaborative research between industry and the Alberta government.

In 2003, EnCana's Foster Creek operation became the first commercial SAGD project in the world. Just four years later, there are seven operational SAGD projects in Alberta, and at least eight more under development. This technology, along with CHOPS and CSS, is also being exported to other unconventional oil deposits around the world.

Today, research continues into ways to improve SAGD and CSS-reducing reliance on water and natural gas—as well as piloting of new variations on old technologies such as in situ combustion. Operators are also looking at post-CHOPS processes to unlock even more of the conventional heavy oil resource.



INTRODUCTION

Without upgrading and refining capacity, the value of Canada's heavy oil and oilsands resource is severely limited. Developers understand this, and continue to build new facilities and expand existing ones to meet the demands of increasing production. Traditionally, the upgraders were built at mine sites. Today, due to a number of factors such as labour strain, increasing project execution costs, and vicinity to further processing facilities and pipelines, upgraders are being built or planned for what is known as Alberta's Industrial Heartland, located near Edmonton.

As well, a new phenomenon to the industry is developing the merchant upgrader. These stand-alone facilities are designed to accept and process bitumen and heavy oil from a variety of sources, capitalizing on the increasing number of smaller-scale in situ projects without the economies of scale to warrant their own upgraders.

The first of three of these planned facilities—BA Energy's Heartland Upgrader—is currently under construction, set to process up to 77,500 barrels per day in 2008. The second, North West Upgrading's North West Upgrader, could process 77,000 barrels per day by 2010. The third, Peace River Oil's Bluesky Upgrader, is unique in that it will be the first facility of its kind in the Peace River oilsands deposit. Bluesky is planned to process 50,000 barrels per day by 2011.

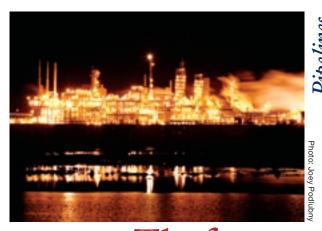




Without markets for Canada's heavy oil and oilsands, development could experience a downward shift. Conventional markets in the American Midwest are filling up guickly, and a number of pipeline projects are in the works to ensure Canada's oil reaches new areas (which you can see on a map on

pages 126-127).

CAPP says there are really two market options for new growth in oilsands production: the United States Midwest/Mid-continent and Gulf Coast, and via Canada's west coast for ocean access to California and Asia. The Gulf Coast and California currently represent the strongest potential markets, CAPP reports, as they present the least distance for transport.



The future

Canada's heavy oil and oilsands industry is entering what many call its "third wave" of development. The first wave happened when oilsands mines first came online in the 1960s and '70s. The second wave came with expansion of these mines in the late 1990s, and the commercialization of SAGD. The third wave will be expansion of SAGD, and developments of new technologies to move the industry forward. Marc Godin, consultant with Portfire Associates, sums it up:

"There will be oilsands here 100 years from now being exploited."



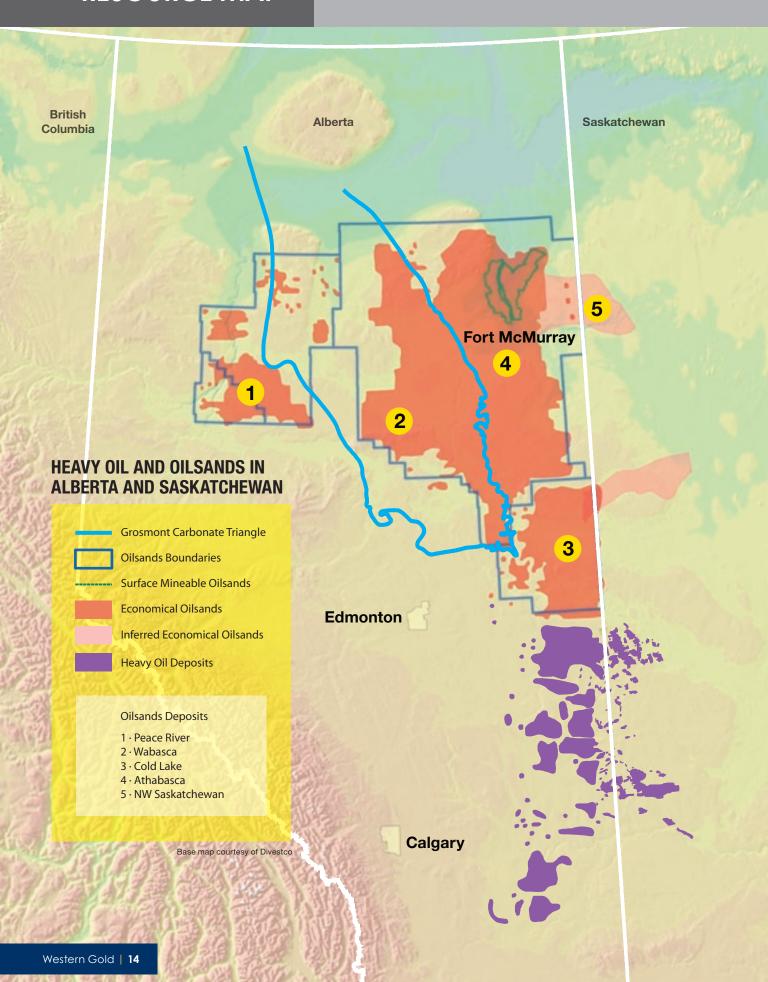
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RESOURCE MAP



MAPPING OUT THE RESOURCE

CONVENTIONAL HEAVY OIL

The Canadian Heavy Oil Belt straddles the provinces of Alberta and Saskatchewan. In this belt, there is an estimated 350 billion barrels of original oil in place, according to a recent report by the National Energy Board (NEB). The NEB estimates that about 74 billion barrels can be recovered with today's technology. With recovery improvements and continued research and development, this number could rise substantially.

OILSANDS

There are three major oilsands deposits in Alberta. At 40,000 square kilometres, the Athabasca deposit is the largest and, with an estimated 1.3 trillion barrels of bitumen in place, it is the most resource rich. Located north of Fort McMurray in the Regional Municipality of Wood Buffalo, the Athabasca deposit was first mentioned in Canadian history in 1719, when a Cree named Wapasun brought a sample of the "gum" to a Hudson's Bay Company outpost. First Nations in the area had traditionally used the bitumen, which seeps from outcrops along the Athabasca River, to waterproof their canoes.

The second largest oilsands deposit is found to the southeast of Fort Mc-Murray, in the area around the city of Cold Lake. There is an estimated 200 billion barrels of bitumen in the 22,000 square kilometres that make up the accumulation. The smallest deposit is found in the province's northwest, near the city of Peace River. It underlies an 8,000-square-kilometre area and is estimated to hold about 130 billion barrels of bitumen in place. According to the Oilsands Discovery Centre, an educational facility in Fort McMurray with more than 20 years of experience, the three oilsands deposits were formed because of intense geological pressure.

"The most prominent theory of how

this vast resource was formed suggests that light crude oil from southern Alberta migrated north and east with the same pressures that formed the Rocky Mountains," the centre explains. "Over time, the actions of water and bacteria transformed the light crude into bitumen, a much heavier, carbon rich, and extremely viscous oil."

CARBONATES

The Alberta Geological Survey (AGS)

estimates the Grosmont Carbonate Triangle alone holds about 318 billion barrels of bitumen. The AGS says the complex extends over a region of 500 kilometres long and 150 kilometres wide. It is exposed at the surface in outcrops along the Peace River. Its northern extent is not well known

So far, this resource is considered by some to be inaccessible bitumen, but companies and researchers are working hard to make production a reality.



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8505 E. North Belt Drive, Humble, TX 77396 Phone: (281) 540-2555 | Fax: (281) 540-2777 E-mail: ctus.tas@sulzer.com Website: www.sulzer.chemtech.com In the 1920s, traces of high-grade oil were discovered in a Lloydminsterarea farmer's water well. Companies such as Imperial Oil went after the resource, but it took almost 25 years for anyone to see commercial production of the viscous crude.



Source: Canadian Centre for Energy Information/Oilsands Review

Sparky #1, four miles from Lloydminster, is brought in. After producing for a few years, it is abandoned due to production problems.

1943-48 About 200 wells drilled around Lloydminster.

The area produces about 50,000 barrels of oil, refined by Excelsior Petroleum into primarily bunker "C" fuel. 1945

Lloydminster oil refinery.

1946 Husky Oil relocates a used 1,500-barrel-per-day refinery in the Lloydminster area.

Husky issues first posted price for heavy crude oil from the Lloydminster region. 1947

1950s

Railroads begin switching from bunker "C" to diesel fuel, devastating Lloydminster oil sales.

Photo: Lloydminster Heavy Oil Centre

Saskatchewan government begins drilling test holes on provincial road allowances, enabling oil companies to determine reservoir size at a very low cost.

1963 The "yo-yo" pipeline is built to connect Husky's Lloydminster refinery to the main Inter-provincial Pipeline.

Around 3,000 wells in the area produce about 3,000 barrels per month. 1972-75

The NewGrade Energy Upgrader—a joint venture by Consumers' Co-op and the Government of Saskatchewan—begins operations.

1984 Husky Oil, Alberta and Saskatchewan governments reach agreement on \$3.2billion Lloydminster Upgrader.

Lloydminster Upgrader begins processing heavy oil.

Progressing cavity pump.

Canadian Association of Petroleum Producers reports heavy oil production from Alberta and Saskatchewan from various companies—including Canadian Natural Resources and Devon Canada at 497,000 barrels per day.

2005



Europeans first reported the presence of oilsands deposits in western Canada in 1714. In the 1800s, Aboriginal Peoples were observed using the substance to dress wounds and waterproof canoes. Explorers and fur traders were aware of the resource, but it wasn't until the early 1900s that industry sought to develop its potential.

Source: Canadian Centre for Energy Information/Oilsands Review

Federal Department of Mines engineer Sidney Ells proposes first industrial use for bitumen, leading to first asphalt n, leading to first asprial 1915

1906 Alfred von Hammerstein drills the first of 24 wells north of Fort McMurray. None found oil, but they did discover salt, which became a major industry in the Fort McMurray area for 50 years.

Karl Clark of the Alberta Research Council demonstrates the first separation method using hot water and caustic soda.

Entrepreneur R.C. Fitzsimmons uses the process to produce bitumen at a plant north of Fort McMurray.

1927

1936 Abasand Oils Ltd. uses a hot water and solvent process to extract gas, fuel oil, and asphalt from the oilsands. The plant burns down, but is rebuilt during the Second World War.

Shell first explores the Athabasca oilsands.

Alberta government announces an oilsands policy to provide for orderly development to supplement conventional crude oil policy. Imperial Oil drills evaluation wells at Cold Lake.

Sun Oil commits to invest almost \$250 1963 million in the Great Canadian Oil Sands (GCOS) project.

1964 GCOS construction begins. Imperial Oil begins construction of its first in situ pilot at Cold Lake. Syncrude consortium is formed.

GCOS begins processing bitumen into synthetic crude oil.

1976 GCOS employees uncover bones of a woolly mammoth.

Syncrude comes on stream. 1978

1979 Shell Canada's Peace River in situ project begins operations.

Shipments of diluted bitumen begin from Cold Lake. 1985

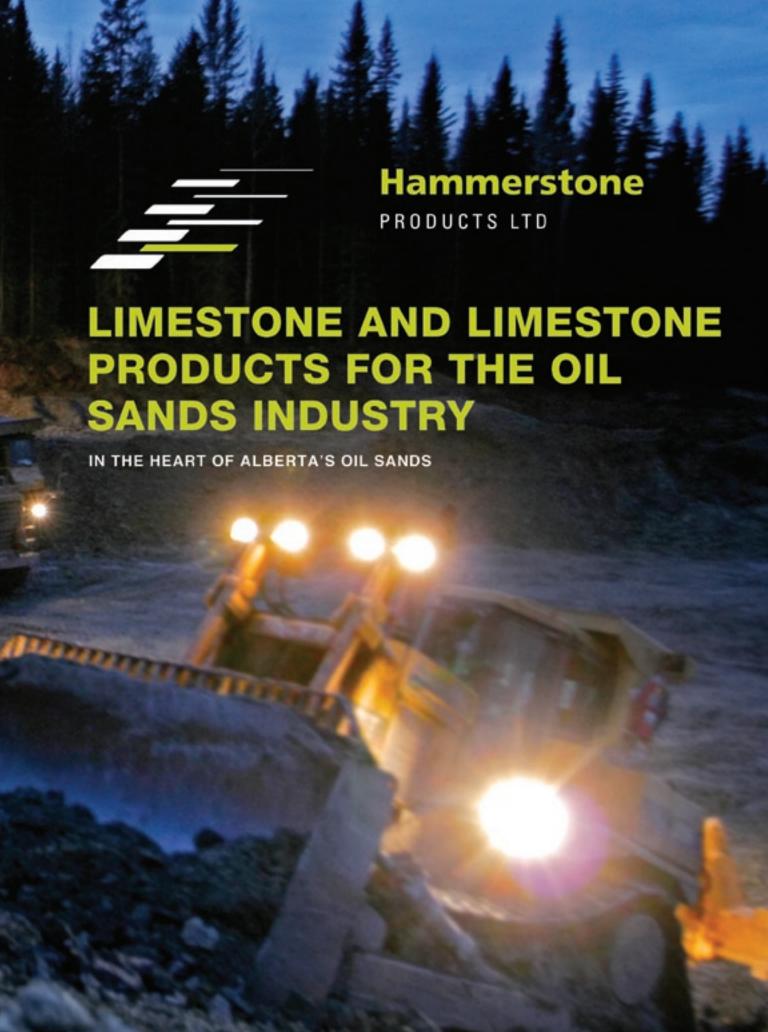
Shell Canada, Chevron Canada, and Western Oil Sands begin construction of the Athabasca Oil Sands Project (AOSP).

Combined oilsands production reaches a milestone one million barrels per day. 2004



Early oilsands technology.





FEATURE



he Alberta Energy and Utilities Board (EUB) is a recognized leader among energy regulators both nationally and internationally, and it rests its reputation on a well-established and proven regulatory process to deal with applications for energy projects. But just as there is no single type of energy development—oil versus gas, conventional versus unconventional—not every application travels the exact same path.

This is most notable in the larger-than-life world of the oilsands, where the regulatory process is often complex, involves more government agencies, and despite best efforts to keep it streamlined, ultimately takes longer to complete—from the pre-application phase through to the final approval—than most conventional oil and gas projects.

Where an application for a typical conventional gas well or a single oil battery may be as short as a few pages, applicants seeking to develop a large-scale in situ recovery project or undertake a major expansion of an already huge oilsands mining operation will likely submit an application that easily fits into a dozen or more thick binders. When a company decides it is ready to proceed with an oilsands project, one of the first steps in the pre-application phase is to draft a development proposal, known as a disclosure document.

The EUB expects the company to begin to consult stakeholders who could be affected by the proposed development early on to attempt to address any issues of concern. The company also has a responsibility to maintain a dialogue with stakeholders during the life of any project. It is also in the pre-application phase that the company would begin working on the environmental impact assessment (EIA).

The EIA often makes up the largest component of an oilsands application. There is a joint EIA process that can involve several Alberta and Canadian government departments that is coordinated by Alberta Environment (AENV).

The EUB has a memorandum of understanding (MOU) with AENV that features a coordinated regulatory approval process for major oilsands development applications that require approvals under both the Oil Sands Conservation Act (OSCA) and the Environmental Protection and Enhancement Act. Although separate approvals are issued by the EUB and AENV, application processing activities are integrated into a "one-window" approach to ensure efficiency of process, consistency of disposition, and enhanced protection of the public interest.

As part of the EIA process, the terms of reference—essentially what is to be included in the document—are set out and it is up to the company to make certain that these terms are addressed in the final application. AENV reviews the EIA to ensure it is complete, and if it is not, it will ask the applicant to provide supplemental information to fill in any holes. Once the EIA has been

THE REGULATORY ROAD

finalized, the EUB carries out a technical review of the application. If the EUB finds deficiencies in the application, additional information from the company will be requested.

When the application is considered complete, a public notice is advertised in relevant media outlets. If the applicant has been unable to resolve any outstanding issues with stakeholders, the stakeholders have the opportunity to file objections to the EUB or statements of concern to AENV.

A pre-hearing meeting may be called at this point. Pre-hearing meetings are usually held to identify stake-holders and to seek input on what should be addressed at the hearing and the hearing schedule.

At the start of a hearing, the panel chair makes opening remarks, which are followed by the presentation of any preliminary procedural matters. The applicant then states its case by having its witnesses speak about the proposed development. Next the applicant's witnesses can be cross-examined by interveners, EUB staff, and panel members.

Each of the interveners may then present their objections in turn, and each is cross-examined by other hearing participants (including the applicant), by EUB staff, and by the panel. Once that has been completed, the applicant has a final opportunity to submit additional evidence to address anything that arises from another participant's evidence. Final arguments may then be heard, followed by the closing of the hearing.

In oilsands hearings, other Alberta government departments often take the opportunity to present their own evidence. Under the terms of the MOU between AENV and the EUB, AENV involvement can range from making pre-hearing submissions to giving evidence, conducting cross-examinations, and providing arguments.

In addition, some applications for oilsands mining developments result in a joint-panel review. Such reviews—covered under the Canada-Alberta Agreement on Environmental Assessment Cooperation (2005)—are triggered when an application to the EUB also requires an environmental assessment by the Canadian Environmental Assessment Agency (CEAA). As well, joint panels can be triggered when there are Canadian government interests in play, such as development proposed on federal lands or for projects slated to receive federal funding.

Matters involving Fisheries and Oceans Canada may require a joint-panel review if a project proposes to impact fish habitat. Transport Canada may also be involved where the construction of a water intake or bridge across a navigable waterway is proposed.

The most recent joint-panel reviews saw the EUB and CEAA hold hearings last year for the Albian Sands oilsands expansion and Imperial Oil's Kearl project. By contrast, the Suncor Voyager application did not require a joint-panel review.

The EUB expects companies to begin to consult stakeholders who could be affected by proposed development early on in order to address any issues of concern.

Because both the Canadian government's regulatory process and the EUB's hearing process must be accommodated, a joint-panel review can take more time from start to completion than would a regular EUB hearing. The board's final verdict on the application comes in the form of a written decision report, usually issued within 90 days after the hearing's conclusion. This document is in turn distributed to all registered participants and is made available to the public.

Board decisions may be appealed to the Alberta Court of Appeal on questions of jurisdiction or law, meaning that the EUB did not have the right to make the decision or that it made a mistake applying the law; however, leave to appeal must first be granted by the Court of Appeal, meaning that the court must be satisfied that there is a genuine issue to be considered by the court.

While not all applications with objections are necessarily destined for a hearing—the EUB has established mechanisms to allow stakeholders to resolve issues—most applications for oilsands mining projects have gone before a board panel given their size and scope. In situ oilsands applications have gone to hearing less frequently than mining applications.

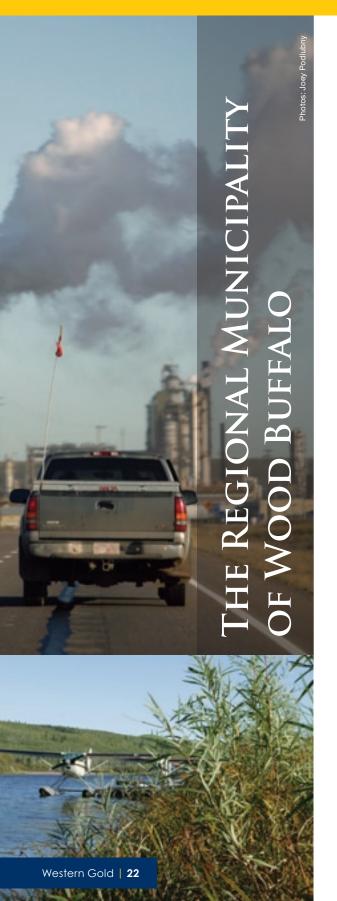
When most oilsands projects are approved by the board, as a final step they must be granted an order-in-council from the lieutenant-governor of Alberta, according to the OSCA.

Not all project applications travel the same path

by John Ludwick | Alberta Energy and Utilities Board

COMMUNITY

The oilsands and heavy oil industry strongly influences the lives of the people who live in its midst. From the bustling Regional Municipality of Wood Buffalo to Lloydminster, we profile six communities who are evolving as a result of the growing demands of increased oilsands and heavy oil production.



Community profiles by Tricia Radison

Nowhere are the reverberations of Alberta's oil boom felt more strongly than in the epicentre of the oilsands industry—the Regional Municipality of Wood Buffalo (RMWB). Approximately \$86 billion worth of projects have been announced since 1997, \$54 billion of which are anticipated to reach completion by 2011.

Virtually every major company in the industry operates in the area and at least 17 of them have expansion or construction plans. In a municipal response to the Suncor Voyageur Upgrader and North Steepbank Mine Extension, Mayor Melissa Blake said, "It's anticipated that oilsands production will exceed one billion barrels a year by 2015."

The Athabasca oilsands were discovered in the 1800s and were the early testing grounds for the eventual development of hot-water extraction. Commercial production was first undertaken by the Sun Oil Company, now Suncor Energy, in 1967. Construction of Sun Oil's \$250-million Great Canadian Oil Sands Project brought 2,000 labourers into the community of Fort McMurray, launching housing issues that have re-emerged today.

The extraction process used in the early days was primitive by today's standards. Sand was placed in a tank, mixed with hot water, and then transferred to another tank where the bitumen that rose to the surface was collected manually.

Technological advances have evolved oilsands production. Because 80 per cent of the bitumen in the oilsands is too deep for surface mining, many companies now employ the in situ method of steam assisted gravity drainage.

The RMWB is struggling to keep up with the demands of its rapidly growing population. In addition to the populations of Fort McMurray and other communities in the municipality, some 10,000 individuals employed by the industry—known as the "shadow population"—live in work camps.

Infrastructure requirements, high housing costs, land shortfalls and considerable municipal debt have been the results of rapid growth. While the region is supportive of the oilsands industry and wants to see further development, attempts have recently been made to slow growth. In addition, a Future Forward committee has been formed to guide future development in a way that is manageable.

There are also a number of groups in the region designed to address issues related to development and support sustainable growth, including:

- · Athabasca Regional Issues Working Group
- · Athabasca Tribal Council/Athabasca Resource Developers
- · Cumulative Environmental Management Association
- · Wood Buffalo Environmental Association

MOVING FORWARD

Right now in the RMWB, there are at least 25 oilsands production projects either planned or under construction. There are a number of initiatives underway to address infrastructure issues related to this growth. Most recently, in early 2007, the Government of Alberta announced more than \$396 million in funding for the area to address "critical growth pressures." Over the next three years, new water and wastewater treatment facilities will be completed, 300 affordable housing units will be created, and money will be set aside to attract and retain health care workers.

Mayor Melissa Blake says the announcement is of great benefit—more municipal projects are required and there will need to be continued monitoring of the needs of growing communities in the region.



THE TEMPERATURE IS RISING... and that's a good thing. Extracting heavy oil is problematic in Canada's Athabasca region. There is a solution, and it's right at your fingertips.

In fact, it might be the very thing your thermal operation needs.

THE INCONVENIENT OIL

The global unconventional oil market has an estimated 4,600 billion barrels of oil with probable reserves ranging from 500 to 1,000 billion barrels. The majority of these reserves are found in the Athabasca region in northern Alberta. Due to extreme viscosity, extracting heavy oils at reservoir temperature is difficult to impossible.

Thermal processes such as Steam Assisted Gravity Drainage (SAGD) and Cyclic Steam Stimulation (CSS) make it possible to produce highly viscous crudes by heating up the oil for extraction. However, the artificial lift used to pump the oil is critical to the overall functioning and efficiency of the well. The Pump Jack is a common method for extraction; however, it can be ineffective and costly due to a large footprint, low production range and high leakage rate. The other option is ESP, which provides at most a 50% efficiency rating and is not well suited for temperatures over 210°C.

"There is an industry need for a high temperature pump in bitumen production". Alex Damnjanovic, Bus. Dev. KUDU Industries



Total, Joslyn Creek



Imperial, Cold Lake

THE KUDU SOLUTION

KUDU has the perfect solution for your thermal application. The High Temperature Progressing Cavity Pump (PCP) offers great economics especially in viscous oil, horizontal wells and sand production. It has an overall efficiency of 75% and pump capacity between 300 m²/day to 1000 m²/day.

KUDU's complete high temperature package includes the pump, surface Drivehead and Oryx Seal. The Oryx Seal is a major component of the High Temperature PCP system due to its wide temperature range and zero leakage rate. It is a critical element for highly productive extractions.

HIGH TEMPERATURE PCP IN SAGD

Provides excellent well control Requires low pump intake pressure Operator friendly for easy well servicing Operates in temperatures up to 350°C Zero shearing or emulsions

HIGH TEMPERATURE PCP IN CSS

Reduces visual impact
Ideal for fluctuating viscosities
Ability to set the pump at a 90 degree angle
Lower power consumption
Zero rod fall issues

FIELD TESTING IN PROGRESS

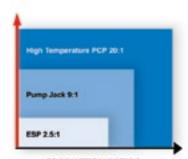
In 2006, KUDU Industries started field testing the High Temperature PCP and Total was the first to run the pump in SAGD in Joslyn Creek, Alberta. The temperature ranged between 100°C to 180°C. The pump started easily at initial high viscosity and zero shearing or emulsions occurred during the entire process. Pump efficiency was 65% and it maintained excellent well control and production range.

Imperial field tested KUDU's complete high temperature package in a CSS application in Cold Lake, Alberta. Pump efficiency ranged from 68% to 73% and the temperature was between 60°C to 330°C. The Imperial project confirmed the High Temperature PCP provides excellent well control and has zero rod falls. The pump is ideal for fluctuating viscosities, which other pumping technologies find challenging.

JUST WHAT YOU NEED

KUDU continues to field test the High Temperature PCP for SAGD and CSS. Results to date show it maintains pump slippage control and high production efficiency at a wide range of temperatures. It also requires low NPSH, consumes less power and reduces operating costs compared to other artificial lift methods.

The High Temperature PCP, contrasting to the Pump Jack and ESP, is able to pump fluid dependent on your operation's needs. It is unnecessary to change extraction methods for increases in well production. KUDU's High Temperature PCP is the one product for all production and temperature ranges.



PRODUCTION RATIOS

KUDU Industries is a leading manufacturer of PCP's. Since its inception in 1989, it has been at the forefront of artificial lift technology and quality. Find out why a pump by any other name just isn't the same.



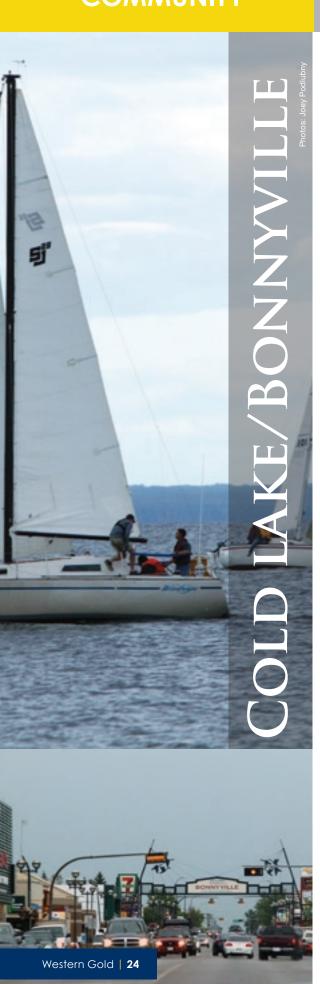
Contact a KUDU representative today. (403) 279-5838 or kudupump.com

Applicable Published Articles:

"Development Status of a Metal PCP for Heavy Oil and Hot Production Wells", SPE International PS2005-365.

"Development Status of a Metal Progressing Cavity Pump for Heavy-Oil and Hot-Production Wells", JPT May 2006, 59-61.

COMMUNITY



With over 200 billion barrels of bitumen below the surface, the Cold Lake/Bonnyville region is Alberta's second largest oil-producing area. Current expansion plans by several major companies indicate that the region is going to keep on pumping for years to come.

Although Imperial Oil has been engaged in small-scale production in the region since the early 1970s, large-scale commercial production didn't begin until 1985. The production method used—cyclic steam stimulation (CSS)—was developed by Imperial. "We developed CSS at Cold Lake for Cold Lake," says Pius Rolheiser, spokesman for Imperial Oil. The company continues to produce bitumen in the same manner today.

EnCana, Canadian Natural Resources Limited, Devon Canada, and Shell Canada currently operate in the region along with Imperial Oil. Another major player, Husky Energy, recently came on board with its 30,000-barrel-per-day Tucker steam assisted gravity drainage (SAGD) project.

The effect of oil development on the region has so far been positive. Vic Stapleton, economic development officer with the Town of Bonnyville, reports that the town is home to a number of field offices for the more than 50 oil companies operating in the region. The influx of industry has also led to significant growth in the service sector.

"The expansion of the SAGD plants north of Bonnyville has encouraged new hotel developments, residential lots, and new retail developments," Stapleton explains.

To accommodate the needs of its growing population, Bonnyville has just completed a \$26-million multi-use recreational centre. The region's oil companies provided \$2 million of funding for the Bonnyville and District Centennial Centre.

The City of Cold Lake is taking a proactive approach to development in order to avoid land-use issues and negative effects on quality of life. In its Action Plan 2006, the City presented its plan to evolve into a regional service centre for northeast Alberta and northwest Saskatchewan.

MOVING FORWARD

Production at Imperial Oil's Cold Lake project reached an all-time high in 2006, with an average of 152,000 barrels per day. Approval has been granted for three more phases, predicted to provide an additional 30,000 barrels per day.

Spokesman Pius Rolheiser reports that that there are no firm plans in place to carry through with the expansion, as the company concentrates on optimizing current facilities through what it calls its capacity enhancement opportunity.

"We now believe that, through the capacity enhancement opportunity, we can realize that 30,000-barrel-per-day capacity gain with the existing facilities," says Rolheiser.

Imperial is proceeding with an extension of its Mahikan North project, which will serve to offset declining production at other wells.

EnCana Energy's Foster Creek thermal project—the first commercial-scale application of SAGD in 2003—is currently under expansion to increase production from 37,000 to 60,000 barrels per day. Through phased development, EnCana plans to increase total production to 210,000 barrels per day within the next decade.

Shell Canada is constructing the 30,000-barrel-per-day Orion SAGD project, which it acquired after its purchase of BlackRock Ventures. Commercial production will begin at the completion of phase one in 2007.

CNRL operates several cold production projects throughout the region, producing 75,000 barrels per day. An additional 75,000 barrels per day is produced at the Primrose/Wolf Lake in situ thermal project, incorporating both CSS and SAGD. These projects are under expansion to bring capacity from 80,000 barrels per day to 120,000 barrels per day in 2009. Further development will increase total production to 300,000 barrels per day.

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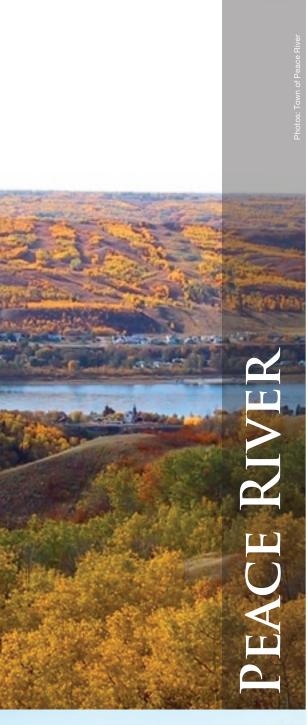
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COMMUNITY





Home to the province's second largest oilsands deposit, the Peace River region is Alberta's newest hot spot for the exploration and development of heavy oil. This area has traditionally been bypassed by the oil industry in favour of the larger Athabasca and Cold Lake deposits, but has recently begun to receive more attention, as is evidenced by several projects either under construction or planned.

The 1947 discovery of oil at Leduc led to exploration throughout the Peace River region.

"Shell discovered the Peace River deposit in the early 1950s and has produced bitumen from a thermal production facility since 1979," says Adrienne Lamb, public affairs representative with Shell Canada. The company's Peace River Complex uses horizontal cyclic steam stimulation technology and is currently licensed to produce 12,000 barrels per day. There are tentative plans in place to expand the facility.

"In December 2006, Shell submitted a regulatory application for a 100,000-barrel-per-day expansion called the Carmon Creek Project," says Lamb. The decision of whether or not to proceed with the first phase of expansion, involving up to 50,000 barrels of bitumen per day, will be made after the completion of the regulatory review process, which is expected to take one to two years.

Shell also uses primary production methods to produce bitumen in the Peace River region—thanks in part to its recent purchase of BlackRock Ventures—and is in the process of building the Cliffdale oil battery. With approximately 2.5 billion barrels in its reserves, Shell continues to explore and develop new technologies in the Peace River region. The potential of the area's oilsands has also attracted other companies, including Penn West Energy Trust, Talisman, Baytex Energy Trust, and Murphy Oil.

Penn West's Seal oilsands project taps a bitumen deposit with a depth of approximately 2,000 feet using conventional artificial lift technology. The company plans to use secondary and tertiary recovery methods, such as thermal production, in the future.

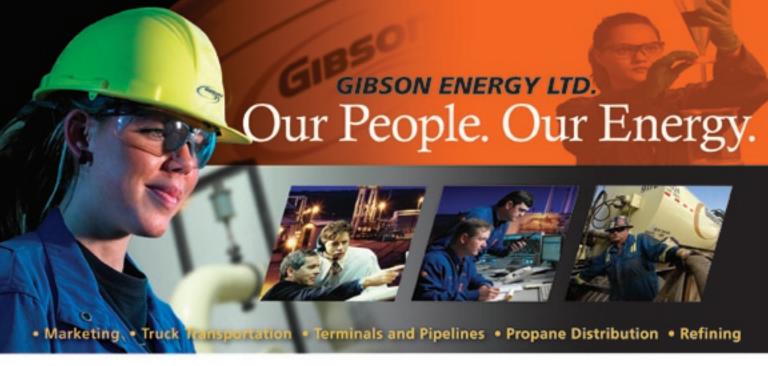
The Peace River region is primarily rural, making it ideal for industrial applications. The largest urban centre is Grande Prairie, with a population of 44,000. There are also numerous small towns and three first nations communities—Woodland Cree First Nation, Duncan's First Nation, and Horse Lake First Nation.

The town of Peace River is northwestern Alberta's second largest urban centre after Grande Prairie. The area is growing at a rapid rate and growth is expected to continue. It is a young community with a thriving service sector. In anticipation of upcoming oilsands projects, there has been an increase in residential and commercial construction, as well as in the number of industrial-related businesses.

MOVING FORWARD

Peace River Oil is in the process of constructing the first upgrader in the region. The \$2.5-billion Bluesky Upgrader is a four-phase project with a targeted total production capacity of 100,000 to 200,000 barrels per day. Commercial production for phase one, scheduled for 2011, has been increased from 25,000 barrels per day to 50,000.

Penn West Energy Trust also has expansion plans for its Peace River Oil Sands (Seal) project. Current production is 2,500 barrels per day with a targeted level of 4,000 to 5,000 barrels per day in early 2007. Additional expansion phases will increase production to 20,000 barrels per day by 2011. The company currently utilizes cold production methods but is exploring thermal production techniques.



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COMMUNITY



The history of oil in the Lloydminster region is a story of peaks and valleys; a cycle of disappointment and elation that has resolved itself in a steadily growing heavy oil industry serving as the backbone of the border town's economy.

It all began in 1926, when farmer Charlie Marren's cattle refused to drink from a newly dug well. Marren's disappointment turned to excitement when it was discovered that oil was the source of the problem. Years of hopeful exploration and mining resulted in a further low: the oil produced in the region seemed to be nearly worthless: a thick, black, heavy substance difficult to access.

It wasn't until 1946 that Husky Oil realized the potential of the Lloydminster region. A year later, the company began commercial production at its first refinery. In 1983, another refinery with a capacity of 25,000 barrels per day went into production.

In 1992, Husky added a \$1.6-billion upgrading facility to its Lloydminster operation. The Husky Lloydminster Upgrader produces 77,000 barrels per day, 23,000 more barrels per day than design capacity. This has been achieved through various debottlenecking programs and technological advancements.

Heavy oil derived from the Lloydminster and Cold Lake regions serves as feedstock for the facility. Because Lloydminster lies on the Alberta-Saskatchewan border, Husky uses an equal amount of heavy oil from each province so that the economic benefits of the upgrader can be shared.

According to Husky Energy, "The upgrader contributes over \$100 million per year to the Lloydminster, Alberta, Saskatchewan, and Canadian economies in goods and services, utility purchases, employee salaries and property taxes." It also employs over 1,100 people both directly and indirectly. In total, Husky operates 16 oil facilities in the Lloydminster region. Both primary and thermal production methods are used.

With a population of approximately 24,000, the city is growing at a rate of 13 per cent, a rapid growth rate that Lloydminster Economic Development attributes to the oil and gas sector. There are 73,216 people in the surrounding area on the Alberta side, and 33,513 on the Saskatchewan side, including the Onion Lake First Nation. Total population for the entire Lloydminster region is more than 130,000.

Lloydminster Economic Development reports that oil-related businesses employ more than 4,000 people in the region.

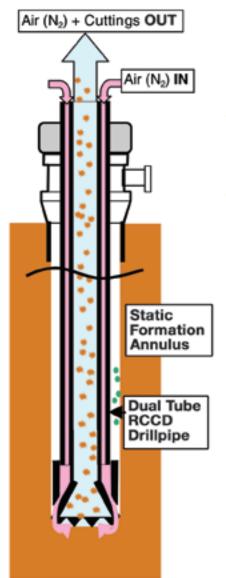
The Lloydminster region has long been the focus of heavy oil production and a number of technologies have been tested and developed in the area. Better progressing cavity pumps capable of handling large amounts of sand and thick oil, and horizontal drilling are two examples of successful technologies developed in the region.

Research and development is ongoing for a number of other projects, including downhole electric drive progressing cavity pumps, high temperature pressure sensors, foam and pump-to-surface methods of production, and new oil-water-sand separation technologies.

MOVING FORWARD

Heavy oil production is expected to grow in the Lloydminster region. Husky Energy is planning to expand its Lloydminster Upgrader by 70,000 barrels per day. Commercial production is expected to begin in 2010.

Nabors Canada Introduces New Technology for Shallow Gas Wells



Nabors Canada introduces Reverse Circulating Center Discharge RCCD drilling technology to reduce costs, reduce water usage, and improve well performance of shallow gas wells.

Reverse Circulating Center Discharge drilling technology reduces or eliminates wellbore formation damage caused by the conventional drilling process.

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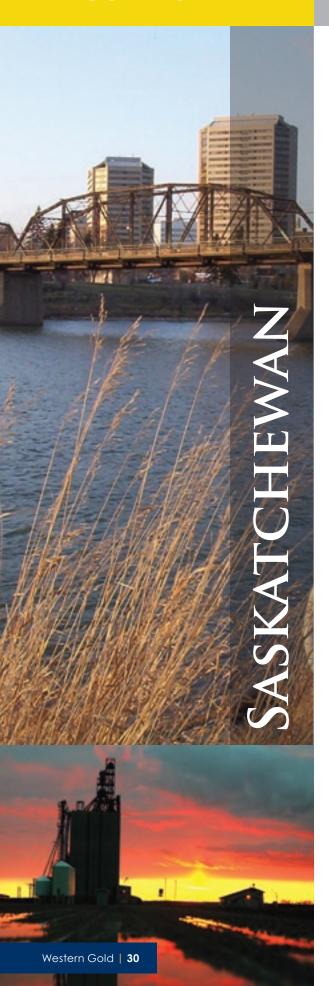
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COMMUNITY



R ecent exploration in Saskatchewan appears to indicate that Canada's second largest oil-producing province is only tapping the surface when it comes to unconventional oil.

Calgary-based Oilsands Quest Inc. is conducting extensive exploration in the northwestern part of the province in order to determine the extent of its bitumen resources east of the Alberta-Saskatchewan border, and so far, the results of been positive.

In January 2007, Christopher Hopkins, president and chief executive officer of Oilsands Quest, reported that the company has seen an 87 per cent success ratio in its 2006/07 winter drilling program, with 27 of 31 holes drilled coring through "bitumen-bearing McMurray formation." The company expects to issue details regarding estimated bitumen volumes and the commercial potential of the region in October 2007.

Trevor Dark, assistant deputy minister, petroleum and natural gas division, Saskatchewan Industry and Resources, says that the common perception of the province as an agricultural economy is erroneous. According to Dark, oil and gas accounts for a larger proportion of Saskatchewan's gross domestic product than agriculture, and has for several years. The heavy oil industry is particularly important to the province.

"Right now, heavy oil accounts for over 50 per cent of our total oil production," says Dark. Since 1965, heavy oil production has increased from 3.1 million barrels to 79 million barrels, and that number is expected to continue to rise.

Oil was first produced commercially in the province in 1944 by the National Petroleum Syndicate and has become a \$2-billion industry. Today, there are over 100 oil companies operating in the area, including Husky Oil Operations Ltd., Canadian Natural Resources Ltd., Nexen Inc., and Penn West Petroleum Ltd.

Vertical drilling is still the most common method of production but resources reachable by this method are dwindling. Horizontal drilling began in 1987 and now accounts for one-third of the province's total production.

Saskatchewan Industry and Resources reports that only "15 per cent of the 37 billion barrels of oil initially in place are recoverable based on current and expected conditions." As a result, new technologies are being used in exploration and drilling, including enhanced oil recovery using steam, carbon dioxide, and gas.

 ${
m CO}_2$ injection has been used successfully at Weyburn, where oil recovery rates have increased from a low of 63,000 barrels per day in 1982 to approximately 155,000 barrels per day. Other methods being used to access previously unattainable oil include waterflooding, steam injection, and solvent injection.

There are currently two heavy oil upgraders in the province. Consumers' Co-operative Refineries Ltd. and the Government of Saskatchewan operate the NewGrade upgrader in Regina, a 55,000-barrel-per-day facility, which provides feedstock for the Co-op's 80,000-barrel-per-day refinery. The border town of Lloydminster is home to the Husky Oil upgrader, which uses 55,000 barrels per day of heavy oil sourced equally from Saskatchewan and Alberta.

MOVING FORWARD

Oilsand Quest will continue its winter drilling program of approximately 250 holes. The company is also constructing a 96-person camp. Husky Oil is planning to expand its Lloydminster upgrader by 70,000 barrels per day. Commercial production is expected to begin in 2010.



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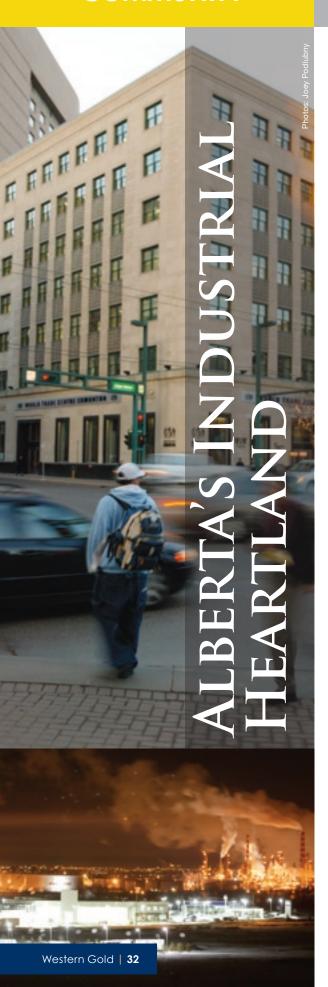
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COMMUNITY



A lberta's Industrial Heartland is aptly named—the 48,000-acre central section of the province, sometimes referred to as "a \$25-billion neighbourhood," is home to approximately 40 industrial plant sites, with more on the way.

The heartland consists of four municipal partners: Strathcona County, Sturgeon County, the City of Fort Saskatchewan, and Lamont County. Most residents live in the city of Fort Saskatchewan (approximately 15,000 people in 2006) or in smaller centres with populations ranging from 1,000 to 7,000. Members of the Alexander First Nation and residents living on acreages and hobby farms comprise the remainder of the population.

The heartland's industrial roots began in 1947, when Imperial Oil struck oil at Leduc, south of Edmonton. Today, companies such as Shell Canada Ltd., Petro-Canada, Dow Canada, Agrium Inc., Air Liquide Canada, and Atco Midstream have heartland installations, and many more plan to build in the region.

The influx of companies in the heartland has resulted in a thinning of the rural population.

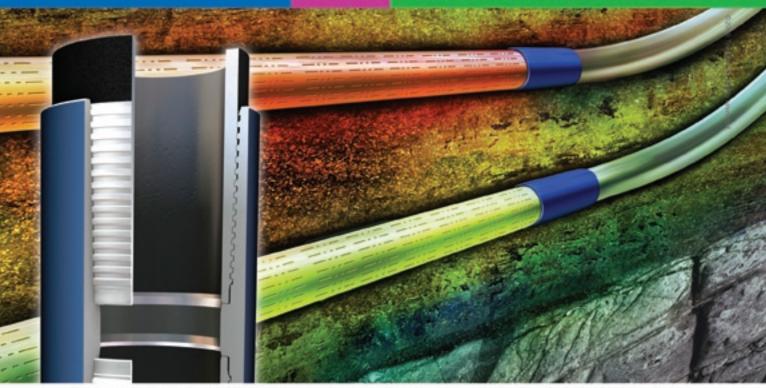
"Within the actual [industrial] area, we're looking at fewer residents simply because they have been relocated," explains Jana Tolmie-Thompson, representative of the Alberta's Industrial Heartland Association (AIHA). In order to avoid conflict with residents, many companies purchase land in large quantities and assist residents with relocation.

Residents can now use the voluntary property purchase program, an initiative of the Industrial Heartland Collaboration to Address Resident Interests.

LOOKING FORWARD

It may be more than 400 kilometres away from the Athabasca oilsands, but the growth of the industry is having a significant impact on Alberta's Industrial Heartland—as a central area, it is considered more attractive for employees and to have easier access to materials. There is only one upgrader in the area today—owned by Shell Canada—but in the coming years it is likely many more will be built and operated.

- Petro-Canada is currently undertaking a \$1.2-billion conversion of its
 Edmonton-area refinery to process 100 per cent oilsands feedstock.
 While the amount of oil produced by 2008 will be on par with
 the 135,000 barrels per day processed today, 85,000 barrels per day will
 come from oilsands-derived bitumen and synthetic crude oil, rather than
 the conventional oil currently processed.
- BA Energy Inc. is currently building its \$1.8-billion Heartland Upgrader, which will process 226,000 barrels of bitumen per day by 2011. This will be the first stand-alone bitumen upgrader in western Canada.
 Construction is taking place in three phases, creating approximately 1,600 jobs.
- Petro-Canada, in conjunction with Teck Cominco Ltd. and UTS Energy Corp., has announced a new upgrader to be built in Strathcona County. Slated to begin production in 2010, the upgrader will have the capacity to produce 100,000 to 170,000 barrels per day of light synthetic crude oil using bitumen mined from the joint venture's Fort Hills oilsands project north of Fort McMurray.
- Shell Canada, along with Athabasca Oil Sands Project joint venture owners Chevron Canada Ltd. and Western Oil Sands Inc., is expanding the Shell Scotford Upgrader in three phases. The \$6-billion project will eventually process 500,000 barrels per day. Construction labour is expected to reach approximately 5,000 people at its peak.
- North West Upgrading Inc. plans to build a \$2-billion upgrader in Sturgeon County in three phases. In 2010, the upgrader will have an initial processing capacity of 50,000 barrels per day, with a full capacity of 250,000 barrels per day.
- Synenco Energy Inc. and China's Sinopec plan to construct a \$3.6-billion upgrader in Sturgeon County. The facility is expected to produce 50,000 barrels per day of synthetic crude using bitumen from the Northern Lights oilsands project by 2010. Capacity will increase by 50,000 by 2012.
- Suncor Energy Inc. has announced it is pursuing options for the purchase of land in Sturgeon County. The company says it has secured options on several parcels, and is beginning consultation with the community on land-use planning in anticipation of potential future development.



Thermographic image showing high temperature zone surrounding the upper steam chamber of a typical SAGD installation.

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GRABBING ECONOMIC OPPORTUNITY

...in the Oil Sands

It's no secret that the oil sands industry in Northern Alberta is booming. In the last five years, development has moved south of Fort McMurray along Hwy 881, known as "Oil Sands Alley." Lac La Biche and Lakeland County are along for the ride.

SAGD companies along the alley have tapped into the resources with more plans for future development. This growth is grabbing the interest of entrepreneurs who don't want to miss out on opportunities.

"I have always been a cautiously optimistic man but I am even more [optimistic] now," said Lac La Biche entrepreneur Albert Stratichuk, who is currently developing a Ramada Hotel in town.

Stratichuk has been developing businesses in Northeastern Alberta for over 50 years and feels that now is the time to really get excited.

"In 10 years you won't recognize Lac La Biche. It will have changed very much. Five years ago there was none of this," said Stratichuk.

Stratichuk feels the recent paving of Hwy 881 will only encourage growth. To support this growth, new residential and commercial lot developments are underway.

"When looking at the SAGD development along Hwy 881, huge potential exists for oil sands servicing companies," said Jane Palmer, economic development manager for the Town of Lac La Biche and Lakeland County. "Local businesses ranging from machine shops, equipment rental and oilfield construction to industrial insulation services and



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in Lakeland County

At the crossroads of two major oilsands deposits



some upgrades soon to accommodate all the business."

Brian Harrison, leader of thermal heavy oil for Devon Canada Corporation states, "Devon has a strong commitment to the communities in which we live and work. As the town of Lac La Biche and Lakeland County are one of

the southern gateways into the Athabasca Oil Sands, we have had great success in securing goods and services from the area for our Jackfish Project."

said general manager Brent Grendys. "We will probably have to make

There is no doubt that people go where the jobs are, something that is evident with all the new residential housing starts.

SAGD projects employ around 100 people, depending on what phase the development is in.

Those people come from all over Canada to work in the area and some make Lac La Biche and Lakeland County home.

People interested in relocating need to know that their future home will meet their expectations.

"We are a community blessed with natural amenities, rich culture and history," said Lakeland County's Reeve Peter Kirylchuk. "Indeed, we are a thriving, full-service community and have something to offer, whether you are looking for a great place to live, play or do business."

transport companies are all capitalizing on this new economic opportunity. New businesses are sprouting up and more are expected."

Palmer goes on to say, "North American Oil Sands Corporation, a new SAGD company, has just recently located its regional office in Lac La Biche."

Athabasca Northern Railway has been in Lac La Biche since 2000, and for them the town is the only location that made sense.

"Our company was about one third the size of what it is now,"

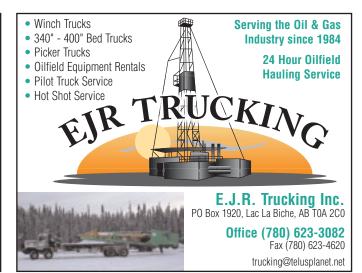


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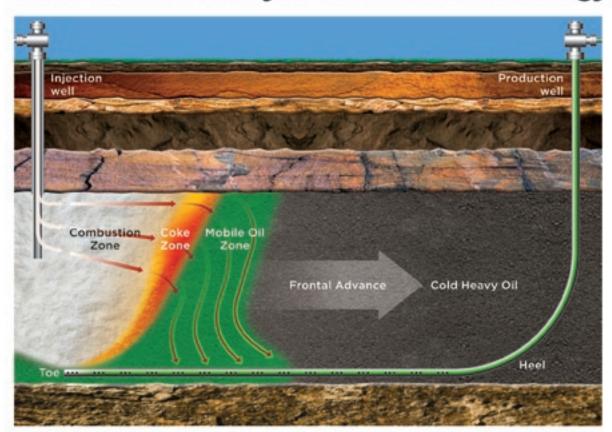
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- produces partially upgraded oil
- lower greenhouse gas emissions
- operates in a wide range of reservoirs
- smaller surface footprint



Heavy oil is often referred to as "the oil that technology made." Today, there are a number of technologies that are unlocking or are poised to unlock a vast oil resource. In the future, they will have to change and adapt, and inevitably will turn the key to even more recoverable volumes.

Primary Heavy Oil Recovery

Techniques for primary heavy oil recovery are similar to those for conventional oil production. Unfortunately, primary recovery of heavy oil is extremely low due to the viscous nature of the oil and its restricted ability to flow through the reservoir under conventional pressure depletion drive. In most cases, reservoir pressures are too low to allow oil to free flow to surface, and downhole mechanical pumping systems are required. Production rates from typical heavy oil wells are very low, ranging from around 12 to 60 barrels per day. Recovery factors through primary production are also extremely low, in the range of 5 to 15 per cent.

Oil recovery is further complicated with the presence of underlying water within the reservoir. In this situation, wells preferentially produce the more mobile water, resulting in significant volumes of high water-cut fluid production. Operating costs can be considerable, given the requirement to separate and handle produced water, and treat the heavy oil for transport to market. More accurate drilling technologies, supported by more complex completions systems—such as multilateral completions-provide an innovative means of increasing pay zone, thereby increasing inflow and recovery.

Secondary and Tertiary Recovery

With the exception of extremely high viscosity pools in the Athabasca, Cold Lake, and Peace River areas, the majority of heavy oil fields developed in western Canada have initially been produced using primary methods. Eventually, secondary and tertiary recovery processes must be considered to further enhance oil recovery. These methods can be classified as either cold enhanced oil recovery (EOR) or thermal processes.

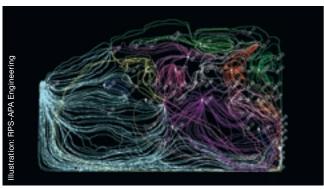
There are a number of considerations in selecting the most appropriate recovery method for heavy oil including fluid viscosity, reservoir complexity, production environment, economics, and refining requirements. In many cases, detailed upfront engineering is required in order to design the appropriate recovery method. Specific understanding of the producing formation and oil characteristics is required, resulting in detailed geological modelling and numerical simulation work. This helps determine and assess reservoir monitoring, control systems, and technologies required to help manage recovery.

Cold EOR

If properly selected and designed, EOR can be a more costeffective recovery option than primary methods, despite the additional capital investment required. Cold EOR is attractive due to the high associated operating and capital expenses for steam generation facilities associated with thermal operations.

Thermal Processes

Thermal processes such as cyclic steam stimulation (CSS) and steam assisted gravity drainage (SAGD) are commonly used in the development of high viscosity reservoirs such as those in the Athabasca, Cold Lake, and Peace River oilsands deposits. Although thermal production techniques promise some of the highest recovery factors, they are also associated with the highest capital expenditures, operating costs, and risk.



Reservoir calculations to determine it generally begin with a detailed 3-D geocellular model.

by Bill MacFarlane incoming president of the Canadian Heavy Oil Association

The oilsands industry began as a mining operation in the late 1960s. While synthetic crude oil production from mining is growing and will continue to be an important backbone of the industry in the future, approximately 80 per cent of oilsands resources in Alberta and Saskatchewan are too deep for the application of this technology. Research and development has evolved the mining process over the years and work continues in an effort to optimize it as it continues.

New Technologies

Environmental and economic pressures demand new technologies to fully exploit the vast heavy oil and bitumen resources in western Canada. Blocking agents to enhance production from cold recovery are being developed. Variations to the existing SAGD method, such as enhanced solvents (ES-SAGD) and hot gas assisted gravity drainage (HGAGD) are being developed.

Enhancements to in situ combustion processes such as combustion override split-production horizontal well (COSH), and "topdown" combustion show promise for commercial application.

Non-steam thermal processes, such as wet electrical heating (WEH) and radio frequency (RF) heating, are seriously being considered as more environmental and cost-effective alternatives to SAGD and CSS. Also, improved downhole pumps, instrumentation, and mechanical wellbore completions are being developed to more efficiently recover production from existing heavy oil fields.



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The oilsands industry began as a mining operation in the late 1960s. While synthetic crude oil production from mining is growing and will continue to be an important backbone of the industry in the future, approximately 80 per cent of oilsands resources in Alberta and Saskatchewan are too deep for the application of this technology. Research and development has evolved the mining process over the years, and the work continues in an effort to optimize production into the future.

According to the Canadian Centre for Energy Information and the Oil Sands Discovery Centre, the following is generally how the process works.

Muskeg and overburden are first removed to expose the oilsands, and are stockpiled for use in reclamation. Originally, oilsand was mined using draglines to excavate the face of the formation, while bucket-wheels and long conveyor belts moved the raw bitumen to on-site production facilities.

Today, large trucks and shovels have replaced draglines and bucket-wheels as a more selective and cost-effective method. The equipment must be durable and strong enough to withstand extreme climate and abrasive oilsand. Mining never stops; the trucks and other equipment work day and night, every day of the year.

Hydrotransport pipelines are used to condition and transport the oilsand from the mine to the extraction plant. The slurry is fed into a separation vessel, where it separates into three layers: sand, water, and bitumen. The bitumen is then skimmed off the top to be cleaned and processed further. Secondary recoveries are made with the middlings zone of the separation vessels to return the smaller quantities of bitumen that would otherwise flow to the settling ponds.

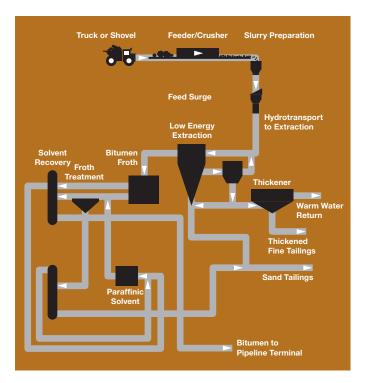
In order to break up the complex chain of molecules in bitumen, upgraders remove some carbon while adding additional hydrogen. This makes more valuable hydrocarbon products.

The end product is synthetic crude oil (SCO). The SCO is then shipped by pipeline to refineries across North America to become jet fuels, gasoline, and other petroleum products.

Companies currently mining oilsands: Suncor Energy, Syncrude Canada, Shell Canada.

Up and coming: CNRL, Petro-Canada, Synenco Energy, Imperial Oil, Total E&P Canada.

Research and development continues to evolve oilsands mining.





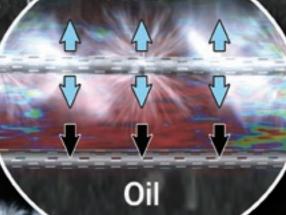
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CHOPS is a non-thermal heavy oil production technology which involves the continuous production of sand to enhance recovery from the reservoir. Wormholes are formed in the unconsolidated sand, creating high-permeability pathways that provide for significantly increased oil production. As with primary producing fields, an artificial lift system is used. Surface production facilities must be expanded for additional fluid handling capacity, as well as to handle the abrasive sand volumes. As with all EOR methods, well placement is critical to a successful CHOPS project, requiring detailed geological characterization.

CHOPS is certainly not new to the Canadian industry, but the technique has gained interest since the early 1990s, thanks to improved pumping equipment that can handle sand production.

The key to current CHOPS operations is the progressing cavity pump (PCP). With the capability to manage material comprised of more than 50 per cent sand, it is no wonder the PCP has made its mark on the Canadian market. The roots of the PCP go all the way back to the 1920s, when a French aerospace engineer named Rene Moineau envisioned a screw compressor designed to increase engine power. As the story goes, in the 1970s and '80s, the oil and gas industry took the concept and, by increasing its length, was able to deploy it deep into a wellbore, stimulating production.

Basically, the PCP can provide a solution anywhere oil and gas producers are dealing with abrasive and/or viscous fluids. Different PCP suppliers have different takes on the technology, but the central concept is the same. Basically, it looks like a carefully and consistently twisted steel pipe inside a cylinder, attached to a motor. Material enters through the bottom, and when the cylinder is filled, the bottom closes. The material then travels up the twisted steel as it turns and moves to the surface.

At present, approximately 220,000 barrels per day of oil production comes via CHOPS from some 6,000 wells in western Canada. With proper design and operation, CHOPS can enhance reserve recovery an additional 15 to 25 per cent over primary recovery methods. Research continues to study factors that affect oil recovery through CHOPS, and to determine ways of optimizing this process.

Some producers currently utilizing CHOPS: CNRL, Devon Canada, Husky Energy.

OPS COLD HEAVY OIL PRODUCTION WITH SAND

CHOPS has gained interest since the 1990s, thanks to improved pumping equipment.





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Waterflooding is the most widely used fluid

injection process for oil recovery in the world today. Although more commonly used in lighter reservoirs, there are a number of heavy oil projects employing this recovery method.

A water displacement front, or waterflood, is developed through a pattern of wells in an effort to drive heavy oil from one vertical injection well towards a vertical producing well, while maintaining reservoir pressures. The effectiveness of the flood front is strongly influenced by the viscosity of the oil, and the geological heterogeneity of the reservoir.

Poor waterflood displacement efficiency within the reservoir will result in significant areas of unswept or trapped oil. The displacement efficiency in heavy oil reservoirs does not perform as well as in lighter reservoirs due to poor hydraulic displacement resulting in gravity under-ride.

The efficiency of the waterflood is influenced by the selection of injection configurations, which can vary between staggered "line drive" and "pattern drive" methods.

The primary objective of any well-managed waterflood is to maintain complete voidage replacement in the reservoir. As a result, a reliable and economic water source is required to make up volume losses realized through oil production. Pattern efficiencies are often evaluated through both pressure and tracer surveys.

In mature waterfloods, oil is trapped as water saturation increases and capillary forces cause the water to collect at pore throats, blocking oil movement. Production rates decline as more oil becomes trapped. Surfactants, polymers, and foams can be used to reduce oil trapping, improving sweep efficiency and increasing recovery factors.

Existing production facilities can be easily modified for the use of surfactants, polymers, and foams. The additional capital and operating costs are significantly higher, but with currently robust oil prices, many waterflood projects have been revitalized to generate substantial profits.

SURFACTANTS

Some producers currently utilizing waterfloods: EnCana, CNRL, Sound Energy Trust, Harvest Energy Trust.

The primary goal of a waterflood is complete voidage replacement.





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Horizontal drilling technology has revolutionized the oil and gas industry, and has led to exciting technology development in heavy oil production. VAPEX is an example of leading-edge technology being used in the heavy oil sector. It is a non-thermal recovery method that uses gaseous solvents to increase oil recovery through reduction of oil viscosity, in situ upgrading, and pressure control.

The basic design of VAPEX uses horizontal well pairs spaced approximately five metres apart. A gas/solvent mixture is injected into the reservoir through the upper well to stimulate the heavy oil. Its viscosity reduced, the lighter oil then drains via gravity to the lower production well. This method is similar to solvent flooding.

VAPEX works best when the dew-point pressure of the injected solvent is just below the reservoir operating pressure. This is achieved by co-injection of a non-condensable gas, such as methane, along with the solvent. However, the higher solvent concentration in the oil results in more methane in the accumulated gas, which means a reduced concentration of vapourized solvent in the vapour chamber, reducing the effectiveness of the process. New techniques, such as the addition of gases like carbon dioxide and sulphur dioxide, are being developed to control solvent concentration in the gas phase.

VAPEX operations are extremely expensive due to the cost of the solvent and the associated risk of not recovering the solvent from production. If thermal recovery such as air combustion follows VAPEX, then significant amounts of the solvent might be recovered. With that, researchers are investigating the use of heavier solvents, as they may promote in situ deasphalting. The asphaltene residue would then be the fuel source for in situ combustion.

Although not considered to be fully commercial, a considerable amount of joint industry work has been completed around VAPEX. Work continues to expand the use of the technology into heavier oil reservoirs such as the oilsands. Successful application of VAPEX along with thermal processes could significantly reduce greenhouse gas emissions.

Companies currently testing VAPEX technology: Petro-Canada, Nexen, EnCana, the DOVAP joint venture.

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In Canada, CSS—also known as the "huff and puff" method—was developed by Imperial Oil at Cold Lake. In the same area, it is now also used by Canadian Natural Resources Limited, and a variation of the technology is used by Shell Canada at Peace River.

"Our success at Cold Lake has been driven by technology and we continue to push that," says Imperial Oil spokesman Pius Rolheiser. "We continue to evolve and try to learn more about CSS. The whole trick is to make it more efficient so that we can recover more of the original bitumen in place. We originally estimated 20 per cent recovery, and now we can get twice that." As its name implies, CSS involves injecting steam underground. CSS heats and thins bitumen so it can be produced via conventional pumpjacks at the surface. There are more than 3,500 directionally drilled wells at Imperial's Cold Lake installation, targeting the Clearwater formation about 400 metres below the surface and producing about 150,000 barrels of bitumen per day. The wells are drilled from pads consisting of 20 to 35 each, designed to minimize surface disturbance and to provide access to the largest prospective area of the deposit.

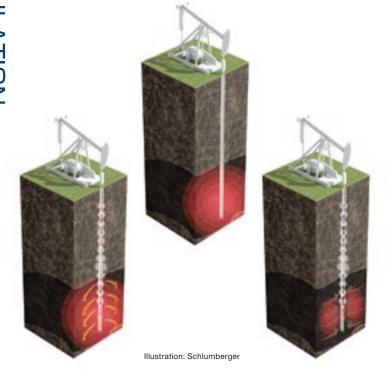
A single well is used to inject steam into the reservoir, both to heat the oil and to reduce its viscosity. It is vital that the steam is injected at high pressures reaching up to 11,000 kilopascals. The pressure dilates the formation, inflating the reservoir. As it cools, the reservoir deflates, providing a drive mechanism. Following injection, the well remains suspended for a required period of time to allow heat to soak into the formation. After the soak phase, the operation of the injector well is reversed to produce the oil. The hot oil is then pumped out of the well using conventional pumpjacks for periods ranging from weeks to months. These three phases together comprise one cycle. Steam is re-injected to begin a new cycle when oil production rates fall below a critical threshold due to the cooling of the reservoir.

The primary advantage of CSS is that it is a robust and proven technology that has application to thinnerbedded reservoirs. A disadvantage of CSS is that reservoir recovery factors are lower than other thermal recovery processes and, like all thermal methods, the cost of steam generation is high.

Companies currently using CSS: Imperial Oil, CNRL, Shell Canada.

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Steam is injected at pressures as high as 11,000 kilopascals.







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FMCTechnologies

The gravity drainage idea was originally conceived by Dr. Roger Butler, an engineer for Imperial Oil. Tests, first by Imperial, and later by the now-defunct Alberta Oil Sands Technology and Research Authority (AOSTRA) at its underground test facility (UTF) in the Athabasca oilsands, proved the feasibility of the concept. After retiring from Imperial Oil, Dr. Butler was appointed to the University of Calgary's Endowed Chair in Petroleum Engineering, which allowed him to pursue the concept full-time and fine-tune the process.

Two parallel horizontal oil wells are drilled in the formation. The upper well injects steam and the lower well collects the water that results from the condensation of the injected steam and the crude oil or bitumen. The injected steam heats the heavy oil or bitumen and lowers its viscosity, allowing it to flow down into the lower wellbore. The water and crude oil or bitumen is recovered to the surface by several methods such as steam lift, gas lift, or by downhole pump.

At the UTF, the original SAGD wells were drilled horizontally from a tunnel in the limestone underburden, accessed by vertical mineshafts. The development of directional drilling technology provided the opportunity to evolve the SAGD concept by accurately drilling horizontal well pairs from the surface.

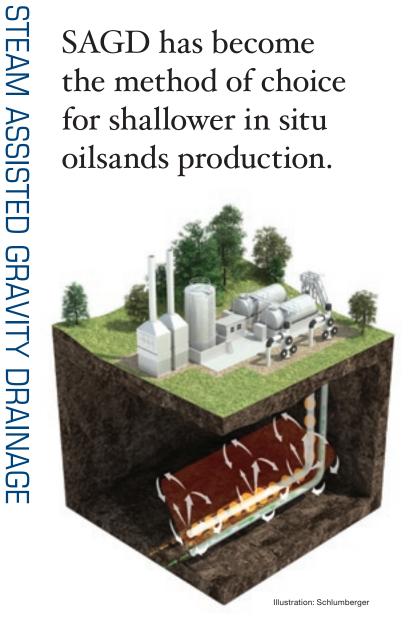
The SAGD process is not without disadvantages. As with cyclic steam stimulation, the process requires large amounts of water and wastewater handling facilities, as well as significant amounts of natural gas or electricity for steam generation. This energy use produces large amounts of greenhouse gases, including carbon dioxide. The reliance on the gravity drainage process also requires comparatively thick and homogeneous reservoirs.

Research and development continues, through agencies such as the Alberta Research Council (ARC) and Saskatchewan's Petroleum Technology Research Centre (PTRC) to optimize the process. Learnings from the use of vapour extraction in conventional heavy oil production are being considered for higher viscosity reservoirs as an alternative to steam.

Some producers currently utilizing SAGD: EnCana, Suncor Energy, Petro-Canada, Total E&P Canada, Husky Energy.

Up and coming users: Connacher Oil and Gas, ConocoPhillips, Devon Canada, MEG Energy, North American Oil Sands, Shell Canada.

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thinking outside the box

For product details and specifications, visit our website at www.advantageproductsinc.com In situ combustion, or ISC, uses oxygen to generate heat to lower oil viscosity, displacing the oil towards production wells with combustion byproducts. This technology has been used in various heavy and light oil pools in North America. Formation heat is achieved through a controlled burn or fire set in the reservoir. The ability to maintain a flame front can be very difficult and dangerous. As with most enhanced oil recovery projects, geological heterogeneity is critical to understand the direction the oil will move, therefore well placement is very important.

Toe-to-heel air injection (THAI) is a revolutionary combustion technology for the in situ recovery of bitumen and heavy oil that combines a vertical air injection well with a horizontal production well. As with conventional air combustion, the process ignites oil in the reservoir and creates a vertical combustion front moving from the "toe" of the horizontal well toward the "heel." The lighter oil fraction, which has been displaced to the producing well, is recovered to the surface using artificial lift. Petrobank Energy and Resources owns all the technology property rights associated with THAI. The company currently has a pilot operation underway in the Athabasca oilsands.

This process has potential advantages over steam assisted gravity drainage (SAGD), including higher resource recovery (70 to 80 per cent of original oil in place) and lower production and capital costs, thanks to minimal use of natural gas and fresh water. It could also provide a partially upgraded crude oil product, reduced diluent requirements for transportation, and significantly lower greenhouse gas emissions. THAI also has the potential to operate in reservoirs that are lower in pressure, contain more shale, are lower in quality, and are thinner and deeper than what SAGD can develop.

Petrobank Energy and Resources is testing toe-to-heel air injection (THAI)—a form of in situ combustion—at its Whitesands pilot project south of Fort McMurray. The company reports that combustion has already commenced on two of three well pairs, and oil is being produced.

SI IN SITU COMBUSTION

Toe-to-heel air injection is a variation of ISC.

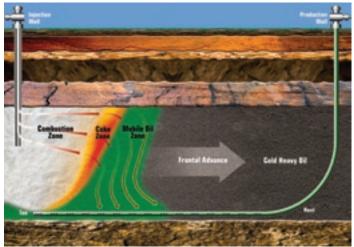


Illustration: Petrobank Energy and Resources

echnologies developed to solve the tough problems of heavy oil and oilsands production in western Canada are being used in fields around the world.

Geology in western Canada is uncooperative: no two fields or reservoirs are alike, plus production requirements change throughout the production cycle. Factor in that the climate is downright unfriendly: what flows in Venezuela barely budges in Lloydminster.

The result is an unmatched level of ingenuity. Just as they've earned international acclaim for technological solutions in conventional oil production, Canadians are becoming world leaders in unconventional oil technologies.

"The only argument is, 'Who's in second place'?" asserts Maurice Dusseault, an Alberta-born-and-educated University of Waterloo geological engineering professor and international consultant.

"It used to be that 25 or 30 years ago, people looked to California. But, starting in 1974, and for 25 years, AOSTRA programs put Alberta way into the lead and Canada—Alberta and Saskatchewan, really—never looked back."

AOSTRA was the Alberta Oil Sands Technology Research Authority, the province's vehicle for developing oilsands technologies in anticipation of a decline in conventional oil production. In August 2000, the Alberta

is pumped to the surface. As it empties, the upper well becomes a chamber for continued steam injection so the heat can reach an expanded area.

"Shallow horizontal wells were basically perfected in Alberta in the early 1990s," Dusseault says, an essential step in the commercialization of SAGD.

"AOSTRA made some very, very wise decisions. They took risks. They were literally laughed at for trying out SAGD, but just that concept alone has been worth all the money they put into research many, many times over."

RUSSIA

The Alberta Research Council (ARC) has been instrumental in introducing SAGD technology to Russia through a consultation contract painstakingly negotiated with Lukoil, the largest oil company there. The pilot project began with ARC emeritus scientist Alex Babchin, who was born and trained in chemical engineering in Russia. Babchin emigrated in the 1970s and came to ARC in the late 1980s.

"About the time he retired, he was interested in trying to make connections to the oil and gas industry in Russia," says Ron Sawatzky, senior research scientist and head of ARC's heavy oil technology transfer program. "He met a vice-president of Lukoil in the fall of 2001 and they were discussing SAGD. That led eventually to a contract for ARC to provide advice on operating strategies, and so on. We started shortly before spring in 2004."

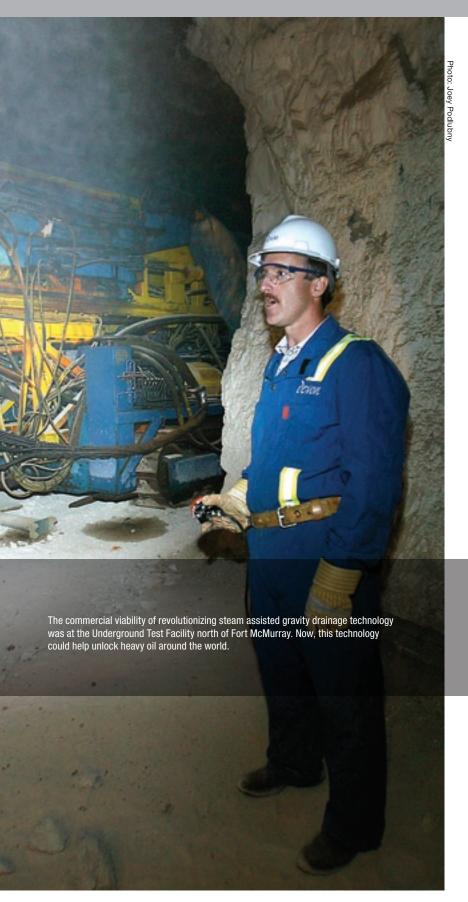
Canadian methods help develop global heavy oil resources

EXPORTING TECHNOLOGY

Energy Research Institute (AERI) took over AOSTRA's programs as part of its full energy spectrum mandate.

One of AOSTRA's greatest success stories is steam assisted gravity drainage, or SAGD, which was designed for bitumen deposits too deep for mining and too shallow for high-pressure steam techniques. Parallel horizontal wells are drilled, one below the other. Steam is initially injected into both wells to soften the surrounding bitumen. The bitumen drips into the lower well and

It's one of those two-way technology transfer projects ARC relishes. While it's exporting Alberta technology, researchers learn how to adapt it to different conditions. That's valuable because SAGD is in what Sawatzky calls "a learning stage. When they're working out the production profile, the steam-to-oil ratio, which is a kind of economic indicator—how much energy you're putting in versus what you're getting out—it has a high degree of uncertainty. It's probably going to take another 10 or 15 years before [SAGD] becomes a mature technology.



"We'll be looking for their reservoir quality, how easily fluids will move, how to take that information and the associated uncertainties and design a good operating strategy for their situation. The area is different from Athabasca [and Cold Lake]. How will this process work? It will be applied to other areas in Alberta that are different from Athabasca [and Cold Lake]. It may apply around Lloydminster.

"Often the differences between making money and losing money are very small. By understanding the details of the process better, [companies] start making money. The international connection offers opportunity for private service providers."

Drilled by Schlumberger in 2004, the Russian project has been under production since September 2005. Besides its lower viscosity, the field has lower pressure.

"The field had been touched before, so there are issues of leakage and all kinds of extra challenges. They've probably had some success, but not as much as they want," Sawatzky says.

ALBANIA

A few thousand kilometres to the south, on the Adriatic Sea, another Alberta-developed technology is getting a workout. Cold heavy

"Starting in 1974, and for 25 years, [research] programs put Alberta way into the lead and Canada—Alberta and Saskatchewan, really—never looked back."

> :: Maurice Dusseault University of Waterloo

oil production with sand (CHOPS) is being employed to revisit a similarly perforated field in Albania.

"With the lift in oil prices, a lot more technology can be applied," says Richard Wadsworth, chief executive officer of Bankers Petroleum. "We're fortunate we got in at the right time in Albania, which has two billion barrels of heavy oil with five to six per cent recovery to date under primary means. [Albania] came out of [decades] of

FEATURE

communism in the early '90s. Now it's privatizing industry, becoming more democratic, and cleaning up the corruption. We can take a field going back to the 1920s, redevelop it and get to production levels they've never seen before.

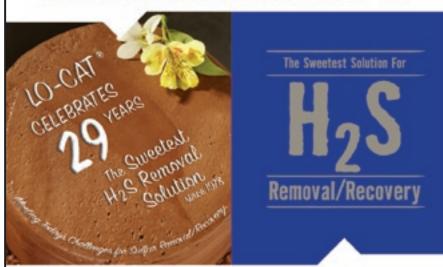
"One challenge in Albania is we have 2,500 wells in this field already, fully developed, but they weren't drilled and completed for thermal purposes," hence the decision to use CHOPS.

"It's a heavy oil, like trying to suck toothpaste through a straw," Wadsworth says. "The pump itself downhole is the key. A conventional pump cannot handle sand. The pumps we use are progressing cavity pumps, like an Archimedes screw pump. It's like a wine corkscrew, except [it's surrounded by] a rubber elastomer which changes in size to accommodate sand. Turning it creates cavities and vacuums."

The sand and oil are then pumped into huge settling tanks that are heated so the oil floats and the sand sinks and settles.

"Canada took the lead on [CHOPS]," Dusseault says. "There are a lot of little wee, wee things you should do to keep the cost down—how you design the heating system, collect the gas, the trucks designed to clear the sand out. Guys out on the field developed the technology themselves," he says with admiration.

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CHINA

Field innovation is what's lacking in China, where Canadian technologies are also applied, but operators lack the mentoring to adapt them for their specific conditions.

"They're using cyclic steam stimulation, steam drive, steam floods and they're experimenting with SAGD in several places," Dusseault says, but adds they have not been highly successful with it.

"Chinese companies are quite prepared to pay for what they consider to be hard technology—equipment, pumps, software, catalysts, chemicals, special equipment, gauges, downhole devices but have a great deal of difficulty in paying for intellectual expertise."

The barriers to communication are cultural as well as linguistic. "In a five-hour workshop, one person out of 50 might ask a question. I give them copies of my slides, copies of my papers, and recommendations for reading, but as long as you have a rigid vertical hierarchy where you're constrained to do what your boss wants and your boss is constrained to do what his boss wants, it's hard to be innovative at the field level, especially in highly complex technical developments."

Breaking down that rigidity will take more than one generation.

Prospects for the future may improve through the joint venture relationship Alberta Economic Development (AED) has developed with the China National Petroleum Corp. The two bodies organized the world's first Heavy Oil Conference in Beijing this winter. ■



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Second-ever event brings international heavy oil experts to Alberta by Bill Whitelaw

he eyes of the heavy oil world will turn to Edmonton next March—and with good reason. That's when heavy oil experts from around the globe will descend on the Alberta capital for the 2008 World Heavy Oil Congress.

While still in the early planning stages, the congress first started to take shape in November 2006 in Beijing, China, at the inaugural World Heavy Oil Conference. Based on the success of the Beijing conference, the Edmonton Congress will offer even more depth and scope, says Simon Mellor, dmg world media's international business development director.

While the Edmonton Congress will bear similarity to the Beijing conference, a number of new program additions will expand the breadth of information and dialogue around heavy oil opportunities and challenges.

To date, the program is shaping up like this:

March 9: Opening ceremonies co-produced by dmg world media and the City of Edmonton.

March 10: Business conference to be chaired by John Berry, Shell International's vice-president of advanced oil recovery. More than a dozen international speakers are expected to form the program's backbone, and issues such as the environment will dominate the agenda. In the evening, there will also be an industry banquet with a non-industry speaker who has experience managing issues in a similar business environment.

March 11: A new addition will be a second day of business programming in a workshop-seminar format intended to expand the focus on topics covered generally the day prior.

March 11: The technical conference opens, with five to seven sessions running concurrently. Two technical committees, under the oversight of Suncor's K.C. Yeung, will manage the program. One committee will focus on heavy oil activities in Asia; the second will be an international committee managed by the Canadian Heavy Oil Association. The technical papers will continue to span a broad continuum of topics, from exploration to upgrading, refining, and downstream operations.

March 12: The second day of the technical conference. Overall, somewhere between 120 to 140 speakers are expected to deliver content in the business and technical programs.

Another key addition to the overall program will be technical tours. These tours will take three forms, but are intended to connect congress delegates closely to Alberta's heavy oil industry, notes Mellor.

The first form will be a two-day tour to Fort Mc-Murray that will include visits to both mine sites and in situ operations. The second form will be a day-long tour to one or more of the major upgradingrefining operations in Edmonton's Industrial Heartland. The third form will be a series of two-hour tours that will start early in the morning-allowing delegates to still attend the conference-visiting a variety of research and manufacturing facilities in the Edmonton area.

As the various planning committees and the overall steering committee complete their work, more details about the congress-to be held at the Shaw Conference Centre—will be released.

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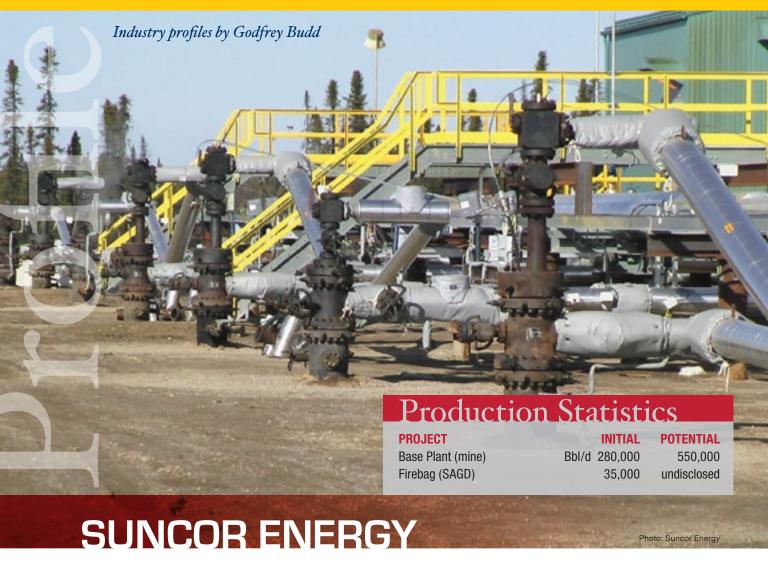
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INDUSTRY

From some of the world's largest integrated companies, to pure-play oilsands and heavy oil juniors, we profile the companies that are either currently producing, expanding, constructing, or conducting detailed planning on heavy oil and oilsands projects.



The world's first oilsands mine

Suncor Energy was originally formed in 1979 by the amalgamation of Sun Oil Company, incorporated in 1923, and Great Canadian Oil Sands Limited, incorporated in 1953. It was the first company to mine bitumen from the oilsands in the Athabasca deposit, beginning operations in 1967.

Since the late 1990s, Suncor has been in a period of constant growth. Construction began on the first major expansion—Project Millennium—in 1999. The project was commissioned in 2001, doubling capacity to 225,000 barrels of oil per day. In the same year, the company announced Voyageur, an expansion designed to increase production capacity to half a million barrels per day by 2010 to 2012.

In the early 2000s, Suncor-which also produces natural

gas—announced and commissioned the Firebag project, which was one of the first commercial-scale applications of steam assisted gravity drainage.

By 2006, Suncor's combined oil and natural gas production was 294,000 barrels of oil equivalent per day. Of this total, oil production in 2006 averaged 260,000 barrels per day, of which 253,800 barrels per day was synthetic crude oil and 6,200 barrels per day was bitumen sold directly to market.

The year 2006 marked an improvement over 2005 on another front. Oilsands cash operating costs averaged \$21.70 per barrel in 2006, down from \$24.55 in 2005. The decrease in 2006 was mainly due to fixed operating costs being spread over higher production volumes and lower natural gas prices, which impact operating costs.

Currently, Suncor is involved in construction projects and new plant development as part of its Voyageur strategy. The company is expanding upgrading capacity and reports that by the end of last year, construction on it Upgrader 2 project, which is expected to bring production capacity to 350,000 barrels per day in 2008, was about 70 per cent complete.

Another component of Suncor's 2012 production target was advanced in 2006 when it received regulatory approval for a planned third upgrader and extension of its Steepbank Mine. The company has also announced plans to obtain regulatory approval for its Voyageur South project. This would be located about three kilometres southwest of its existing mining operation, with a construction start in 2009 and production to begin in 2011.

The target production for Voyageur South is 120,000 barrels per day. Although several new technologies are proposed for the project, the cost of which was originally pegged at \$7 billion, the most significant is the plan to use mobile ore preparation equipment. The new technology is expected to reduce noise pollution and air emissions, in particular nitrogen oxides. It should also reduce labour force requirements.

The company is also expanding its thermal in situ operation.

Stage 2 began production in 2006 with a cumulative yearend average production of 33,700 barrels per day, and is continuing to ramp up. A \$400-million cogeneration project and expansion is on target for completion in 2007, designed to increase production from Firebag stages 1 and 2 beyond their original combined projected capacity of 70,000 barrels per day.

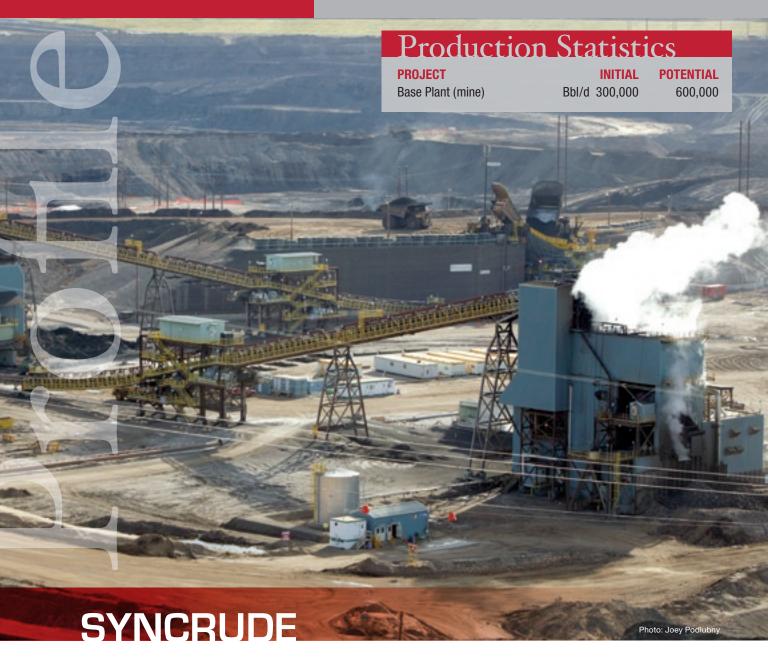
Several more expansions are planned for Firebag, with construction slated to start in 2007 of Stage 3. This should add a further 60,000 barrels per day of production. The company has targeted 2010 for a construction start on Stage 4, subject to regulatory and board of directors approval.

Suncor has always been an oilsands leader, and it is also a leader in the field of renewable energy. In 2000, the company unveiled plans to invest \$100 million by 2005 to support this goal. In 2001, Suncor partnered with Enbridge to open the SunBridge wind power project, Saskatchewan's first major supply of renewable energy. Today, Suncor has three wind power projects in operation, with a fourth under construction, slated for commissioning in late 2007. As well, the company operates an ethanol plant that it is considering expanding to double production output.

Suncor also has downstream refining assets as well as gas stations under the Sunoco brand. ■



INDUSTRY



Joint venture maintains steady long-term growth

Construction began on the Syncrude site in 1973 and, after five years, the first barrel was shipped on July 30, 1978. Production steadily increased over the ensuing years and, on April 16, 1998, the billionth barrel was sent down the pipeline. This was achieved five years ahead of schedule.

Syncrude—Canada's single largest source of oil production—is a joint venture undertaking among Canadian Oil Sands Limited, Imperial Oil, Petro-Canada, ConocoPhillips, Nexen Inc., Mocal Energy, and Murphy Oil. Syncrude Canada is the operator.

Syncrude has a long-term growth plan that envisions productive capacity reaching about 500,000 barrels per day of premium quality, light, sweet synthetic crude oil

in a series of stages by or shortly after 2016. Stages one, two, and three have been completed, and the joint venture currently produces about 350,000 barrels per day.

Initially, the company began its mining, extraction, and upgrading operations at its Mildred Lake plant, which is located about 40 kilometres north of Fort McMurray.

Oil prices were strong in the late 1970s and early 1980s, and expansion plans for Syncrude were in the works shortly after the start of production. However, oil prices through much of the 1980s languished, often at less than US\$18 per barrel, and Syncrude's expansion projects were shelved for a time. In recent years, thanks to a change in Alberta's royalty regime and now-robust energy prices, the expansion has begun.

The UE1 expansion began operations in the spring of 2006, bringing Syncrude's total production capacity to approximately 350,000 barrels per day.

A recent series of projects saw the addition of the Aurora mining, extraction, and cogeneration facilities, which began production in 2001. Aurora is located about 35 kilometres northeast of the Mildred Lake plant and is part of the triple-stage series of expansions that began in 1996 and culminated last year with the completion of stage three—also known as Upgrader Expansion One (UE1).

The first expansion stage increased production of synthetic crude oil from 73.5 million barrels in 1996 to 81.4 million barrels in 1999, at a total cost of \$470 million. It included an expansion of the North Mine at Mildred Lake, and the operational start in 1997 of a new truck-and-shovel train that replaced the old bucket-wheel and dragline system.

The period between 1996 and 1999 also saw the introduction of a new hydrotransport system that moves oilsands as slurry from mine face to extraction plant. The technology, developed by Syncrude, cuts energy requirements as it allows the extraction process to operate at about 50 degrees Celsius, rather than 80 degrees Celsius as it had in the past.

Debottlenecking, a process that typically results in additional production capacity of two to 10 per cent, was also done at the upgrader during this period.

Stage two, between 1998 and 2001, at a total cost of \$1 billion, boosted production to 90 million barrels per year and saw the start-up of the Aurora Mine and further debottlenecking at the Mildred Lake upgrader to accommodate the additional production.

Construction of stage three began in 2001 with the development of another truck and shovel train at Aurora, which began production in 2003, and the UE1 project, a major expansion of the Mildred Lake upgrader. The UE1 expansion began operations in the spring of 2006, bringing Syncrude's total production capacity to approximately 350,000 barrels per day.

It's believed that further improvements could boost capacity by 30,000 to 50,000 barrels per day before major work begins on a possible stage four expansion, which is still at the concept development stage.

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Production Statistics

PROJECT	INITIAL	POTENTIAL
Muskeg River/Jackpine (mine)	Bbl/d 150,000	550,000
Peace River (CSS)	12,000	100,000
Orion (SAGD – pilot)	500	30,000
Seal (primary)	23,000	undisclosed



Acquire guaranteed assets and bet on the technology

In early 2003, when the Athabasca Oil Sands Project (AOSP) began operations, it marked the first new fully integrated oilsands development in 25 years. It now supplies about 10 per cent of Canada's oil requirements.

The project has two main components—the Muskeg River Mine, located about 75 kilometres north of Fort McMurray, and the Scotford upgrader, next to a Shell refinery, northeast of Edmonton. A 493-kilometre pipeline transports diluted bitumen from the mine to the Scotford upgrader and a return pipeline carries the diluent back to the mine for reuse.

The AOSP is a joint venture between Shell Canada (60 per cent), Chevron Canada Ltd. (20 per cent), and Western Oil Sands Inc. (20 per cent). Shell is the overall project administrator as well as operator of the Scotford upgrader. Albian Sands Energy, a new company created by the joint venture, operates the Muskeg River Mine.

The mine resource is said to contain over five billion barrels of bitumen. Over the expected 30-year lifetime of the project, the Muskeg River Mine, which currently employs about 500 people, will aim to recover 1.65 billion barrels of bitumen. Currently the mine produces about 155,000 barrels of bitumen per day, which, after upgrading, is ready for refining.

Expansions for the AOSP are being considered in two phases. The first—which has now been approved by Alberta's regulators—would add a further 3.2 billion barrels of bitumen resources and boost production by about 100,000 barrels per day. Phase 2 would add 3.9 billion barrels to the resource base with an additional 100,000 barrels per day of bitumen produced. With approvals in place, the first phase would start by 2010 and the second phase between 2010 and 2015.

The Scotford upgrader uses hydrogen-addition technology to upgrade the high-viscosity Muskeg River bitumen into a wide range of low-sulphur and low-viscosity synthetic crude

oils. The upgrader complex at Scotford includes a hydrogenmanufacturing unit that produces most of the hydrogen needed for the hydrogen-addition process. Some pressure vessels at the plant are 55 metres long and 4.4 metres in diameter. The location of the upgrader next to the refinery enables the operation to avail of cost advantages stemming from shared infrastructure, including land, utilities, and process heat.

Another cost advantage, in this case at the mine site, comes from a 170-megawatt cogeneration facility. This involves the simultaneous production of electrical power and steam from a single fuel source using combustion gas turbines and heat recovery steam generators. The plant consists of two natural gas-fuelled combustion turbines and generators. The exhaust gas from each gas turbine is sent through a waste heat recovery boiler to produce steam that is used in the mine's bitumen extraction process. Unused electrical power is sold to the local grid system.

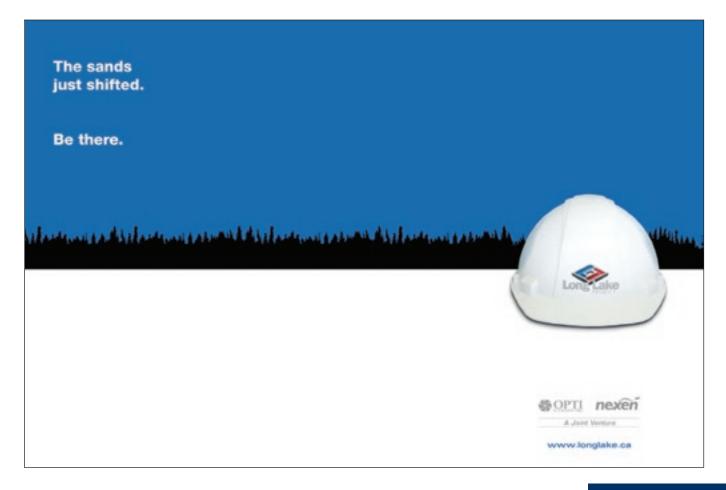
Although the AOSP is Shell's first bitumen mining operation, it is not the company's first heavy oil venture there. Since 1979, Shell has been operating its Peace River Complex, a thermal in situ facility that now employs a variation of cyclic steam stimulation. Production from the thermal project, located about 40 kilometres northeast of Peace River, is in the 12,000-barrels-per-day range. In December 2006, Shell submitted its regulatory application for the Carmon Creek project, which would expand production to 100,000 barrels per day.

Also in 2006, Shell finalized a purchase of BlackRock Ventures for \$2.5 billion. As a result of the deal, Shell acquired control of an estimated one billion barrels of heavy oil in place that comprised BlackRock's asset in the Seal play, located near Shell's Peace River thermal facility.

Despite the proximity of the two operations—Shell and BlackRock—in the region, there was an important difference between them. Both were producing heavy oil, but BlackRock's production had succeeded with no application of thermal technology. Furthermore, by the time the deal between the two companies closed, conventional cold heavy oil production from BlackRock's Seal asset was more than 10,000 barrels per day.

At the time of the purchase, BlackRock was also developing a 10,000-barrel-per-day first phase of a planned 40,000-barrel-per-day steam assisted gravity drainage operation at its Hilda Lake asset near Cold Lake in eastern Alberta, called Orion. A 500-barrel-per-day pilot project has been operating at Orion since 2000, and regulatory approval is in place to expand production to 20,000 barrels per day. Development will occur in two 10,000-barrel-per-day phases, the first of which is under construction.

Shell's purchase of BlackRock is seen by analysts as a strategy to reduce risk on the asset front through acquisition and bet on developing the right technology to exploit the asset.



INDUSTRY



New technologies—key to better recovery rates, more production

Imperial Oil has been part of Canada's energy industry for over 125 years, and currently produces about six per cent of the county's primary energy supply. Its thermal in situ oilsands operation near Cold Lake in eastern Alberta is the biggest—and first—of its kind in the world. With a 20-year pilot project beginning in 1965 and continuous commercial production since 1985, Cold Lake is a testament to the incremental introduction of improved recovery technologies—and successful drilling programs.

Initially, commercial production was under 30,000 barrels per day, but, as a result of a series of development phases, climbed to almost 100,000 barrels per day by the early 1990s. From 1992 to 2005, average production growth was four per cent per year. By 2006, the average daily production was 152,000 barrels per day. This exceeded

the previous record of an average 139,000 barrels per day achieved in 2005.

In a presentation to an investment conference in 2006, Eddie Lui, vice-president of oilsands development and research, said that a series of technological improvements had played an important role in the long-term success of Imperial's Cold Lake project. The technologies that made a difference included 3-D seismic, introduced in the early 1990s; passive seismic monitoring after 1995; infill recovery processes; and a hydrocarbon-based vapour injection system with steam. Imperial obtained a patent for the vapour technology in 2005.

But the key technology that Imperial uses at Cold Lake is cyclic steam stimulation (CSS), for which the company obtained a patent in 1965. This technology was developed at Cold Lake, for Cold Lake. In CSS, steam is

injected down a vertical well for weeks or even months at a time, typically until a very high downhole pressure and relatively high temperatures are achieved. Next, the steam is left to soak in the reservoir for a period, and the heated bitumen comes up to the surface through the same wellbore using conventional pumpjacks. The company continues to use CSS at Cold Lake because it views it as the technology best suited for the reservoir formation there.

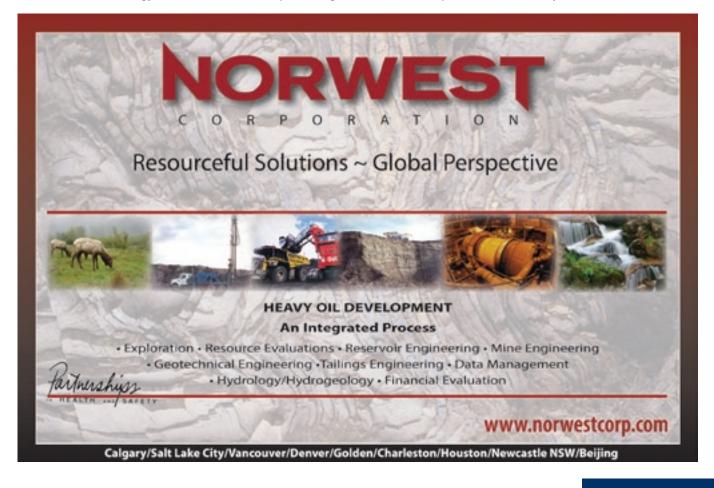
In his presentation, Lui noted that the advances in recovery technology made over the years had given a significant boost to the recovery factor at Imperial's Cold Lake asset.

"The increase from 13 to 30-plus per cent is a direct result of our continued focus in research and technology development and our growing expertise in thermal operations," he told his audience. Imperial has also made great strides in reducing fresh water use, dropping requirements from three barrels of water per barrel of bitumen to less than half a barrel of water for every bitumen barrel produced.

Another thermal technology for which Imperial obtained a patent for in 1982 is steam assisted gravity drainage. This technology is associated with the pioneering work of the late Dr. Roger Butler, who worked for Imperial for many years. It involves a continuous process in which pairs of horizontal wells are drilled into the pay zone. As the upper well injects the steam, the producer well below collects the softened bitumen.

Imperial's oilsands holdings are considerable. Within a 300-square-mile area at Cold Lake, it holds about 364,000 acres in leases. The company also holds about 101,000 acres of leases at Kearl, about 70 kilometres north of Fort McMurray. It has a 70 per cent stake in a partnership with ExxonMobil Canada (30 per cent) to develop the Kearl asset in a series of stages into a 300,000-barrel-per-day mining operation. Plans for the first stage call for 100,000 barrels per day. The partnership hopes to begin production sometime in 2010. Precise construction costs have yet to be nailed down, but are expected to be about \$7 billion.

The project moved a step closer to the construction phase when it received conditional approval from a federal-provincial regulatory panel on Feb. 27, 2007. Total recoverable resources on the Kearl leases are estimated at 4.4 billion barrels. Imperial has substantial experience in the oilsands mining industry, as it also holds a 25 per cent interest in Syncrude.



INDUSTRY



Growth through diversity of heavy oil projects

Canadian Natural Resources Limited (CNRL) is an example of a junior that became a giant—in less than 20 years. In 1989, CNRL was an oil and natural gas company operating only in Alberta. It had a small staff of about 10, produced about 1,400 barrels of oil equivalent per day and had a market capitalization of \$1 million. It now has about 2,500 employees, production of over 530,000 barrels of oil equivalent per day from assets in North America, offshore West Africa and the North Sea, and has an enterprise value of approximately \$22 billion.

It is one of Canada's biggest producers of crude oil and natural gas liquids, with productive capacity in the country of about 210,000 barrels per day. A substantial component of CNRL's recent and expected future growth stems from a diversified portfolio of heavy oil operations. These run the

gamut from cold heavy oil production with sand (CHOPS) in the Lloydminster area, to cyclic steam stimulation (CSS) and steam assisted gravity drainage (SAGD) at Primrose/Wolf Lake, to its Horizon mining project, at present under construction north of Fort McMurray.

According to figures from a December 2006 report from Alberta Employment Immigration and Industry, CNRL is currently producing 75,000 barrels per day from its numerous CHOPS projects in the Cold Lake region. The company is also producing on average 75,000 barrels per day from its Primrose/Wolf Lake CSS and SAGD project, including production recently brought on stream from the Primrose North project.

Also, in the Pelican Lake region, in north-central Alberta, considerably southwest of Fort McMurray, the company's

In early 2006, CNRL filed for regulatory approval for its proposed Primrose East CSS expansion project. This would boost production capacity of this operation from 80,000 to 120,000 barrels per day.

Pelican Lake primary operation is producing an average of about 20,000 barrels per day.

The company has embarked on an aggressive program expansion and development in the Cold Lake region. A large part of this is focused on thermal in situ projects. Preliminary work on an expansion of CNRL's Primrose/Wolf Lake has begun. In early 2006, the company filed for regulatory approval for its proposed Primrose East CSS expansion project. This would boost production capacity of this operation from 80,000 to 120,000 barrels per day. With approval expected in either the first or second quarter of 2007, a construction start is anticipated in the second half of the year, with first production sometime in 2009. The Primrose East project is the second phase of a planned series of developments that would bring production to 300,000 barrels per day in the region.

The company's proposed Kirby SAGD project, also in

the Cold Lake region, had been put on hold, but CNRL recently announced that it will submit an application and its Environmental Impact Assessment for the project in the fall of 2007. The 30,000-barrel-per-day project should see a construction start in 2009–10, and first production in 2011.

The decision to build the \$10.8-billion Horizon mine was announced in February 2005. The project, barely two years ago, was then considered huge—even by oilsands standards. Development of the Horizon site, about 70 kilometres north of Fort McMurray, is being done in a series of phases. Once in operation, the site will include the mining of bitumen with an on-site upgrader and related facilities. Phase one production will begin in the second half of 2008 with 110,000 barrels of synthetic crude oil (SCO) per day. In 2010, the second phase would see production reach 155,000 barrels, and, with phase three completed, production would hit 232,000 barrels per day in 2012. ■



INDUSTRY



Heavy oil focus for Canadian energy giant

EnCana Corporation is one of Canada's biggest companies in terms of market capitalization, and, in 2006, it placed 34th in Platts top 250 global energy company rankings. Although EnCana is exploring opportunities in the Middle East, Africa, and Brazil, the company says that at present, 100 per cent of its production and proven reserves are located in continental North America. Of the company's 12 key resource plays in Canada and the United States, nine are in natural gas and three in the oilsands.

The company's steam assisted gravity drainage (SAGD) operation at Foster Creek, about 100 kilometres north of Cold Lake, marked the first commercial-scale application of this technology. EnCana describes Foster Creek as "the quintessential resource play—a high-quality unconventional resource with large potential and scaleable, repeatable operations that enable the

company to incorporate technical advances." The company conducted a multi-year pilot before commercial start-up in 2001. Current production at Foster Creek is about 43,000 barrels per day.

A SAGD project at Christina Lake could eventually become EnCana's biggest thermal heavy oil operation. Located about 120 kilometres south of Fort McMurray, production at Christina Lake is slightly exceeding the company's expectations, with production at 2006 yearend at about 7,000 barrels per day, according to an Alberta government oilsands update.

Recently, EnCana retained independent qualified reserve evaluators McDaniel & Associates Consultants Ltd. to update its resource estimates. McDaniel's current best estimate of recoverable bitumen for Foster Creek and Christina Lake is more than 6.5 billion barrels.

EnCana's Pelican Lake cold heavy oil facility is the company's third producing heavy oil play. Its production averages about 25,000 barrels per day.

Plans are in the works to invest as much US\$5.4 billion over the next decade or so to grow bitumen production capacity at Foster Creek and Christina Lake to a total of about 400,000 barrels per day. By about 2015, Foster Creek would produce 190,000 barrels per day and Christina Lake would produce 210,000 barrels per day.

A Foster Creek expansion nearing completion is expected to take production to about 60,000 barrels per day in the first half of 2007. The next two Foster Creek expansions, of 30.000 barrels each, are scheduled to come on stream in 2008 and 2009. An expansion at Christina Lake should take production there to about 18,000 barrels per day before the end of 2008.

An issue that many heavy oil producers in western Canada have to face is whether to do their own upgrading or sell to an upgrading facility and take their chances on demand-and prices-being strong. EnCana has taken

another approach. It has opted for a long-term strategic partnership arrangement under which EnCana will bring production to about 500,000 barrels per day by 2015 while the downstream partner, ConocoPhillips, will invest US\$5.3 billion to add bitumen processing capacity at its Wood River, Illinois, and Borger, Texas, refineries in the United States.

EnCana's Pelican Lake cold heavy oil facility is the company's third producing heavy oil play. Its production averages about 25,000 barrels per day. The Pelican Lake operation began with primary production, which has a probable recovery rate of around six per cent. With about one billion barrels of water-floodable heavy oil in place, the company expects to boost the recovery rate to about 12 per cent on the asset.

Another SAGD project, Borealis, north of Fort McMurray, is under development and has a planned peak production of about 100,000 barrels per day.

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INDUSTRY



Vast oilsands assets and diversified portfolio

Petro-Canada is Canada's second largest integrated oil and gas company. It has upstream assets, midstream refining, and a downstream retail network that has been steadily increasing its stake in the oilsands industry.

The company was one of the first producers to launch a commercial-scale steam assisted gravity drainage (SAGD) project with its McKay River project, northwest of Fort McMurray in 2002. It has applied to regulators to expand its current production capacity of 33,000 barrels per day to 73,000 barrels per day.

At present there are 25 well pairs that were drilled from two central "pads." Each pair goes about 100 metres below the surface—a SAGD well can be considerably deeper, however—before extending horizontally for about 750 metres. Petro-Canada says that each well pair

at McKay River can produce up to about 1,200 barrels per day of bitumen for up to eight years.

The company has other leases in the Fort McMurray region—at Meadow Creek, south of Fort McMurray; at Lewis, to the northeast; and at Dover, which is immediately northwest of the McKay River operation. These are possible locations, the company says on its website, for future SAGD facilities. Petro-Canada acquired the Dover lease in 2005, which includes the Underground Test Facility (UTF), where the concept of SAGD was originally proven feasible.

The company is continuing the research tradition at Dover with its DoVap pilot project, which is testing VAPEX technology. VAPEX involves a process of injecting a hydrocarbon like butane or propane instead of steam to soften the bitumen. If it can work commercially,

With Petro-Canada as operator with a 55 per cent stake, along with UTS Energy (30 per cent interest) and Teck Cominco (15 per cent), the Fort Hills partnership has received regulatory approval for production of up to 190,000 barrels per day of bitumen.

VAPEX would offer four main benefits, one primarily financial and three primarily environmental. It would lower operating costs, eliminate the use of natural gas required to generate steam, and reduce both greenhouse gas emissions and water consumption.

The diversification of Petro-Canada's oilsands portfolio includes plans for a mining and upgrading project at Fort Hills, about 95 kilometres north of Fort McMurray. With Petro-Canada as operator with a 55 per cent stake, along with UTS Energy (30 per cent interest) and Teck Cominco (15 per cent), the Fort Hills partnership has received regulatory approval for production of up to 190,000 barrels per day of bitumen. First oil production is set for 2011. The plan is to mine more than four billion barrels of bitumen (2.2 billion net to Petro-Canada) at Fort Hills over a 30- to 40-year period.

It may be the first oilsands mining project for UTS and global digger Teck Cominco, but Petro-Canada already has interest in such an operation. Since 1976—two years before commercial operations started—the company, which was owned by the Canadian government at the time, has owned a share of Syncrude. Today that ownership is at 12 per cent.

The Fort Hills partnership has also filed an application to build an upgrader in Sturgeon County, near Edmonton. It would be built in three phases with a combined design capacity of 340,000 barrels per day. First production of synthetic crude oil is expected in 2011, with full capacity achieved in 2013.

Currently, Petro-Canada is also converting its Edmonton-area refinery so that by 2008, it will process 100 per cent oilsands feedstock. ■



INDUSTRY



Japanese company made 30-year commitment

Thermal heavy oil producers are unanimous that it is essential to match the recovery technology as precisely as possible with the specific, unique features of the reservoir. Getting the technology right entails better production efficiency overall and, in particular, holding the line on the steam-to-oil ratio. This ratio refers to the number of barrels of water converted to steam that are required to produce a barrel of bitumen. The less water needed translates to lower fuel costs, an important factor when natural gas, which has been subject to sharp price swings in North America and elsewhere, is the fuel most commonly used.

Even when a choice of technologies is available, the process of selecting the appropriate technological fit can take years.

The experience of Japan Canada Oil Sands (JACOS) in the oilsands industry, which goes back decades, illustrates this. Japanese interests, with a major owner, Japan Petroleum Exploration Company Ltd. (JAPEX), holding an 86 per cent stake, own the company. JACOS began work in the Athabasca region in the late 1970s when the company farmed in on leases held by Petro-Canada, Imperial Oil Ltd., and Nexen Inc., which at the time was called Canadian Occidental.

At its Hangingstone lease, about 50 kilometres southwest of Fort McMurray, JACOS and some partners began experimenting with a cyclic steam stimulation pilot project in 1984, which lasted until 1994.

Meanwhile, in 1992, JAPEX participated in steam assisted gravity drainage (SAGD) experiments at the

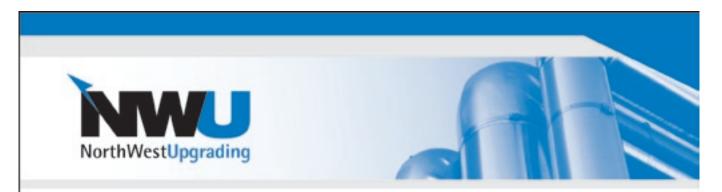
JACOS holds rights on over 98,000 acres in the region, and the company believes its leases "contain approximately 2 billion barrels of recoverable oilsands resource.

underground test facility (UTF) north of Fort McMurray, which was operated by the now-defunct Alberta Oil Sands Technology and Research Authority. SAGD was proven viable at the UTF, helping to prompt JACOS to launch a three-phase demonstration project, the first phase of which began production in 1999.

The current daily output of about 9,000 barrels at the Hangingstone SAGD facility stems from the production of 15 pairs of horizontal wells, each consisting of a horizontal injection well overlying a production well by about five metres. The horizontal wells range in length from 500 to 750 metres.

JACOS and Nexen, on a 75/25 per cent partnership basis, respectively, plan to further develop the Hangingstone asset, and 3-D seismic work on the lease is expected in 2007 and 2008. JACOS says that upon confirming commercial reserves, it will be in the position to file the necessary regulatory applications, with potential start-up as early as 2014.

JACOS holds rights on over 98,000 acres in the region, and the company believes its leases "contain approximately 2 billion barrels of recoverable oilsands resource." Besides Hangingstone, JACOS has leases in the Chard, Corner, and Thornbury areas. ■





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INDUSTRY



France-based energy giant becomes an oilsands player

Total E&P Canada is the Canadian arm of the world's fourth largest oil company, Total S.A. When the Parisbased energy giant established a foothold in Alberta's oilsands through its acquisition of an 84 per cent interest in the Joslyn Creek asset in 2005, it served to underline the growing allure of the oilsands for the international oil and gas community. Under the purchase, Total paid about \$1.5 billion to Deer Creek Energy, a relatively small Alberta independent that had acquired the Joslyn Creek lease from Talisman Energy in 1999 for \$30 million.

Oilsands analysts say that big energy companies like Total are attracted to Canada's oilsands because of the country's political stability and the presence of a guaranteed asset that will produce at a steady, reliable rate for two or three decades.

At the time of the 2005 purchase, limited production of about 260 barrels per day had already started earlier in the year, but hundreds of core wells had been drilled and extensive delineation of the oilsands asset had been done. The research showed that the lease, located about 60 kilometres north of Fort McMurray, could support both a thermal in situ and a mining operation.

Now, in short order, Total has become a major oilsands player with plans to spend from \$10 million to \$15 million over the next decade in developing its Joslyn Creek asset with partner Enerplus Resources.

In the fourth quarter of 2006, the second phase of the steam assisted gravity drainage (SAGD) project at Joslyn Creek achieved production of 6,000 barrels per day with a targeted peak production level of 10,000 barrels per day by 2008, according to an Alberta government oilsands update published in December 2006. Regulatory approval for an additional 15,000 barrels per day of production is expected in 2007.

Total is also expected to announce sometime before the end of the third quarter of 2007 a decision on an upgrader to process the company's growing oilsands output. The company said in February this year that it plans to build an upgrader in Alberta, but is still deciding on a suitable location, the size of the upgrader, and exactly what technology it would use.

Total plans to upgrade all of its planned oilsands production in Alberta, which is expected to be about 300,000 barrels per day by 2015. The upgrader is likely to be either near Fort McMurray or Edmonton.

Total is also developing plans for a mine at Joslyn Creek. The company has decided to combine the first two phases of its Joslyn mining venture, so it starts at 100,000 barrels a day in 2012 or perhaps 2013, rather than at 50,000 barrels per day in 2011.

Plans call for an additional 50,000 barrels per day of production in 2013.

In 2006, the company filed an application to regulatory agencies for what is now to be the first phase of mining production of 100,000 barrels per day. Total estimates cumulative production from the Joslyn lease at around two billion barrels of bitumen.

Total also has a 50 per cent stake in the Surmont SAGD project alongside ConocoPhillips, which is the operator. An initial phase of production is scheduled to start in 2007 and should reach a plateau of 27,000 barrels per day. The total potential production from Surmont is said to be more than 200,000 barrels per day. How quickly Surmont is fully developed to its potential remains to be seen, however. In a conference call with analysts earlier this year, ConocoPhillips executives suggested that spiralling costs in Alberta's oilsands could slow development at Surmont.

Total's share of the aggregate production from Joslyn and Surmont should eventually reach almost 300,000 barrels per day within the next decade. ■



(trow11 by Godfrey Budd with Deborah Jaremko

Established heavy oil producers, global giants, little juniors—increasingly, companies are choosing to join the oilsands industry and continue to grow conventional heavy oil production and processing capacity.

BAYTEX ENERGY TRUST

Less capital-intensive cold heavy oil production with sand (CHOPS) has been a strong focus for Baytex Energy Trust, which is active in west-central Saskatchewan, Cold Lake, and Peace River/Seal. With CHOPS technology, the trust is able "to generate relatively low-cost replacement production through conventional cold production methods." CHOPS has a key role, the trust says, in offsetting its over-

all production decline rate. In 2005, Baytex's heavy oil production averaged 21,265 barrels per day. Baytex is also conducting a VAPEX pilot project that is examining the use of vapour solvents to enhance primary CHOPS and as a possible alternative to SAGD. If VAPEX works, Baytex hopes to recover 40 per cent of the original oil in place, "compared with three per cent under primary production."

Chevron Canada is the subsidiary of Chevron Corporation, one of the largest integrated energy companies in the world.

Chevron Canada is the subsidiary of Chevron Corporation, one of the largest integrated energy companies in the world. It holds a 20 per cent interest in the 155,000-barrelper-day Athabasca Oil Sands Project, which has recently received approval for a 100,000-barrel-perday integrated expansion of its mining, extraction, and upgrading facilities. In 2006, Chevron Canada announced it is planning to develop a thermal in situ operation called Ells River that may eventually produce up to 100,000 barrels per day.

CONOCOPHILLIPS CANADA

The Canadian subsidiary of the third largest integrated energy company in the United States has its toes in the oilsands industry. Its Surmont steam assisted gravity drainage (SAGD) project, which it owns 50/50 with Total E&P Canada Ltd., was approved by regulators in 2003, and production was slated to commence in late 2006 or early 2007. Peak production of about 100,000 barrels of bitumen per day is expected by 2012. ConocoPhillips also holds a nine per cent interest in Syncrude.

CONNACHER OIL AND GAS

Connacher expects to start steam injection in summer 2007 at its Great Divide SAGD installation currently under construction. After an acquisition of additional land in the area earlier this year, Connacher now holds about 90,000 acres in leases, most of which are contiguous to, if they are

not actually part of, the Great Divide target system. Since the start of 2007, Connacher has accelerated a corehole drilling program, with a total of 70 holes scheduled for drilling by spring 2007. The company says the results of the drilling program at the lease, which is located about 80 kilometres south of

Fort McMurray, have been very positive, with thick oil-bearing zones encountered. Bitumen production should reach 10,000 barrels per day after the plant is commissioned. Connacher also owns a small refinery in Montana, which will use Great Divide bitumen as a feedstock in the future.



DEVON CANADA

Devon Canada, subsidiary of Houston-based Devon Energy, is continuing construction of the first phase of its Jackfish SAGD project. First production should come on stream in the second quarter of 2007 and, by sometime in 2008, should be at capacity of 35,000 barrels per day. The company, which has 100 per cent interest in the Jackfish asset, has filed with regulatory agencies to expand and boost production a further 35,000 barrels per day, with a construction start in 2008. This would bring total production at Jackfish to about 70,000 barrels per day with both phases at full capacity sometime in 2010. The Jackfish project is located 140 kilometres south of Fort McMurray, near Conklin. Total recoverable resources are estimated at over 300 million barrels.



ENERPLUS RESOURCES FUND

In 1986, Enerplus became the first energy income fund in Canada. It holds a 16 per cent interest in the Joslyn combined SAGD and mining project along with operator Total E&P Canada. In spring 2007, it announced it was adding an operated oilsands project to its portfolio—Kirby, a SAGD installation that could ultimately produce 30,000 to 40,000 barrels per day.

South Korea's state-owned oil company has made its stake in Canada's oilsands. Created in 1979, Korea National Oil Corporation (KNOC) has a mandate to secure oil supplies for the country's future, and it looks like it sees Canada as a viable source. In 2006, KNOC purchased leases in

the Cold Lake oilsands deposit belonging to Newmont Mining Corporation, and hopes to implement an in situ project in the coming years. It would like to see Enbridge's Gateway Pipeline be constructed in order to transport production to the coast of British Columbia, and by ship to its borders.

Production from Husky's Sunrise project should start in 2008 or 2009, initially at about 50,000 barrels per day.

LARICINA ENERGY

Laricina Energy is the new company of Glen Schmidt, former CEO of Deer Creek Energy, which was purchased by France-based Total SA in 2005. Since its creation in November 2005, the company has assembled 55,260 net operated acres in the Athabasca oilsands. It also retains interest in Total's Joslyn project. In addition to the "familiar" oilsands resources, Laricina has exposure to heavy oil in carbonates. Five development locations have been identified, which together could produce more than 150,000 barrels of bitumen per day.



Husky's Tucker SAGD installation

HUSKY **FNERGY**

Husky Energy has been involved in heavy oil production and upgrading for decades, and has recently embarked on several expansions and a major new facility development. Work presently underway at Husky's Lloydminster upgrader should nearly double capacity from 80,000 to 150,000 barrels per day of synthetic crude oil and diluent. Overall completion is expected in 2010. The company holds more than 1.57 million acres in the Lloydminster heavy oil area straddling Alberta and Saskatchewan, of which approximately twothirds is undeveloped.

Following its first foray into the oilsands industry, Husky also has approval to proceed with another project. The 30,000-barrel-per-day Tucker SAGD project, located in the Cold Lake oilsands deposit, commenced production in late 2006.

The company also has the go-ahead to proceed with its Sunrise project, an in situ development 60 kilometres northeast of Fort McMurray. Production should start in 2008 or 2009, initially at about 50,000 barrels per day.

Husky also has two other potential oilsands projects-Caribou, which can be produced with conventional thermal methods, and Saleski, which involves the Grosmont carbonates.

MEG ENERGY

Private company MEG Energy has begun construction of a 3,000-barrel-per-day SAGD pilot, the first phase of the company's Christina Lake Regional Project. Christina Lake, about halfway between Fort McMurray and Cold Lake, consists of about 80 square miles of leases with about four billion barrels of bitumen in place and an estimated two billion recoverable. The first couple of phases of commercial operations are expected to follow in short order after the period of pilot testing. Phases one and two are expected to achieve an average of 25,000 barrels per day by 2010, with a production start anticipated in 2007. Eventually, production could hit about 200,000 barrels per day, sustainable over 30 years.

NORTH AMERICAN OIL SANDS



North American Oil Sands is a privately owned company, with a shareholder base that the company describes as "predominantly institutional in nature." Its sole focus is the development of its Kai Kos Dehseh Project in the Athabasca oilsands, along with an upgrader near Edmonton. Since its founding in 2001, North American has assembled a land base of 275,000 acres in

the central region of the Athabasca deposit, south of Fort McMurray. The company plans a SAGD operation, producing from a formation about 450 metres below the surface. It expects that the resource is sufficient to support production of more than 160,000 barrels per day for more than 25 years. North American has filed a regulatory application to start a commercial demonstration project at Leismer.

NORTHWEST UPGRADING

Unintegrated in situ bitumen production is growing, and merchant upgrading projects are emerging. North West Upgrading is a private company that is planning a three-phase, ultimately 231,000-barrel-per-day processing capacity project in the Edmonton area. Regulatory approval is anticipated in 2007, with start-up of the 77,000-barrel-per-day first phase in 2010.

OILSANDS QUEST

Established in 2004, Oilsands Quest is working on proving that the Athabasca oilsands resource extends into the province of Saskatchewan. Its exploration permits cover 500,000 acres and are as close as 50 kilometres to Suncor Energy's operational Firebag steam assisted gravity drainage project. Oilsands Quest also holds prospective oilsands lands on the Alberta side of the border, as well as oil shale exploration permits in Saskatchewan.



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OPTI/NEXEN

OPTI/Nexen's Long Lake steam assisted gravity drainage (SAGD) project is the industry's fourth integrated facility, and it will be the next to come online. The performance of the patented Orcrude upgrading technology at Long Lake can be expected to attract widespread interest when the facility begins production in 2007. The Orcrude unit, a gasifier, a hydrocracker, and other components combine as an energyefficient technology that uses bottom-of-the-barrel asphaltene residue to produce virtually all the natural gas required to supply the commercial SAGD operation, a cogeneration facility, and the upgrader, as well as hydrogen to feed the hydrocracker.

The technology is expected to keep operating costs in the range of \$5 to \$9 per barrel, mainly by cutting the need for natural gas. The partners in the 70,000-barrelper-day project, OPTI Canada and Nexen Inc., view this as a big cost advantage. Already, slightly more than 50 per cent of Nexen's Canadian production is in heavy oil, mostly in the Lloydminster area—that is, east-central Alberta and west-central Saskatchewan. The company also holds a 25 per cent interest in Japan Canada Oil Sands Ltd.'s Hangingstone SAGD project.

PARAMOUNT RESOURCES

In the Surmont area, Paramount is planning a steam assisted gravity drainage project. On its leases, the company reports there is over a million barrels of bitumen in place, with about 400,000 barrels recoverable. In full development, Paramount sees a 45,000-barrel-per-day project. It will make a regulatory submission in 2007.



Paramount Resources reports over a million barrels of bitumen in place on its leases, with about 400,000 barrels recoverable.

PEACE RIVER OIL

Alberta's first bitumen upgrader was built north of Fort McMurray. Since, similar installations have been built at Lloydminster and in Alberta's Industrial Heartland, an industrial zone near Edmonton. Peace River Oil plans to develop the first bitumen upgrader in the Peace River oilsands deposit—Canada's smallest. Production from the area is set to increase substantially, and this merchant projectdubbed the Bluesky Upgrader-is positioning itself to support the The 25,000-barrel expansion. per-day first phase-pending regulatory approval—is scheduled for 2010.

PETROBANK

Petrobank is proceeding with development on its Whitesands Project, the first field-scale application of its patented toe-to-heel air injection (THAI) recovery technology. In this process, air is injected through a vertical well, causing a combustion front to develop. As it moves along a horizontal well from its toe to its heel, viscosity-reduced bitumen is produced. Proponents believe that THAI has several advantages over SAGD, including potentially higher rates of recovery (70 to 80 per cent), lower production and capital costs, minimal use of natural gas and water, and lower emissions. If the THAI process proves successful, a commercial-scale operation could start at the Whitesands lease, and the technology could be deployed on its heavy oil leases around the world.



SYNENCO ENERGY

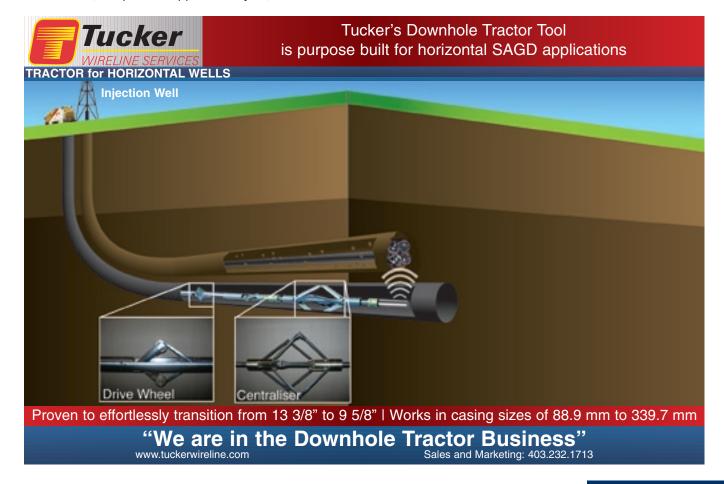
In a merging of international interests, Calgary-based Synenco Energy and SinoCanada Petroleum Corporation, a subsidiary of China-based Sinopec International, have teamed up to form the Northern Lights partnership. Synenco is the managing partner with a 60 per cent stake in the partnership, which will develop a mine north of Fort McMurray and an upgrader near Edmonton. The capital costs of the mining and extraction part of the project are estimated at \$4.4 billion. The recoverable resource is pegged at about 1.3 billion barrels, with enough to produce 100,000 barrels a day of synthetic crude for about 30 years. First oil production is scheduled for the second quarter of 2011. In an innovative strategy, Synenco has announced that it will have its modules fabricated in Asia and shipped by boat along the Mackenzie River system to site.

VALUE CREATION

Until spring 2007, Value Creation Group was known as an affiliate of BA Energy, which is currently constructing Alberta's first merchant upgrader. The Heartland Upgrader, which is currently under construction in the Edmonton area, will process approximately 77,500 barrels

per day by 2008. After three phases are complete, BA's upgrader will have capacity to process about 260,000 barrels per day.

Now, Value Creation has added another oilsands interest to its portfolio, with the announcement of the 40,000-barrel-per-day Terre de Grace in situ project. The private company plans this development in two phases, with first production in 2011.



FEATURE



Photo: Joey Podlubny

lbertans consider "blue gold" to be as valuable as oil.

That's why government and the oilsands industry are taking additional steps to ensure that the province's water resources are protected. A joint Alberta-federal government framework, announced in March 2007, sets new limits on oilsands companies' use of the Athabasca River in northern Alberta.

"It provides immediate protection of the river and demonstrates Alberta's ongoing commitment to keeping its waterways healthy," Alberta Environment Minister Rob Renner says.

The Athabasca River Water Management Framework, developed by the provincial government and Fisheries and Oceans Canada, requires oilsands operators to reduce water withdrawals from the Athabasca River during "all environmentally sensitive periods."

The Athabasca is the main water source for Canada's three giant oilsands mines: the Shell-controlled Athabasca Oil Sands Project, Suncor Energy, and the Syncrude Canada joint venture.

Kim Hunt, a spokesperson for Alberta Environment, says the framework scientifically establishes the minimum flows required to maintain the health of the Athabasca River's ecosystem, and those figures determine the overall, or cumulative, amount of water that oilsands operators are allowed to withdraw. Companies must work together to share the amount of water available depending on flow conditions, Hunt says.

The new rules will allow companies to collectively withdraw between eight to 15 cubic metres of water per second even when the river is at its lowest flows during the winter. The Pembina Institute, an Alberta-based environmental research and policy group, worries about the impact on the river's fishery and ecosystem, especially if climate change results in more years with very low flows.

But Alberta Environment says that the framework also includes continued research and monitoring of the Athabasca River, and a review of the oilsands industry's water withdrawal limits in September 2010.

Oilsands companies have been licensed by the province to withdraw a total of 349 million cubic metres of water per year. That is more than twice the amount required from the Bow River in southern Alberta for the City of Calgary's domestic needs, the Pembina Institute says.

However, industry points out that the amount is still only about one per cent of the Athabasca

River's annual flow. Also, not all companies use their allocated amount. Syncrude, for example, currently uses only about half of the water it is allowed to use.

The oil and gas industry has just over seven per cent of the overall surface and groundwater licensed for use in Alberta, compared with nearly 46 per cent for agricultural use (mostly irrigation), says David Pryce, vice-president of western Canada operations for the Canadian Association of Petroleum Producers (CAPP).

All major oilsands projects now recycle more than 90 per cent of their water. Syncrude, for example, which 10 years ago consumed about four barrels of water to produce one barrel of oil, today uses just over two barrels of water for every barrel of oil produced.

Imperial Oil's Cold Lake operation now uses less than half a barrel of fresh water to recover a barrel of bitumen—compared with 4.5 barrels of water in 1985—through treating and recycling more than 95 per cent of produced water in the process.

Many petroleum companies including oilsands operators also have dramatically increased their use of non-potable saline, or brackish, water in their operations, thereby reducing their use of fresh water, Pryce notes.

There is also potential to use the City of Edmonton's 270 million litres per day of wastewater—rather than the North Saskatchewan River which runs through the city—to supply some of the planned facilities nearby that would upgrade bitumen pipelined from Athabasca oilsands operations.

Petro-Canada has shown that the concept works in principle. The company's Strathcona refinery near Edmonton is currently using five million litres per day of treated water pipelined from the city's Gold Bar Wastewater Treatment Plant, rather than withdrawing the water from the river.

As demand for energy continues to rise in North America, Alberta's 175 billion barrels of established oilsands reserves are increasingly seen as a secure, reliable source that can help meet this demand. Some \$100 billion of projects are planned over the next decade.

Oilsands production is expected to triple to three million barrels per day by 2015, from current production of just over one million barrels per day, according to a recent forecast by the National Energy Board (NEB).

Oilsands producers now use about 700 million cubic feet per day of natural gas for fuel, or five per cent of production in the Western Canadian

FEATURE



Sedimentary Basin. By 2015, that could rise to 2.1 billion cubic feet per day, or nearly 12 per cent, the NEB says.

As a consequence, greenhouse gas emissions from the oilsands, which amounted to 23.2 million tonnes in 2000, are forecast to nearly triple to 66 megatonnes by 2015.

"I don't think we need to have a 'gold rush' mentality when approaching this resource," says Marlo Raynolds, the Pembina Institute's executive director. Slowing the pace of development and setting "clear performance hurdles" for new projects would actually prolong the opportunities for work, environmental quality, and other social benefits for future generations, he says.

The provincial government and the petroleum industry continue to look for ways to improve environmental performance.

Alberta has reduced natural gas flaring by 72 per cent during the last decade, preventing the release of 7.2 million tonnes of carbon dioxide to the atmosphere, says the Alberta Energy and Utilities Board (EUB). Sulphur emissions across the province have been cut by 32 per cent since 2000. Syncrude, for example, has reduced sulphur dioxide emissions by 16 per cent while raising oil production by 40 per cent.

Alberta is the first province in Canada to introduce climate change legislation and regulations aimed at reducing the "intensity" of greenhouse gas emissions (the amount of carbon dioxide released per barrel of oil produced, for example) by "large emitters"—including oilsands operators.

The province has reduced emissions intensity by 16 per cent since 1990, although total greenhouse gas emissions have increased by 40 per cent over that same period, Alberta Environment acknowledges.

Starting July 1, 2007, existing large emitters

(facilities that are releasing 100,000 tonnes or more of greenhouse gases annually) will be required to reduce their emissions intensity by 12 per cent by the end of 2007. About 100 facilities representing about 70 per cent of Alberta's industrial emissions are expected to be subject to the new rule.

Large emitters unable to make the 12 per cent reduction target—and most of them likely will be in this category—have the option of investing in an Alberta-based technology fund that will be used to develop infrastructure to reduce emissions or to support research into innovative climate change solutions. Large emitters will be required to pay \$15 per tonne to the technology fund for every tonne above the 12-percent target.

One of the early beneficiaries of the fund is likely to be carbon capture and storage (CCS) technology. It involves capturing carbon dioxide at industrial facilities and injecting it as a liquid under high pressure into geological reservoirs for permanent storage or "sequestration." The CO₂ can also be used in enhanced oil recovery to sweep more oil from aging fields where production is declining.

In March 2007, Alberta and the federal government announced \$156 million for projects to reduce greenhouse gas emissions, along with the creation of a new federal-provincial task force to recommend ways to implement CCS—including at oilsands plants.

"Together, using technology and innovation, we can be good stewards of the environment while at the same time enhancing Alberta's position on the cutting edge of energy production," Premier Ed Stelmach said.

Oilsands companies are also pursuing alternative fuels and other ways to reduce their reliance on natural gas.

Nexen and OPTI, at their joint \$3.5-billion Long Lake SAGD project scheduled to be operational by the end of

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FEATURE

2007, will use OPTI's patented OrCrude process to convert liquid asphaltenes produced by the upgrader into a synthetic gas used as fuel for stream and power generation—almost eliminating the need for gas and electricity.

Suncor Energy, as part of its Voyageur expansion (which received regulatory approval in November 2006), plans to build a gasification plant that would process about 20 per cent of a new upgrader's petroleum coke

(a waste byproduct of upgrading) into synthetic gas, which would reduce reliance on natural gas.

Petro-Canada will receive more than \$1.4 million in royalty adjustments under Alberta's Innovative Technologies Program to test new "Steam and Gas Push" technology aimed at reducing energy and water consumption while improving bitumen recovery. The company's MacKay River SAGD oilsands operation will

field-test a new steam-ejector system designed to re-compress the produced vapour recovered during normal SAGD operations, for re-injection into the steam-injection wells.

At the University of Calgary, researchers at the 4-year-old Alberta Ingenuity Centre for In Situ Energy are developing novel technologies using chemical catalysts to extract and upgrade bitumen directly in the reservoir. This would greatly reduce the amount of upgrading—with its associated natural gas usage and greenhouse gas emissions—required in facilities on the surface.

At the University of Alberta, the Imperial Oil-Alberta Ingenuity Centre for Oil Sands Innovation, announced in February 2007, the focus is reducing water use in the oilsands (which includes using non-aqueous solvents such as naphtha instead of water) and utilizing nanotechnology to make bitumen upgrading more efficient.

At the University of Calgary's Haskayne School of Business, Neil McCrank, prior to his retirement after nine years as chairman of the EUB, noted that the regulator had approved six major new oilsands projects in recent years.

Three of those projects occurred in the last five months: Imperial Oil's \$7-billion Kearl mine; Suncor's \$7-billion Voyageur expansion; and Shell's \$12.8-billion Athabasca Oil Sands Project expansion. The EUB placed 91 conditions on the most recently approved oilsands projects relating to water management and resource conservation, and made 120 recommendations to federal and provincial governments to mitigate environmental and social impacts.

"Alberta has been blessed by abundant resources, and we have all benefited from them," McCrank said in his last public talk before retiring at the end of March 2007. "Our challenge today, as we are front and centre on the world stage, is to move forward and make sure that oil and gas development continues to be done right in Alberta."



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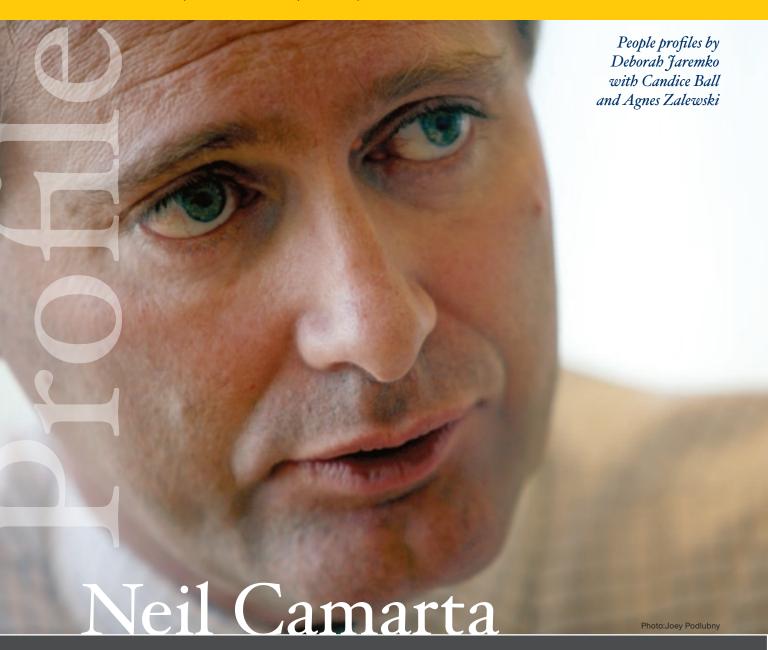
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PEOPLE

It's been said that the heavy oil and oilsands industry is "addictive," it "gets in your blood," and is "an interesting combination of frustration and success." For decades, people from Canada and around the world have become part of this industry and helped to further its success. Here are fifteen of them.



Senior vice-president, oilsands | Petro-Canada

Why you need to know him: Camarta has earned a prominent spot in the who's who of leaders in oilsands development. Long before "megaproject" became a buzz word, Neil Camarta led the mammoth \$6-billion Athabasca Oil Sands Project from planning to start-up. Today, the man who invented his own language to describe oilsands project management leads Petro-Canada's oilsands portfolio.

- Why do you call the oilsands industry a "sausage factory"?
- Building these megaprojects is like linking sausages. You have to approach things in bite-sized, manageable pieces. But it's also important to continuously plan for the next phase, and then the phase after that. That way you minimize execution risk by pre-building to keep costs down and retaining an experienced workforce. These projects are elephants, but by linking the sausages we can wrestle them to the ground.
- Where do you see the oilsands industry in 2015?
- ▲ For one thing, our Fort Hills mining project should be into its second or third phase by then, producing up to 350,000 barrels per day of bitumen. At MacKay River, we'll be up to 70,000 barrels per day, and our other in situ prospects will be well along the planning curve. So Petro-Canada will be in a great position in 2015.

As an industry, I think oilsands will play an increasingly important role to 2015 and for decades beyond. These are the ultimate long-life resources. Conventional crude sources are in decline, including here in western Canada. Supply has to come from somewhere, and the most secure and reliable source right now is Alberta's oilsands. There are projections out there calling for three million barrels per day of oilsands production by 2015, and I think that's achievable.

What will it take to get there?

⚠ We've got some work to do on things like water supply and regional infrastructure, but collectively the energy industry is working with governments and other stakeholders to make sure we get things right. The most important thing for the success of these large projects is great execution, and that requires a predictable playing field. We're willing to step up to the plate on things like environmental sustainability, but we need the certainty to make sound investments. ■





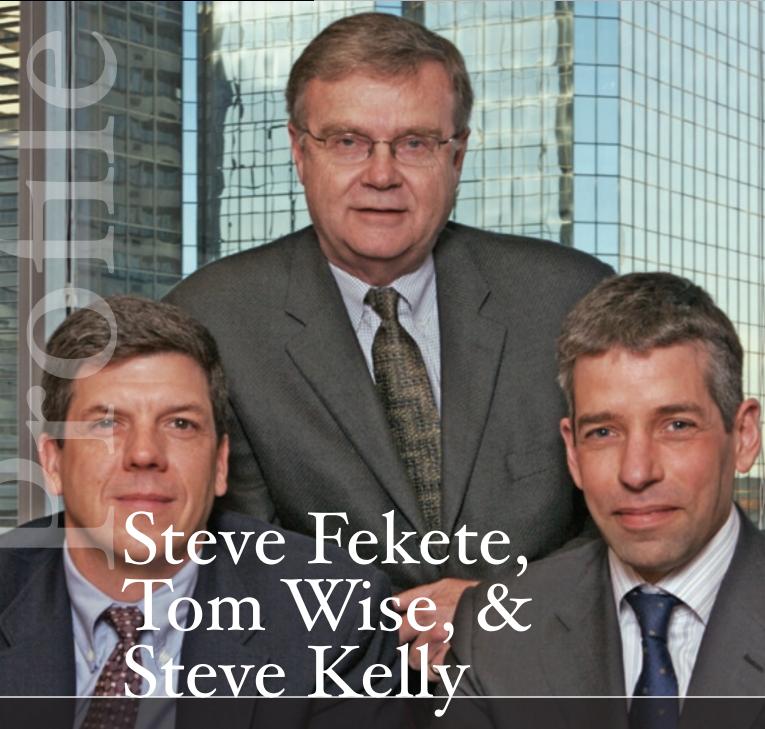
General manager | Fort McMurray office Alberta Energy and Utilities Board (EUB)

Why you need to know him:
The EUB is Alberta's energy regulator and plays a key role in almost every step of heavy oil and oilsands project development. In Fort McMurray, Steve Smith is at the helm of the office closest to the issues that face the oilsands industry in the bustling and expanding Athabasca area.

- From a regulator's standpoint, how has the oilsands and heavy oil industry changed in the last decade?
- ⚠ The pace and scale of development in the Athabasca region over the last 10 years has highlighted areas that required further regulatory definition from the EUB. These include usage, and environmental impacts. The EUB must ensure that regulations are in place—or under development—to deal effective, and appropriate.
- Where does the EUB stand on issues related to infrastructure in communities affected by development?
- A The provincial government has the authority to manage Alberta's infrastructure; the EUB does not. However, as the regulator, the EUB has an obligation to consider environmental

- and socio-economic impacts of development. If the EUB determines that a proposed development will cause any unacceptable impacts, then we will deny the application. To date, the EUB has not determined that any proposed oilsands development would cause any unacceptable impacts.
- tailings management, operational performance criteria, water [How does the EUB differ from other regulatory agencies such as Alberta Environment?
- with these issues and that those regulations are complete, The EUB upholds the laws of Alberta as they pertain to oilsands development, but we operate independently of government. The EUB's quasi-judicial framework allows us to provide the public, industry, and other interested parties with a forum where they can express their concerns or voice their support for applied-for projects. The EUB is funded partially by industry (57.3 per cent) and partially by government (43.3 per cent).





Senior principal, vice-president, and senior vice-president Purvin & Gertz

Why you need to know them:

This Houston-based energy industry consulting firm has maintained an office in Calgary for over 30 years, enabling it to develop specialized knowledge of the oilsands industry from its infancy through to the current period of rapid growth. These three gentlemen, with years of industry experience, lead the Calgary team.

Photo:Joey Podlubny

- What are the biggest challenges and opportunities facing the oilsands industry in the next five years?
- A Escalating capital costs are a major challenge in Alberta and globally, and will certainly influence company decisions, possibly impacting the viability of some projects. The location of upgraders is a complex issue, and different companies are taking different approaches. Heavy crude markets have been saturated and the bitumen price is volatile, so upgrading to synthetic crude may present an opportunity to reduce market risk.

Environmental issues are a major uncertainty. Greenhouse gas emissions and water supply issues need to be resolved, and technology selection will be part of the solution. We also [6] What about global market issues? see pipeline capacity out of Alberta as a major challenge. Pipeline companies are working to increase export capacity, A The crude market remains very volatile, with financial players which will correct the situation in the long term, but tightness over the next couple of years could cause more apportionment and impact the realized price in Alberta. Diluent supply and pricing for bitumen blending will be an ongoing challenge for producers.

- What market issues face the oilsands industry?
- ⚠ The disposition and processing requirements of bitumen are receiving tremendous attention. Additional upgrader capacity

in Alberta, as well as downstream processing capacity at refineries will be needed to upgrade the bitumen to finished products. The price differential between light and heavy crude will significantly challenge heavy producers.

Growing supplies of synthetic crude oil (SCO) are also forecast, and we expect that downstream refineries will reach limits in processing the incremental SCO over the next several years. Clearing markets for SCO will likely continue to move further away from Alberta, resulting in increased price discounts. On the positive side, price discounts will create an economic incentive for refiners to install more SCO conversion capacity.

- - having a greater influence on day-to-day changes in crude price than they did even a few years ago. We foresee that the high-price environment will temper demand growth compared to recent years. In addition, we think that some relief in crude supply is coming, with increasing supplies from West Africa, the CIS region, the U.S. Gulf of Mexico, and of course Canada. Finally, substantial refining capacity projects have been announced, which will provide a capacity buffer that doesn't exist today.





Chief | Fort McKay First Nation

Why you need to know him:
About 65 kilometres north of Fort McMurray, the approximately 500-strong community of Fort McKay is surrounded by oilsands and oilsands-related development. Under the leadership of Jim Boucher, who became chief in the 1980s, Fort McKay has become actively involved in industry, from reviewing project applications to supporting development through its limited companies, which generated about \$85 million in revenue in 2006. Boucher has also been chair of the Athabasca Tribal Council for over 11 years.

- What role does the Fort McKay First Nation play in the oilsands industry?
- We have two roles. One is oversight with respect to projects, looking at applications and their impact on lifestyle, animals, and the environment within our region. We have built up our capacity so that we can be engaged and represent our interests. As a result of that, we have developed relationships with industry and government.

The other role is a support function. We have developed our own people so that we have education systems and ways to be involved in the resource extraction industry. In the future, we plan to develop our own resources in a partnership with Shell Canada.

In the future?

Matching That is one of the foremost questions not just for Fort McKay, but also for other communities. We need to situate ourselves so that we have future economic opportunities as

- Why has Fort McKay taken this approach to development?
- ▲ We used to have a thriving economy from trapping. Our people used to make a substantial amount of money on a

yearly basis, until the anti-fur campaign successfully drove down the price of fur. We had to find another way to make a living. At the moment, the oilsands is the only game. We've had to change the way we work in our community, but it has come at a cost, of course. We work with industry and government to reduce impacts. Certainly we want to be leaders in the way we develop our resources and how it disrupts the environment.

- How can Fort McKay ensure its sustainability long into the future?
 - That is one of the foremost questions not just for Fort McKay, but also for other communities. We need to situate ourselves so that we have future economic opportunities as the oilsands industry dissipates. It is very incumbent upon us that we prepare for that event. We need to continue to develop educational and economic models to continue to be self-sufficient in the future. ■





Outgoing and incoming presidents Canadian Heavy Oil Association (CHOA)

Why you need to know them:

Every year, the CHOA has a new leader—someone to head a group designed to bring together those involved in the heavy oil and oilsands industry in a technical, educational, and social forum. Last year, this was Gerry Belyk, who works in business development with RPS-APA Petroleum Engineering. This year, Bill MacFarlane, Nexen's manager of technology integration for synthetic oil, takes the reins.

- What is the role of the Canadian Heavy Oil Association?
- ▲ We provide a forum for the exchange of ideas through networking and information sharing using regular conferences, events, and newsletters. Our role is to offer our members an opportunity to understand how our industry is evolving, to exchange ideas, and maybe integrate the information into their regular industry roles.

 ★ The CHOA is stepping into the future today. We're going to be able to provide support for those outside of Canada who are asking for information on heavy oil, through initiatives such as our Heavy Oil 101 course. In addition to more international exposure, there's lots of potential for the CHOA—it's hard to stay small in an expanding industry that has become
- How is the CHOA changing?
- ▲ Our Canadian industry is very innovative. We are being called upon, and are responding to the call, to share our technology internationally. As a result, our membership has grown significantly over the past couple of years to 1,000 members. Over this time, we have aligned ourselves with the Alberta Government as an opportunity to cast a wider net for our members, and are promoting our Canadian industry and technology worldwide. The CHOA has become a sort of "go-to" place for people to learn more about the industry in western Canada. The CHOA focus is not confined to resource recovery—our association provides a holistic forum for understanding our broader business and its impacts.

- What do you see as the future for the CHOA?
 - The CHOA is stepping into the future today. We're going to be able to provide support for those outside of Canada who are asking for information on heavy oil, through initiatives such as our Heavy Oil 101 course. In addition to more international exposure, there's lots of potential for the CHOA—it's hard to stay small in an expanding industry that has become increasingly complex. Foremost, we are non-profit and want to stay that way. We want to keep our traditional, high-value offerings, such as our social events and technical conferences. But, if we grow, there is more opportunity for us to give back to our industry. For example, we have expanded scholarship offerings at the University of Calgary, University of Regina, and University of Alberta. This is a positive way to keep our industry strong.

We are very committed to representing our industry. Recently, the spotlight has been so much on the Alberta-based oilsands industry, but we need to maintain our commitment to our conventional heavy oil industry. As we developed a unique affiliation with the Alberta Government, we are seeking opportunities to do the same with the Government of Saskatchewan.





Senior policy analyst | The Pembina Institute

Why you need to know him:

Since 2003, Woynillowicz has spearheaded the Pembina Institute's role in the review of proposed oilsands projects and in the multi-stakeholder initiatives advocating the regional environmental management and monitoring of the oilsands industry. He has also delivered expert testimony on the environmental impacts of oilsands development to provincial and federal regulatory review panels.

Photo: The Pembina Institute

- How does the Pembina Institute define sustainability?
- A Our focus is on sustainable energy solutions. This requires ensures economic, social, and environmental sustainability for our generation and that of our children and grandchildren. We envision a world in which our immediate and future needs are met in a manner that protects the earth's living systems.
- What recommendations does the Pembina Institute offer to the heavy oil/oilsands industry to support responsible development?
- A Responsible development will require significant innovation and evolution in extraction and upgrading. Oilsands companies must acknowledge that the environmental impacts of their individual operations contribute towards cumulative environmental impacts. With this in mind, companies must evaluate whether and how they can develop projects in a way that respects the limits of environmental sustainability.

With the rate and scale of development, the technologies and approaches of the 20th century are no longer adequate. Significant step-wise changes in technology are required to dramatically reduce the impacts on air quality, fresh water, the boreal forest, and global warming.

- What are your top two hot button issues relating to heavy oil and oilsands?
- that we produce and consume energy in a manner that Mone, action on global warming. The governments of Alberta and Canada have continually delayed imposing tough regulations on greenhouse gas pollution. As Albertans and Canadians see more global warming impacts—such as the spread of pine beetle into the boreal forest and impacts to freshwater sources—there will be growing pressure on both the oilsands industry and government to actually start reducing greenhouse gas pollution.

Two, managing the pace and scale of growth. Albertans are increasingly concerned about the environmental and social implications arising from the pace of oilsands development. At the heart of the issue is the fact that the government doesn't have the policies and systems in place to manage the current, let alone future, scale of oilsands development. There is an urgent need to catch up to existing development and then get ahead of future development to ensure public interest decisions are being made.





Deputy director | Porous Media Research Institute University of Waterloo, Ontario

Why you need to know him:

Maurice Dusseault is one of the many people who are a product of the Alberta Oil Sands Technology and Research Authority (AOSTRA), which has been replaced by the Alberta Energy and Research Institute (AERI). Many of these people hold key positions in the heavy oil and oilsands industry today. Maurice Dusseault has authored close to 400 technical papers related to heavy oil and oilsands, and is exemplary of the "addictive buzz" the industry creates.

- What was AOSTRA? What were its key accomplishments?
- AOSTRA was created in 1974 by the Alberta government, and technology. It supported research with industry to the tune of over \$800 million during this period. Perhaps its stellar accomplishment was to fund a field pilot in steam assisted gravity drainage, despite profound industry disinterest at the time. This technology, affectionately called SAGD, has revolutionized the heavy oil industry, resulting in 174 billion barrels of recoverable reserves to be allocated to Alberta in 2002-2003.
- Why is collaboration important for oilsands/heavy oil research?
- ∧ Oilsands and heavy oil research has benefited from single academics working alone in universities, and from large teams of scientific and industrial researchers working toward specific goals. Some problems are best suited for a single expert researcher, but most of the problems are multi-disciplinary, and need input from persons in a wide variety of disciplines.

- Why is Canadian technology popular for heavy and extraheavy oil development around the world?
- lasted 25 years as an agency to fund research into oilsands \(\bar{A}\)Canada, especially Alberta and to a lesser degree Saskatchewan and the federal government, have invested billions of dollars into heavy oil and oilsands technologies. Direct funding from the provinces, industry, and the federal government is only part of it. Many academics in Canada have dedicated large amounts of time and public facilities to research and education as well.

Canada was the first country in the world to produce over a million barrels per day of heavy oil and synthetic crude, and that level continues to increase. Other countries are interested because we do it best, thanks to the huge investment, stable government, and industry commitment to research and field trials for over 30 years. What has happened in Canada is a model for other countries.





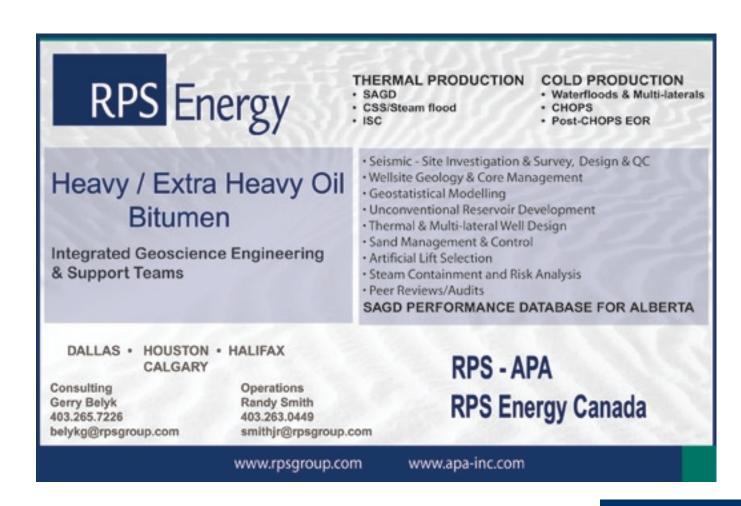
Chief executive officer | Syncrude Canada

Why you need to know him:

Right now, Syncrude Canada produces more synthetic crude oil from oilsands than any other company. This joint venture is also Canada's single largest source of crude oil. Charles Ruigrok has been at its helm since 2003, after a long career with Imperial Oil. Under his leadership, Syncrude completed the largest expansion in its history.

- What would you say has been Syncrude's greatest accomplishment since its inception?
- ⚠ It would be hard to select a single greatest accomplishment since Syncrude began producing high-quality crude from the oilsands nearly three decades ago. Over the years, there have been many successes in important areas like safety, improved technology and work processes, reliability, and reduced environmental impact, that have added up to the strong position we have today. One recent accomplishment that stands out is the completion of the Stage 3 expansion in 2006, increasing our productive capacity by 100,000 barrels per day. This expansion incorporated important environmental improvements that include new sulphur-scrubbing technology. This has allowed us to reduce our total sulphur dioxide emissions even while increasing production.
- What do you see as potential roadblocks to continued oilsands development?
- ⚠ The supply of skilled labour is one of the more significant challenges facing our industry today. Syncrude's strong reputation as an employer of choice is helping us meet that

- challenge, but it's not the only solution. We have taken a multi-faceted approach to help address this issue, with one of the biggest areas being to help young people prepare for a rewarding career in our industry. Syncrude continues to be a leader in promoting apprenticeships and partnering with post-secondary institutions. We're a major supporter of the Community Careers Cooperative and we employ a large number of apprentices. We also work closely with post-secondary institutions like Keyano College to help develop the skilled workforce we need, and we're collaborating with local aboriginal communities on a number of initiatives including the Alberta Aboriginal Apprenticeship Project.
- improvements that include new sulphur-scrubbing technology. What would you pass on as a key learning to other companies. This has allowed us to reduce our total sulphur dioxide emissions entering the oilsands game?
 - Notwithstanding 40 years of commercial oilsands development, the industry still has opportunity for further technological evolution. We've progressed to where we are today as a result of a relentless focus on innovation and continuous improvement. And it's critical that we sustain this focus. In doing so, we will achieve the tremendous potential of the oilsands in a way that also mitigates the impact on the environment. ■





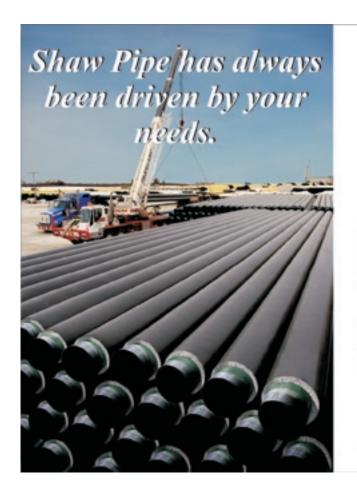
Vice-president of markets and fiscal policy Canadian Association of Petroleum Producers (CAPP)

Why you need to know him:
Greg Stringham is a key source of information on the oilsands and heavy oil industries for CAPP members, interested investors and producers from around the world, and the media. His voice is heard everywhere from corporate boardrooms to industry conferences to newspaper headlines.

- What is CAPP's role in the heavy oil and oilsands industry?
- ▲ CAPP's role is to bring together our members to set a ▲ While there is a vast resource in Alberta, it is one of the costliest direction for the upstream oil and gas industry, to solve issues and to communicate to the public as a unified voice. CAPP is a vehicle for providing information on issues such as environmental standards, royalties and taxes paid to governments, supply outlooks, and market analysis.
- What questions do governments, media, and other companies from outside Alberta ask you?
- A Visitors and those who are interested in the industry have a variety of questions and comments. For example, they are amazed at the technologies being used and the scale of the production. They all want to visit a plant. Since they know it's costly to produce, they ask what oil price it takes to be economical. They comment on the prosperity the industry is generating, and the associated growth strains. International visitors are quick to note Canada's political stability, the government framework and polices in place, and the advantage of being close to one of the largest markets in the world.

- What are the key challenges facing the oilsands industry?
 - sources of supply in the world. The industry faces rapidly rising costs, such as for steel, labour, and infrastructure. I often hear that today's higher prices must be covering the costs, but many people don't recognize that the price for the heavy, sticky bitumen from the oilsands is only 30 to 40 per cent of the oil price quoted in the media everyday. While prices currently are above US\$50 per barrel for light crude oil, bitumen only sells for US\$15 to \$20 per barrel. This makes it challenging to cover the rising costs.

In addition, strict environmental standards must be met for water use, air emissions, and land reclamation. The oil and gas industry is constantly looking for new technologies and better ways to reduce the environmental impact while keeping the production economical. Another critical concern is to ensure that there is sufficient pipeline capacity to get the increases in oil production to market.





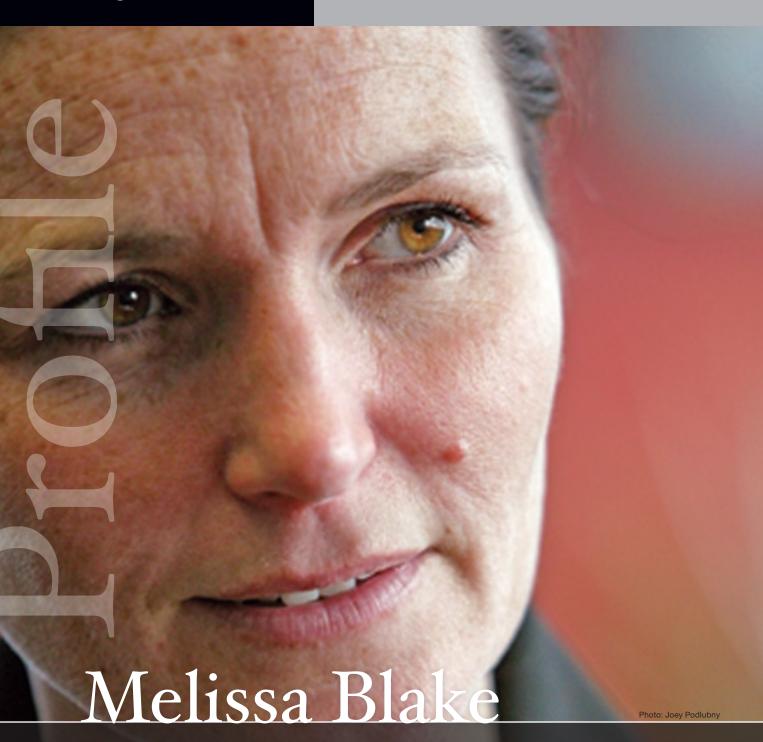
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Mayor | Regional Municipality of Wood Buffalo

Why you need to know her:

Melissa Blake is the vibrant and determined voice of the principal municipality currently bearing the brunt of the growing pains brought about by expanding oilsands development. She leads the crusade to ensure that there is enough regional infrastructure in place to support the growing number of people required to quickly increase oilsands production to meet exploding demand. She also plays a key role in expressing the community's concerns about cumulative effects.

- What's it like to watch Fort McMurray undergo such rapid growth?

We're going from what I knew growing up—[a population of] about 30,000 to 35,000, to 100,000-plus in the next five years. That's a significant change in the community.

- What does a sustainable oilsands industry look like to you?
- ⚠ It's something that's well-planned out and you know what the impacts are going to be before you put your shovels or pipes into the ground. The end result is already predetermined before you start, which means reclamation efforts are built into the planning.

The other really important thing is to look at the cumulative effects. So, we don't look at individual applicants. We look at the multitude of projects that are happening. And, again,

having that end-state base plan in place and the compliance to ensure that we're not exceeding the thresholds related to air emissions, terrestrial disturbance, or water use. So we would have an informed picture of what it would be like and manage against what the thresholds would be. And I'm just not sure we had enough of that information on the cumulative impact.

- What would you identify as the Regional Municipality of Wood Buffalo's most important mandate?
- Balance. I say that because there are so many things coming at us. What we learned in the last election is the fact that we had been putting off our quality of life projects for fire halls, roads, and services. People said, "Enough's enough. I've been here for X number of years. I've got kids and they should have the ability to not have to play hockey at 10 o'clock at night."

We need to look at our budget again and make sure we're balancing all those growth items with quality-of-life items. To support our long-term vision, we created an initiative called Future Forward. It allows us to look beyond the bumps in the road. ■





Executive vice-president, oilsands | Suncor Energy

Why you need to know him:

In 1967, Suncor became the world's first oilsands mining producer. Forty years later, the company continues to expand and lead the industry, with many lessons to offer. The role of executive vice-president of oilsands is a new one for Kirk Bailey, but he is certainly not new to the oilsands industry. Formerly, he was senior vice-president of the company's mining and and extraction operations. He says he looks forward to the opportunity to be a strong advocate for the oilsands industry, and the Wood Buffalo community, which he calls home.

- What can new oilsands producers learn from Suncor?
- Maintain a dual focus. Growth is important, but so is the foundation on which growth is built. So while pursuing major expansion projects, always keep a firm eye on the health of existing operations. Both must excel for your company to Are there any misconceptions about the industry you would succeed.

employees, consult your stakeholders, and understand your customers. Be open and honest. Be prepared, but also be open and transparent about the challenges and how you are tackling them. This will build credibility with your stakeholders and instill confidence in your investors and customers. You'll need both when things go wrong (and they will).

- What is the biggest challenge Suncor faces as it continues to expand?
- A Recruitment and retention. The issue of workforce shortages affects everyone, from the corner grocer to the largest corporate or government employer. Unless we plan wisely, the oilsands industry's huge demands for skilled labour could exacerbate the situation across the economy.

To minimize our impact on other employers, Suncor is committed to doing its hiring as systematically as possible. The company is also acting to relieve regional labour pressures by shifting more work off-site.

Whenever possible, Suncor prefers to hire locally. The company supports several training programs at Fort McMurray's Keyano College and is a key participant in the Alberta Aboriginal Apprenticeship Project.

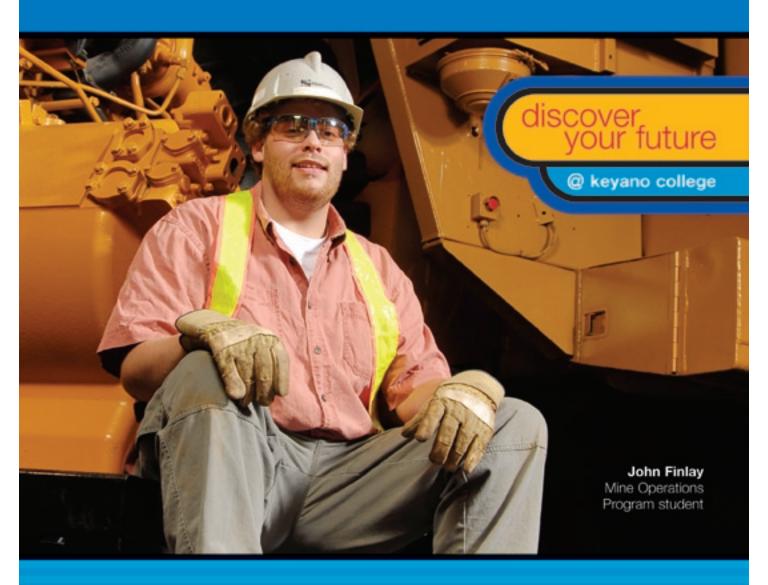
- like to address?
- industry is interested only in growth—and at any cost. This is simply not true.

Yes, the oilsands industry impacts the environment. But we work hard to mitigate those impacts, and with considerable success.

By harnessing technology to improve overall energy efficiency, Suncor has significantly reduced its greenhouse gas emissions on a per-barrel basis. We have similarly reduced the intensity of our water consumption.

Some critics say today's environmental challenges are too great and so oilsands development should be slowed or halted. Then again, a decade ago, many suggested that the industry as a whole could never be made economically viable. Through good planning and the innovative use of technology, we proved the skeptics wrong. The same strategies, we believe, will allow us to demonstrate that energy development and environmental excellence can proceed in tandem.





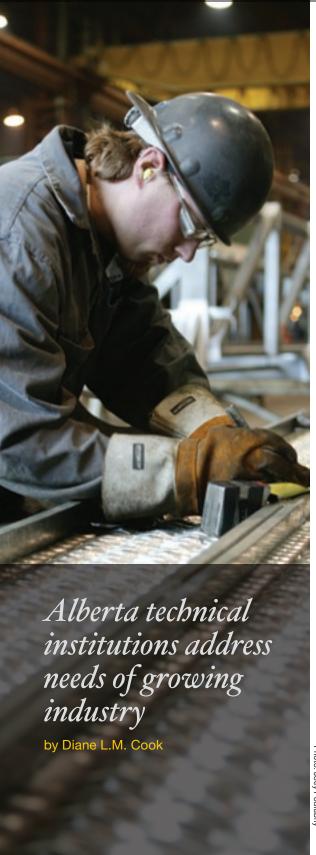
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SKILLS SOLUTIONS



t's no secret that industry in western Canada—specifically the heavy oil and oilsands sector-is suffering from a shortage of skilled workers. But what's being done to mitigate this shortage? We checked in with three Alberta educational institutions to find out.

KEYANO COLLEGE

Located in the epicentre of the Athabasca oilsands region, the City of Fort McMurray, Keyano College offers a wide variety of apprenticeship and non-apprenticeship programs to train individuals for jobs that require specific skills in the heavy oil and oilsands sector.

Glennvan't Wout, acting dean of Keyano's trades and heavy industrial division, says, "We offer apprenticeship programs such as carpentry, electrical, welding, steamfitter/pipefitter, heavy equipment technician, and millwright. All of the students in these programs are currently employed by the oilsands operators or by the companies that have been awarded contracts by the operators."

In addition to its apprenticeship programs, Keyano offers power engineering, process operating, mine operations, and truck transport programs.

"The mine operations program trains students to operate heavy equipment on operational mine sites. The truck transport program is unique in that it trains students to drive heavy equipment at our Suncor Energy Industrial Campus, which has an ideal setting of private roads on which to train on," says van't Wout.

Under its mechanical and construction trades preparation program, Keyano introduces

and trains individuals for specific skills in the mechanical and construction trades. To develop programs that reflect current practice and meet industry's requirements, Keyano collaborates with industry.

"The first step in developing our industry-related programs is to create a steering committee with representation from both industry and the college," says Marylea Jarvis, Keyano's vicepresident of instruction. "The steering committee guides program development by identifying the types of tasks a graduate would perform and the skill sets required, as well as providing advice on the curriculum and the overall nature of the program. After a program has been implemented, the steering committee will continue to offer guidance to ensure the material remains current and relevant."

Keyano partners with other educational institutions, such as the Northern Alberta Institute of Technology (NAIT), and industry to address the shortage of skilled workers. Jarvis says, "We collaborated with NAIT and Devon Canada on NAIT's Trades in Motion program to deliver trades training directly to a Métis community south of Fort McMurray."

Keyano plans to double its capacity in the trades that are high in demand and add new trades to its programs. It also plans to reintroduce its engineering technology program, implement a new inspections technologies program, and expand its ability to offer heavy equipment operator training to specifically address the shortage of skilled workers in the heavy oil and oilsands sector.

To ensure students are properly and adequately trained for jobs in the energy industry, [institutions] look at industry demand when developing new programs.

THE NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY (NAIT)

Providing technical training to individuals living in northern Alberta, NAIT offers 35 apprenticeship programs that are specific to the heavy oil and oilsands sector.

"NAIT is the only educational institution in Alberta that offers a crane and hoist program. This program is vital to the oilsands industry, where everything that is erected is done by crane. There are 600 registered crane operator apprentices in Alberta alone," says Wayne Fox, a crane and hoist equipment operator instructor at NAIT.

NAIT also offers several technology engineering programs in the areas of geology, chemical, petroleum, and electrical. Bruce Reinders, a program head, says, "Graduates from our geology program [exploration option] are employed in oilsands exploration, drilling supervision, and

geophysical logging during the reserve calculations phase for several oilsands projects. And graduates from our geology program [hydrogeological option] are employed with environmental consulting firms, dealing with groundwater protection, monitoring, and remediation associated with heavy oil and oilsands projects."

Reinders explains that graduates from NAIT's chemical engineering technology program are employed by companies that design and fabricate processing equipment for the oilsands sector.

"Some graduates are employed as operators of processing equipment in heavy oil upgraders and refineries. Graduates of our petroleum engineering technology program are employed by companies involved in the drilling and completion of wells in in situ oilsands projects and heavy oil projects. These graduates also find work in production optimization and reservoir engineering associated with heavy oil and in situ oilsands projects."

NAIT's process for developing programs directly related to industry is similar to other educational institutions.

"NAIT has advisory committees made up of industry representatives who provide guidance to our program heads and developers about which skills our students need to know and what type of material should be included in our programs. This ensures that the material and skills

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we teach our students is always up to date," says NAIT's Raquel Maurier.

NAIT collaborates with the Southern Alberta Institute of Technology (SAIT) and the British Columbia Institute of Technology by jointly owning PanGlobal, an organization that provides training for a fourth-class power engineering certificate that is required by most employers involved in heavy oil upgrading.

Although NAIT is not currently working on developing any new programs specific to the heavy oil and oilsands industry, it offers a wide variety of programs that are relevant to the sector.

THE SOUTHERN ALBERTA INSTITUTE OF TECHNOLOGY (SAIT)

SAIT, located in the heart of the energy industry's headquarter city—Calgary, provides technical training to individuals living in southern Alberta.

SAIT's MacPhail School of Energy offers a variety of programs that support the energy industry. Duke Anderson, associate vice-president of energy at SAIT says, "We offer a comprehensive selection of programs to individuals who are interested in a career in the energy industry. Currently, we offer a bachelor of applied technology, petroleum engineering; petroleum engineering technology;

power engineering technology; a process operations program; an instrumentation engineering technology diploma; an electrical engineering technology diploma; and an environmental technology program."

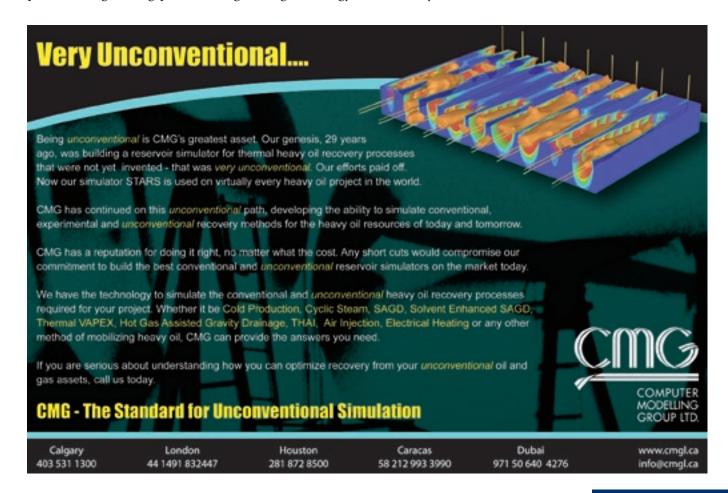
SAIT also offers the SAIT Opening Learning Instruction System (SOLIS) that is designed to quickly train field personnel in essential field operations.

"SOLIS is the industry standard for progression training and contains a total of 700 modules. From these modules, industry professionals can choose tailored training packaged into courses that suit their needs," says Anderson.

In the near future, SAIT will offer a new heavy oil course under SOLIS with the option of tailored packages of modules as necessary to meet industry requirements. A bachelor of engineering petroleum production program is also currently being developed. This will be SAIT's first full baccalaureate program at the engineering level.

To ensure its students are properly and adequately trained for jobs in the energy industry, SAIT looks at industry demand when it develops new programs.

"Not only do we meet industry's needs but we believe we meet our students' needs by providing them with the most current education, thereby providing them with better opportunities and a career they can enjoy for a lifetime," says Anderson.





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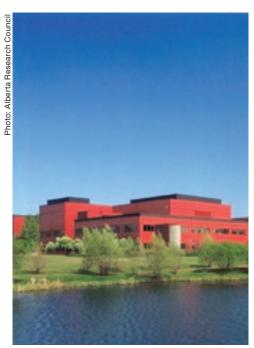
Canada's heavy oil and oilsands industry is poised to catapult the country to the position of an energy superpower. Beyond political stability and declining conventional oil production, what fuels this growth is research. Here are three facilities in Alberta that are working towards the next wave of technologies to optimize production, while reducing its footprint.



hen the Alberta Research Council (ARC) was founded in 1921, one of its first employees was Karl Clark, a young scientist who had recently been persuaded by the president of the University of Alberta, Henry Marshall Tory, to move to Alberta and pursue his work in mining research. The 33-year-old scientist had a PhD in chemistry and, at the time he met Tory, worked for the Canadian Geological Survey in Ottawa. After moving west, the main research focus of Clark's work at the newly formed research council's Edmonton laboratory was the province's oilsands resource.

Alberta's early settlers had learned of the oilsands, and newspaper accounts of the time describe trips of explorers and surveyors to the Athabasca oilsands in the 1880s. When Clark arrived in Alberta in 1921, provincial officials mostly believed that the key potential of the oilsands was as a source of asphalt for paving roads. But the age of the automobile had reached Alberta and industry in much of the world was switching from coal to oil for fuel. The Alberta government asked Clark to evaluate how the oilsands might be used to benefit the province.

By the late 1920s, Clark had developed a water-based process that separated bitumen from sand and silts. It was 40 years later, in 1967, that commercial oilsands production began, but Clark's work had taken the Athabasca oilsands to another conceptual level and, from a practical standpoint, unlocked their potential as a source of refined fuels. Variants of Clark's process are currently used in mining operations in the Fort McMurray region.



Established in 1921, the Alberta Research Council was the first provincial research organization in Canada. Much of its work has centred around the heavy oil and oilsands indsutry.

Today, ARC has an annual operating budget of more than \$80 million, with about 500 skilled employees doing research in a range of areas. Heavy oil issues—just as they were when ARC was launched more than 85 years ago—remain a focus of research. One of ARC's roles in this is to provide a range of research and technical services for some of the complex pilot projects that are being done to assess the potential of possible and emerging oilsands technologies. Here are three examples.

JOINT IMPLEMENTATION OF VAPOUR EXTRACTION (JIVE)

ARC, the Petroleum Technology Research Centre arm of the Saskatchewan Research Council (SRC), and three oil and gas companies, Husky Energy, Nexen Inc., and Canadian Natural Resources Ltd., are involved in something called JIVE. The funky-sounding acronym stands for joint implementation of vapour extraction (VAPEX), explains Ron Sawatsky, a senior heavy oil specialist at ARC.

Each of the companies is running a pilot test of hydrocarbon-based vapour extraction of heavy oil. The VAPEX process is similar to steam assisted gravity drainage (SAGD) in that it employs pairs of wells, but instead of steam, hydrocarbon solvents are injected into an upper well to dilute the bitumen and reduce its viscosity, allowing it to flow into the lower well. The process does some partial upgrading of bitumen right in the formation, and has the special advantage, which could become more critical in future, of eliminating the burning of natural gas, as water does not need to be heated to generate steam.

Sawatsky says the JIVE project uses a shared information model that, he believes, could be applied to other new technologies. Each of the parties involved benefits from all the available information being shared. One of the hoped-for spinoffs from this approach is that new technologies can be more speedily assessed for their viability, and if it's found that they work, can perhaps be brought to the commercial level relatively fast.



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As pilot tests and experiments under programs like JIVE evaluate and match various solvents with different heavy oil reservoirs, research council scientists and technical staff provide the necessary support and analysis. "We are hoping to engage industry in a similar way on other heavy oil research projects," says Sawatsky.

CARBONATES

Another area of research that is being assessed at ARC and at the Alberta Energy Research Institute (AERI) stems from the fact that an estimated 30 per cent of the estimated 1.6 trillion barrels of original oil in place (OOIP) in the oilsands is located in carbonates, not sands.

"While that is enough oil to command attention, there has never been commercial [oilsands] production out of a carbonate," says Sawatsky.

Several pilots were conducted in the 1970s and 1980s. "The results were not very good but some oil was produced," he says. ARC and AERI are reviewing the data from these pilots and a carbonate research project is being developed.

IMPROVING SAGD

Improving the SAGD production process with the addition of hydrocarbon-based solvents is another important area of oilsands research at ARC. Tawfik Nasr heads a team doing research in a process called expanding solvent, or ES-SAGD.

In this process, a mixture consisting of roughly 90 per cent

steam and 10 per cent solvent vapour is injected down the upper (SAGD) steam well. Nasr, who holds four patents for in situ recovery processes, explains the rationale for ES-SAGD.

"Each on its own—steam or solvent—has problems. Why not try using both together? Steam and solvents have been used for conventional EOR [enhanced oil recovery] for years, but there were problems such as fingering and loss of solvents. The question was: can we get the solvent and steam to work together?"

Nasr reviewed and researched vast tracts of reports and technical data before reaching some conclusions about the conditions in which a solvent/steam combo might work in a SAGD recovery project. A critical conclusion, however, was that for an ES-SAGD process to work, it was essential that the solvent and water/steam move from phase to phase liquid to gas-in tandem together. Selecting the right solvent and adjusting temperature, when feasible, helps accomplish this.

Research in the last few years has included lab work at ARC and field pilot testing by some companies-information about the companies' ES-SAGD research is mostly under wraps—but the results of a series of experiments in the ARC hydrocarbon laboratory have been promising.

Scientists in the laboratory used an industrial-scale pressure vessel to simulate underground field conditions. The results showed that ES-SAGD boosted the rate of recovery by 20 to 30 per cent while cutting fuel requirements for making steam.

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University of Calgary

by Mark Lowey

Researchers address a variety of heavy oil issues

Above: PhD candidate Jennifer Adams is working with Dr. Steven Larter to better understand the fluid properties of heavy oil and oilsands reservoirs.

cientists at the University of Calgary (U of C) are engaged in a range of research and development activities focused on heavy oil and oilsands. The following are their major initiatives.

ALBERTA INGENUITY CENTRE FOR IN SITU ENERGY (AICISE)

Established in October 2004, this research centre is the focus for a revolution in the way the oilsands are produced to create synthetic oil, commercial fuels, and spin-off products such as petroleum feedstocks.

AICISE is an initiative of Alberta Ingenuity and the Institute for Sustainable Energy, Environment, and Economy (ISEEE), along with the U of C's Schulich School of Engineering and Faculty of Science, and founding industry partner Shell International/Shell Canada Limited.

Centre co-directors Pedro Pereira-Almao, a chemist, and Steve Larter, a petroleum geologist, lead a team of researchers in multiple disciplines that is developing more efficient, cleaner, and cheaper technologies and processes to extract and upgrade in situ bitumen deposits that are too deep to be surface mined.

Researchers at AICISE are investigating novel processes, including using nanosized chemical catalysts, to extract the bitumen and, as a first step, partially upgrade it into heavy oil right in the reservoir. As this underground "reactor" technology is further refined, the goal is to produce methane, petrochemical feedstocks, and, eventually, clean-burning hydrogen directly from the reservoir.

Alberta Ingenuity has committed up to \$9 million over five years to AICISE, while the Alberta Energy and Research Institute (AERI) is contributing almost \$900,000 over three years. In November 2006, the research centre received nearly \$9.4 million from the Canada Foundation for Innovation—funding subsequently matched by the Alberta government.

"Our research targets reducing the environmental footprint of oilsands production by enhancing the upgrading of bitumen directly in the reservoir," Pereira-Almao says. "This funding will help us create the first 'park' of pilot plants in the world to advance that research, consolidating the U of C and Canada's leadership in this field."

PETROLEUM RESERVOIR GROUP

This U of C research group, led by Steve Larter, Canada Research Chair in Petroleum Geology, is focused on understanding the origin and the natural biodegradation processes of Alberta's heavy oil reserves.

The aim is to identify and characterize the best-quality reserves and to improve the recovery rate of heavy oil—which now averages only about 17 per cent worldwide. A current project with Shell Canada involves doing a geochemical characterization of bitumen in the Peace River region in order to identify pockets of higher-quality, lighter oil.

The group is also working with researchers at the Norwegian firm of Norsk Hydro and at the University of Newcastle in the U.K. on a project looking at the feasibility of greatly accelerating the natural biodegradation process in heavy oil reservoirs.

"Instead of recovering heavy oil or bitumen, you could actually recover just the clean natural gas directly from the reservoirs," Larter says.

IN SITU COMBUSTION RESEARCH GROUP

Gordon Moore and Raj Mehta, both professors of chemical and petroleum engineering with the U of C's Schulich School of Engineering, lead this research group.

Moore, Mehta, and their team are recognized internationally as pioneers in using in situ combustion technology (also called air injection) to enhance oil recovery. The process involves injecting air or pure oxygen into the reservoir to ignite a small portion of the oil, then harnessing the advance of the fire to move the oil to a location where it can be more easily recovered.

The research group is focused on thoroughly understanding the in situ combustion processes to develop a much more efficient technology for use in the field in a wide range of reservoirs. "It could mean trillions—not billions—of dollars if we can open up these reservoirs," Moore notes.

CONSORTIUM FOR RESEARCH IN ELASTIC WAVE EXPLORATION SEISMOLOGY (CREWES)

Sponsors of the advanced geophysical imaging work done by CREWES, a U of C-industry research and development consortium, include oilsands players such as ConocoPhillips, Husky Energy Inc., Devon Canada Corp., Nexen, and Petro-Canada.

CREWES' most recent research thrust, supported by almost \$2 million over four years from the federal Natural Sciences and Engineering Research Council and by 30 industry sponsors, is to produce detailed and accurate pictures of the subsurface characteristics of reservoirs. This includes the rock type, what fluids

are present in the rock, and how these fluids are moving through the rock.

"A lot of this work is really targeted at optimal reservoir management," including during enhanced recovery operations, says Rob Stewart, CREWES' director and U of C geology and geophysics professor.

Researchers at the Alberta Ingenuity Centre for In Situ Energy are investigating novel processes to extract bitumen and, as a first step, partially upgrade it in the reservoir.

CONSORTIUM FOR HEAVY OIL RESEARCH BY UNIVERSITY SCIENTISTS (CHORUS)

This collaboration between academia and industry is focused on boosting the recovery and efficiency of heavy oil using "cold" or primary recovery processes—rather than thermal processes such as SAGD.

Research goals are to understand the rock physics of heavy



oil reservoirs as they evolve through production, to develop and evaluate advanced seismic methods for monitoring these processes, and to find ways to optimize the cold production engineering process.

U of C members of CHORUS are investigating two phenomena that have a significant impact on cold production of heavy oil: worm holes (high-porosity zones) and foamy oil (solution gas trapped within oil). Based on initial results, the researchers have concluded that wormholes may help drain the reservoir, while foamy oil may aid in maintaining reservoir pressure and improving oil recovery.

TOMOGRAPHIC IMAGING AND POROUS MEDIA **LABORATORY**

U of C is also home to the Tomographic Imaging and Porous Media Laboratory, directed by Apostolos Kantzas, Canada Research Chair in Energy and Imaging.

Tomography involves using computer systems and imaging devices to track the changes that occur as waves and other signals are sent through an object (including porous media like oil and gas reservoirs), and then produce highquality images of cross-sections of the object. Kantzas and his team are involved in projects to characterize heavy oil and bitumen formations. The group is also using its low-field NMR (nuclear magnetic resonance) scanners to monitor the VAPEX process, in which solvent is injected into heavy oil reservoirs to enhance recovery.

ICENTRE LABORATORY

This four-year-old laboratory, in the Calgary Centre for Innovative Technology at the U of C, houses four large screens that project computer-generated 3-D images.

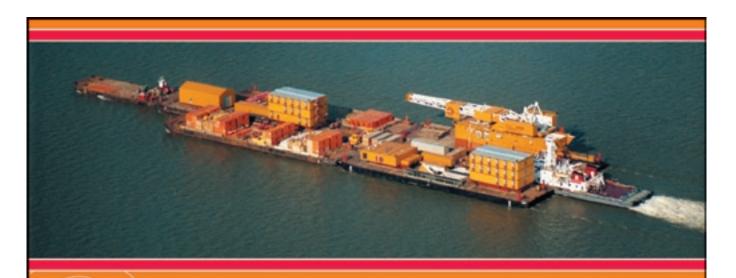
Ian Gates, associate professor of chemical and petroleum engineering, is using the iCentre to visualize what happens in bitumen reservoirs during production, and to optimize thermal recovery processes such as SAGD.

"By optimizing the process, companies will realize more profit while minimizing environmental impact," Gates says. "In the long term, this could increase Alberta's oil production."

ENERGY AND ENVIRONMENTAL SYSTEMS (EES)

EES group leader David Keith, Canada Research Chair on Energy and the Environment, and Joule Bergerson, ISEEE research associate, are working on a "life-cycle" framework to assess the full environmental and economic impacts of developing oilsands bitumen—from extraction of resources to disposal of unwanted residuals.

"Sound decision making about development of future mining and in situ operations requires improved methods for accounting for the life-cycle environmental impacts of the two methods of oilsands production," Keith says. The EES group also plans to use the life-cycle assessment model to investigate using coal—likely coupled with carbon capture and storage technology-to supply heat, electricity, and hydrogen (for upgrading) to oilsands operations as an alternative to natural gas. 🔳



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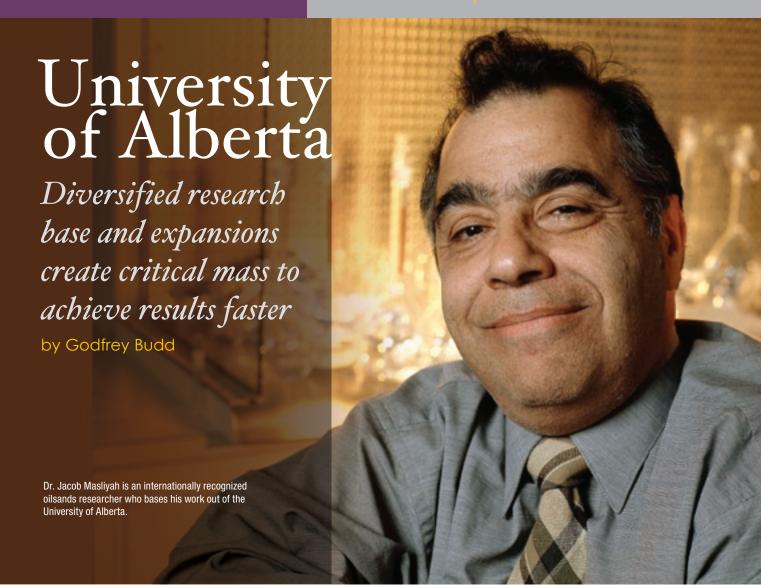


Photo: The University of Alberta

he University of Alberta is one of Canada's five biggest universities, with one of the most extensive libraries in the country. Located in the heart of the petroleum province, it is also a centre for heavy oil and oilsands research.

Dozens of professors, graduate students, and technical staff are at work on a range of oilsands research projects. As one would expect, research in these areas goes back many decades at the University of Alberta. However, oilsands research received a shot in the arm in the form of additional funding when the Imperial Oil—Alberta Ingenuity Centre for Oil Sands Innovation (COSI) was launched a few years ago.

COSI funding now includes \$10 million from Imperial Oil, \$8 million from the Alberta Ingenuity Fund, \$10 million from the Alberta Access to the Future Fund, and about \$2 million from federal science agencies.

COSI director Dr. Murray Gray says the centre is focused on two critical production areas—better economics and less environmental impact.

"We want to find processes that don't require as much water from the Athabasca River, and develop new upgrader technology with higher production and lower energy use," says Gray.

UPGRADING

One area of research designed to make upgrading more efficient relates to the presence of metals like nickel and vanadium in bottom-of-the-barrel asphaltenes. The metals in the asphaltenes deteriorate the action of catalysts in hydrocracking, a key part of upgrading. The research is focused on finding a way to selectively remove those—and only those—asphaltenes that contain nickel and vanadium. Success in this research would offer several dividends.

"It expands the options for processing, which could in turn have a range of advantages, including [options in] the choice of fuel," says Ron Myers, manager for oilsands research at Imperial Oil. Research began a year ago on the three-year project.

The feasibility of other possible research projects in catalysts is also being evaluated. One would explore zeolites and other compounds occurring in nature for their potential as catalysts to improve efficiency and reduce energy use in some extraction and upgrading processes.

Zeolites are crystalline solids with well-defined structures. Because of their unique porous properties, zeolites are used in a variety of applications with a global market of several million tonnes per annum. In the west, major uses are in petrochemical

Five projects are in the works at the Imperial Oil—Alberta Ingenuity Centre for Oil Sands Innovation to find alternatives to water-based extraction in bitumen mining.

cracking, ion-exchange (water softening and purification), and in the separation and removal of gases and solvents, according to the British Zeolite Association.

Five projects are in the works at COSI to find alternatives to water-based extraction used currently in bitumen mining. Among other things, the research will examine the science and engineering fundamentals of solvents, water, clay, and asphaltene interactions, says Myers.

The assembling and hiring of researchers and other staff is already underway, and work is scheduled to start on all five projects by mid-summer 2007.

"We have added three more upgrading research projects, and now have a well-aligned program in the key areas," says Myers. Most research projects are of two or three years' duration.

MINING

One of the challenges that oilsands mining operations have to contend with is the variability in the quality of the ore from which the bitumen is to be extracted. Not only that, but ores that present significantly different levels of difficulty for the extraction process can be hard to distinguish from one another.

"Some ores look for all purposes quite normal, but they don't yield a high recovery," explains Dr. Jacob Masliyah, a chemical engineering professor and Natural Sciences and Engineering Research Council (NSERC) Industrial Research Chair in Oil Sands Engineering at the University of Alberta.

Not part of COSI, the work of Masliyah and his team of about 20 scientists and technical people is in addition to that of the new centre.

Much of the work of Masliyah's group is involved in exploring the potential of additives to improve bitumen recovery, make the separation froth process—a key part of water-based bitumen production—work better, and, finally, to promote the settling of solids in tailings ponds. These ponds are repositories of unusable water and fine solid particles created by the production cycle. For environmental reasons, the more separation of solids from water in these ponds, the better.

"The trick is to improve all three, which is very difficult. In order to do that, you must understand the basic science. A lot of the work here is about understanding the basic science of all the processes from when the ore is scooped up out of the ground to when it is ready for upgrading," says the professor.

The group, he explains, works at developing a better understanding of the water chemistry that is critical to the extraction process in today's oilsands mining operations. The late Karl Clark invented the water-based extraction process in the 1920s, but







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some of the chemical processes that enable it to work well are not yet fully understood.

The group is also involved in research into the role that temperature plays in the process, and which temperatures are optimal and why.

"If we don't the answer to the why question, we can't improve the process. Industry is very much aware that this is the route to go," says Masliyah.

IN SITU

Another significant area of oilsands research at the University of Alberta is into what Marcel Polikar refers to as FAST SAGD (steam assisted gravity drainage). The petroleum engineering professor, who developed the concept some years ago, describes it as a combination of SAGD and cyclic steam stimulation (CSS). A key goal of the concept, for which an Alberta government agency holds a patent, is to make thermal in situ extraction more fuel-efficient.

An operation applying the concept would involve installing a pair of SAGD wells first. These would be in standard SAGD configuration, with a horizontal steam injector well to soften the bitumen about five metres above a second, producer horizontal well that would collect the bitumen. Two horizontal CSS wells would also be installed in the pay zone, with one CSS well on one side of the SAGD pair, about 50 metres away, the second on the other side of the SAGD pair, also at a distance of about 50 metres.

"From numerical simulation, we have found production to be

20 to 30 per cent higher than SAGD alone for the same amount of steam injected. We are trying to get the best of both worlds," says Polikar.

THE FUTURE

Imperial's Ron Myers says that the location of the newly minted National Institute of Nanotechnology (NINT) at the University of Alberta should benefit some aspects of oilsands research at the university. Corrosion is a big issue in many oilsands processes and one that "nano-scale-catalysts" might help mitigate. Myers, who has a Ph.D. in inorganic chemistry, also points to a possible role of special nano-chemicals in helping with emulsion breaking—often a critical process in oilsands operations.

Another positive development that should benefit oilsands research, says Myers, is the fact that the university's engineering faculty has added research staff and expanded considerably in the last five years. Referring to this development, NINT, COSI, and other research facilities at the university, he says that as a result of this "critical mass of expertise in many areas, some things could be done very quickly."

Some research projects, especially those related to aboveground oilsands processes, where conditions are more easily controlled, could perhaps achieve results with timelines measured in months or years, rather than decades, as has been the case with some subsurface processes.

The growing urgency around many of the issues involved could also act a spur to achieve results quickly. \blacksquare





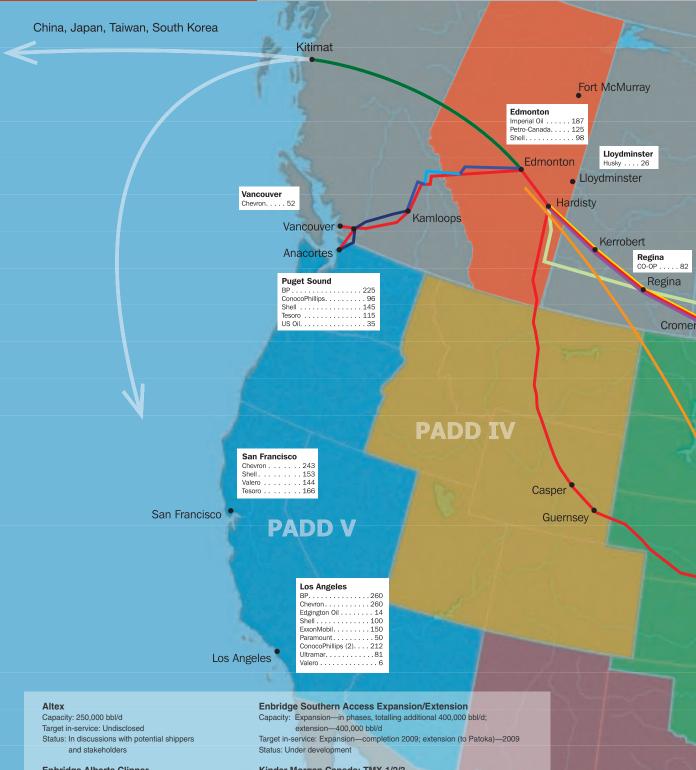
Steam Chief is recommended for use on tubing, casing

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STATISTICS



Enbridge Alberta Clipper

Capacity: 450,000 bbl/d Target in-service: 2009

Status: Regulatory applications to be filed in early 2007

Enbridge Gateway

Capacity: 400,000 bbl/d Target in-service: 2012-2014 Status: In discussions with potential shippers and stakeholders

Kinder Morgan Canada: TMX-1/2/3

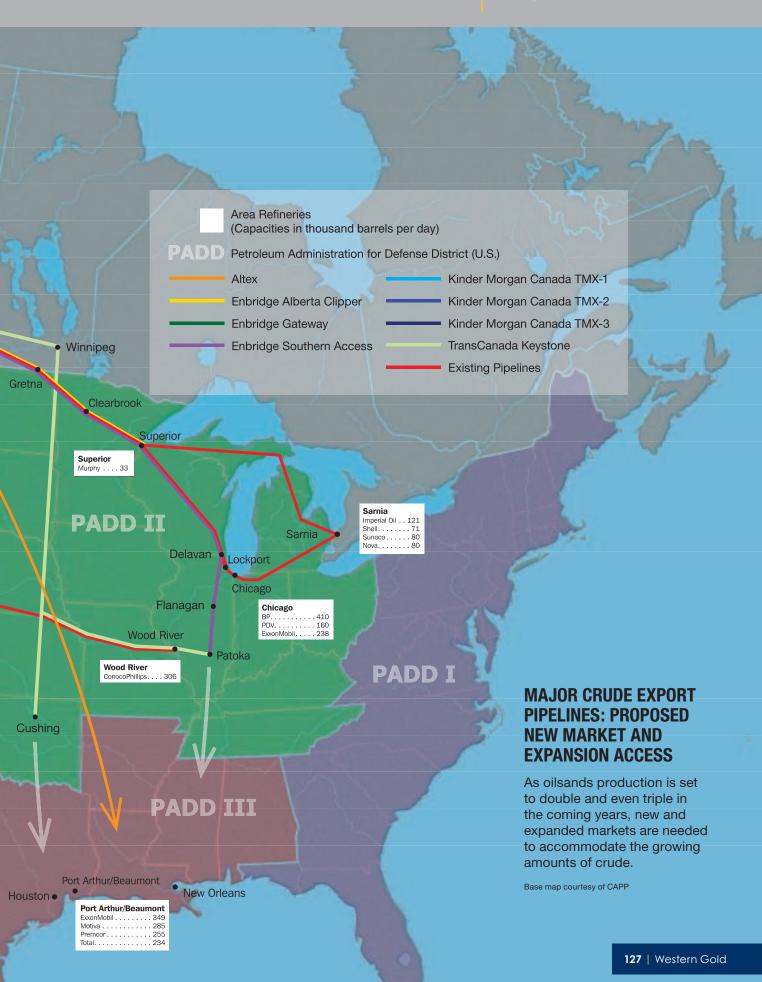
Capacity: TMX-1—40,000 bbl/d; TMX-2—100,000 bbl/d; TMX-3—undisclosed Target in-service date: TMX-1—2008, TMX-2—2009; TMX-3—undisclosed Status: TMX-1 under construction; TMX-2 in discussions with potential shippers; TMX-3 undisclosed

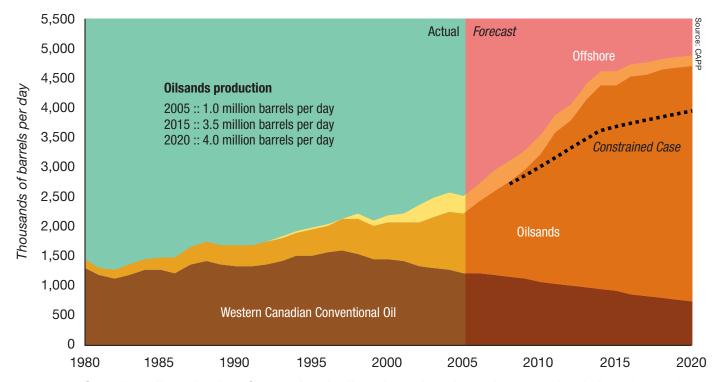
TransCanada Keystone

Capacity: 435,000 bbl/d Target in-service: 2009

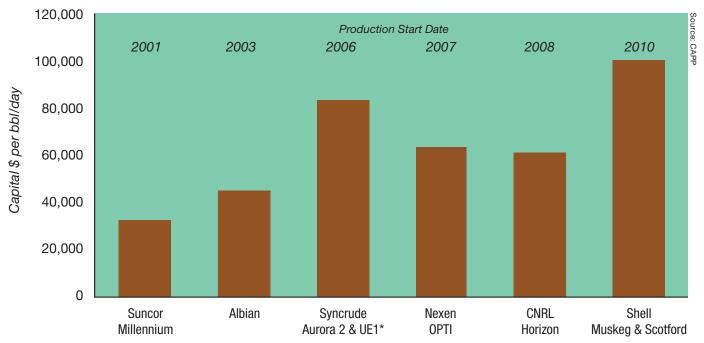
Status: application filed with NEB, hearing held in fall 2006

Houston/Texas City
Crown
Deer Park (Shell) 334
ExxonMobil557
Lyondell - CITGO 270
Valero (2)90
BP437
ConocoPhillips (Ponca Sweeny), 229
Marathon Ashland72
Valero (2) 293



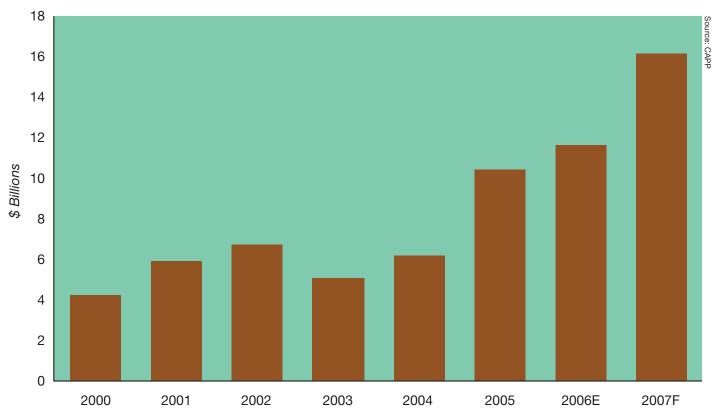


Canadian oil production: Conventional, oilsands, and offshore. As conventional oil production in Canada declines, the oilsands industry will play a key part in maintaining and increasing production. Offshore production will also have a role to play.

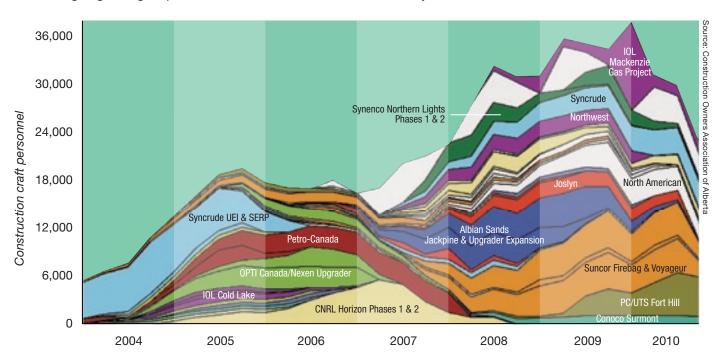


*Syncrude includes base plant quality improvements and power

Oilsands capital costs increases. Due to a variety of factors such as labour strain, rapid development in countries such as India and China (increasing costs for materials), the capital cost of a 100,000 barrel per day project has gone from \$3.3 billion in 2001 to \$10 billion forecast in 2010.

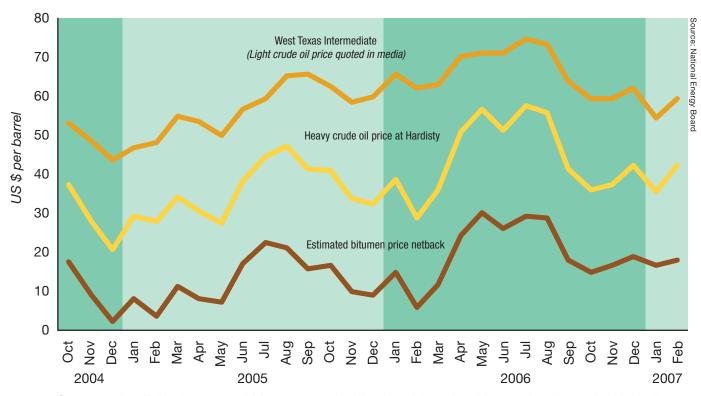


Capital investment in the oilsands industry. Oilsands operations are large-scale, high-risk ventures that require significant up-front capital investment. With the number of projects in the planning or expansion stages growing, capital investment has increased substantially since 2000.



Construction workforce outlook: October 2006. Labour strains in western Canada—especially for skilled trades for construction of a variety of projects, which are shown here—look set to continue to at least 2010. In fact, the COAA graph shows demand has not yet even peaked, further challenging Canada's industrial project developers.

STATISTICS



Comparative light, heavy, and bitumen crude oil price. All crude oil is not valued equally. Light oil is more valuable to refiners than heavy oil. The differential in value between oils is determined by the market for each type. Wider differentials lead to poorer profitability for heavy oil and oilsands producers.



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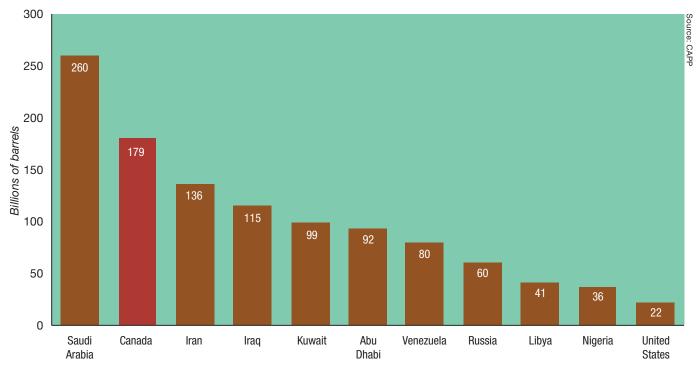
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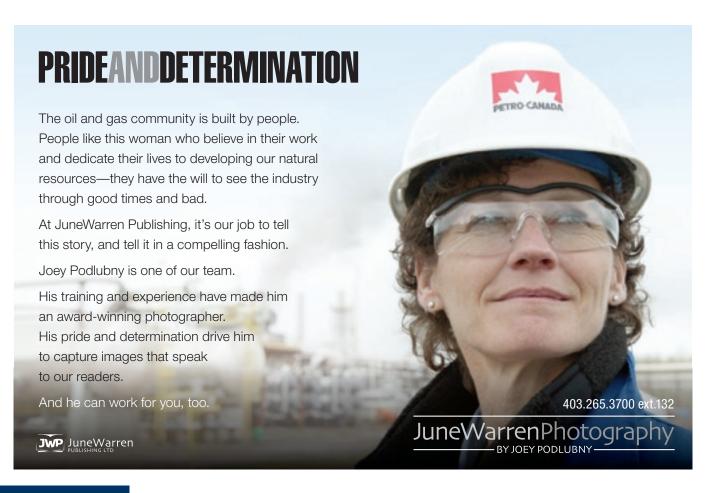




STATISTICS



Global crude oil reserves by country. Canada's 179 billion barrels of oil reserves shown here include its 175 billion barrels of recoverable oilsands. This number, only recently recognized by the global community, places Canada second only to Saudi Arabia for its oil development potential.





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Glossary

Understanding the language of the heavy oil and oilsands industry

API

An American Petroleum Institute measure of liquid gravity. Water is 10 degrees API, and a typical light crude is from 35 to 40. Heavy oil is, by convention, typically from 9.0 to 11 degrees API, while bitumen is 7.5 to 8.5.

AROMATICS

Hydrocarbon species that occurs in unusually high concentrations in bitumen and some derived products.

ASPHALTENES

The heaviest and most concentrated aromatic hydrocarbon fractions of bitumen.

BANKED CUBIC METRES (BCM)

A measurement of volume used to state the volume of in situ material moved during mining operations.

BARREL

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

BITUMEN

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

BUCKET-WHEEL EXCAVATOR

Mining machine that uses toothed buckets mounted on the rim of a revolving wheel to scoop up oilsand and deposit it on a conveyor system.

CATALYST

Used in upgrading processes to assist cracking and other upgrading reactions.

COKE

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

COKING

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

COLD HEAVY OIL PRODUCTION WITH SAND (CHOPS)

CHOPS is a non-thermal primary heavy oil production method. Continuous production of sand improves the recovery of heavy oil from the reservoir. The simultaneous extraction of oil and sand during the cold production of heavy oil generates high-porosity channels termed "wormholes." Wormholes grow in a three-dimensional radial pattern within a certain layer of net pay zones, resulting in the development of a high permeability network in the reservoir, boosting oil recovery. In most cases, an artificial lift system is used to lift the oil with sand.

COGENERATION

The simultaneous production of electricity and steam.

CONDENSATE

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

CONVENTIONAL CRUDE OIL

Mixture mainly of pentane and heavier hydrocarbons recoverable at a well from an underground reservoir and liquid at atmospheric pressure and temperature. Unlike bitumen, it flows through a well without stimulation and through a pipeline without processing or dilution. In Canada, conventional crude oil includes light, medium, and heavy crude oils, like those produced from the Western Canadian Sedimentary Basin. Crude oils containing more than 0.5 per cent of sulphur are considered "sour," while crudes with less than 0.5 per cent are "sweet."

CRACKING

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

CYCLIC STEAM STIMULATION

For several weeks, high-pressure steam is injected into the formation to soften the oilsand before being pumped to the surface for separation. The pressure created in the underground environment causes formation cracks that help move the bitumen to producing wells. After a portion of the reservoir has been saturated, the steam is turned off and the reservoir is allowed to soak for several weeks. Then the production phase brings the bitumen to the surface. It either flows on its own, or is pumped up the well to the surface. When the rates of production start to decline, the reservoir is pumped with steam once again.

CYCLOFEEDER

Receives oilsand feed and prepares it in slurry form for transport to extraction.

DEASPHALTING (OR SOLVENT DEASPHALTING)

A physical separation process using light solvents to separate heavy material from deasphalted oil.

DENSITY

The heaviness of crude oil, indicating the proportion of large, carbon-rich molecules, generally measured in kilograms per cubic metre (kg/m³) or degrees on the American Petroleum Institute (API) gravity scale; in western Canada, oil up to 900 kg/m³ is considered light to medium crude—oil above this density is deemed as heavy oil or hitumen.

DESULPHURIZATION

The process of removing sulphur and sulphur compounds from gases or liquid hydrocarbon mixes.

DII BIT

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

DILSYNBIT

A blend of bitumen, condensate, and synthetic crude oil similar to medium sour crude.

DILUENT

see Condensate

DRAGLINE

Mining machine that drops a heavy, toothed bucket on a cable from the end of a boom into the oilsand, then drags the bucket through the deposit, scooping up the sand.

EBULLATED BED PROCESS

An upgrading/refining process that uses an expanded, ebullated bed of catalyst for hydrocracking.

ENGINEERED TAILS

A term used to describe a mixture of mature fine tails and coarse tails. Also referred to as "consolidated tails."

ENHANCED OIL RECOVERY (EOR)

The third stage of hydrocarbon production during which sophisticated techniques that alter the original properties of the oil are used. Enhanced oil recovery can begin after a secondary recovery process or at any time during the productive life of an oil reservoir. Its purpose is not only to restore formation pressure, but also to improve oil displacement or fluid flow in the reservoir.

The three major types of enhanced oil recovery operations are chemical flooding (alkaline flooding or micellar-polymer flooding), miscible displacement (carbon dioxide $[{\rm CO}_2]$ injection or hydrocarbon injection), and thermal recovery (steam flood). The optimal application of each type depends on reservoir temperature, pressure, depth, net pay, permeability, residual oil and water saturations, porosity and fluid properties such as oil API gravity, and viscosity.

ESTABLISHED RECOVERABLE RESERVES

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

ESTABLISHED RESERVES

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

EXTRACTION

A process, unique to the oilsands industry, which separates the bitumen from the oilsand using hot water, steam, and caustic soda.

FINE TAILINGS

Essentially muddy water—about 85 per cent water and 15 per cent fine clay particles by volume produced as a result of extraction.

FINES

Minute particles of solids such as clay or sand.

FISCAL TERMS

Royalty and tax terms under which the industry operates.

FLUID COKING

A residual upgrading process which continuously cracks the heaviest fraction of bitumen into lighter hydrocarbons as fluid coke.

FRACTION

A portion of crude oil defined by boiling range. Naptha, diesel, gas oil, and residual are fractions of crude oil.

FROTH TREATMENT

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

GAS OIL

The fraction of crude oil that can be processed into gasoline through fluid catalytic cracking or hydrocracking in a refinery.

GASIFICATION

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

GREENHOUSE GASES

Gases commonly believed to be connected to climate change and global warming. ${\rm CO}_2$ is the most common, but greenhouse gases also include other light hydrocarbons (such as methane) and nitrous oxide.

GYPSUM

A byproduct of flue gas desulphurization units, and is also partly consumed in mining operations to help consolidate fine tailings.

HEAVY CRUDE OIL

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

HYDROCRACKING

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

HYDROPROCESSING

An upgrading/refining process that adds hydrogen to crude oil fractions using a catalyst system. Hydroprocessing includes both hydrotreating and hydrocracking.

HYDROTRANSPORT

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

HYDROTREATER

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

INITIAL ESTABLISHED RESERVES
Established reserves prior to the deduction of any production.

INITIAL VOLUME IN PLACE

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

IN SITU

In its original place; in position; in situ recovery refers to various methods used to recover deeply buried bitumen deposits, including steam injection, solvent injection, and fire floods.

IN SITU COMBUSTION

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

LC-FINING

A licensed hydroprocessing upgrading technology that uses an ebullated catalyst bed to continuously crack the heaviest fraction of bitumen into lighter products.

LEASE

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

LIGHT CRUDE OIL

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

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I would recommend Oilpatch 101 for anyone entering the oil and gas industry or people who are changing roles and would benefit from a broad understanding of how each sector is linked together. The material was easy to follow and our facilitator, Frank, was extremely knowledgeable and able to offer insight into virtually any topic area.

Donovan Volk Portfolio Manager, Oil & Gas Solutions CGI Calgary, Alberta



GLOSSARY

MATURE FINE TAILINGS

A gel-like material resulting from the processing of clay fines contained within the oilsands.

MEDIUM CRUDE OIL

Liquid petroleum with a gravity between 23 and 28 degrees API.

MIDDLINGS

Mixture of water, clay, sand, and bitumen that remains between the bitumen froth at the surface and the sand at the bottom of a primary separation vessel at the end of the extraction stage. Further processing is required to maximize bitumen recovery.

MUSKEG

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

NAPHTHA

Any of various volatile, often flammable, liquid hydrocarbon mixtures used chiefly as solvents and diluents. Naptha has a boiling range of 40 to 400 degrees Celsius.

OILSANDS

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

OVERBURDEN

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

PILOT PLANT

Small model plant for testing processes under actual production conditions.

PRIMARY PRODUCTION

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

PROCESS GAS

Gas produced from the upgrading process that is not distilled as a liquid. Usually burned as a fuel.

PROVEN RECOVERABLE RESERVES

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

RECLAMATION

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

REMAINING ESTABLISHED RE-SERVES

Initial reserves less cumulative production.

RESIDUUM

The heaviest boiling fraction (552 degrees Celsius plus) remaining after processing or distillation of hydrocarbons.

ROYALTY

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

SOUR OIL

Crude oil containing free sulphur, hydrogen sulphide, or other sulphur compounds.

STEAM ASSISTED GRAVITY DRAINAGE (SAGD)

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

STEAM METHANE REFORMING

A process commonly used to convert natural gas to hydrogen for upgrading.

SURFACE MINING

Operations to recover oilsands by open-pit mining, where overburden depth permits.

SYNBIT

A blend of bitumen with sweet synthetic crude oil to meet pipeline transportation specifications.

SYNTHETIC CRUDE OIL

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

TAILINGS

A combination of water, sand, silt, and fine clay particles that is a byproduct of removing the bitumen from the oilsand.

TAILINGS SETTLING BASIN

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

THERMAL RECOVERY

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

TOE-TO-HEEL AIR INJECTION (THAI)

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

TRUCK-AND-SHOVEL MINING

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

UPGRADING

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

VAPOUR EXTRACTION (VAPEX)

VAPEX is a non-thermal recovery method that involves injecting a gaseous hydrocarbon solvent into the reservoir where it becomes less viscous, then drains into a lower horizontal well and is produced.

VISBREAKING

A process designed to reduce residue viscosity by thermal means, but without appreciable coke formation.

VISCOSITY

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

WESTERN CANADIAN

SEDIMENTARY BASIN (WCSB)

The major land-based sedimentary basin in Canada. The basin extends from British Columbia in the west, eastward through Alberta, Saskatchewan, and Manitoba, and includes portions of the Northwest and Yukon territories. ■

Upcoming Events 2007*

April 25

Fundamentals of Oil Sands Taxation, Regulatory Approval, and Venture Structuring Strategies Telus Convention Centre | Calgary, Alberta www.insightinfo.com

April 25-26

Supply Chain Challenges in Oilsands Expansion and Conventional Production Coast Plaza Hotel & Conference Centre | Calgary, Alberta

www.canadianinstitute.com

May 16-17

Seventh Biennial Peace Region Petroleum Show Grande Prairie, Alberta

www.peaceregionpetroleumshow.com

May 14-17

CPSG/CSEG 2007 Convention

Roundup Centre, Stampede Park | Calgary, Alberta www.geoconvention.org

June (date undisclosed)

2007 Oil Sands Investor Symposium

New York, New York

www.srinstitute.com/oilsands

June 3-5

CERI 2007 Petrochemical Conference

Delta Lodge at Kananaskis I Kananaskis Country, Alberta www.ceri.ca

June 6-7

12th Biennial Saskatchewan Oil and Gas Show Exhibition Grounds | Weyburn, Saskatchewan www.oilshow.ca

June 12-14

GO EXPO: Gas and Oil Exposition 2007 Stampede Park | Calgary, Alberta www.petroleumshow.com

June 18-20

CAPP Investment Symposium Hyatt Regency Hotel | Calgary, Alberta www.capp.ca

June 21-22

PSAC Investment Symposium

Calgary, Alberta www.psac.ca

July 18-20

Oil Sands and Heavy Oil Technologies Conference and Exhibition

Telus Convention Centre | Calgary, Alberta http://Oshot07.events.pennnet.com

September 11-12

Oil Sands Tradeshow & Conference 2007 C.A. Knight Centre | Fort McMurray, Alberta www.petroleumshow.com

*This is a listing of select events only

Between May and September, Fort McMurray Tourism offers site tours of Syncrude Canada and Suncor Energy. The package, which does not include transportation to Fort McMurray, includes two nights accommodation at one of four local hotels, a site tour, breakfast at the hotel both mornings, as well as admission to both the Oil Sands Discovery Centre and Heritage Park.

DATES

Syncrude Canada

Starting May 19 Saturdays only

June Thursday, Friday, and Saturday

July & August Wednesday to Saturday September Friday and Saturday

Suncor Energy

June Sunday and Monday July & August Sunday to Tuesday

Source: Fort McMurray Tourism

n interactive story

THE OIL SANDS DISCOVERY CENTRE SHARES THE INDUSTRY WITH THE WORLD

For those who are new to the oilsands industry, production installations can be complex and confusing puzzles of curving, stretching pipes, giant vessels, and heavy equipment. Combined with a sandbox on the largest of scales, and steam generators that burn giant fires inside their bellies, the story of the oilsands industry can seem almost impossible to fully understand.

There is really only one way a person can learn about the whole operation, from its history and current technology to its future, all in one place. For the last 20 years, the Oil Sands Discovery Centre in Fort McMurray, Alberta, has been sharing this engaging tale with visitors from all over the world.

"People get a sense of exactly what the oil-sands looks like, smells like, and what it's like to handle it. It makes it real to them," says Janet Annesley, Shell Canada's senior public affairs representative for oilsands. "It really gives people a good grounding in the development of the oilsands, where it started and how we have gotten to the million barrels of production we see today."

The Oil Sands Discovery Centre is open daily, year-round, although it is closed on Mondays.



Networking

Networking

ASSOCIATIONS/ORGANIZATIONS

Alberta Association of Surface Land Agents 140, 21-10405 Jasper Ave Edmonton AB T5J 3S2 Phone: (780) 413-3185 Fax: (780) 421-0204 Contact: Ted Parent, President tedp@hurland.ca www.aasla.com

Alberta Building Trades Council 11848 111 Ave NW Edmonton AB T5G 0E1 Phone: (780) 421-9400 Fax: (780) 421-9433 www.albertabuildingtrades.com

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Champion Technologies Ltd 1400-815 8 Ave SW Calgary AB T2P 3P2 Phone: (403) 234-7881 www.champ-tech.com

ICTC - Innovative Chemical Technologies Canada Ltd 400-635 6 Ave SW Calgary AB T2P 0T5 Phone: (403) 720-5020 www.eclgroup.com

Lone Wolfe Distributors c/o Sci-Tech Engineered Chemicals 340-53016 Hwy 60 Acheson AB T7X 5A7 Phone: (780) 960-1200

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Quadra Chemicals (Western) Ltd 470-700 4 Ave SW Calgary AB T2P 3J4 Phone: (403) 232-8130 www.quadrachemicals.com

Regent Control Systems 300-840 6 Ave SW Calgary AB T2P 3T5 Phone: (403) 269-8088 www.regentcontrol.com

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Select Energy Systems Inc 4215 54 Ave SE Calgary AB T2C 2A2 Phone: (403) 243-7542 www.selectesi.com

Source Energy Tool Services Inc 6606 50 Ave Lloydminster AB Phone: (780) 808-8788 www.sourceenergy.ca

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Synerchem International Inc 4333 46 Ave SE Calgary AB T2B 3N5 Phone: (403) 203-1481

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West Penetone Inc 16803 118 Ave NW Edmonton AB T5V 1H3 Phone: (780) 455-9161

Wil-Chem Specialty Chemicals Ltd PO Box 639 Thorhild AB TOA 3J0 Phone: (780) 398-3990

Windale Oilfield Services Ltd 5517 38 St Lloydminster AB Phone: (780) 871-1999

Winterhawk Enterprises (Provost) Ltd P0 Box 2925 Wainwright AB T9W 1S8 Phone: (780) 842-2841 www.winterhawk.ca

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Baldwin Filters PO Box 66111 Heritage Postal Outlet Edmonton AB T6J 6T4 Phone: (780) 468-3499 www.baldwinfilter.com

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Border Paving Ltd 4217 41 St Camrose AB T4V 3V8 Phone: (780) 672-3389

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Seko Construction Ltd 425 Gregoire Dr Fort McMurray AB T9H 4K7 Phone: (780) 743-1636

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Boxer Petroleum Services Inc P0 Box 6819 Bonnyville AB T9N 2H3 Phone: (780) 826-5002 www.boxervalve.com

Brother's Oilfield Services PO Box 3273 Wainwright AB T9W 1T2 Phone: (780) 842-4220

Carson Welding & Maintenance Ltd P0 Box 3273 Wainwright AB T9W 1T2 Phone: (780) 842-4220 www.carsonwelding.com

Central Peace Contracting Ltd Peace River AB Phone: (780) 338-3898

Christina River Enterprises (1987) Ltd PO Box 6040 Stn Main Fort McMurray AB T9H 4W1 Phone: (780) 334-2446 www.clac.ca

Cold Lake First Nations PO Box 1769 Stn Main Cold Lake AB T9M 1P4 Phone: (780) 594-7183

Consun Contracting Ltd PO Box 5056 Stn Main Fort McMurray AB T9H 3E2 Phone: (780) 743-3163

Crude Energy Services Inc PO Box 2635 Lac La Biche AB TOA 2C0 Phone: (780) 623-4409

D E Prpich Enteprises Ltd PO Box 645 High Prairie AB TOG 1E0 Phone: (780) 523-3661 Denision Contractors Ltd 7912 97 Ave Peace River AB T8S 1W5 Phone: (780) 624-5718

Denmar Energy Services Ltd PO Box 8029 Bonnyville AB T9N 2J3 Phone: (780) 826-5523 www.denmarenergy.com

Deynaka Developments Ltd PO Box 935 High Prairie AB TOG 1E0 Phone: (780) 523-2420

E Construction Ltd 10130 21 St Edmonton AB T6P 1W7 Phone: (780) 467-7701 www.ecltd.ca

E G Gas Operators Ltd PO Box 26 Innisfree AB TOB 2GO Phone: (780) 592-3733

Elite Mechanical PO Box 12188 Lloydminster AB T9V 3C4 Phone: (780) 808-8450 www.elitemechanical.ca

Enmax Corporation 141 50 Ave SE Calgary AB T2G 4S7 Phone: (403) 514-3290 www.enmax.com

Estabrook Construction Ltd PO Box 258 Grimshaw AB TOH 1W0 Phone: (780) 332-4111

Fort McKay Group of Companies PO Box 5360 Stn Main Fort McMurray AB T9H 3G4 Phone: (780) 828-2400

Foster Bulldozing Services Ltd PO Box 540 Mannville AB TOB 2W0 Phone: (780) 763-3750

Gallivan Construction Ltd PO Box 10 Tangent AB TOH 3JO Phone: (780) 359-2052

GEM Grant Energy & Maintenance PO Box 1683 High Prairie AB TOG 1E0 Phone: (780) 523-3470

Gift Lake Metis Settlement PO Box 60 Gift Lake AB TOG 1B0 Phone: (780) 767-3894

Glen Armstrong Construction Ltd 8122 102 Ave Peace River AB T8S 1M6 Phone: (780) 624-2101

Granite Oilfield Services Inc 6006 52 Ave Lloydminster AB T9V 2S8 Phone: (780) 875-1652 Grimm Mel Holdings Ltd PO Box 630 Manning AB TOH 2M0 Phone: (780) 836-3632

Guest Industrial Contractors Ltd 5503 52 St Lloydminster AB T9V 0R7 Phone: (780) 875-5877

H. Wilson Industries Ltd 7829 Franklin Ave Fort McMurray AB T9H2H5 Phone: (780) 743-1881 www.wilson-industries.com

Homeland Well Servicing Ltd GD Fishing Lake AB TOA 3G0

Phone: (780) 943-2466

Hugo Zbinden Contracting

137 Berens Pl Fort McMurray AB T9K 2C3 Phone: (780) 714-9690

Jay's Salvage & Cats Ltd Site 632 Comp 3 RR 1 Lac La Biche AB TOA 2C1 Phone: (780) 623-4096

JMB Crushing Systems Ltd 4725 Railway Ave Elk Point AB Phone: (780) 724-3960

K G Enterprises Ltd PO Box 787 Lamont AB TOB 2R0 Phone: (780) 895-7554

L Robert Enterprises Ltd 125 MacKay Cres Fort McMurray AB T9H 4C9 Phone: (780) 791-0118

Lakeshore Contracting Ltd 14 Crescent Hts Fort McMurray AB T9H 1L6 Phone: (780) 714-3665

Liam Construction Inc 36 Riedel St Fort McMurray AB T9H 3E1 Phone: (780) 791-1500

Location Cats PO Box 1397 St Paul AB TOA 3A0 Phone: (780) 645-5336 www.locationcats.com

Lorenzen's Oilfield Service Ltd PO Box 353 Manning AB TOH 2M0 Phone: (780) 836-3786

M & J Cats Ltd PO Box 749 Lac La Biche AB TOA 2C0 Phone: (780) 623-7653

Millennium Cats Inc PO Box 1914 Lac La Biche AB TOA 2CO Phone: (780) 623-4036

Monad Industrial Constructors Inc 8812 60 Ave NW Edmonton AB T6E 6A6 Phone: (780) 468-8026 **Neegan Development Corporation Ltd**

283 MacAlpine Cres Fort McMurray AB T9H 4Y4 Phone: (780) 791-9386

NorDen Contracting Ltd

PO Box 2307 Lac La Biche AB TOA 2CO Phone: (780) 623-7567

Northern Backhoe Ltd PO Box 149

Manning AB T0H 2M0 Phone: (780) 836-2617

Permasteel Construction Ltd 17430 103 Ave NW Edmonton AB T5S 2K8 Phone: (780) 452-7281 www.permasteel.com

Peter Kiewit Sons Co Ltd 11211 215 St NW Edmonton AB T5S 2B2 Phone: (780) 447-3509

ww.kiewit.ca

Phoenix Industrial Maintenance Ltd

3703 38 Ave Whitecourt AB T7S 1P7 Phone: (780) 778-5883 www.phoenixindustrial.ca

Porkys Oilfield Construction Ltd 2101 17 Ave

Wainwright AB T9W 1L2 Phone: (780) 842-3661

Prairie Tech Oilfield Services

PO Box 819 Elk Point AB TOA 1A0 Phone: (780) 614-1873

Precision Contractors Ltd PO Box 10578 Lloydminster AB T9V 3A7

Phone: (780) 875-1962

R P Mad Enterprises Girouxville AB

Phone: (780) 323-4356 **Riverside Oilfield Services**

5709 50 Ave Bonnyville AB

Phone: (780) 826-9327

Rocky Pine Oilfield Services Ltd PO Box 739 Stn Main Lloydminster SK S9V 1C1 Phone: (780) 871-1238

S N R Contracting Ltd PO Box 357

Wabasca AB TOG 2K0 Phone: (780) 891-2169

Sabre Cats Ltd 10140 101 St Lac La Biche AB Phone: (780) 623-2113

Schindle & Bazin Oilfield Construction

Lloydminster AB Phone: (780) 875-7710 **Shadow Oilfield Services**

PO Box 231

McLennan AB T0H 2L0 Phone: (780) 324-2137

Shamrock Valley Enterprises Ltd

PO Box 505 Elk Point AB TOA 1A0 Phone: (780) 724-3177

Skully's Oilfield Maintenance Ltd

PO Box 272 Viking AB T0B 4N0 Phone: (780) 336-4064

Spirig Welding Ltd

PO Box 68

Dixonville AB TOH 1E0 Phone: (780) 971-3730

Steed Contracting PO Box 6955

Peace River AB T8S 1S7 Phone: (780) 624-8108

Stony Valley Contracting 212 Beaconhill Dr

Fort McMurray AB T9H 3G3 Phone: (780) 743-0527

Stuber's Cat Service Ltd Site 7 Box 12 RR 2 Barrhead AB T7N 1N3 Phone: (780) 785-2173

Szmyrko Construction PO Box 300 Boyle AB TOA 0M0 Phone: (780) 689-9497

www.szmyrko.com

Tarsands Steam Cleaning PO Box 39

Kehiwin AB T0A 1C0 Phone: (780) 826-6392

Tercom Enterprises Reception 200-9401 Franklin Ave Fort McMurray AB T9H 3Z7 Phone: (780) 799-3217 www.dclconstruction.com

Thompson Bros (Constr) Ltd 411 South Ave Spruce Grove AB T7X 3B4 Phone: (780) 962-1030 www.thompsonbros.com

Tuc's Contracting 283 MacAlpine Cres Fort McMurray AB T9H 4Y4 Phone: (780) 791-9386

TWB Construction Ltd 210 Weston Ave W Maidstone SK S0M 1M0 Phone: (306) 893-4500

W.A.T. Holdings Ltd PO Box 1170 Wabasca AB TOG 2K0 Phone: (780) 891-3006

Wiebe Construction PO Box 818 Manning AB T0H 2M0 Phone: (780) 836-3220

DRILLING PRODUCTS & SERVICES

A & C Water Well Drilling PO Box 6469 Bonnyville AB T9N 2H1

Phone: (780) 826-5625

Aable Directional Drilling Box 14 Site 15 RR 3 Olds AB T4H 1P4 Phone: (403) 556-7400

Ace Power Tongs PO Box 1576 Slave Lake AB TOG 2A0

Phone: (780) 805-2999 **AKITA Drilling Ltd** 900-311 6 Ave SW

Calgary AB T2P 3H2 Phone: (403) 292-7979 www.akita-drilling.com

Akuna Drilling Limited Partnership 300-500 4 Ave SW Calgary AB T2P 2V6 Phone: (403) 214-5970 www.akunadrilling.com

Alfs Drilling & Supplies Ltd

PO Box 452 Viking AB T0B 4N0 Phone: (780) 336-2207

Alliance Drilling Fluids Ltd 1840-840 7 Ave SW Calgary AB T2P 0Z9 Phone: (403) 663-9766 www.alliancefluids.com

Allstar Oilfield Services Ltd PO Box 11279

Lloydminster AB T9V 3B5 Phone: (780) 875-1918

Anchor Industries Ltd RR 1 Site 1 Box 8 Bon Accord AB TOA 0K0 Phone: (780) 921-2144

Anchors First Ltd PO Box 2388 Stn Main Lloydminster SK S9V 1W5 Phone: (306) 825-6535

Apex Oilfield Services (2000) Inc 2020-633 6 Ave SW Calgary AB T2P 0T5 Phone: (403) 257-5152 www.apexoil.ca

B-Line Horizontal Directional Drilling

PO Box 7 Elk Point AB TOA 1A0 Phone: (780) 724-2184

Baxter's Mobile Rig Service Ltd. 5106 63 St

Lloydminster AB T9V 2E6 Phone: (780) 872-5955

Benoit Rentals PO Box 51 Chauvin AB T0B 0V0 Phone: (780) 858-2212 **Black Gold Drilling** PO Box 56 Nampa AB T0H 2R0 Phone: (780) 322-2123

Bonnyville Drilling Services 5210 54 Ave Bonnyville AB T9N 2H9 Phone: (780) 826-3906

Brandt NOV 1600-540 5 Ave SW Calgary AB T2P 0M2 Phone: (403) 264-9646 www.varco.com

Brian Steed Contracting & Horizontal Drilling Ltd PO Box 6934

Peace River AB T8S 1S7 Phone: (780) 624-8609

Canadian Mat Systems Inc 241 76 Ave NW Edmonton AB T6P 1P2 Phone: (780) 485-0808 www.matsystems.ca

Carnwood Wireline Service Ltd PO Box 427 Slave Lake AB 2A0 Phone: (780) 849-3085

Cheyenne Rig Repair & Supply Ltd PO Box 1319 Gibbons AB TOA 1NO

Phone: (780) 414-1477 www.chevron.ca

Con-Force Structures Limited 4300 50 Ave SE Calgary AB T2B 2T7 Phone: (403) 248-3171 www.con-force.com

CTC Energy Services 7755 Edgar Industrial Way Red Deer AB T4P 3R2 Phone: (403) 347-6717 www.buildersenergy.com

Directional Plus 1700-715 5 Ave SW Calgary AB T2P 2X6 Phone: (403) 265-2560 www.directionalplus.com

Discovery Seismic Drilling PO Box 456 Bashaw AB T0B 0H0 Phone: (780) 372-3883

Edcon Power Tongs and Oilfield Services Ltd PO Box 209 Lac La Biche AB TOA 2CO

Phone: (780) 623-4808

Emco Corporation - Waterworks & Geosynthetics 1-270 MacKay Cres Fort McMurray AB T9H 5C6 Phone: (780) 713-2433 www.emcoltd.com

Encore Coring & Drilling Inc 1345 Highfield Cres SE Calgary AB T2G 5N2 Phone: (403) 287-0123 www.ensignenergy.com/encore

G & L Slotco Oil Field Services 1110-700 4 Ave SW Calgary AB T2P 3J4 Phone: (403) 261-1717 www.gl-slotco.com

Garritty And Baker Geotechnical Drilling Inc 5715 56 Ave NW Edmonton AB T6B 3G3 Phone: (780) 433-8786

www.garrittyandbakerdrilling.com

GrenCo Industries Ltd 3710 78 Ave NW Edmonton AB T6B 3E5 Phone: (780) 468-2000 www.grenco.com

Hitech Power Tongs Inc PO Box 1088 Gibbons AB TOA 1N0 Phone: (780) 872-5322 www.mightymitetongs.ca

Hunting Energy Services (Canada) Ltd. 5550 Skyline Way NE Calgary AB T2E 7Z7 Phone: (403) 543-4477 www.hunting-intl.com

Hurricane Industries Ltd P0 Box 2038 Lloydminster SK S9V 1R5 Phone: (780) 875-5597 www.hurricanefoam.com

Hydril Canadian Company LP 2700-350 7 Ave SW Calgary AB T2P 3N9 Phone: (403) 531-1590 www.hydril.com

Impact Rock Bits PO Box 6448 Peace River AB T8S 1S3 Phone: (780) 624-2640 www.impactrockbits.com

Import Tool Corp Ltd. 930-910 7 Ave SW Calgary AB T2P 3N8 Phone: (403) 261-3032 www.importtool.com

Inspectrite Services Inc PO Box 6235 Bonnyville AB T9N 2G8 Phone: (780) 826-3480

International Mat of Canada 300-635 6 Ave SW Calgary AB T2P 0T5 Phone: (403) 290-5369 www.newpark.ca

J & L Supply Co Ltd 4511 Manitoba Rd SE Calgary AB T2G 4B9 Phone: (403) 287-3300

J.E.D. Anchors & Environmental Ltd

Eckville AB TOM 0X0 Phone: (403) 746-3826

Jay-Nart Directional Drilling PO Box 400 Redwater AB TOA 2W0 Phone: (780) 942-4105 www.compusmart.ab.ca/jncddrill/ K & S Power Tongs Ltd 3614 63 Ave Cl Lloydminster AB T9V 2W1 Phone: (780) 875-0000

Kodiak Wireline Services Ltd 9702 90 Ave Morinville AB T8R 1K7 Phone: (780) 939-5554 www.kodiakservices.ca

Larry Lebeau Drilling Ltd PO Box 5127 Westlock AB T7P 2P4 Phone: (780) 349-2702

LoCo Power Tongs Ltd PO Box 1401 High Prairie AB TOG 1E0 Phone: (780) 523-2475

M-I Drilling Fluids 500-700 2 St SW Calgary AB T2P 2W2 Phone: (403) 290-5336

Marquis Fluids Inc 700-706 7 Ave SW Calgary AB T2P 0Z1 Phone: (403) 264-1588 www.marquisfluids.com

McAllister Waterwells Ltd PO Box 1189 Blackfoot AB S9V 1G1 Phone: (780) 875-2409

Mid-East Oilfield Services Inc PO Box 56 Minburn AB TOB 3B0 Phone: (780) 593-3946

Mike's Oilfield Services Ltd 6210 50 Ave Lloydminster AB T9V 2C9 Phone: (780) 875-1561 www.mikesoilfield.com

Mitee Industries Inc PO Box 1088 Gibbons AB TOA 1N0 Phone: (780) 554-5453 www.mightymitetongs.ca

Nabors Canada 2800-500 4 Ave SW Calgary AB T2P 2V6 Phone: (403) 263-6777 www.nabors.com

Newpark Canada Inc 300-635 6 Ave SW Calgary AB T2P 0T5 Phone: (403) 266-7383 www.newpark.ca

Newsco Directional & Horizontal Services Inc 7000 Railway St SE Calgary AB T2H 3A8 Phone: (403) 243-2331 www.newsco.ca

Norseman Inc 14545 115 Ave NW Edmonton AB T5M 3B8 Phone: (780) 451-6828 www.norseman.ca

Northstar Drillstem Testers Inc 1422-510 5 St SW Calgary AB T2P 3S2 Phone: (403) 265-8987 www.northstardst.com

Peak Energy Services 1800-530 8 Ave SW Calgary AB T2P 3S8 Phone: (403) 543-7325 www.peak-energy.com

Pendemak Industries Ltd 9926 29 Ave NW Edmonton AB T6N 1A2 Phone: (780) 435-5706 www.varelrockbits.com

Penlynn Contracting PO Box 1645 Grimshaw AB T0H 1W0 Phone: (780) 332-2048

Petroline Rentals Ltd PO Box 118 High Prairie AB TOG 1E0 Phone: (780) 523-0063

Prairie Dog Directional Drilling PO Box 7921 Stn Main Bonnyville AB T9N 2J2 Phone: (780) 812-9145

Precision Drilling Corporation 4400-150 6 Ave SW Calgary AB T2P 3Y7 Phone: (403) 264-4882 www.precisiondrilling.com

Pro-Rod Coiled Rod Solutions 3201 84 Ave NW Edmonton AB T6P 1K1 Phone: (780) 449-7101 www.prorod.com

ProDrill Fluids Technologies 1740-840 7 Ave SW Calgary AB T2P 3G2 Phone: (403) 269-8260

Q'Max Solutions Inc 1700-407 2 St SW Calgary AB T2P 2Y3 Phone: (403) 269-2242 www.qmaxsolutions.com

R & R Pipehandlers Ltd 11218B 89 Ave Grande Prairie AB T8V 5V8 Phone: (780) 538-9999 www.randrpipehandlers.com

RBI Canada 2000 Inc 5677 Burleigh Cres SE Calgary AB T2H 1Z7 Phone: (403) 255-3730

ReedHycalog 2700-144 4 Ave SW Calgary AB T2P 3N4 Phone: (403) 234-9999 www.ReedHycalog.com

Remote Wireline Services 8804 98 St Morinville AB T8R 1K6 Phone: (780) 939-6655 www.remotewireline.com

Ryan Energy Technologies 2800-500 4 Ave SW Calgary AB T2P 2V6 Phone: (403) 269-5981 www.ryanenergy.com

Scormac Oilfield Bits Inc PO Box 11626 Lloydminster AB T9V 3B8 Phone: (780) 808-6462

SDS Drilling 4025 96 Ave SE Calgary AB T2C 4T7 Phone: (403) 287-1460 www.boartlongyear.com

Shield Wireline Ltd 6004 50 Ave Lloydminster AB T9V 2T9 Phone: (780) 875-2772

Sicotte Drilling Tools 1101 77 Ave NW Edmonton AB T6P 1M8 Phone: (780) 440-6700 www.sicottedrillingtools.com

Silverline Coil PO Box 923 Slave Lake AB TOG 2A0 Phone: (780) 849-8377

Silvertip Rentals And Fishing Tools P0 Box 207 Slave Lake AB TOG 2A0 Phone: (780) 849-8372 www.silvertiprentals.com

Smith Bits 1600-335 8 Ave SW Calgary AB T2P 1C9 Phone: (403) 264-6077 www.smithbits.com

Smith International Canada Ltd 1600-335 8 Ave SW Calgary AB T2P 1C9 Phone: (403) 264-6077 www.smith.com

Smith Services 1600-335 8 Ave SW Calgary AB T2P 1C9 Phone: (403) 264-6077 www.siismithservices.ca

Summit Wireline Inc PO Box 11439 Lloydminster AB T9V 3B7 Phone: (306) 825-4191

Superheat FGH Canada, Inc 1303 77 Ave NW Edmonton AB T6P 1M8 Phone: (780) 469-8008 www.superheatfgh.com

Tallrig International Inc 14-2310 53 Ave Lloydminster AB T9V 2S4 Phone: (780) 808-5311 www.tallrig.com

Tangedal Water Well Drilling PO Box 1 Athabasca AB T9S 2A2 Phone: (780) 675-4405

Tartan Controls Inc 202-1201 5 St SW Calgary AB T2R 0Y6 Phone: (403) 232-1490 www.tartancontrols.com

Ted's Power Tongs & Laydown Machine Ltd PO Box 267 Manning AB TOH 2M0 Phone: (780) 836-2460

Titus Tools Inc 6014 52 Ave Lloydminster AB T9V 2S8 Phone: (780) 875-6282 www.titustools.com

Tomtruck Oilfield Services Ltd Bay E-6209 50 Ave Lloydminster SK S9V 0G4 Phone: (780) 205-1535

Top Gun Sand Pumps & Rentals Ltd PO Box 124 Marsden SK SOM 1P0 Phone: (306) 826-5750

Tornado Technologies Inc PO Box 1390 Stettler AB TOC 2L0 Phone: (403) 883-2400 www.tornadotech.net

Trendon Bit Service Ltd PO Box 548 Redcliff AB TOJ 2P0 Phone: (403) 548-7242

Treo Drilling Services LP 285160 Kleysen Way RR 5 Calgary AB T2P 2G6 Phone: (403) 723-8600 www.treodrilling.com

Trinidad Drilling Ltd 2500-700 9 Ave SW Calgary AB T2P 3V4 Phone: (403) 265-6525 www.trinidaddrilling.com

Triple D Bending 4707 Glenmore Tr SE Calgary AB T2C 2R9 Phone: (403) 255-2944 www.pipebending.com

Tryton Tool Services 5107 62 St Lloydminster AB T9V 2E3 Phone: (780) 875-0800 www.trytontoolservices.ca

Tundra Environmental Drilling Stettler AB Phone: (403) 883-2671

Unique Boring PO Box 1122 Slave Lake AB TOG 2A0 Phone: (780) 849-0232

Vam Premium Connections Inc 1920-444 5 Ave SW Calgary AB T2T 2T8 Phone: (403) 233-0119

Variperm Canada Limited 10-3424 26 St NE Calgary AB T1Y 4T7 Phone: (403) 250-7263 www.variperm.com Vermilion Ready-Mix Concrete 4807 47 Ave

Vermilion AB T9X 1J4 Phone: (780) 853-4818

Vetco Gray Canada Inc 2000-520 5 Ave SW Calgary AB T2P 3R7 Phone: (403) 264-4146 www.vetcogray.com

Volant Products Inc 4624 Eleniak Rd NW Edmonton AB T6B 2S1 Phone: (780) 490-5185 www.volantproducts.ca

Vortex Energy Pumping Services Inc 5115 62 St Vegreville AB T9C 1N6

Phone: (780) 632-3558

Ward's Power Tongs PO Box 208 Mannville AB TOB 2W0 Phone: (780) 763-6483

Wellsite Masters Ltd 301-9816 Haradin St Fort McMurray AB T9H 4K3 Phone: (780) 880-6559 www.wmasters.ca

Welltec Canada Inc 4860 25 St SE Calgary AB T2B 3M2 Phone: (403) 263-2248 www.welltec.com

Welltec Wireline Services 5617 50 Ave Bonnyville AB T9N 2L1 Phone: (780) 812-2585 www.heatseekersltd.com

Western Lakota Energy Services Inc 300-500 4 Ave SW Calgary AB T2P 2V6 Phone: (403) 214-5970 www.westernlakota.com

Wilson Tong Service Ltd 5922 52 Ave Vermilion AB T9X 1X3 Phone: (780) 853-6866

Xtreme Wireline 1900-715 5 Ave SW Calgary AB T2P 2X6 Phone: (403) 206-4678

ELECTRICAL-INSTRUMENTATION/CONTROLS

ABB Inc Blackfoot Corporate Centre 110-4411 6 St SE Calgary, AB T2G 4E8 Phone: (403) 225-5511 ww.abb.com

Abstract Gasfield Solutions Limited 5141 50 Ave Vegreville AB T9C 1M5 Phone: (780) 603-7770 www.gasfieldsolutions.com

Ainsworth LP 4-6215 3 St SE Calgary AB T2H 2L2 Phone: (403) 265-6750 www.ainsworth.com Aircom Industries 9752 60 Ave NW Edmonton AB T6E 0C5 Phone: (780) 434-6916 www.teamaircom.com

All-Tek Industrial & Auto Electric 6015 53 Ave Lloydminster AB T9V 2T1 Phone: (780) 808-5209

Amercable 3812 64 St Stettler AB TOC 2L1 Phone: (403) 742-1833

Apex Valve Services 6217 50 Ave Bonnyville AB T9N 2L9 Phone: (780) 826-4355 www.hrvalve.com

B J Electric Supplies Ltd 4143 97 St NW Edmonton AB T6E 6E9 Phone: (780) 461-2334 www.bjelectric.ca

Babco Electric Group Inc 12465 153 St NW Edmonton AB T5V 1E4 Phone: (780) 447-1386 www.babco-electric.com

Baldor Motors And Drives (Alberta) Ltd 4053 92 St NW Edmonton AB T6E 6R8 Phone: (780) 434-4900 www.ebaldor.ca

Battle River Electric Ltd 1330 10A St Wainwright AB T9W 1K5 Phone: (780) 842-4485

Bayzik Electrical Valve & Instrumentation Inc 8112 Fraser Ave Fort McMurray AB T9H 1W5 Phone: (780) 743-2995 www.bayzikelectric.com

Benchmark Instrumentation & Analytical Services Ltd 146-51350 Rge Rd 224 Sherwood Park AB T8H 1H3 Phone: (780) 669-1300 www.benchmark.ca

Bentek Systems Ltd 504 42 Ave SE Calgary AB T2G 1Y6 Phone: (403) 243-5135 www.scadalink.com

Ber-Mac Electrical & Instrumentation Ltd 250 42 Ave SE Calgary AB T2G 1Y4 Phone: (403) 287-6026 www.ber-mac.com

Bi-Systems Electric & Controls Ltd PO Box 309 Stn Main Lloydminster SK S9V 0Y2 Phone: (780) 875-4047

Borealis Electrical & Controls Ltd 129 Silverdale Gdns Fort McMurray AB T9H 3S6 Phone: (780) 743-1118 Bredon Electrical Systems Ltd PO Box 6136 Fort McMurray AB T9H 4W1 Phone: (780) 799-9117

Bruin Instruments Corp 9001 20 St NW Edmonton AB T6P 1K8 Phone: (780) 430-1777 www.bruinpumps.com

Canonbie Contracting Ltd 12307 17 St NW Edmonton AB T6S 1A7 Phone: (780) 377-2200 www.canonbie.ca

Carbon Controls Ltd 124-11979 40 St SE Calgary AB T2Z 4M3 Phone: (403) 238-9944 www.carboncontrolsltd.com

Casca Electric Ltd 206-9401 Franklin Ave Fort McMurray AB T9H 3Z7 Phone: (780) 743-2002 www.cascaelectric.com

CD Nova Instruments Ltd 117-1144 29 Ave NE Calgary AB T2E 7P1 Phone: (403) 250-5600 www.cdnova.com

Centurion Energy Services Ltd PO Box 23073 RPO Thickwood Fort McMurray AB T9H 5B7 Phone: (780) 791-5661

Chemco Electrical Contractors Ltd 6-210 MacAlpine Cres Fort McMurray AB T9H 4A6 Phone: (780) 790-9722

Classic Electric PO Box 6021 Peace River AB T8S 1S1 Phone: (780) 624-5749

Concept Controls Inc 1-2315 30 Ave NE Calgary AB T2E 7C7 Phone: (403) 208-1065 www.conceptcontrols.com

Coneco 16116 111 Ave NW Edmonton AB T5M 2S1 Phone: (780) 451-2630 www.coneco.ca

D'Lanne Electro Controls (2000) 905 4 St NW Slave Lake AB TOG 2A1 Phone: (780) 849-4316

Daryl's Electric & Trenching Services PO Box 348 Glendon AB TOA 1PO Phone: (780) 635-2634

Eagletech Electric Ltd 1215 Main St NE Slave Lake AB TOG 2A0 Phone: (780) 849-7818

EECOL Electric 63 Sunpark Dr SE Calgary AB T2X 3V4 Phone: (403) 253-1952 www.eecol.com

Emes Electric Ltd PO Box 351 Slave Lake AB TOG 2A4 Phone: (780) 849-2771 Endress + Hauser 318-8925 51 Ave NW Edmonton AB T6E 5J3 Phone: (780) 486-3222 www.ca.endress.com

Energy Electric Ltd 4111 48 St Bonnyville AB T9N 1P4 Phone: (780) 826-7795

Energy Navigator Inc 2150-255 5 Ave SW Calgary AB T2P 3G6 Phone: (403) 233-9400 www.energynavigator.com

Fluid Lift Systems Inc PO Box 104 Vimy AB TOG 2J0 Phone: (780) 961-3545 www.fluidlift.com

Fort McMurray Valve & Fitting Ltd 266 MacKay Cres Fort McMurray AB T9H 5C6 Phone: (780) 790-0640

G G Electric 3807 46A Ave Close Lloydminster SK S9V 2C1 Phone: (306) 825-5484

General Electric Canada Inc 9353 45 Ave NW Edmonton AB T6E 5Z7 Phone: (780) 438-3280

Grizzly Electric & Instrumentation Ltd PO Box 332

Slave Lake AB TOG 2A0 Phone: (780) 849-9164

Guillevin International Co 4220A Blackfoot Tr SE Calgary AB T2G 4E6 Phone: (403) 287-1680 www.guillevin.com

Harris Electric Co Ltd 6205 48 St Lloydminster AB T9V 2G1 Phone: (780) 875-3336

Honeywell Limited 5925 Centre St SW Calgary AB 72H 0C2

Calgary AB T2H 0C2 Phone: (403) 509-1200 www.honeywell.com/acs

Hy-Lok Canada Inc 2407 96 St NW Edmonton AB T6N 0A7 Phone: (780) 409-4484 www.hy-lokcanada.com

Independent Electric & Controls Ltd 6211 51 Ave Lloydminster AB T9V 2E1

Lloydminster AB T9V 2E1 Phone: (780) 871-0830

Industrial Electrical Services (Fort McMurray) Ltd 8333 Fraser Ave

8333 Fraser Ave Fort McMurray AB T9H 1W9 Phone: (780) 743-9393 Intech Supplies Ltd 3444 78 Ave NW Edmonton AB T6B 2X9 Phone: (780) 448-9575 www.intech-nde.com

Invensys Systems Canada Inc 7665 10 St NE Calgary AB T2E 8X2 Phone: (403) 777-1150 www.invensys.com

JAG Instrument Services Ltd PO Box 1138 Slave Lake AB TOG 2A0 Phone: (780) 849-2786

Kadon Electro Mechanical Services Ltd 4920 43 St SE Calgary AB T2B 3N3 Phone: (403) 279-2211 www.kadon.ca

Kenry Electric Ltd 9717 90 Ave Peace River AB T8S 1G8 Phone: (780) 624-5435

Kingsway Instruments Ltd 4238 91A St NW Edmonton AB T6E 5V2 Phone: (780) 463-5264 www.kingswayinstruments.com

Kinsella Electric Ltd PO Box 7 Kinsella AB TOB 2N0 Phone: (780) 336-2493

Kintek Ltd 10214 Centennial Dr Fort McMurray AB T9H 1Y5 Phone: (780) 790-0746

Kondro Electric (1980) Ltd 6202 50 Ave Lloydminster AB T9V 2C9 Phone: (780) 875-6226

Laird Electric Inc 225 MacDonald Cres Fort McMurray AB T9H 4B5 Phone: (780) 743-2595 www.lairdelectric.com

Link Industrial Technologies Ltd 9544 27 Ave NW Edmonton AB T6N 1B2 Phone: (780) 437-4380 www.linkindustrial.com

Marlyn Electric Ltd PO Box 805 Slave Lake AB TOG 2A0 Phone: (780) 849-4447

www.matrikon.com

Matrikon Inc 1800-10405 Jasper Ave NW Edmonton AB T5J 3N4 Phone: (780) 448-1010

Midlite Powerline Construction 199 Berard Cres Fort McMurray AB T9K 1V9 Phone: (780) 714-6559 Midwest Communications 5910 44 St Lloydminster AB T9V 1V7 Phone: (780) 808-2223 www.midwestcommunications.ca

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Nedco 5-242 MacAlpine Cres Fort McMurray AB T9H 4A6 Phone: (780) 743-3461

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Nomad Electrical Contractors Ltd 8909 96 St

Peace River AB T8S 1G8 Phone: (780) 624-2447

Nor-Tech Systems Ltd 4819 55 Ave Grimshaw AB TOH 1W0 Phone: (780) 332-3944

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North Star Electric PO Box 517 High Prairie AB TOG 1E0 Phone: (780) 523-5511

Osprey Scientific Inc 100-18130 105 Ave NW Edmonton AB T5S 2T4 Phone: (780) 487-4334 www.ospreyscientific.com

PMC Process Measurement & Controls Inc 6235B 86 Ave SE Calgary AB T2C 2S4 Phone: (403) 258-3670

Primary Flow Signal Canada Inc 4003 97 St NW Edmonton AB T6E 5Y5 Phone: (780) 440-0109 www.primaryflowsignalcanada.com

Procon Systems Inc 9310 60 Ave NW Edmonton AB T6E 0C1 Phone: (780) 437-0244 www.proconsystems.com

Pronghorn Controls Ltd 101-4919 72 Ave SE Calgary AB T2C 3H3 Phone: (403) 292-0870 www.pronghorn.ca

Pyramid Corporation 2308 8 St Nisku AB T9E 7Z2 Phone: (780) 955-2988 www.pyramidcorporation.com

Quality Rewind & Electric Ltd 230 MacAlpine Cres Fort McMurray AB T9H 4A6 Phone: (780) 743-1123 www.qualityre.ca R.L. Electric Motor Rewinding 1995 Ltd 6506 50 Ave Lloydminster AB T9V 2W8 Phone: (780) 875-6880

Regent Electric Ltd 6202 49 Ave Bonnyville AB T9N 2M5 Phone: (780) 826-5573

Rentco Equipment Ltd 7913 100 Ave Peace River AB T8S 1M5 Phone: (780) 624-4646 www.rentcoequipment.com

RL Brews Ltd 18003 111 Ave NW Edmonton AB T5S 2P2 Phone: (780) 452-3730 www.rlbrews.com

Rockwell Automation 230-6223 2 St SE Calgary AB T2H 1J5 Phone: (403) 253-0878

Rotork Controls (Canada) Ltd 6-820 28 St NE Calgary AB T2A 6K1 Phone: (403) 569-9455 www.rotork.com

Simark Controls Ltd 7725 46 St SE Calgary AB T2C 2Y5 Phone: (403) 236-0580 www.simark.com

Spartan Controls Ltd 8403 51 Ave Edmonton AB T6E 5L9 Phone: (780) 440-8351 www.spartancontrols.com

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Telvent Canada 200-10333 Southport Rd SW Calgary AB T2W 3X6 Phone: (403) 253-8848 www.telvent.com

Toran Power & Equipment Ltd 1800-715 5 Ave SW Calgary AB T2P 2X6 Phone: (403) 218-1882 www.toranpower.com

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Trakware Systems Inc 1120-13 Mission Ave St Albert AB T8N 1H6 Phone: (780) 460-1023 www.trakware.com

TYCO Thermal Controls 11004 174 St Edmonton AB T5S 2P3 Phone: (780) 434-7417 www.tycothermal.com

Vanko Analytics Ltd 4340 97 St NW Edmonton AB T6E 5R9 Phone: (780) 436-0281 www.vanko.net

Voyageur Electric Ltd PO Box 159 Plamondon AB TOA 2TO Phone: (780) 798-3939

Vulcan Electrical Ltd 18225 107 Ave NW Edmonton AB T5S 1K4 Phone: (780) 483-0036 www.vulcanelectrical.com

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Western Gauge & Instruments Ltd 2-4045 74 Ave SE Calgary AB T2C 2H9 Phone: (403) 236-4888 www.wgiltd.com

Westwood Electric Ltd 5-707 12 Ave Nisku AB T9E 7M2 Phone: (780) 955-7688 Wika Instruments Canada Ltd 3103 Parsons Rd NW Edmonton AB T6N 1C8 Phone: (780) 463-7035 www.wika.ca

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Alliance Environmental Solutions Ltd 1840-840 7 Ave Calgary AB T2P 3G2 Phone: (403) 663-9766 www.alliancefluids.com

Alpine Environmental Ltd 119-1440 Aviation Park NE Calgary AB T2E 7E2 Phone: (403) 291-1081 www.alpine-env.com

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Axys Environmental Consulting Ltd 300-805 8 Ave SW Calgary AB T2P 1H7 Phone: (403) 269-5150 www.axys.net

Bear Slashing Ltd PO Box 6158 Bonnyville AB T9N 2G8 Phone: (780) 826-8048 www.bearslashing.com

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Coop's Contracting Ltd 102 14 St Wainwright AB T9W 1L1 Phone: (780) 842-5317

Core Laboratories Canada Ltd 2810 12 St NE Calgary AB T2E 7P7 Phone: (403) 250-4000 www.corelab.com

Cozy Cats Ltd PO Box 1282 Lac La Biche AB TOA 2C0 Phone: (780) 623-1926

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Diggen Bury Trenching Ltd PO Box 1292 Athabasca AB T9S 2B2 Phone: (780) 675-2794

Dipper Holdings Ltd PO Box 10457 Lloydminster AB T9V 3A6 Phone: (780) 875-0657 www.littledipper.ab.ca

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EnviroSORT Inc. 700-540 5 Ave SW Calgary AB T2P 0M2 Phone: (403) 509-2150 www.envirosort.com

Evergreen Solutions 110-3506 118 Ave SE Calgary AB T2Z 3X1 Phone: (403) 273-8000 www.evergreensolutions.com

Excel Vegetation Services

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GCHEM Ltd Bay 1-4810 62 Ave Lloydminster AB T9V 2E9 Phone: (780) 871-4668 www.gchem.ca

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Gourley Construction Ltd 4606 49 Ave Vermilion AB T9X 1R6 Phone: (780) 853-5087

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Hobblestone Enterprises Inc PO Box 28 Blackfoot AB TOB 0L0 Phone: (780) 875-7282 www.hobblestoneplastics.com

Interra Environmental Inc Bay 12-2180 Pegasus Way NE Calgary AB T2E 8M5 Calgary AB 36-4901 www.cadvision.com/interra

IPAC Services Corporation RR 3 Site 1 Box 29 Grande Prairie AB T8V 5N3 Phone: (780) 539-1373 www.ipacservices.com

Ivanhoe 9516 146 Ave Grande Prairie AB T8V 7W7 Phone: (780) 538-3904 www.ivanhoecontracting.com

Kaizen Lab 333 50 Ave SE Calgary AB T2G 2B3 Phone: (403) 297-0868 www.kaizenenviro.com

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Kinsella Plastics PO Box 5 Kinsella AB TOB 2NO Phone: (780) 336-3308 www.kinsellaplastic.com

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www.geomembranes.com

Lo-Cost Waste Disposal 105-190 MacAlpine Cres Fort McMurray AB T9H 4A6 Phone: (780) 743-4020

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Mobile Augers & Research Ltd 5603 54 St NW Edmonton AB T6B 3G8 Phone: (780) 436-3960 www.mobileaugers.com

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Noise Solutions Inc 301-206 7 Ave SW Calgary AB T2P 0W7 Phone: (403) 232-0916 www.noisesolutions.com

North East Sixteen Construction PO Box 173 Fawcett AB TOG 0Y0 Phone: (780) 681-3737

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Orkin Pest Control 4024 7 St SE Calgary AB T2G 2Y8 Phone: (403) 236-2700 www.pco.ca

Panther Environmental Inc PO Box 7793 Bonnyville AB T9N 2J1 Phone: (780) 812-2702

Pembina Institute 200-608 7 St SW Calgary AB T2P 1Z2 Phone: (403) 269-3344 www.pembina.org

PHH-ARC Environmental 111-11505 35 St SE Calgary AB T2Z 4B1 Phone: (403) 543-1940 www.arcinc.ca Powell Cats Ltd PO Box 248 Chauvin AB TOB 0V0 Phone: (780) 858-3978

Praxair Canada Inc 100-10524 107 St NW Edmonton AB T5S 1H3 Phone: (780) 467-9000 www.praxair.com

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Radium Reclamation Ltd PO Box 26 Mallaig AB TOA 2K0 Phone: (780) 635-2225

Recyc-Haul Waste Management Inc PO Box 51011 RPO Beddington Calgary AB T3K 3V9 Phone: (403) 272-3138

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RemedX Remediation Services Inc 305-1550 5 St SW Calgary AB T2R 1K3 Phone: (403) 209-0004 www.remedx.net

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Total Combustion Inc 1510-734 7 Ave SW Calgary AB T2P 3P8 Phone: (403) 309-7731 www.tciburners.com

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Trigil Energy Inc PO Box 366 High Prairie AB TOG 1E0 Phone: (780) 523-3798

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Mustang Capital Partners Inc 3601-150 6 Ave SW Calgary AB T2P 3Y7 Phone: (403) 537-6300 www.mustangcapital.ca National Bank Financial 2800-450 1 St SW Calgary AB T2P 5H1 Phone: (403) 531-8400 www.nbfinancial.com

National Bank of Canada 2700-530 8 Ave SW Calgary AB T2P 3S8 Phone: (403) 294-4938 www.nbc.ca

Native Venture Capital Co Ltd 27 Artist View Pointe Calgary AB T3Z 3N3 Phone: (403) 208-5380

Norfolk Group The 1100-940 6 Ave Calgary AB T2P 3T1 Phone: (403) 232-8545 www.norfolkgrp.com

Orion Securities Inc 1210-335 8 Ave SW Calgary AB T2P 1C9 Phone: (403) 218-6650 www.orionsecurities.ca

Overlord Financial Inc 3400-205 5 Ave SW Calgary AB T2P 2V7 Phone: (403) 770-4800

Parlee McLaws LLP 1500-10180 101 St NW Edmonton AB T5J 4K1 Phone: (780) 423-8500 www.parlee.com

Peters & Co Limited Bankers Hall W 3900-888 3 St SW Calgary AB T2P 5C5 Phone: (403) 261-4850 www.petersco.com

PricewaterhouseCoopers 3100-111 5 Ave SW Calgary AB T2P 5L3 Phone: (403) 509-7500

Priority Leasing Inc 200-7909 Flint Rd SE Calgary AB T2H 1G3 Phone: (403) 216-1930 www.priorityleasing.net

Raymond James Ltd 2500-707 8 Ave SW Calgary AB T2P 1H5 Phone: (403) 509-0500

RBC Capital Markets 1100-888 3 St SW Calgary AB T2P 5C5 Phone: (403) 292-3774 www.royalbank.com

Rogers Insurance Ltd 600-1000 Centre St NE Calgary AB T2E 7W6 Phone: (403) 296-2400

Ross Smith Energy Group Ltd 400-407 8 Ave SW Calgary AB T2P 1E5 Phone: (403) 294-9111 www.rseg.com RoyNat Inc 3900-700 2 St SW Calgary AB T2P 2W2 Phone: (403) 269-7755 www.roynat.com

RSM Richter 430-736 8 Ave SW Calgary AB T2P 1H4 Phone: (403) 233-8462

Sayer Energy Advisors 1620-540 5 Ave SW Calgary AB T2P0M2 Phone: (403) 266-6133 www.sayersecurities.com

SCF Partners 3430-400 3 Ave SW Calgary AB T2P 4H2 Phone: (403) 244-7888

Sphere Energy Corp 750-815 8 Ave SW Calgary AB T2P 3P2 Phone: (403) 233-2822 www.sphereenergy.ca

Stikeman Elliott LLP 4300-855 2 St SW Calgary AB T2P 5C5 Phone: (403) 266-9000 www.stikeman.com

Tax Back Ltd 710-7015 Macleod Trail SW Calgary AB T2H 2K6 Phone: (403) 252-3128 www.taxback.ab.ca

TD Securities 800-324 8 Ave SW Calgary AB T2P 2Z2 Phone: (403) 299-7964 www.tdsecurities.com

Trans Action Oil & Gas Ventures Inc 445-708 11 Ave SW Calgary AB T2R 0E4 Phone: (403) 263-9270 www.taog.ca

Tristone Capital Inc 2200-335 8 Ave SW Calgary AB T2P 1C9 Phone: (403) 294-9541 www.tristonecapital.com

Union Bank of California 730-440 2 Ave SW Calgary AB T2P 5E9 Phone: (403) 233-4800 www.uboc.com

Valiant Trust Company 510-550 6 Ave SW Calgary AB T2P 0S2 Phone: (403) 233-2801

Van Helden Agencies Ltd 1215 14 Ave SW Calgary AB T3C 0W1 Phone: (403) 244-8957

Veracity Financial Services 4909 49 St Lloydminster SK S9V 0M2 Phone: (306) 825-6200 Willis Canada Inc 1120-605 5 Ave SW Calgary AB T2P 3H5 Phone: (403) 263-6117

Working Capital Corporation 628-138 4 Ave SE Calgary AB T2G 4Z6 Phone: (403) 262-2803 www.workingcapitialcorp.com

OILFIELD EQUIPMENT MANUFACTURING-WELDING PRODUCTS/SERVICES

A-Plus Machining 4706 62 Ave Lloydminster AB T9V 2G2 Phone: (780) 875-6969 www.aplusmachining.com

Accurate Machining Ltd 6502 56 St Lloydminster AB T9V 2W9 Phone: (780) 875-8756

Advance Engineered Products Ltd 2335 Schuyler St Saskatoon SK S7M 5V1 Phone: (306) 933-2445 www.advanceengineeredproducts.com

Advantage Products Inc 273-1919B 4 St SW Calgary AB T2S 1W4 Phone: (403) 264-1647 www.advantageproductsinc.com

Almac Machine Works Ltd 9624 35 Ave NW Edmonton AB T6E 5S3 Phone: (780) 434-3402 www.almacmachine.com

Almita Manufacturing Ltd 6606 42 Ave Ponoka AB T4J 1J8 Phone: (403) 783-5800 www.almita.com

Amyotte & Sons Welding Ltd PO Box 96 Mallaig AB TOA 2K0 Phone: (780) 635-3880

Anchor Manufacturing Inc 2315 5A St Nisku AB T9E 8G6 Phone: (780) 955-9393 www.anchormanufacturing.ca

Aqua Industrial Limited 205-9912 Franklin Ave Fort McMurray AB T9H 2K5 Phone: (780) 799-7300

Argus Machine Co Ltd 5820 97 St NW Edmonton AB T6E 3J1 Phone: (780) 434-9451 www.argusmachine.com

B-Line Welding Inc PO Box 205 Athabasca AB T9S 2A3 Phone: (780) 689-2562

Bartan Machine & Welding Co Ltd 285 MacDonald Cres Fort McMurray AB T9H 4B7 Phone: (780) 743-1817 Battle River Ironworks Inc 4907 49 Ave Forestburg AB

Forestburg AB Phone: (780) 582-3596

Bend-Tech Fabricating PO Box 11793 County Energy Park Lloydminster AB T9V 3C1 Phone: (780) 872-5234

Beta Machinery Analysis Ltd 300-1615 10 Ave SW Calgary AB T3C 0J7 Phone: (403) 245-5666 www.betamachinery.com

Big B's Portable Welding 224 Cheechem Dr Anzac AB TOP 1J0 Phone: (403) 660-3977

Blue Chip Machining & Manufacturing Ltd 1812 17 Ave Wainwright AB T9W 1L2 Phone: (780) 842-7490

Bluestar Welding RR 2 Site 7 Box 20 Grande Prairie AB T8V 2Z9 Phone: (780) 532-1160 www.bluestarwelding.com

Bonnyville Sandblasting Ltd PO Box 6296 Bonnyville AB T9N 2G8 Phone: (780) 826-4532

Bonnyville Welding Ltd PO Box 8075 Bonnyville AB T9N 2J3 Phone: (780) 826-3847 www.bonnyvillewelding.com

Border Steel PO Box 710 Lloydminster SK S9V 0Y7 Phone: (780) 875-3235

Boyd Lay's Welding PO Box 6551 Bonnyville AB T9N 2H1 Phone: (780) 826-7717

Bushrat Welding & Picker Service Site 4 Box 7 RR 1 Westlock AB T7P 2N9 Phone: (780) 954-2239

C M & T Pressure Welding & Fabrication Ltd 101 Robin Cres Fort McMurray AB T9H 2W4 Phone: (780) 743-8562

Century Machining Services Ltd 8-235 Mackay Cres Fort McMurray AB T9H 4T5 Phone: (780) 743-5109

Cessco Fabrication & Engineering Ltd 7310 99 St NW Edmonton AB T6E 3R8 Phone: (780) 433-9531 www.cessco.ca

Cherokee Welding Ltd PO Box 11475 RPO 10 Lloydminster AB T9V 3B7 Phone: (780) 875-8900 Clearwater Welding & Fabrication Ltd 8124 Fraser Ave Fort McMurray AB T9H 1W6 Phone: (780) 743-2171 www.clearwaterweldfab.com

Collins Industries Ltd 3740 73 Ave NW Edmonton AB T6B 2T8 Phone: (780) 440-1414

Corlac Industries Box 10050, Lot 9, County Energy Park Lloydminster AB T9V 3A2 Phone: (780) 875-8459 www.corlac.com

Dacro Industries Inc 9325 51 Ave NW Edmonton AB T6E 4W8 Phone: (780) 434-8900 www.dacro.com

Dale's Welding Inc 6003 52 Ave Lloydminster AB T9V 2S8 Phone: (780) 875-0032

Damik Machine Ltd RR 1 Westlock AB T7P 2N9 Phone: (780) 349-3431

Davco Welding & Crane Service Ltd 106 16 Ave Wainwright AB T9W 1L5

Wainwright AB T9W 1L5 Phone: (780) 842-5559 www.davco.cc

Dewan's Welding PO Box 7586 Bonnyville AB T9N 2H9 Phone: (780) 826-2531

Don Hiebert's Welding Ltd PO Box 3492 Wainwright AB T9W 1T5 Phone: (780) 842-3238

Donnelly Machining & Fabricating Ltd PO Box 289 Donnelly AB TOH 1GO Phone: (780) 925-2021

Double B Machining & Fabricating Ltd PO Box 786 Slave Lake AB TOG 2A0 Phone: (780) 849-6688

DTS Welding Ltd 3501 51 Ave Lloydminster AB T9V 1C9 Phone: (780) 871-5979

DWH Welding Ltd PO Box 493 Marwayne AB TOB 2X0 Phone: (780) 847-2186

Edmonton Exchanger & Manufacturing Ltd 5545 89 St NW Edmonton AB T6E 5W9 Phone: (780) 468-6722 www.edmontonexchanger.com

Electra Welding (1988) Ltd 2152 1 Ave Wainwright AB T9W 1L7 Phone: (780) 842-4066 Endura Manufacturing Company Ltd 12425 149 St NW Edmonton AB T5L 2J6 Phone: (780) 451-4242 www.endurapaint.com

ENG Machining Ltd 3-5202 63 St Lloydminster AB T9V 2E6 Phone: (780) 875-1500

Feldspar Excavating & Redi-Mix 5002 65 St Lloydminster AB T9V 2K2 Phone: (780) 875-2208

Foremost Industries LP 1225 64 Ave NE Calgary AB T2E 8P9 Phone: (403) 295-5800 www.foremost.ca

Garneau Manufacturing Inc PO Box 3154 Morinville AB T8R 1S1 Phone: (780) 939-2129 www.garweld.com

Get It Done Machining & Manufacturing 6-5914 51 Ave Lloydminster AB T9V 3K5 Phone: (780) 872-5797

Golden View Fabricating Ltd PO Box 315 Smoky Lake AB TOA 3C0 Phone: (780) 656-3575

Greg Chapman Welding 3104 55A Ave Lloydminster AB T9V 1S6 Phone: (780) 875-7539

Grit Industries Inc PO Box 10448 Lloydminster AB T9V 3A8 Phone: (780) 875-5577 www.gritindustries.com

Guthrie Mechanical Services Ltd 180 MacDonald Cres Fort McMurray AB T9H 4B2 Phone: (780) 715-0946

Guy's Welding PO Box 1121 Lac La Biche AB TOA 2CO Phone: (780) 623-7428

Herb's Heavy Equipment Repair Ltd PO Box 2343 Slave Lake AB TOG 2A0 Phone: (780) 849-3768 www.herbsheavyequipment.com

Hritzuk Peter Welding Ltd PO Box 106 Tofield AB TOB 4J0 Phone: (780) 662-4664

ICI Artificial Lift Inc PO Box 21027 Lloydminster AB T9V 2S1 Phone: (780) 872-7470 www.icisolutions.ca

Innicor Subsurface Technologies 7071 112 Ave SE Calgary AB T2C 5A5 Phone: (403) 236-2815 www.innicor.com

Innovative Hydraulics Ltd 5510 63 Ave Lloydminster AB T9V 3C5 Phone: (780) 875-4385 www.innovativehyd.com

John's Welding Service E-2404 57A Ave Lloydminster AB T9V 2W4 Phone: (780) 871-2078

JV Driver Projects Inc 2029 87 Ave NW Edmonton AB T6P 1L5 Phone: (780) 449-0002 www.jvdriver.com

Kinetic Process Systems 700-840 6 Ave SW Calgary AB T2P 3E5 Phone: (403) 258-1971 www.kineticprocess.ab.ca

Kinsella Steelworks PO Box 116 Kinsella AB T0B 2N0 Phone: (780) 336-2151

Koenders Manufacturing (1997) Ltd PO Box 171 Englefeld SK SOK 1NO Phone: (877) 581-8877 www.koendersmfg.com

Kramer Ltd PO Box 707 Stn Main Regina SK S4P 3A8 Phone: (306) 949-6261 www.kramerItd.com

Lemax Machine & Welding Ltd 175 MacDonald Cres Fort McMurray AB T9H 4B3 Phone: (780) 791-1445

Liebherr-Canada Ltd 208-53016 Hwy 60 Acheson AB T7X 5A7 Phone: (780) 962-6088 www.liebherr.com

Lor-Lin Tank & Fabrication PO Box 218 Lloydminster AB S9V 0Y2 Phone: (780) 871-5951

M H Welding Ltd PO Box 6027 Bonnyville AB T9N 2G7 Phone: (780) 826-3906

Maxximat 4911 82 Ave Edmonton AB T6B 0E5 Phone: (780) 440-6222 www.maxximat.com

McKinley Welding PO Box 6141 Fort McMurray AB T9H 4W1 Phone: (780) 791-5460

Metal Fabricators & Welding Ltd 12509 124 St NW Edmonton AB T5L 0N6 Phone: (780) 455-2186 www.metalfab.ca

Metaltek Machining Ltd P0 Box 10433 Lloydminster AB T9V 3A5 Phone: (780) 875-6535

Murland Projects Inc PO Box 256 Lloydminster SK S9V 0Y2 Phone: (780) 871-4671

Murray's Portable Welding 10313 89 St Peace River AB T8S 1N9 Phone: (780) 624-5068

Nardei Fabricators Ltd 8915 44 St SE Calgary AB T2C 2P5 Phone: (403) 279-3301 www.nardei.com

Natco Canada PO Box 850 Stn T Calgary AB T2C 4R6 Phone: (403) 236-1850 www.natcogroup.com

Norcan Fluid Power 3053 Faithfull Ave Saskatoon SK S7K 8B3 Phone: (306) 384-9100 www.norcanfluidpower.com

Noremac Industrial Coatings PO Box 6231 Fort McMurray AB T9H 4W1 Phone: (780) 743-5968

North Wind Welding Ltd PO Box 2331 Stn Main Lloydminster SK S9V 1S6 Phone: (780) 875-1481

O & K Orenstein & Koppel Inc 395 MacKenzie Blvd Fort McMurray AB T9H 5E2 Phone: (780) 791-0887 www.essltd.com

Orion Machining & Manufacturing Inc 8-6202 48 St Lloydminster AB T9V 2G2 Phone: (780) 875-1535

Peerless Engineering Sales Ltd 7316 18 St NW Edmonton AB T6P 1N8 Phone: (780) 439-3322 www.peerlessengineering.com

Penfabco Ltd 5715 56 Ave NW Edmonton AB T6B 3G3 Phone: (780) 434-0222 www.penfabco.com

Peter Hritzuk Welding Ltd PO Box 106 Tofield AB T0B4J0 Phone: (780) 662-4664

Plainsman Mfg Inc 8305 McIntyre Rd NW Edmonton AB T6E 5J7 Phone: (780) 496-9800 www.plainsmanmfg.com

Plamondon Welding Ltd PO Box 1192 Lac La Biche AB TOA 2CO Phone: (780) 623-2149

Porterco Welding 5B Parkdale Way Slave Lake AB TOG 2A0 Phone: (780) 805-4000 Propak Systems Ltd PO Box 2 Airdrie AB T4B 2C3 Phone: (403) 912-7000 www.propaksystems.com

PWM Steel Services Ltd PO Box 97 Lloydminster SK S9V 0X9 Phone: (780) 875-3167

R & R Stress Relieving Service Ltd 2103 6 St Nisku AB T9E 7X8 Phone: (780) 955-7559 www.rrstress.com

R H S Welding & Fabrication Ltd PO Box 6155 Fort McMurray AB T9H 4W1 Phone: (780) 791-7956

R J S Welding PO Box 218 Lamont AB T0B 2R0 Phone: (780) 895-7548

Ramco Restoration Painting & Sandblasting PO Box 1174 Cold Lake AB T9M 1C3 Phone: (780) 594-2648

Redwater Machining & Manufacturing Co Ltd PO Box 428 Redwater AB T0A 2W0 Phone: (780) 942-3437 www.rwmmc.com

Roda Deaco Valve Ltd 3230 97 St NW Edmonton AB T6N 1K4 Phone: (780) 465-4429 www.rodadeaco.com

S.C.K. Welding Ltd Box 67 Site 1 RR 2 Tofield AB TOB 4J0 Phone: (780) 662-3733

Sabre Machining Ltd PO Box 10717 Lloydminster AB T9V 3A7 Phóne: (780) 875-4780 www.sabremachining.com

Shaw Cat & Equipment Ltd PO Box 3354 Wainwright AB T9W 1T3 Phone: (780) 842-2195

SIF Superior Industrial Frictions Ltd 11570 154 St NW Edmonton AB T5M 3N8 Phone: (780) 451-6894 www.sifbrake.com

Sinclair Welding PO Box 454 St Paul AB TOA 3A0 Phone: (780) 645-5242

Sorge's Pro Welding Ltd PO Box 5768 Stn Main Fort McMurray AB T9H 4V9 Phone: (780) 743-9739

Sprung Instant Structures Ltd Maple Leaf Rd Aldersyde AB Phone: (403) 245-3371 www.sprung.com

Standard Machine Ltd/Hamilton Gear 868 60 St E Saskatoon SK S7K 8G8 Phone: (306) 931-3343 www.hamiltongear.com

Streamline Services 301 Boreal Drive Red Earth Creek AB Phone: (780) 649-2225

Supreme Steel Ltd 10457 184 St NW Edmonton AB T5S 1G1 Phone: (780) 483-3278 www.supremesteel.com

Terry's Welding 5204 54 Ave Bonnyville AB T9N 2E1 Phone: (780) 826-2158

3M Porta Weld PO Box 157 Edgerton AB TOB 1KO Phone: (780) 755-2053

TIC Canada 131-26230 Twp Rd 531A Acheson AB T7X 5A4 Phone: (780) 960-7450

TIW WESTERN Inc 7770 44 St SE Calgary AB T2C 2L5 Phone: (403) 279-8310 www.tiwwestern.com

Tomco Production Services Ltd 6219 52 Ave Bonnyville AB T9N 2H4 Phone: (780) 826-2522

Triangle Machine Shop PO Box 2061 High Prairie AB TOG 1E0 Phone: (780) 523-2479

Ultimate Sandblasting & Painting Ltd PO Box 138 Lloydminster AB T9V 0N9 Phone: (780) 875-5574

VaporTech Energy Services Inc 308-1235 17 Ave SW Calgary AB T2T 0C2 Phone: (403) 228-3012 www.vaportechinc.com

Wabash Manufacturing Inc 9312 110A St Westlock AB T7P 2M4 Phone: (780) 460-9142

Waiward Steel Fabricators Ltd 10030 34 St NW Edmonton AB T6B 2Y5 Phone: (780) 469-1258

Westech Industrial Ltd 5636 Burbank Cres SE Calgary AB T2H 1Z6 Phone: (403) 252-8803 www.westech-ind.com

Westech Vac Systems Ltd 1002 15 Ave Nisku AB T9E 7S5 Phone: (780) 955-3030 www.westechvac.com

Western Truck Body Mfg 6115 30 St NW

Edmonton AB T6P 1J8 Phone: (780) 466-8065 www.western-truck-body-mfg.com

(WWL) Weaver Welding Ltd 7501 107 Ave Peace River AB T8S 1M6 Phone: (780) 618-7522 www.wwl.com

ZCL Composites Inc. 6907 36 St NW Edmonton AB T6B 2Z6 Phone: (780) 466-6648 www.zcl.com

PIPELINE PRODUCTS & SERVICES

A H McElroy Sales & Service (Canada) Ltd 13212 146 St NW Edmonton AB T5L 4W8 Phone: (780) 454-0638 www.ahmcelroy.com

AABB-X-Air Ltd PO Box 7454 Bonnyville AB T9N 2H8 Phone: (780) 812-3246 www.aabbxair.com

Aerotec Locator Services Ltd PO Box 12117 Lloydminster AB T9V 3C4 Phone: (780) 875-0041

Alberta Line Find Inc 440 Aquaduct Dr Brooks AB T1R 1C4 Phone: (403) 793-2800

Alfred Clark Oilfield Servicing Ltd PO Box 3186 Vermilion AB T9X 2B2 Phone: (780) 853-4316

Athabasca Pipelines Ltd PO Box 1950 Stn Main Athabasca AB T9S 2B5 Phone: (780) 675-4070

Atlantic Pipeline (2004) Inc 311-253 Gregoire Dr Fort McMurray AB T9H 4G7 Phone: (780) 715-1526 www.atlanticpipeline.com

Baker Atlas 5816 50 Ave Bonnyville AB T9N 2K7 Phone: (780) 826-3409 www.bakerhughes.com

Bandit Pipeline PO Box 12248 Lloydminster AB T9V 3C5 Phone: (780) 875-8764 www.banditpipeline.com

Beretta Pipeline Construction Ltd PO Box 21042 RPO Lloydmall Lloydminster AB T9V 1V8 Phone: (780) 875-6522

BJ Process & Pipeline Services 9010 34 St NW Edmonton AB T6B 2V1 Phone: (780) 465-6495 www.bjservices.com Brenntag Canada Inc 1900-777 8 Ave SW Calgary AB T2P 3R5 Phone: (403) 263-8660 www.brenntag.ca

Buryn Construction PO Box 651 Redwater AB TOA 2W0 Phone: (780) 942-3635

Comco Pipe & Supply Ltd 230 MacKay Cres Fort McMurray AB T9H 5C6 Phone: (780) 743-3404

Crane Supply Inc 324 58 Ave SE Calgary AB T2H 0P2 Phone: (403) 252-7811 www.cranesupply.com

Doran Stewart Oilfield Services (1990) Ltd PO Box 1750 Rocky Mountain House AB T4T 1B3 Phone: (403) 845-4044 www.doranstewart.com

Dynamic Energy Projects Inc 29 Stein CI SE Medicine Hat AB T1B 4M8 Phone: (403) 580-9876

Edgen Murray Canada 8524 Roper Rd NW Edmonton AB T6E 6V4 Phone: (780) 440-1475

Enbridge Pipelines Inc 3000-425 1 St SW Calgary AB T2P 3L8 Phone: (403) 231-5768 www.enbridge.com/gateway

Exact Oilfield Developing Ltd PO Box 755 Slave Lake AB TOG 2A0 Phone: (780) 849-2211

Flexpipe Systems Inc 3501 54 Ave SE Calgary AB T2C 0A9 Phone: (403) 503-0548 www.flexpipesystems.com

Fullkote Pipeline Services (1996) Ltd 4873 46 St Lacombe AB T4L 2B2 Phone: (403) 782-3176

Henuset Group of Companies 13024 Canso PI SW Calgary AB T2W 3A8 Phone: (403) 236-0014

Houlder Construction PO Box 560 Grimshaw AB TOH 1W0 Phone: (780) 332-4691 www.houlders.ca

IR Corrosion Control Ltd 37 Camelot Ave Leduc AB T9E 4L7 Phone: (780) 986-5553 K. Kenn Industries Ltd 5004 49 St Mannville AB Phone: (780) 763-3924

Kinder Morgan Canada Inc 2700-300 5 Ave SW Calgary AB T2P 5J2 Phone: (403) 514-6400 www.kindermorgan.com

Kool Welding Ltd PO Box 64 St Brides AB TOA 2Y0 Phone: (780) 645-2388

Krantz Contracting Ltd PO Box 728 Manning AB TOH 2M0 Phone: (780) 836-2830

Lincoln County Oilfield Services Ltd 1-3603 53 St

Athabasca AB T9S 1A9 Phone: (780) 675-9613

Line Finders Ltd PO Box 147 Marshall SK SOM 1R0 Phone: (306) 387-6264

LTD Oilfield Services Inc PO Box 859 Redwater AB TOA 2W0 Phone: (780) 942-4484

Midwest General Contractors Ltd PO Box 5296 Stn E Edmonton AB T5P 4C5 Phone: (403) 962-1993

North American Construction Group 2-53016 Hwy 60 Acheson AB T7X 5A7 Phone: (780) 960-7171 www.nacg.ca

O.J. Pipelines Canada 1409 4 St Nisku AB T9E 7M9 Phone: (780) 955-3900 www.ojpipelines.com

Pinnacle Pigging Systems (Canada) Inc 8118 49 Ave Cl Red Deer AB T4P 2V5 Phone: (403) 347-8018

Pinpoint Locating & Hydrovac Service PO Box 1642

Athabasca AB T9S 2B4 Phone: (780) 675-5228

Pipe-tech Corporation Ltd 3311 114 Ave SE Calgary AB T2Z 3X2 Phone: (403) 287-3558 www.pipetechcorp.com

Plains Marketing Canada, LP 1400-888 3 St SW Calgary AB T2P 5C5 Phone: (403) 298-2100

Pro Line Locators Ltd 5108 27 St Lloydminster AB T9V 2K9 Phone: (780) 808-8393 Proline Pipe Equipment Inc 7141 67 St NW Edmonton AB T6B 3L7 Phone: (780) 465-6161 www.proline-global.com

RD Scan Inc. PO Box 7159 Bonnyville AB T9N 2H5 Phone: (780) 872-1599 www.rdscan.biz

Red Flame Hot Tap Services Ltd 6736 71 St Red Deer AB T4P 3Y7 Phone: (403) 343-2012 www.redflame.ca

Red-Alta Utility Location Ltd Box 10 Site 3 RR 1 Red Deer AB T4N 5E1 Phone: (403) 346-1212 www.red-alta.ca

River Valley Energy Services Corp PO Box 1038 Grimshaw AB TOH 1W0 Phone: (780) 332-1330

Round Pipeline Inspection & Consulting Ltd PO Box 101 Clyde AB TOG 0P0 Phone: (780) 348-5862

Saddle Tech. Inc. 4015 53 St Athabasca AB T9S 1A7 Phone: (780) 675-5661 www.saddletech.ca

Santec Tool Services Ltd 5209 63 St Lloydminster SK S9V 1R5 Phone: (780) 875-1216

Sharp Underground B-1902 15 Ave Wainwright AB T9W 1L2 Phone: (780) 842-3336

Summit Tubulars Corp 2400-350 7 Ave SW Calgary AB T2P 3N9 Phone: (403) 232-6066 www.summit-tubulars.com

T.D. Williamson Canada ULC 9503 28 Ave NW Edmonton AB T6N 0A3 Phone: (780) 440-6637 www.tdwilliamson.com

Tartan Construction Ltd PO Box 9 Redwater AB TOA 2W0 Phone: (780) 942-3802

TransCanada Pipelines Limited 15th FIr-450 1 St SW Calgary AB T2P 5H1 Phone: (403) 920-2000 www.transcanada.com

Viking Power Dozer Ltd PO Box 204 Viking AB TOB 4N0 Phone: (780) 336-3032

Waschuk Equipment Rentals Ltd

PO Box 5003 Red Deer AB T4N 6A1 Phone: (403) 342-2447

Weatherford PC Pump 4604 62 Ave Lloydminster AB T9V 2G2 Phone: (780) 875-0103

Willbros Canada 2415 101 St NW Edmonton AB T6X 1A1 Phone: (780) 469-3300 www.willcobroscanada.com

Wolseley Engineered Pipe Alberta 7251 18 St NW Edmonton AB T6P 1N1 Phone: (780) 461-9400 www.perma-eng.com

Woody's Oilfield Service Inc PO Box 231 Red Earth Creek AB TOG 1X0 Phone: (780) 649-2040

PRODUCTION PRODUCTS & SERVICES

A-Fire Burner Systems 5508 59 Ave Lloydminster AB T9V 3A8 Phone: (780) 875-0672 www.a-fire.ca

A-1 Oilfield Services PO Box 6469 Bonnyville AB T9N 2H1 Phone: (780) 826-7763

Albrico Services (1982) Ltd 4-6923 Farrell Rd SE Calgary AB T2H 0T3 Phone: (403) 251-2556 www.albrico.com

Apex Equipment Ltd 116-5726 Burleigh Cres SE Calgary AB T2H 1Z8 Phone: (403) 214-2049 www.apexequipmentltd.com

Areva T & D Canada Inc 3532-114 Ave SE Calgary AB T2Z 3V6 Phone: (403) 236-3389 www.areva-td.com

Argo Sales Ltd 1300-717 7 Ave SW Calgary AB T2P 0Z3 Phone: (403) 265-6633 www.argosales.com

Armour Valve Ltd 6-2221 41 Ave NE Calgary AB T2E 6P2 Phone: (403) 229-3171 www.armourvalve.com

Babcock & Wilcox Canada 17611 105 Ave NW Edmonton AB T5S 1T1 Phone: (780) 489-0404 www.babcock.com

Baker Hughes Inteq 1000-401 9 Ave SW Calgary AB T2P 3C5 Phone: (403) 537-3400 www.bakerhughes.com Beartrax Pumpjack Services Inc PO Box 2465

Slave Lake AB TOG 2A0 Phone: (780) 849-3388

Bornemann Inc. 320-441 5 Ave SW Calgary AB T2P 2V1 Phone: (403) 294-0777 www.bornemann.com

Braiker Oilfield Services Ltd 5214 62 St Lloydminster AB T9V 2E4 Phone: (780) 808-2999

Bucyrus Canada Limited 18131 118 Ave NW Edmonton AB T5J 2L9 Phone: (780) 454-9000 www.bucyrus.com

BW Technologies 2840 2 Ave SE Calgary AB T2A 7X9 Phone: (403) 248-9226 www.qasmonitors.com

Caliber Industries Ltd PO Box 10706 Lloydminster AB T9V 3A7 Phone: (780) 875-5705 www.calibercoil.ca

Canadian Dewatering Ltd 5603 67 St NW Edmonton AB T6B 3H5 Phone: (780) 490-5800 www.canadiandewatering.com

Canitron Systems Inc 220 Pump Hill Rise SW Calgary AB T2V 4C8 Phone: (403) 259-8732

Canusa - CPS 1200-630 3 Ave SW Calgary AB T2P 4L4 Phone: (403) 218-8207 www.shrinksleeves.com

CHEP Catalyst & Chemical Containers 5520 59 Ave Lloydminster AB

Lloydminster AB Phone: (780) 875-3271 www.chep.com

Christie Corrosion Control (1983) Ltd PO Box 11458 Lloydminster AB T9V 3B7 Phone: (780) 875-6559 www.christiecorrosioncontrol.com

Conquest Energy Services 400-608 7 St SW Calgary AB T2P 1Z2 Phone: (403) 266-8880 www.conquestenergyservices.com

COPATA - Crude Oil Production & Transportation Association 5201 65 St Lloydminster AB T9V 2E8

Phone: (780) 719-8839

Cougar Pump Supply & Service Ltd 1802 1 Ave Wainwright AB T9W 1L7 Phone: (780) 842-6710 D & K Enterprises Ltd 6222 49 Ave Bonnyville AB T9N 2M5 Phone: (780) 826-4323

Danco Equipment Inc 308 53 Ave SE Calgary AB T2H 0N3 Phone: (403) 253-6421 www.dancoequipment.com

Deerborn Oilfield Services Ltd 5301 55 St Bonnyville AB T9N 2K6 Phone: (780) 573-1273

Eadie Oil Inc 14019 104 Ave Edmonton AB T5N 0W7 Phone: (780) 906-0577 www.eadie.com

Electric Motor Service Limited 201 MacKay Cres Fort McMurray AB T9H 4T5 Phone: (780) 790-9550

Enerflex 4700 47 St SE Calgary AB T2B 3R1 Phone: (403) 236-6800 www.enerflex.com

Gateway Compression Inc 10-11 Rowland Cres St Albert AB T8N 5B3 Phone: (780) 458-1770 www.gatewaycompress.com

GEOCAN Energy Inc 1100-717 7 Ave SW Calgary AB T2P 0Z3 Phone: (403) 261-3851 www.geocan.com

Goulds Pumps 4724 14 St NE Calgary AB T2E 6L7 Phone: (403) 215-7867 www.westcommpump.com

Guest Controls (2001) Ltd 5503 52 St Lloydminster AB T9V 0R7 Phone: (780) 875-5822 www.guestcontrols.com

Halliburton Wireline & Perforating 1800-311 6 Ave SW Calgary AB T2P 3H2 Phone: (403) 267-6725 www.halliburton.com

Hanover Canada Corporation P0 Box 5069 Stn A Calgary AB T2H 1X1 Phone: (403) 279-5000 www.hanover-canada.com

Holyoke Contracting Ltd 5201 44 St Bonnyville AB T9N 2H6 Phone: (780) 826-7626

Hot Tools 5109 63 St Lloydminster AB T9V 2E7 Phone: (780) 875-2468 www.2hottools.ca ICS Group/Aircon Technologies Ltd 8214 Fraser Ae Fort McMurray AB T9H 1W8 Phone: (780) 791-4484 www.icsgroup.ca

ITT Flygt 300 Labrosse Ave Pointe-Claire QC H9R 4V5 Phone: (514) 695-0100 www.ittflygt.ca

Kema Enterprizes PO Box 769 Redwater AB TOA 2W0 Phone: (780) 736-2232

Kenilworth Combustion Ltd PO Box 12118 Lloydminster AB T9V 3C4 Phone: (780) 744-3974 www.kenilworth.ca

Klaus Enterprises Ltd 123 Cree Rd Sherwood Park AB T8A 3X9 Phone: (780) 467-7823 www.klaus.ca

Krupp Canada Inc 405-1177 11 Ave SW Calgary AB T2R 0G5 Phone: (403) 245-2866 www.krupp.ca

Kudu Industries Inc 9112 40 St SE Calgary AB T2C 2P3 Phone: (403) 279-5838 www.kudupump.com

Lufkin Industries Canada Ltd 1050-808 4 Ave SW Calgary AB T2P 3E8 Phone: (403) 234-7692 www.lufkin.ca

Marking Services Inc Bay 6-702 12 Ave Nisku AB T9E 7P7 Phone: (780) 955-9303 www.markserv.com

MJB Slickline Services 400-608 7 St SW Calgary AB T2P 1Z2 Phone: (403) 262-7432 www.mjbslickline.com

MMD Mineral Sizing (Canada) Inc 355 MacKenzie Blvd Fort McMurray AB T9H 5E2 Phone: (780) 799-4600 http://www.mmdsizers.com

Mosquito Enterprises 2407 53 Ave Lloydminster AB T9V 2R1 Phone: (306) 871-4221

National Process Equipment 5-3401 19 St NE Calgary AB T2E 6S8 Phone: (403) 219-0270 www.natpro.com

Northern Industrial Insulation Contractors Inc 17408 106A Ave NW Edmonton AB T5S 1E6 Phone: (780) 483-1850 www.northern-insulation.ca Oil Lift Technology Inc 3-1820 30 Ave NE Calgary AB T2E 7M5 Phone: (403) 291-5300 www.oillifttechnology.com

P & H MinePro Services of Canada 300-7326 10 St NE Calgary AB T2E 8W1 Phone: (403) 730-9851 www.minepro.com

PC Compression Inc 6023 52 Ave Bonnyville AB T9N 2M3 Phone: (780) 826-6680 www.pccompression.com

Prime Pump Industries 510-407 2 St SW Calgary AB T2P 2Y3 Phone: (403) 234-7033

Pure Energy Services Partnership 300-1010 1 St SW Calgary AB T2R 1K4 Phone: (403) 262-4000 www.pure-energy.ca

Quadrise Canada Fuel Systems Inc 1200-202 6 Ave SW Calgary AB T2P 2R9 Phone: (403) 290-1100 www.quadrisecanada.com

Quinn Pumps PO Box 846 Stn Postal Box Ctr Red Deer AB T4N 5H2 Phone: (403) 347-1128 www.quinnpumps.com

RamEx Exchanger Inc 157-54150 RR 224 Fort Saskatchewan AB T8L 3Y5 Phone: (780) 992-8333 www.ramex.ca

Rivard Enterprises Ltd 3-320 MacKay Cres Fort McMurray AB T9H 4E4 Phone: (780) 743-3003

RJV Gas Field Services 4901 Bruce Rd Vegreville AB T9C 1C3 Phone: (780) 632-7774 www.laniuk.com

Rocanda Enterprises Ltd 329 10A St NW Calgary AB T2N 1W7 Phone: (877) 726-9943 www.rocanda.com

Sand Control Systems Ltd PO Box 11698 Lloydminster AB T9V 3B9 Phone: (780) 875-2741 www.sandcontrolsystems.com

Sandale Utility Products 4435 90 Ave SE Calgary AB T2C 2S6 Phone: (403) 663-2101

Seven Lakes Oilfield Services Corp PO Box 39 Bonnyville AB TOA 1CO

Phone: (780) 826-6392

Sign Language Bay 2-6206 50 Ave Lloydminster AB T9V 2C9 Phone: (780) 875-7446 Smith Cameron Industrial Inc 4422 97 St NW Edmonton AB T6E 5R9 Phone: (780) 432-6202 www.smithcameron.com

SS Holdings 5504 52 Ave Bonnyville AB T9N 2A2 Phone: (780) 826-4394

Talmek Compression Services Ltd PO Box 1152 Slave Lake AB TOG 2A0 Phone: (780) 849-6844

Techna-West Engineering Ltd 600-10010 106 St NW Edmonton AB T5J 3L8 Phone: (780) 451-4800

Texacana Turbines Inc 6132 46 St SE Calgary AB T2C 4X4 Phone: (403) 720-8080

The Pickford Group Ltd 5759 67 St NW Edmonton AB T6B 0B4 Phone: (780) 469-6002 www.pickford.com

Thermon Heat Tracing Services Inc 5215 87 St NW Edmonton AB TGE 5L5 Phone: (780) 437-6326 www.thermon.com

Toromont Energy Systems 10121 Barlow Tr NE Calgary AB T3J 3C6 Phone: (403) 291-3438 www.toromontprocess.com

Tracerco Process Diagnostics 8908 60 Ave Edmonton AB T6E 6A6 Phone: (780) 469-0055 www.tracerco.com

Tri-Alta Oilfield Industries Ltd PO Box 813 Redwater AB TOA 2W0 Phone: (780) 942-6000

Triple J Oilfield Services Lloydminster 2933 67 Ave Lloydminster AB T9V 3H6 Phone: (780) 808-8784

Universal Industries 5014 65 St Lloydminster AB T9V 2K2 Phone: (780) 875-6161 www.uic.ca

Waterflood Service & Sales Ltd PO Box 1490 Estevan SK S4A 2L7 Phone: (306) 634-7212 www.waterflood.com

Wellstream International Ltd Wallstream House, Wincomblee Rd Walker Riverside Newcastle T2P 3E5 Phone: 191 295-9169 www.wellstream.com Wellvision Field Services Inc 389 Archibald Close Fort McMurray AB T9K 2P6 Phone: (780) 790-0206

Western Energy Services Corp 5109 63 St Lloydminster AB T9V 2E7 Phone: (780) 808-8770

Wild Rows Pump Service Ltd 5901 63 Ave Lloydminster AB T9V 3C1 Phone: (780) 875-0650

SAFETY PRODUCTS & SERVICES

Advanced Paramedic Limited PO Box 7320 Peace River AB T8S 1S9 Phone: (780) 624-4911 www.advancedparamedic.com

Apprenticeship & Industry Training 7-9915 Franklin Ave Fort McMurray AB T9H 2K4 Phone: (780) 743-7150

Arcadia Safety Training PO Box 118 Enilda AB TOG 0W0 Phone: (780) 523-1997

Asset Safety Services Inc PO Box 23003 Fort McMurray AB T9H 5B7 Phone: (780) 799-4473

ASTEC Safety Services Ltd 2602 50 Ave Lloydminster AB T9V 2S3 Phone: (780) 875-0331 www.astecsafety.com

Audits & Safety Services 9420 85 Ave Peace River AB T8S 1G2 Phone: (780) 624-0615 www.peaceriversafetytraining.com

Bern's Wellsite Medic Service PO Box 76 Red Earth Creek AB TOG 1X0 Phone: (780) 649-0482

Bonnyville Municipal Ambulance 4902 47 Ave Bonnyville AB T9N 1M4 Phone: (780) 826-6224

Bulwark Protective Apparel Ltd 9146 Yellowhead Tr NW Edmonton AB T5B 1G2 Phone: (780) 479-4444 www.bulwark.com

Bumper To Bumper PO Box 510 High Prairie AB TOG1E0 Phone: (780) 523-4521

CALA Environment, Safety and Wellness Inc PO Box 836

Lac La Biche AB T0A 2C0 Phone: (780) 623-9444

Canadian Linen & Uniform Service 8631 Stadium Rd NW Edmonton AB T5H 3W9 Phone: (780) 424-3181 www.canadianuniform.com Cansafe Inc 3-4720 50 St Lloydminster SK S9V 0M7 Phone: (306) 825-8845 www.cansafesafety.com

CMS Canadian Industrial Medical Services Ltd 4918 46 Ave St Paul AB TOA 3A4 Phone: (780) 645-7750

Cold Lake Emergency Medical Services 207-314 25 St Cold Lake AB T9M 1G6 Phone: (780) 639-6699

D C Safety and Welding Supplies 108 12 Ave SW SS 4 Slave Lake AB TOG 2A4 Phone: (780) 849-9898

Dino Holdings Inc PO Box 149 Smoky Lake AB TOA 3CO Phone: (780) 656-0101

DuPont Personal Protection PO Box 27069 TUSC RPO Calgary AB T3L 2Y1 Phone: (403) 217-9696 www.personalprotection.dupont.ca

ElectroGas Monitors Ltd 1-7961 49 Ave Red Deer AB T4P 2V5 Phone: (403) 341-6167 www.electrogasmonitors.com

ESS Support Services 14610 115 Ave NW Edmonton AB T5M 3B9 Phone: (780) 429-4949 www.ess-global.com

Fire Power Oilfield Firefighting Ltd 1300-510 5 St SW Calgary AB T2P 3S2 Phone: (403) 233-7904 www.firepower.ca

Firemaster Oilfield Services Inc 4728 78A St Cl Red Deer AB T4P 2J2 Phone: (403) 342-7500 www.firemaster.ca

Fort McMurray Regional Business Development Centre 102-9816 Hardin St Fort McMurray AB T9H 4K3 Phone: (780) 791-0330 www.fortmcmurray.com/bdc

Goodfish Lake Development Corporation Box 273 Site SC Goodfish Lake AB T0A 1R0 Phone: (780) 636-2863 www.gfidc.ca

Horizon Enterprises Inc 170 Valley Point South 52559 Hwy 21 Sherwood Park AB T8A 4S6 Phone: (780) 467-5149

HSE Integrated Ltd 1-350 MacAlpine Cres Fort McMurray AB T9H 4A8 Phone: (780) 715-2088 www.hseintegrated.com

Industrial Life Support PO Box 1815 Slave Lake AB TOG 2A0

Slave Lake AB T0G 2A0 Phone: (780) 849-6787

Industrial Paramedic Services Ltd 500-441 5 Ave SW Calgary AB T2P 2V1 Phone: (403) 264-6435 www.ipsems.com

J & R Safety PO Box 1986 Lloydminster SK S9V 1R5 Phone: (780) 875-9772

Just-In Case Fire Ltd 321-11979 40 St SE Calgary AB T2Z 4M3 Phone: (403) 243-9728 www.justincasefire.com

KB Jodan Inc Site 639 Comp 4 RR 2 Lac La Biche AB TOA 2C2 Phone: (780) 623-3152

Lash Enterprises Ltd 5510 63 Ave Lloydminster AB Phone: (780) 875-2596 www.flushby.com

Leeway Heavy Oil (1996) Ltd 4609 51 Ave Elk Point AB TOA 1A0 Phone: (780) 724-3026

Lesser Slave Lake Community Development Corp 105-6 Ave NW Slave Lake AB Phone: (780) 849-3232 www.lslcdcorp.ab.ca

Levitt-Safety Limited 9241 48 St NW Edmonton AB T6B 2R9 Phone: (780) 461-8088 www.levitt-safety.com

Lloydminster Emergency Care Services 4734 42 St Lloydminster SK S9V 0E1

Lloydminster SK S9V 0E1 Phone: (306) 825-7077 Marshall's Safety Services Ltd P0 Box 514

High Level AB T0H 1Z0 Phone: (780) 926-3344

Medi-Care Ambulance Services Inc 4925 47 St Redwater AB TOA 2W0

Redwater AB T0A 2W0 Phone: (780) 942-4703

Mikisew Slings & Safety Ltd 7027 Girard Rd Edmonton AB T6B 2C4 Phone: (780) 490-0255 www.mikisewslings.com

Mine Safety Appliances Company 16435 118 Ave NW Edmonton AB T5V 1H2 Phone: (780) 483-0988 www.msanet.com Mine Safety Appliances Company 222-5538 Eglinton Ave W Toronto ON M9C 5K5 Phone: (416) 620-2520 www.msanet.com

Mobile Industrial Health Services 230E MacKay Cres Fort McMurray AB T9H 5C6 Phone: (780) 791-9898

Mountain Industrial Safety PO Box 1231 Nisku AB T9E 8A8 Phone: (780) 987-3465 www.nic.bc.ca

North Safety Products Ltd 6303 Roper Rd NW Edmonton AB T6B 3G6 Phone: (780) 437-2641 www.northsafety.com

Northern Air Charter (PR) Inc PO Box 677 Grimshaw AB TOH 1W0 Phone: (780) 624-1911

Northern Factory Surplus (1999) 4006 50 Ave Lloydminster AB T9V 1B2 Phone: (780) 875-4800 www.northernfactorysurplus.com

Northern Lakes College 1201 Main St SE Slave Lake AB TOG 2A3 Phone: (780) 849-8714

Northern Safety Supply & Training Ltd PO Box 1462 St Paul AB TOA 3A0 Phone: (780) 645-4000

Olson Safety Services PO Box 368 Chauvin AB TOB 0V0 Phone: (780) 205-2804 www.olsonsafety.com

Patent Construction Systems 7030 51 Ave NW Edmonton AB T6B 2P4 Phone: (780) 468-3292 www.pcshd.com

Peace Regional Emergency Medical Services PO Box 735 Grimshaw AB TOH 1W0 Phone: (780) 624-3375

Peace Safety & Environmental Training PO Box 6215 Stn Main Peace River AB T8S 1S2 Phone: (780) 624-4886

Primco Dene Emergency Medical Services Ltd PO Box 2070 Cold Lake AB T9M 1P5 Phone: (780) 594-4034

Protective Clothing Supplies Ltd 7-8802 Franklin Ave Fort McMurray AB T9H 2J7 Phone: (780) 743-4055 Red Earth & District Ambulance Services Ltd GD

Red Earth Creek AB TOG 1X0 Phone: (780) 649-2222

Safe-Net Safety Service 9 Miller Cres Cold Lake AB T9M 1N2 Phone: (780) 639-4156

SafeTech Consulting Group Ltd 12126 90 St NW Edmonton AB T5B 3Z3 Phone: (780) 455-4480 www.safetech.ca

Safety Builders Consulting Corp 2 Briarwood Way Stony Plain AB T7Z 2R4 Phone: (866) 963-5933 www.safetybuilders.com

Safety Buzz Ltd PO Box 7968 Bonnyville AB T9N 2J3 Phone: (780) 573-0311 www.safety-buzz.com

Safety Direct Ltd 188-2257 Premier Way Sherwood Park AB T8H 2M8 Phone: (780) 464-7139 www.safetydirect.ca

Safety First 218-307 Athabasca Ave Fort McMurray AB T9J 1G9 Phone: (780) 799-1416

Safety Link PO Box 1016 Grimshaw AB TOH 1W0 Phone: (780) 332-2339

SafetyBoss Environmental Services Inc 921 9 Ave SE Calgary AB T2G 0S5 Phone: (403) 261-5075 www.safetyboss.com

Schram Crane & Rigging Consultants 165 Garnet Cres Wetaskiwin AB T9A 2S3 Phone: (780) 352-3199

SimplexGrinnell 215A MacDonald Cres Fort McMurray AB T9H 4B5 Phone: (780) 790-1525 www.simplexgrinnell.com

Skyway Canada Ltd 3408 76 Ave NW Edmonton AB T6B 2N8 Phone: (780) 413-8007 www.skywayequipment.com

Slave Lake Ambulance Service 309 6 St NE SS 2 Slave Lake AB TOG 2A2 Phone: (780) 849-4977

Slave Safety Supply Ltd 207 Caribou Tr Slave Lake AB TOG 2A0 Phone: (780) 849-4214 STARS (Alberta Shock Trauma Air Rescue Service Foundation) 1441 Aviation Park NE Calgary AB T2E 8M7 Phone: (403) 516-3574 www.stars.ca

Superior Safety Ltd 6025 50 Ave Bonnyville AB T9N 2L3 Phone: (780) 826-6031

United Safety Ltd 104 East Lake Rd Airdrie AB T4A 2J8 Phone: (403) 912-3690 www.unitedsafetyworld.com

Viewpoint Medical Assessment Services 310-1011 Glenmore Tr SW Calgary AB T2V 4R6 Phone: (403) 253-4272 www.viewpointonline.com

Wapose Medical Services Inc 2nd Floor Bay 3 360 MacKenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 714-6654 www.waposemedical.ca

SERVICE COMPANIES-INTEGRATED SERVICES

Baker Hughes 1000-401 9 Ave SW Calgary AB T2P 3C5 Phone: (403) 537-3400 www.bakerhughes.com

Bison Energy Services Inc 2020-355 4 Ave SW Calgary AB T2P 0J1 Phone: (403) 265-7772 www.bisonenergyservices.com

BJ Services Company Canada 1300-801 6 Ave SW Calgary AB T2P 4E1 Phone: (403) 531-5151 www.bjservices.com

CCS Energy Services 24 FIr-530 8 Ave SW Calgary AB T2P 3S8 Phone: (403) 233-7565 www.ccsenergyservices.com

ECL Group of Companies 7100 44 St SE Calgary AB T2C 2V7 Phone: (403) 720-5000 www.eclgroup.com

Ensign Energy Services Inc 1000-400 5 Ave SW Calgary AB T2P 0L6 Phone: (403) 262-1361 www.ensignenergy.com

Eveready Industrial Services Corp 15715 121A Ave NW Edmonton AB T5V 1B1 Phone: (780) 451-6969 www.evereadyindustrial.com

Ferus Inc 916-401 9 Ave SW Calgary AB T2P 3C5 Phone: (403) 517-8777 www.ferus.ca Flint Energy Services Ltd 100-2899 Broadmoor Blvd Sherwood Park AB T8H 1B5 Phone: (780) 416-3400 www.flintenergy.com

Gibson Energy Ltd 1700-440 2 Ave SW Calgary AB T2P 5E9 Phone: (403) 206-4000 www.gibsons.com

Halliburton Energy Services 1600-645 7 Ave SW Calgary AB T2P 4G8 Phone: (403) 231-9300 www.halliburton.com

Integrated Production Services 1900-840 7 Ave SW Calgary AB T2P 3G2 Phone: (403) 266-0908 www.ipsadvantage.com

Northern Arc Lubrication & Abrasion Specialists Ltd Bay 7 & 8-284 MacDonald Cres

Fort McMurray AB T9H 4B6 Phone: (780) 743-4339

Platinum Energy Services Corp 750-333 11 Ave SW Calgary AB T2R 1L9 Phone: (403) 264-6688 www.platinumenergy.net

PowerComm Inc 9333 37 Ave NW Edmonton AB T6E 5N4 Phone: (780) 465-7038 www.powercomm.ab.ca

Precision Energy Services 4500-150 6 Ave SW Calgary AB T2P 3Y7 Phone: (403) 265-6060 www.precision-es.com

Rockwell Servicing Partnership 1000-400 5 Ave SW Calgary AB T2P 0L6 Phone: (403) 260-6603 www.ensignenergy.com

Roevin Technical People Ltd 1160-10303 Jasper Ave NW Edmonton AB T5J 3N6 Phone: (780) 420-6232

Schlumberger 525 3 Ave SW Calgary AB T2P 0G4 Phone: (403) 509-4000 www.slb.com

Superior Concrete Construction (1984) Ltd PO Box 8427 Stn Main Cold Lake AB T9M 1N2 Phone: (780) 639-2849

Trican Well Service 2900-645 7 Ave SW Calgary AB T2P 4G8 Phone: (403) 266-0202 www.trican.ca

Tridon Communications 10017 Queen St Fort McMurray AB T9H 4Y9 Phone: (780) 791-1002 www.tridon.com

Tristar Resource Management Ltd 1601-840 7 Ave SW Calgary AB T2P 3G2 Phone: (403) 262-8595 www.tstar.ca

Weatherford 1100-333 5 Ave SW Calgary AB T2P 3B6 Phone: (403) 269-7788 www.weatherford.com

Wellco Energy Services 2300-500 4 Ave SW Calgary AB T2P 2V6 Phone: (403) 232-6334 www.wellcoenergy.com

SPECIALITY SERVICES

ACS Engineering Technologies Inc 200-1144 29 Ave NE Calgary AB T2E 7P1 Phone: (403) 255-2551 www.acsengineering.com

Acuren Group Inc 230 MacDonald Cres Fort McMurray AB T9H 4B4 Phone: (780) 790-1776 www.acuren.com

Aggressive Steaming Ltd PO Box 375 Falher AB T0H 1M0 Phone: (780) 837-3737

Aitec (Western) Inc 701 9 St SW SS 4 Slave Lake AB TOG 2A4 Phone: (780) 849-5321

AKO Oilfield Services PO Box 23 Kitscoty AB T0B 2P0 Phone: (780) 872-7022

Alberta North Steamers PO Box 1127 Manning AB TOH 2M0 Phone: (780) 836-5542

All West Surveys Ltd 17327 106A Ave NW Edmonton AB T5S 1M7 Phone: (780) 481-3399 www.allwest.ca

ALS Laboratory Group 2-1313 44 Ave NE Calgary AB T2E6L5 Phone: (403) 291-9897 www.alsenviro.com

AltaLink PO Box 20 Station M Calgary AB T2P 2G9 Phone: (403) 267-3400 www.altalink.ca

Attack Energy Services Ltd PO Box 2674 High Prairie AB TOG 1E0 Phone: (780) 523-3302

Attack Hydrovac PO Box 1166 Manning AB T0H 2M0 Phone: (780) 836-3609 Bakos (N.D.T.) Inspection (1989) Ltd PO Box 1832

Lac La Biche AB TOA 2CO Phone: (780) 623-1119

Bosch Holdings Inc PO Box 73 Red Earth Creek AB TOG 1X0 Phone: (780) 649-1135

Boss Pressure Services PO Box 923 Slave Lake AB TOG 2A0 Phone: (780) 849-8868

Briarwood Daylighting Ltd 6C-380 MacKenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 743-9031

Brother's Specialized Coating Systems Ltd 6150 76 Ave NW Edmonton AB T6B 0A6 Phone: (780) 440-2855 www.brotherscoating.com

CGG Veritas 500-404 6 Ave SW Calgary AB T2P 0R9 Phone: (403) 266-1011 www.cgg.com

Challenger Geomatics Ltd 1400-10117 Jasper Ave NW Edmonton AB T5J 1W8 Phone: (780) 424-5511 www.chalsurv.com

CMG Computer Modelling Group Ltd 200-3512 33 St NW Calgary AB T2L 2A6 Phone: (403) 531-1338 www.cmgl.ca

D & L Mobile Steaming PO Box 26 Eaglesham AB T0H 1H0 Phone: (780) 359-2000

Das Disposals Ltd 4302 47 St Vegreville AB T9C 1C3 Phone: (780) 632-9727

Dynacare Kasper Medical Laboratories 200-10150 102 St NW Edmonton AB T5J 5E2 Phone: (780) 451-3702 www.dkml.com

Dynasoft Communications Inc 4-4502 50 Ave Lloydminster AB T9V 0W3 Phone: (780) 808-8731

E & L Mobile Steaming GD Peace River AB T8S 1V8

Phone: (780) 618-8283

Emerald Associates Inc B8 140-2526 Battleford Ave Calgary AB T3E 7J4 Phone: (403) 686-7100 www.emerald-associates.com

Fugro Airborne Surveys 610-600 6 Ave SW Calgary AB T2P 0S5 Phone: (403) 777-9281 www.fugroairborne.com Geologic Systems Ltd 900-703 6 Ave SW Calgary AB T2P 0P9 Phone: (403) 262-1992 www.geologic.com

Global Thermoelectric 9-3700 78 Ave SE Calgary AB T2C 2L8 Phone: (403) 236-5556 www.globalte.com

Guardian - A ShawCor Company 950 78 Ave NW Edmonton AB T6P 1L7 Phone: (780) 440-1444 www.guardianoil.com

Hycal Energy Research Laboratories Ltd A-1338 36 Ave NE Calgary AB T2E 6T6 Phone: (403) 250-5800 www.hycal.com

Hydra-Tech International Corp 6060 86 Ave SE Calgary AB T2C 4L7 Phone: (403) 720-7740 www.hydra-tech.net

K. Ridge Mobile Hot Wash Ltd PO Box 609 Athabasca AB T9S 2A5 Phone: (780) 675-2919

L & L Steam Service PO Box 569 Viking AB T0B 4N0 Phone: (780) 336-2330

Lloyd's Steam Cleaning Ltd PO Box 6961 Stn Main Bonnyville AB T9N 2H4 Phone: (780) 826-5503

LRI Perforating Systems Inc 1-5202 63 St Llovdminster AB T9V 2E6 Phone: (780) 872-5072

McElhanney Land Surveys Ltd 450-999 8 St SW Calgary AB T2R 1J5 Phone: (403) 245-4711 www.mcelhanney.com/mlsl

N-Tech Technologies Ltd Bay 434-11979 40 St SE Calgary AB T2Z 4M3 Phone: (403) 272-9332 www.n-tech.ab.ca

Northern Lights Steam & Clean Red Earth Creek AB Phone: (780) 649-2272

Owen Oil Tools 5409-39139 Hwy 2A Red Deer County AB T4S 2B3 Phone: (403) 340-1017 www.owentools.com

Penetrators Canada Inc 8002 Edgar Industrial Ave Red Deer AB T4N 5E7 Phone: (403) 346-7474 www.penedrill.com

Photon Control Inc. 210-600 6 Ave SW Calgary AB T2P 0S5 Phone: (403) 249-6228

Precision Systems Inc 7217 Girard Rd NW Edmonton AB T6B 2C5 Phone: (780) 463-0026 www.precisionscale.com

Ranger Inspection Ltd 13-3716 56 Ave SE Calgary AB T2C 2B5 Phone: (403) 252-4487 www.rangerinspection.com

Richard Oilfield Services Ltd PO Box 507 Plamondon AB TOA 2TO Phone: (780) 798-3325

Roch-On Steaming Falher AB Phone: (780) 837-0045

Sanjel Corporation 500-622 5 Ave SW Calgary AB T2P 0M6 Phone: (403) 269-1420 www.sanjel.com

Sensornet Ltd 700-1816 Crowchild Tr NW Calgary AB T2M 3Y7 Phone: (403) 313-8304 www.sensornet.co.uk

Specialty Products Research & Supply (SPRS) 9763 60 Ave NW Edmonton AB T6E 4S8 Phone: (780) 436-1010 www.sprs.ca

Spyder Portable Boiler Service PO Box 7884 Bonnyville AB T9N 2J2 Phone: (780) 826-1122

TANDBERG Canada Inc 204-855 8 Ave SW Calgary AB T2P 1C5 Phone: (403) 777-3705 www.tandberg.net

Team Snubbing Services Inc 6, 4127-39139 Hwy 2A Red Deer County AB T4S 2A8 Phone: (403) 314-4220 www.teamsnubbing.com

TISI Canada Inc 8525 18 St NW Edmonton AB T6P 1K4 Phone: (780) 467-8070 www.teamindustrialservices.com

Veritas GeoServices 2200-715 5 Ave SW Calgary AB T2P 5A2 Phone: (403) 205-6000 www.veritasdgc.com

Wellside Services PO Box 1346 Grimshaw AB TOH 1W0 Phone: (780) 332-2512 Xergy Processing Inc 850-555 4 Ave SW Calgary AB T2P 3E7 Phone: (403) 264-4835 www.xergy.ca

Young EnergyServe Inc 4756 14 St NE Calgary AB T2E 6L7 Phone: (403) 517-2100 www.youngenergy.ca

SUPPLIES RENTALS & SALES

A R Williams Truck Equipment Ltd 8019 54 St SE Calgary AB T2C 4R7 Phone: (403) 243-6111 www.arwilliamstruck.com

A-1 Fencing PO Box 3157 Wainwright AB T9W 1T1 Phone: (780) 842-3082

Acklands-Grainger Inc 5208 63 St Lloydminster AB T9V 2E6 Phone: (780) 875-5878 www.acklandsgrainger.com

Addley NDT Supplies Ltd 1101 78 Ave NW Edmonton AB T6P 1L8 Phone: (780) 462-7110 www.addleyndt.com

Air Liquide Canada Inc 10020 56 Ave NW Edmonton AB T6E 5Z2 Phone: (780) 438-5600 www.airliquide.com

Apex Distribution Inc 905 3 St NW Slave Lake AB Phone: (780) 849-6111

B W Rig Repair & Supply 9305 27 Ave NW Edmonton AB T6N 1C9 Phone: (780) 463-8686 www.hyduke.com

B.G.E. Service & Supply Ltd 5711 103A St NW Edmonton AB T6H 2J6 Phone: (780) 436-6960 www.thefiltershop.com

B.W. Rentals PO Box 1228 High Prairie AB TOG 1E0 Phone: (780) 523-3051

Balon Corporation 6210 48 St SE Calgary AB T2C 4P7 Phone: (403) 203-0777 www.balon.com

Baron Oilfield Supply Ltd PO Box 66 High Prairie AB TOG 1E0 Phone: (780) 523-4000

BIW Connector Systems E, 70-161 Liberton Dr St Albert AB T8N 6A7 Phone: (780) 460-3993 www.biwconsys.com Bobcat of Fort McMurray 270 MacKay Cres Fort McMurray AB T9H 5C6 Phone: (780) 714-9200 www.bobcat.com

Cameron Valves and Measurement 1300-311 6 Ave SW Calgary AB T2P 3H2 Phone: (403) 398-9930 www.c-a-m.com

Car-Ber Testing Alberta Inc Bay 31-380 MacKenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 743-2496

Carreau Oilfield Specialties 9509 41 Ave NW Edmonton AB T6E 5X7 Phone: (780) 436-7730 www.carreauoilfield.com

Cat Rental Store 9520 51 Ave NW Edmonton AB T6E 5A6 Phone: (780) 989-1300 www.catrents.ca

Cat Rental Store Hwy 63 N of Confederation Way Fort McMurray AB T9H 3G6 Phone: (780) 743-5217 www.catrents.ca

CCI Thermal Technologies Inc 5918 Roper Rd Edmonton AB T6B 3E1 Phone: (780) 466-3178 www.ccithermal.com

CE Franklin Ltd 1900-300 5 Ave SW Calgary AB T2P 3C4 Phone: (403) 531-5600 www.cefranklin.com

Classic Oilfield Service Ltd 5211 65 St Lloydminster AB T9V 2E8 Phone: (780) 875-3276

Cold Weather Technologies 5508 59 Ave Lloydminster AB T9V 3A8 Phone: (780) 875-2530 www.coldweathertech.com

Commercial Solutions Inc 4203 95 St NW Edmonton AB T6E 5R6 Phone: (780) 432-1611 www.commercialsolutions.ca

Commercial Solutions Inc 5201 62 St Lloydminster AB T9V 2E3 Phone: (780) 875-2399 www.commercialsolutions.ca

Communications Group 7434 50 Ave Red Deer AB T4P 1X7 Phone: (403) 347-0777 www.commgroup.net

Continental Chain & Rigging Ltd 7011 Girard Rd NW Edmonton AB T6B 2C4 Phone: (780) 437-2701 www.continentalchain.com Corlac Equipment Ltd 1100-540 5 Ave SW Calgary AB T2P 0M2 Phone: (403) 294-4500 www.nov.com

Crane & Rig Inc 413 24 Ave Nisku AB T9E 8J1 Phone: (780) 955-8862 www.cranerig.com

Crest-Way Fencing 8-2933 67 Ave Lloydminster AB T9V 3H6 Phone: (780) 875-5448

D & D Oilfield Rentals 4-5113 62 St Lloydminster AB T1A 7Y5 Phone: (780) 875-5171

Dakota Crane Services Ltd 2601 47 Ave Lloydminster AB T9V 1X8 Phone: (780) 871-3996

Deltavalve 7712 56 St SE Calgary AB T2C 4S9 Phone: (403) 543-2244 www.deltavalve.com

Deran Oilfield Services Ltd PO Box 307 Lac La Biche AB TOA 2C0 Phone: (780) 623-2193

Dicks Boiler Ltd PO Box 474 Blairmore AB TOK 0E0 Phone: (403) 562-7600

Douglas Coatings Ltd 150 MacKay Cres Fort McMurray AB T9H 4W8 Phone: (780) 743-1810

Drillex Oilfield Services Ltd PO Box 2458 Lloydminster SK S9V 1W5 Phone: (780) 808-9500

Duraguard Fence Ltd (Fort McMurray) PO Box 5978 Fort McMurray AB T9H 4V9 Phone: (780) 743-2468 www.duraguardfence.com

E & E Radiator Service (1992) 10003 94A Ave Westlock AB T7P 2M7 Phone: (780) 349-4234

Edmonton Valve & Fitting Inc 4503 93 St NW Edmonton AB T6E 5S9 Phone: (780) 437-0640 www.swagelok.com/edmonton

Emco Limited PO Box 1200 Manning AB TOH 2M0 Phone: (780) 836-2002

Flowserve (FCD) 9044 18 St NW Edmonton AB T6P 1K6 Phone: (780) 449-4850 www.flowserve.com Fluid Clarification DanVic Inc (FCI-DanVic Inc) 9-7408 40 St SE Calgary AB T2C 2L6 Phone: (403) 236-0666 www.fluidclarification.com

FMC Technologies Company 6510 30 St Edmonton AB T6P 1J6 Phone: (780) 468-9231 www.fmcwellhead.com

GEM Supplies Ltd 5113 63 St Lloydminster AB T9V 2E7 Phone: (780) 875-4155

Gerk-Hoe Contracting & Equipment Rentals 7410 107 Ave Peace River AB T8S 1M6 Phone: (780) 624-1700

Global Fusion Coating Inc 1710 18 St Wainwright AB T9W 1L2 Phone: (780) 842-6860

Goodall Rubber Co of Canada Ltd 9725 62 Ave NW Edmonton AB T6E 0E4 Phone: (780) 437-1260 www.goodallonline.com

Gosselin Pipe & Steel Ltd PO Box 3083 Wainwright AB T9W 1S9 Phone: (780) 842-5705 www.gosselinpipe.com

Hallmark Tubulars Ltd 910-255 5 Ave SW Calgary AB T2P 3G6 Phone: (403) 266-3807 www.hallmarksolutions.ca

Hertz Equipment Rental 6110 86 St Edmonton AB T6E 5K2 Phone: (780) 440-5909 www.hertzeguip.com

Hex-Hut Shelter Systems Ltd 206-1053 10 St SW Calgary AB T2R 1S6 Phone: (403) 293-7333 www.hex-hut.com

HYTORC Sales & Service 45 Corriveau Ave St Albert AB T8N 5A3 Phone: (780) 459-5004 www.hytorc.com

In-Situ Machining Solutions Ltd 4-51309 Hwy 60 Spruce Grove AB T7Y 1C4 Phone: (780) 913-5075 www.insitumachining.com

Inland Industrial Supply Ltd Bay 4D-380 Mackenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 742-2430

International Cooling Tower Inc 3310 93 St NW Edmonton AB T6N 1C7 Phone: (780) 469-4900 www.ictower.com J C Inspections & Associates Ltd PO Box 1986 Stn Mn Lloydminster SK S9V 1R5 Phone: (780) 875-5711

JEN Supply Inc 4907 47 Ave Vermilion AB T9X 1J4 Phone: (780) 581-9990

Jet-Lube Of Canada Ltd 3820 97 St NW Edmonton AB T6E 5S8 Phone: (780) 463-7441 www.jetlubecanada.com

Karborah Contracting Services Ltd 124 Aspenhill Dr Fort McMurray AB T9J 1E1 Phone: (780) 791-3056

Keddco Mfg Ltd 4120 78 Ave NW Edmonton AB T6B 3M8 Phone: (780) 438-4944 www.keddco.com

Kelro Pump & Mechanical Ltd P0 Box 10989 Lloydminster AB T9V 3B3 Phone: (780) 875-7252 www.kelro.com

Ketek Industries Ltd 8124 Manning Ave Fort McMurray AB T9H 1V7 Phone: (780) 714-5059

Kinecor Inc 1403 5 St Nisku AB T9E 8C7 Phone: (780) 955-2155 www.kinecor.com

Lampson Canada Ltd PO Box 510 Beiseker AB TOM 0G0 Phone: (403) 947-2222

LaPrairie Crane PO Box 23038 Fort McMurray AB T9H 4N6 Phone: (780) 714-5438

Lloydminster Production Services 5210 63 St Lloydminster AB T9V 2E6 Phone: (780) 872-7300

Lonetech 5306 58 Ave Grimshaw AB Phone: (780) 332-4767

Max Fuel Distributors Ltd 701 12 Ave NE Slave Lake AB TOG 2A2 Phone: (780) 849-3820

McCann Equipment Ltd 4120 97 St Edmonton AB T6E 5Y6 Phone: (780) 414-1808 www.torquetools.com

Meridian Specialties 3780 98 St Edmonton AB T6E 6B4 Phone: (780) 468-7161 www.meridianvalve.ca Micron Filtration Inc Bay 12-6320 11 St SE Calgary AB T2H 2L7 Phone: (403) 717-2891 www.micronfilter.com

Midfield Supply ULC 1600-101 6 Ave SW Calgary AB T2P 3P4 Phone: (403) 233-7166 www.midfieldsupply.com

Midway Distributors Ltd 5402 44 St Lloydminster AB T9V 0B4 Phone: (780) 875-5551

Mutual Propane Ltd PO Box 2006 Lac La Biche AB TOA 2C0 Phone: (780) 623-2363

New Concept Manufacturing Ltd PO Box 32 Vimy AB TOG 2J0 Phone: (780) 961-3835

Norspec Filtration Ltd PO Box 933 Sarnia ON N7T 7K2 Phone: (519) 332-2433 www.norspec.com

Northwell Rentals (Lloydminster) Inc 5205 60 St Lloydminster AB T9V 2S9 Phone: (780) 875-6604

Panther Technologies Inc PO Box 7793 Bonnyville AB T9N 2J1 Phone: (780) 871-2784

Pason Systems Corp 6130 3 St SE Calgary AB T2H 1K4 Phone: (403) 233-0106 www.pason.com

Phoenix Fence Inc 12816 156 St NW Edmonton AB T5V 1E9 Phone: (780) 447-1919 www.phoenixfence.ca

Precision Bolting Ltd 3880 74 Ave NW Edmonton AB T6B 2P7 Phone: (780) 466-9869 www.precisionbolting.com

Process Combustion Systems (2000) Inc 13-1515 Highfield Cres SE Calgary AB T2G 5M4 Phone: (403) 250-1075 www.processcombustion.com

PROMORE 2100-125 9 Ave SE Calgary AB T2G 0P6 Phone: (403) 571-1669 www.promore.com

Prudential Steel Ltd 1800-140 4 Ave SW Calgary AB T2P 3N3 Phone: (403) 267-0300 www.prudentialsteel.com R C Moffatt Supply Ltd 9565 60 Ave NW Edmonton AB T6E 0C2 Phone: (780) 435-1921

Realistic Rod Guides Box 81017, 755 Lake Bonavista Dr SE Calgary AB T2J 0N0 Phone: (403) 225-1382 www.realistic.ca

REDCO Equipment Sales Ltd 8105 Davies Rd NW Edmonton AB T6E 4N1 Phone: (780) 466-1820 www.redcovalves.com

Relay Distributing 6005 50 Ave Lloydminster SK S9V 2A4 Phone: (306) 825-4322

Rental Service Corporation 4915 101 Ave NW Edmonton AB T6A 0L6 Phone: (780) 485-4208 www.rentalservice.com

RSC Equipment Rental 5114 62 St Lloydminster AB T9V 2E4 Phone: (780) 875-5844 www.rentalservice.com

Sabre Communications Inc PO Box 541 Lloydminster SK S9V 0N7 Phone: (306) 825-8500

Score Energy Products Inc 9821 41 Ave NW Edmonton AB T6E 0A2 Phone: (780) 466-6782 www.scorevalves.com

Shaw Pipe 1824 Crowchild Tr NW Calgary AB T2M 3Y7 Phone: (403) 263-2255 www.shawpipe.ca

Sil Industrial Minerals 8635 Stadium Rd NW Edmonton AB T6S1G3 Phone: (780) 467-2627 www.sil.ab.ca

661254 Alberta Ltd PO Box 6231 Stn Main Fort McMurray AB T9H 4W1 Phone: (780) 743-5968

Specialty Oilfield Rentals Ltd 206-50090 48 St Lloydminster AB T9V 0M7 Phone: (780) 875-4214

SPX Valves & Controls 3424 78 Ave NW Edmonton AB T6B 2X9 Phone: (780) 465-3110 www.dezurik.com

Stewart Sales & Rentals 24 Nipawan Rd Lac La Biche AB Phone: (780) 623-3243

Stream-Flo Industries Ltd 400-202 6 Ave SW Calgary AB T2P 2R9 Phone: (403) 269-5531 www.streamflo.com

Summit Valve & Controls Ltd 5304 68 Ave NW Edmonton AB T6B 3M4 Phone: (780) 468-6900 www.summitvalve.com

Tierra Alta 4926 89 St Edmonton AB T6E 5K1 Phone: (780) 462-8271 www.tierraalta.com

Topco Oilsite Products Ltd 5-3401 19 St NE Calgary AB 72E 6S8 Phone: (403) 219-0255 www.topcooilsite.com

Total Oilfield Rentals PO Box 129 Red Earth Creek AB TOG 1X0 Phone: (780) 649-2202

Trivax Enterprises Ltd 230A MacKay Cres Fort McMurray AB T9H 5C6 Phone: (780) 598-0919 www.evereadyindustrial.com

Unified Alloys 8835 50 Ave NW Edmonton AB T6E 5H4 Phone: (780) 468-5656 www.etalloys.com

United Rentals of Canada 320 MacKenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 790-2700 www.unitedrentals.com

Van Leeuwen Pipe & Tube (Canada) 2875 64 Ave NW Edmonton AB T6P 1R1

Phone: (780) 469-7410 Vegreville Equipment Rentals & Sales Inc

5125 52 Ave Vegreville AB T9C 1M2 Phone: (780) 632-2976

Wajax Industries 16745 111 Ave NW Edmonton AB T5M 2S4 Phone: (780) 487-6700 www.wilwest.wajax.com

Westlund 4103 84 Ave Edmonton AB T6B 2S3 Phone: (780) 463-7473 www.westlund.ca

Westlund Tren-Dy Oil & Industrial Supplies

5-6206 50 Ave Lloydminster AB T9V 2C9 Phone: (780) 875-5455

Wilter Auto & Industrial Supply 5609 55 St Cold Lake AB T9M 1R6 Phone: (780) 594-4666

Wolf's Equipment Sales Waskatenau AB Phone: (780) 358-2772

XL Resources Ltd 5211 65 St Lloydminster AB T9V 2E8 Phone: (780) 875-6100

Zero Tolerance Valve Inc PO Box 2484 Lac La Biche AB TOA 2C0 Phone: (780) 623-3454

TRUCKING

Aero PO Box 5027 Stn Main Fort McMurray AB T9H 3G2 Phone: (780) 791-7278

Aim Transport PO Box 1440 Stn Main Lloydminster SK S9V 1K4 Phone: (306) 825-3616

Allan Trucking PO Box 1655 St Paul AB TOA 3A0 Phone: (780) 635-2191

Allnite Trucking Ltd PO Box 99 Boyle AB TOA 0M0 Phone: (780) 689-2121

Allvac Oilfield Services Ltd PO Box 7993 Bonnyville AB T9N 2J3 Phone: (780) 826-5151

Andre's Water Delivery Ltd 9113 93 St Lac La Biche AB TOA 2CO Phone: (780) 623-4027

AV Transportation Inc 5-380 MacKenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 790-0630

Axani Bros Trucking 1205 5 Ave Cold Lake AB T9M 1A8 Phone: (780) 812-5362

B & B Expediting & Hot Shot Service 144 McMillan Rd Fort McMurray AB T9H 5L4 Phone: (780) 743-6100

B & R Eckel's Transport Ltd 5520 50 Ave Bonnyville AB T9N 2K8 Phone: (780) 826-3889 www.breckels.com

Baron Transport 910 8 St NW SS 1 Slave Lake AB TOG 2A1 Phone: (780) 849-4360

Barracuda Pilot Service PO Box 26 High Prairie AB TOG 1E0 Phone: (780) 523-7119

Barry's Transport Ltd PO Box 493 Boyle AB TOA 0M0 Phone: (780) 689-3994 Beniuk's Water Hauling Ltd PO Box 1394 Lac La Biche AB TOA 2CO

Phone: (780) 623-2236

Blackwatch Energy Services Trust Transport 5115 62 St Vegreville AB T9C 1N6 Phone: (780) 632-4266

Blair's Oilfield Hauling 3409 47 Ave Lloydminster SK Phone: (306) 387-6865

BOS Oilfield Service Ltd PO Box 176 Glendon AB TOA 1P0 Phone: (780) 635-4459

Bourassa Truck Service & Backhoe Ltd PO Box 9 Breynat AB TOA 0P0 Phone: (780) 771-3923

Brooks Trucking PO Box 6086 Stn Main Fort McMurray AB T9H 4W1 Phone: (780) 743-4855

Brydon Trucking & Picker Service Ltd PO Box 658 Viking AB TOB 4N0 Phone: (780) 336-2034

Bush Baby Trucking Ltd PO Box 2454 Slave Lake AB TOG 2A0 Phone: (780) 849-5565

Calnash Trucking (South) Ltd 1 Parker Rd Lac La Biche AB TOA 2CO Phone: (780) 623-4817

Canadian Freightways Ltd 4041A 6 St SE Calgary AB T2G 4E7 Phone: (403) 287-1090 www.canadianfreightways.com

CD Rouleau Construction PO Box 327 Eaglesham AB T0H 1H0 Phone: (780) 837-1712

Cen-Alta Oilfield Trucking Ltd PO Box 359 Legal AB TOG 1L0 Phone: (780) 961-4148

Chem-Tech Transportation Service (1994) 4807 37 St Lloydminster SK S9V 0A7 Phone: (780) 871-4040

Chief Hauling Contractors Inc 140 MacLennan Cres Fort McMurray AB T9H 4E8 Phone: (780) 791-7808 www.chiefhauling.com

Cold Lake Ford PO Box 1888 Stn Main Cold Lake AB T9M 1P4 Phone: (780) 594-3000 Continental Cartage Inc 200 Airport Rd Fort McMurray AB T9H 4P1 Phone: (780) 743-2255

Cooke's Mobile Service PO Box 1591 Lloydminster SK S9V 1K5 Phone: (306) 825-6502

Cut Line Construction Ltd PO Box 1397 St Paul AB TOA 3A0 Phone: (780) 645-2029

D G R Tank Service PO Box 73 Calmar AB TOC 0V0 Phone: (780) 649-2230

D W Hot Shot Service PO Box 885 Lloydminster SK Phone: (306) 821-2383

Delorme Enterprises Ltd PO Box 1089 High Prairie AB TOG 1E0 Phone: (780) 523-3278

Dennis's Oilfield Hauling Ltd PO Box 125 Redwater AB T0A 2W0 Phone: (780) 942-3880

Diamond B Transport 502-5116 50 St Lloydminster AB T9V 0M3 Phone: (780) 875-3039

Diamond D Oilfield Hauling Ltd Boyle AB TOA 0M0 Phone: (780) 525-3380

Dot-Lyn Sales & Service Ltd 5701 Mackenzie Rd Grimshaw AB TOH 1W0 Phone: (780) 332-4230

Dow Trucking Ltd PO Box 128 Chipman AB TOB 0W0 Phone: (780) 363-3817

DRIVING FORCE 16310 100 Ave NW Edmonton AB T5P 4X5 Phone: (780) 930-7013

Duke's Transport Ltd 400 MacAlpine Cres Fort McMurray AB T9H 4B1 Phone: (780) 791-1478 www.dukes.ca

Duniece Bros Trucking Ltd PO Box 2280 Athabasca AB T9S 2B8 Phone: (780) 525-2262

Dymen Holdings Ltd PÓ Box 305 Lac La Biche AB TOA 2CO Phone: (780) 623-3541

E & N Trucking Ltd RR 1 Boyle AB TOA OMO Phone: (780) 525-2646 **Edmonton Trailer Sales & Leasing Ltd** 16830 111 Ave NW

Edmonton AB T5M 2S6 Phone: (780) 413-6030

EJR Trucking Inc PO Box 1920 Lac La Biche AB TOA 2CO Phone: (780) 623-3082 www.oildirectory.com/ejrtrucking/

ejrtrucking.htm

Elkow Enterprises PO Box 244 Two Hills AB T0B 4K0

Phone: (780) 208-1792 **Enzie Trucking Ltd**

3706 53 Ave Lloydminster AB T9V 1T5 Phone: (780) 875-5420

EPS Trucking

1910 15 Ave Wainwright AB T9W 1L2 Phone: (780) 842-4941

Eric Auger & Sons Contracting PO Box 360

Wabasca AB T0G 2K0 Phone: (780) 891-3751

Fat Cat Trucking P0 Box 406 Nampa AB T0H 2R0 Phone: (780) 322-2729

Frontier Peterbilt Sales Ltd 5201 40 Ave

Lloydminster SK S9V 2B7 Phone: (306) 825-3553

Full Motion Expediting Ltd PO Box 6077

Fort McMurray AB T9H 4W1 Phone: (780) 713-5588

G Force Diesel Service Ltd P0 Box 1040 Lloydminster SK S9V 1E9 Phone: (306) 825-2875

Garry's Trucking PO Box 63

Eaglesham AB T0H 1H0 Phone: (780) 837-5220

Gator Ventures Inc PO Box 131 Plamondon AB T0A 2T0 Phone: (780) 798-2332

Gear Centre The 215 MacDonald Cres Fort McMurray AB T4H 4B5 Phone: (780) 714-3570

Gino's Trucking Inc 9550 Yellowhead Tr Edmonton AB T5C 0W4 Phone: (780) 479-8115 www.ginotrucking.com

Go With the Flow PO Box 81 Colinton AB TOG ORO Phone: (780) 675-3148

Golosky Trucking & Contracting Ltd 10217 King St Fort McMurray AB T9H 3J1 Phone: (780) 791-2357 www.abraxusgroup.net

Gray's Water Hauling Ltd PO Box 127

Marsden SK S0M 1P0 Phone: (306) 826-5751

Green Valley Engineering PO Box 6305 Peace River AB T8S 1S2 Phone: (780) 624-2448

Grimshaw Trucking Ltd 11510 151 St NW Edmonton AB T5M 3N6 Phone: (780) 414-2850 www.grimshaw-trucking.com

H & E Oilfield Services Ltd 2201 1 Ave Wainwright AB T9W 1L7 Phone: (780) 842-6444

Formula Powell LP P0 Box 1707 Lloydminster SK S9V 1M6 Phóne: (780) 875-7960

H.L. Powell Trucking 305 Birch Ave NW Slave Lake AB TOG 2A0 Phone: (780) 849-5115

Hammer Equipment Sales Ltd 145 MacDonald Cres Fort McMurray AB T9H 4B3 Phone: (780) 743-1968 www.hammereg.com

Heavy Crude Hauling LP 5202 65 St Lloydminster AB T9V 2T3 Phone: (780) 870-4002 www.heavycrudehauling.com

Hi-Mark Hotshot, Picker & Rental Services PO Box 846 Slave Lake AB TOG 2A0 Phone: (780) 849-0888

Hidden Lake Oilfield Services Ltd PO Box 360 Ardmore AB TOA 0B0

Hoffman's Tank Truck Service Ltd PO Box 67

Elk Point AB TOA 1A0 Phone: (780) 724-4117

Phone: (780) 826-4481

Inter-Rail Transport Ltd 8621 18 St Edmonton AB T6P 1K4 Phone: (780) 464-7046

Intra Plains Transport Ltd 5905 47 St Lloydminster AB T9V 2G4 Phone: (780) 875-9205

J Seniuk Trucking Ltd 380 MacKenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 791-2435

Jules Bastien Trucking PO Box 259 Guy AB TOH 1Y0 Phone: (780) 925-2168 K & F Trucking (1990) PO Box 206 Grimshaw AB T0H 1W0

Phone: (780) 332-4279 Kannorth Transportation &

Construction (1988) Ltd PO Box 6625 Peace River AB T8S 1S4 Phone: (780) 624-1280

Lac La Biche Transport Ltd PO Box 36 Lac La Biche AB TOA 2C0 Phone: (780) 623-4711

Landing Transport Ltd 3505 53 St Athabasca AB T9S 1A9 Phone: (780) 675-2349

Leading Edge Hot Shot & Picker Service PO Box 809 Manning AB T0H 2M0 Phone: (780) 836-2445

Lebid Ron Trucking PO Box 756 Athabasca AB T9S 2A6 Phone: (780) 675-4754

Lorette Truck Service Ltd PO Box 766 Grimshaw AB T0H 1W0 Phone: (780) 332-4039

Mach 1 Diesel Repair Ltd 5107 65 St Lloydminster AB T9V 2E8 Phone: (780) 875-3306

Mad Dog Oilfield Services Inc 401 16 Št Wainwright AB T9W 1J3 Phone: (780) 842-3517

Manning Mobile Mechanics PO Box 56 Canyon Creek AB TOG 0M0 Phone: (780) 369-2174

Marcels Oilfield Hauling Ltd PO Box 454 Slave Lake AB TOG 2A0 Phone: (780) 849-3848

Martix's Pilot Truck Services Ltd PO Box 30 Anzac AB TOP 1J0 Phone: (780) 598-3411

Marvin Sheehan Services PO Box 214 Grimshaw AB T0H 1W0 Phone: (780) 332-4777

Matco Transportation Systems 18151 107 Ave NW Edmonton AB T5S 1K4 Phone: (780) 484-8800 www.matco.ca

MBT Enterprises PO Box 6214 Peace River AB T8S 1S2 Phone: (780) 618-9730

McBride Trucking PO Box 239 Edgerton AB T0B 1K0 Phone: (780) 755-3790 McCoy's Trucking Ltd PO Box 5821 Westlock AB T7P 2P6 Phone: (780) 348-5451

Metro Gordey Trucking Ltd 7110 Bulyea Ave Fort McMurray AB T9H 1B1 Phone: (780) 743-4487

Michael S Witryk Oilfield Transport Ltd PO Box 575 Clandonald AB T0B 0X0 Phone: (780) 724-3195

Millartime Transport P0 Box 2332 Stn Main Lloydminster SK S9V 1S6 Phone: (306) 825-3899

Monahan Light Oilfield Hauling & **Hotshot Service** PO Box 1869 High Prairie AB TOG 1E0 Phone: (780) 523-2422

Morley Muldoon Transport Ltd 2009B 1 St Wainwright AB T9W 1L5 Phone: (780) 842-2222 www.nbf-biz.com/muldoontransport

Mud 'n Dust Trucking PO Box 654 Wabasca AB T0G 2K0 Phone: (780) 891-0303

Murdock Energy Inc PO Box 574 Slave Lake AB TOG 2A0 Phone: (780) 849-4863

Night Hawk Trucking 5905 47 ST Lloydminster AB T9V 2G4 Phone: (780) 875-4955

Nitro Heavy Hauling Ltd PO Box 11632 Stn Main Lloydminster AB T9V 3B8 Phone: (780) 875-6832

Nor-Trail Oilfield Ltd PO Box 147 Slave Lake AB TOG 2A0 Phone: (780) 849-5230

Northern Plains Moving & Transport Ltd 140 Mackay Cres Fort McMurray AB T9H 4W8 Phone: (780) 790-1336

Northwest Transport Ltd 400 MacAlpine Cres Fort McMurray AB T9H 4B1 Phone: (780) 791-1478

Orion's Way Hot Shot Service PO Box 536 Manning AB T0H 2M0 Phone: (780) 836-5545

Over-D Trucking PO Box 1024 Falher AB T0H 1M0 Phone: (780) 925-8254

Peace River Towing & Glass 4-9710 94 St

Peace River AB T8S 1J2 Phone: (780) 624-7777

Peace Truck & Trailer Ltd 9003 75 St

Peace River AB T8S 1T2 Phone: (780) 624-8655

Pebbles Trucking Ltd RR 5 Stn Main Lloydminster AB T9V 3A1 Phone: (780) 875-8460

Pentastar Transportation Ltd PO Box 2370

Lloydminster SK S9V 1W5 Phone: (780) 875-7722

Performance Truck Service 5201 62 St

Lloydminster AB T9V 2E3 Phone: (780) 875-9218

Pesklevis Ted Water Hauling PO Box 244

Waskatenau AB T0A 3P0 Phone: (780) 358-2590

Pioneer Truck Lines Ltd PO Box 72032 RPO Ottewell Edmonton AB T6B 3A7 Phone: (780) 467-8880 www.pioneertrucklines.com

Potts Trucking Ltd PO Box 33 Canyon Creek AB TOG 0M0 Phone: (780) 369-3775

Prairie Express Ltd 4-360 MacKenzie Blvd Fort McMurray AB T9H 4C4 Phone: (780) 715-4011

Q-Line Trucking Ltd. PO Box 110B RR 4 Corman Industrial Park Saskatoon SK S7K 3J7 Phone: (306) 651-3540 www.qlinetrucking.com

QIS Trucking Ltd PO Box 6479 Peace River AB T8S 1S3 Phone: (780) 624-3778

Quantum Winch PO Box 6977 Bonnyville AB T9N 2H4 Phone: (780) 826-3272

R & D Enterprises PO Box 6091 Stn Main Fort McMurray AB T9H 4W1 Phone: (780) 743-2042

R & E Madu Trucking Ltd PO Box 207 Redwater AB TOA 2W0 Phone: (780) 942-3977

R M J B Trucking Ltd 2909 55th Ave Lloydminster AB T9V 1N6 Phone: (780) 875-6875 Rainbow Transport (1974) Ltd 17508 116 Ave NW Edmonton AB T5S 2T9 Phone: (780) 452-5275

Phone: (780) 452-5275 www.rainbowtransport.com

Rand's Oilfield Services PO Box 727

Manning AB TOH 2M0 Phone: (780) 836-3150

Red Planet Trucking Ltd PO Box 258

Red Earth Creek AB TOG 1X0 Phone: (780) 649-3401 www.redplanettrucking.com

Reimer Express Lines Ltd 10120 52 St SE Calgary AB T2C 4M2 Phone: (403) 279-6866

Renigade Trucking PO Box 7220 Bonnyville AB T9N 2H6

Phone: (780) 826-2811

Rick's Oilfield Hauling

4808 44 St Redwater AB TOA 2W0 Phone: (780) 942-2932

Ridgid Oilfield Services Ltd PO Box 135 Lloydminster SK S9V 0Y1 Phone: (780) 875-7939

Ridley & Son's Hauling Ltd 4816 7 Ave N Chauvin AB TOB 0V0 Phone: (780) 858-2584

Ro-Bar Trucking Ltd PO Box 39 Widewater AB TOG 2M0 Phone: (780) 369-2191

Roadrunner Water Hauling Ltd PO Box 356

Innisfree AB T0B 2G0 Phone: (780) 592-2271

Rosenau Transport Ltd 5805 98 St NW Edmonton AB T6E 3L4 Phone: (780) 431-2877 www.rosenau.org

Roth Dennis Trucking Ltd 413 Main St S SS 3 Slave Lake AB TOG 2A3 Phone: (780) 849-4468

Sam's General Trucking Ltd 2009 1 St Wainwright AB T9W 1L5 Phone: (780) 842-3216

Sandpiper Truck Services Ltd PO Box 453 Lloydminster SK S9V 0Y6 Phone: (780) 875-2850

Schafer Mechanical Services 600 Caribou Tr SW Slave Lake AB Phone: (780) 849-2449

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