# OIL SANDS INDUSTRY UPDATE

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**Alberta Economic Development**

June 2006

# TABLE OF CONTENTS


Page

**WHAT'S NEW? ..... 1**

**1. INTRODUCTION ..... 5**

**2. OIL SANDS INDUSTRY OVERVIEW ..... 6**

2.1 BACKGROUND ..... 6
2.2 OIL SANDS INDUSTRY ACTIVITIES ..... 7
2.3 FUTURE OIL SANDS EXPENDITURES ..... 23
2.4 CO-OPERATIVE INITIATIVES ..... 25

**3. OIL SANDS REGIONS ..... 28**

3.1 THE WOOD BUFFALO REGION ..... 28
3.2 COLD LAKE REGION ..... 30
3.3 PEACE RIVER REGION ..... 30


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## LIST OF TABLES


TABLE 1 Major Oil Sands Projects, Wood Buffalo Region ..... 14
TABLE 2 Major Oil Sands Projects, Cold Lake Region ..... 19
TABLE 3 Major Oil Sands Projects, Peace River Region ..... 21
TABLE 4 Major Oil Sands Projects, Other Areas ..... 22


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## LIST OF FIGURES


Figure 1 Oil Sands Industry Expenditure Forecast ..... 24

# WHAT'S NEW?

### New Construction Projects

Oil sands facility construction ongoing in the first half of 2006 includes:

- Construction of the **Syncrude Upgrader Expansion** 1 (UE1) component of the Stage 3 project was completed in May 2006. Some start-up problems are expected to delay the coker coming on-line until the third quarter of 2006. The Stage 3 expansion is designed to increase Syncrude's production to 350,000 bpd.

- **Suncor** continues construction on two major projects. Work on the Millennium Coker Project – which will bring the plant upgrading capacity to a nominal 350,000 bpd -- is approximately 35% complete. After completing Firebag phase 2 in late 2005, Suncor has commenced with the construction of **Firebag** phase 3

- **OPTI Canada** and joint-venture partner **Nexen Inc.** are progressing with the construction of Phase 1 of their **Long Lake Project**, an integrated SAGD *in situ* project with upgrading facilities. Total design capacity of the project is 70,000 bpd. Construction of Phase 1 is proceeding on schedule and budget, with engineering reaching substantial completion and 69% of the project budget committed. SAGD on-site construction was over 55% complete at the end of March 2006, with first steam scheduled for late-2006 and upgrader start-up for mid-2007.

- **Canadian Natural Resources Ltd. (Canadian Natural)** is continuing with the construction of Phase I of its **Horizon Project**, a $10.8 billion integrated mine and upgrader that will eventually produce 232,000 bpd. Phase 1 production of 110,000 bpd is expected to commence in the second half of 2008. The first quarter 2006 progress report states that phase 1 construction is slightly ahead of schedule, at 26% completion.

- **Access Pipeline** is beginning construction immediately, after receiving regulatory approval for its proposed pipeline project between Fort McMurray and Edmonton. The company, a joint venture between **MEG Energy Corp.** and **Devon ARL Canada Corp.**, was formed to transport production from the companies' **Christina Lake** and **Jackfish** developments.

## Applications for Regulatory Approval

The following companies have filed for regulatory approval for oil sands projects:

- **Total SA** has filed an application for regulatory approval in February 2006 for the initial phase of the **Joslyn North Mine Project,** located 60 kilometres north of Fort McMurray. The application calls for two stages of construction. Phase 1 will produce 50,000 bpd starting in 2010, and Phase 2 will raise output to 100,000 bpd in 2013.

- **CNRL** has filed for regulatory approval for the **Primrose East Project** in the Cold Lake region. The project includes expansion of the Wolf Lake Central Processing Facility from its current design capacity of 88,000 bpd to 120,000 bpd. Subject to regulatory approval, construction is expected to begin in 2007.

- **Synenco Energy Inc.** has filed for regulatory approval for the **Northern Lights Partnership (NLP)** to construct and operate the Northern Lights mining and extraction project, located approximately 100 kilometres north of Fort McMurray. The 114,000 bpd bitumen extraction project has a target production date of 2010, pending regulatory approval.

## Hearings

A number of project applications that have been completed in recent months have progressed to the point of an EUB public hearing. These projects include:

- Shell Scotford Upgrader Expansion (finished); and

- Suncor Voyageur Project (upcoming).

Two other projects where the EUB may call a public hearing are:

- Shell Muskeg River Mine Expansion; and

- Imperial Oil Kearl Project.

## Public Announcements

Several developers have publicly announced plans for new developments or major expansions over the next 10-15 years:

- **Canadian Natural** has announced plans to develop an upgrader to process thermal in-situ oil sands resources. The project would be developed in two phases, each with 125,000 bpd capacity. Start-up is forecasted by 2010-2012; the final location is yet to be disclosed.

- **Petro-Canada**, along with partners **UTS Energy** (30% interest) and **Teck Cominco Ltd.** (15% interest) have chosen the location for an upgrader to be tied-in with production from the **Fort Hills Oil Sands Mine Project.** The Sturgeon Upgrader will be located in Sturgeon County, 40 km northeast of Edmonton. A public disclosure document was released in April 2006, stating the consortium's plans of increasing the upgrader output capacity to 170,000 bpd of bitumen, as well as intent to study the feasibility of an ultimate capacity of 350,000 to 400,000 bpd. Regulatory application is expected in late 2006 or early 2007.

- **Synenco** and its partner SinoCanadian Petroleum disclosed their plans to build and operate the Northern Lights upgrader. The planned 100,000 bpd upgrader is located in Sturgeon County just north of the City of Edmonton. Regulatory application is expected late in 2006 or early 2007.

- **Peace River Oil (PRO)**, a new private company, has made a public announcement of plans to construct the **Bluesky Upgrader**, near McLennan. The first stage of the upgrader would provide capacity to process 25,000 bpd of bitumen, with a target completion date of 2010. The total planned capacity of the plant is 100,000 bpd, to be developed in four stages. Regulatory application is expected to be submitted by the end of 2006.

- **Shell Canada Ltd.** has announced its intention to file for regulatory approval by the end of 2006 for an expansion of its existing **Carmon Creek Project**, located northeast of Peace River. The application is based on a 100,000 bpd capacity recovery facility. The first phase of 50,000 bpd is scheduled to begin construction after 2007, with production targeted by 2010.

**Other News**

New entrants to the Alberta oil sands industry have been in the news over the last months:

- **SURE Northern Energy Ltd.**, a subsidiary company of **Shell EP Americas Unit,** has been formed to evaluate and potentially develop heavy oil resources in Canada. The company acquired 10 properties approximately north and east of Fort McMurray in May 2006. The company states that these properties will provide a good opportunity to assess new and emerging technologies.

- **North American**, a recent start-up funded by various investors including **Paramount Resources**, has announced plans to develop the **Kai Kos Dehseh Project**, an *in situ* development located 75 kilometres south of Fort McMurray. The 160,000 bpd project calls for five phases of development, with the initial phase producing10,000 bpd by 2008, and peak production reached by 2015. Plans also include an upgrading plant, with the first phase scheduled for 2011.

- **Total SA** completed its takeover of **Deer Creek Energy** in 2005, acquiring an 84% stake in the **Joslyn Oil Sands Project**. The Joslyn development has both a mine and *in situ* components. Total also increased its share in the **Canadian Surmont** leases by 6.5%, to now hold 50% stake alongside ConocoPhillips, who is the operator of the project.

- **Chevron Corp.** has purchased new leases located 120 kilometres west of Fort McKay, where they plan to develop the **Ellis River Project**. Early estimates call for 100,000 bpd staged production by the middle of the next decade, employing *in situ* extraction methods.

- Shell Canada purchased **BlackRock Ventures Inc.** in May of 2006, acquiring (among others) the **Seal Project**, located in the Peace River area. The deal is pending and expected to be finalized by the end of June 2006.

- **Petrobank** expanded its land holdings with the acquisition of 15 sections of leases offsetting their existing lands, increasing their overall holdings by 33%.

- **Fort McKay First Nation** has reached a deal with the Athabasca Oil Sands Project (consortium of Shell, Chevron, Western Oil Sands) to participate in the next expansion of the ASOP Muskeg River Mine project, in exchange for allowing the company access to First Nations land for future mine expansions. The Muskeg River Mine expansion is scheduled to start in 2009.

# 1. INTRODUCTION

The *Oil Sands Industry Update*, which is published twice each year, provides an overview of the current status of the oil sands industry expansion in Alberta.

Oil sands industry expansion is a major driver of economic activity in Alberta. Oil sands projects account for 62% of all major projects listed by Alberta Economic Development in the May, 2006 edition of its *Inventory of Alberta Major Projects*. During the operational phases of these projects (most of them have life spans of 30 years or more), they will contribute to the economic well being of the province through long-term employment creation, purchases of goods and services, and payment of taxes and royalties.

Oil sands industry expansion also places stresses on the social fabric of Alberta communities and on their biophysical environment. These stresses need to be managed and mitigated where possible. Mitigation involves the timely identification of the issues, information sharing among all stakeholders, and the initiation of appropriate and often multi-party initiatives.

The purpose of the *Oil Sands Industry Update* is to facilitate communication and cooperation between oil sands developers, the various departments of the Alberta government, and other stakeholders.

# 2. Oil Sands Industry Overview

## 2.1 BACKGROUND

Alberta has massive deposits of oil sands, a mixture of sand, clay, water, and bitumen -- a black, asphalt-like hydrocarbon as thick as molasses. These deposits, which account for the majority of the province's crude oil reserves, are located in three geological regions: Athabasca, Cold Lake, and Peace River. A simple map of these regions can be found at http://www.energy.gov.ab.ca/docs/oilsands/pdfs/PUB_osgenbrf.pdf. In this report, we discuss the oil sands industry by geographical-political region. The Wood Buffalo region, with Fort McMurray as its population centre, overlaps essentially with the geological Athabasca region. There are two smaller projects near Wabasca Desmarais that are in the Athabasca geological region but not in the geo-political region of Wood Buffalo.

There are essentially two approaches to oil sands development: mining and *in situ*.

- The mining approach is employed in the Athabasca deposits to the north of Fort McMurray. It exposes the oil sands by stripping the overburden, and then removes the sands using truck and shovel mining methods. The extraction process separates the bitumen from the sands through a process that relies on the addition of warm water and the agitation of the resulting slurry.

- The *in situ* approach removes the bitumen from the sand while the oil sands deposit is still in place underground. The most common method of separating the bitumen from the sand is to add heat, thus making the bitumen more fluid and allowing it to be pumped up to the surface. Some *in situ* projects use a cyclic steam stimulation (CSS) process, in which steam is added to the oil sands via vertical wells and the liquefied bitumen is subsequently pumped to the surface using the same well. Other *in situ* projects use variations of the steam assisted gravity drainage (SAGD) process. This process consists of adding steam to the oil sands using a horizontal well and simultaneously lifting the liquefied bitumen using another horizontal well located just below the steam injection well. Other emerging approaches to *in situ* production include the vapour recovery extraction method (VAPEX), which involves the use of solvents as a supplement or alternative to steam. Yet another approach to *in situ* recovery of bitumen is known as primary or "cold" production, which is employed in reservoirs where the oil sands will flow to the surface of wells without the introduction of heat.

The most recent Alberta oil sands production figures published by the Alberta Energy and Utilities Board (http://www.eub.gov.ab.ca/bbs/default.htm) are for 2004 production.

Data indicates that mining operations accounted for roughly two-thirds (600,000 bpd) of the total, with *in situ* operations accounting for roughly one-third (380,000 bpd). Of the *in situ* production, approximately two-thirds (270,000 bpd) was recovered through thermal methods and one-third (110,000 bpd) through primary ("cold") production.

The bitumen obtained through either mining or *in situ* production methods can be used directly for asphalt, diluted and transported by pipeline to refineries for processing, or upgraded into synthetic crude oil (SCO). SCO itself is a feedstock for refineries, where it can be further processed into gasoline, aviation fuel, or other products. Syncrude and Suncor have upgraders on site north of Fort McMurray and the Albian Sands mine is integrated with the Athabasca Oil Sands Project upgrader in Scotford to the northeast of Edmonton in Strathcona County. Other upgraders are located in Lloydminster and Regina.

The commercial development of Alberta's mineable oil sands started in the late 1960s when Great Canadian Oil Sands (now Suncor Energy) built a mine and upgrader north of Fort McMurray. In the 1970s, the Syncrude consortium built another plant in the area. Over the years these facilities have been upgraded, debottlenecked, and expanded on an incremental basis. In early 2003 the Athabasca Oil Sands Project commenced operations. Numerous other projects have broken ground or are in the regulatory approval process.

Commercial *in situ* production commenced in 1985 when Imperial Oil opened its Cold Lake Production Project and B.P. and Petro-Canada initiated operations at Wolf Lake, also in the Cold Lake region. In the following year, Shell commenced operations at its Peace River Project.

## 2.2 OIL SANDS INDUSTRY ACTIVITIES

The following information, including production levels, is drawn from publicly available sources, including project applications, company press releases, and financial information. Production information may refer to bitumen or synthetic crude oil, depending on the project.

The oil sands industry activities are presented by socio-economic region.

### 2.2.1 Wood Buffalo Region

Oil sands industry activities in the Wood Buffalo region can be summarized as follows:

- **Suncor** reported first quarter 2006 average synthetic crude production of 264,400 bpd, up from the first quarter 2005 average of 139,900 bpd. First quarter 2006 production includes 27,400 bpd production from the **Firebag** *in situ* project, up from 18,700 bpd in first quarter 2005.

  Work continues on the next stage of expansion including the addition of a third coker to the Millennium Upgrader, which will serve to increase oil

sands production to 350,000 bpd in 2008 or 2009. The project is on schedule and budget, with the majority of engineering finished and 35% of construction completed. Construction of Firebag Phase 2 is complete and in the commissioning stage, and construction of the next Firebag phased has started.

The Alberta Energy and Utilities Board (EUB) convened a public hearing regarding the **Voyageur Project** in early July. The Voyageur Project includes construction of a third upgrader and the opening of the Steepbank North Mine Extension. The new mine is being brought on-line to replace older producing mines reaching the end of their economic lives. The project is estimated to cost $7 billion and is expected to boost Suncor's oil sands output to 500,000-550,000 bpd by 2010-2012.

- **Syncrude** produced an average of 205,000 bpd of its Syncrude Sweet Blend (SSB) during the first quarter of 2006, up from 157,000 bpd during the same period in 2005. Similar to 2005, production in this current quarter was impacted by significant turnaround activities.

  Construction of the **Syncrude Upgrader Expansion** 1 (UE1) component of the Stage 3 project was completed in May 2006. Some start-up problems are expected to delay the coker coming on-line until the third quarter of 2006. The Stage 3 expansion is designed to increase Syncrude’s production to 350,000 bpd. The Stage 3 expansion was completed at the revised budget of $8.4 billion.

- **Athabasca Oil Sands Project** (AOSP -- a joint venture between Shell Canada, Chevron Canada Resources, and Western Oil Sands), operates the **Albian Sands Muskeg River Mine,** the **Shell Scotford Upgrader,** and the **Corridor Pipeline.** AOSP reported average bitumen production of 77,400 bpd during the first quarter of 2006, compared with 79,000 bpd during the same period in 2005. A major tear in the conveyor that transports ore to the extraction plant in February 2006 resulted in a significant reduction in production, until repairs were completed in mid-March.

  Both trains at the mine and the upgrader were down for scheduled maintenance during the second quarter of 2006. This first major turnaround was scheduled to last eight weeks.

  The joint venture partners have outlined growth initiatives for the Athabasca Oil Sands Project that may increase bitumen production from the current capacity of 155,000 bpd to between 500,000 and 600,000 bpd by 2014-2015, including:

- a number of debottlenecking projects at the Muskeg River Mine and the Scotford Upgrader;
- the **Muskeg River Mine (MRM) Expansion Project** and the **Scotford Upgrader Expansion Project**, which are expected to increase production to between 270,000 and 290,000 bpd by 2009/2010. Regulatory applications for these projects have been filed, with approvals anticipated by the end of 2006 or early 2007. A hearing for the Scotford project were held at the end of June, while a hearing for the MRM expansion may be scheduled in August or September 2006.
- the **Jackpine Mine**, a mining and extraction facility to be located straight east of the Muskeg River Mine. Phase 1 of the mine, with a design capacity of 200,000 bpd, has obtained regulatory approval. Phase 2 of the mine, which would require additional regulatory approval, could increase production capacity of the mine to 300,000 bpd.

- **Petro-Canada** reported average bitumen production of 21,300 bpd during 2005 at its **MacKay River** *in situ* project, up from 16,600 bpd the previous year. The Project has a design capacity of 33,000 bpd. The company has applied for regulatory approval for the **MacKay River Expansion Project**, which is designed to increase the production capacity of the facility from 33,000 bpd to 73,000 bpd, an increase of 40,000 bpd.

  Petro-Canada, along with partners **UTS Energy** (30% interest) and **Teck Cominco Ltd.** (15% interest) is proceeding with plans to develop **Fort Hills Oil Sands Mining and Upgrading Project**. Under the terms of the partnership agreement, Petro-Canada holds a 55% interest in the project and is designated as the operator. The company and its partners have received regulatory approval for production of up to 190,000 bpd of bitumen. They have also received approval for an amendment that enables them to change the timeline and scope of the first phase of the Project. Under the terms of the amendment, the partners will be able to produce 100,000 bpd from an oil sands mine by 2011 rather than 50,000 bpd by 2009.

  The location of the upgrader that will process the bitumen from the mine has been chosen. The proposed location for the **Sturgeon Upgrader** will be is Sturgeon County, 40 km northeast of Edmonton. A public disclosure document was released in April 2006, stating the consortium's plans of increasing the upgrader output capacity to 170,000 bpd of bitumen, as well as intent to study the feasibility of an ultimate capacity of 350,000 to 400,000 bpd. Regulatory application is scheduled for late 2006.

  In February 2006, the Fort Hills partnership acquired two additional leases

adjacent to their existing property, located 95 km north of Fort McMurray, increasing their position by 30%.

- **EnCana Energy's** *in situ* SAGD **Christina Lake Thermal Project** is expected to produce approximately 6,000 bpd in 2006. The design capacity of Phase 1 is 10,000 bpd, and expansion is currently underway to bring production up to 18,000 bpd by 2008. The long term target is for the facility to produce 250,000 bpd.

  The publicly announced **Borealis SAGD Project,** located to the north of Fort McMurray, has a planned peak production of 100,000 bpd. Including developments in the Cold Lake region, Encana's oil sands production target as of 2015 is 500,000 bpd. The company continues investigating potential partnerships with other oil and gas firms for development and downstream refining.

- **ConocoPhillips** is proceeding with construction of its **Surmont Project**, a multi-phased *in situ* project designed to produce 100,000 bpd. Production of the first 25,000 bpd is anticipated in 2006. Additional phases are expected to be constructed in the 2007 to 2012 period.

- **Japan Canada Oil Sands (JACOS)** continues to operate its SAGD Pilot Plant at the Hangingstone lease. Current production is averaging 8,000-8,500 bpd. The company intends to submit an application for a 30,000 bpd commercial SAGD project on the Hangingstone lease. The timing of the submission is not known.

- **OPTI Canada** and joint-venture partner **Nexen Inc.** are proceeding with construction of Phase 1 of their **Long Lake Project**, an integrated SAGD *in situ* project with upgrading facilities. Total design capacity of the project is 70,000 bpd. Construction of Phase 1 is proceeding on schedule and budget, with engineering reaching substantial completion and 69% of the project budget committed. SAGD on-site construction was over 55% complete at the end of March 2006, with first steam scheduled for late-2006 and upgrader start-up for mid-2007. Opti and Nexen have regulatory approval for a second upgrader phase with a design capacity of an additional 70,000 bpd. The companies are working towards a Long Lake SAGD Phase 2 and have discussed possible further expansions.

- **Canadian Natural Resources Ltd. (CNRL)** is continuing with the construction of Phase I of its **Horizon Project**, a $10.8 billion integrated mine and upgrader that will eventually produce 232,000 bpd. Phase 1 production of 110,000 bpd is expected to commence in the second half of 2008. The first quarter 2006 progress report states that phase 1 construction is slightly ahead of schedule, at 26% completion. Phase 2 is expected to increase production to 155,000 bpd in 2010. Phase 3 is

scheduled to further increase production to the design capacity 232,000 bpd. The company is evaluating the possibility of combining operations for phases 2 and 3 by 2011.

CNRL has also announced plans to further develop the Horizon Project beyond its currently approved first 3 phases. The plans call for the addition of two more phases, which will increase the production capacity of synthetic crude to a total of approximately 500,000 over the next 10-15 years.

The company has announced plans to develop an additional upgrader to process thermal in-situ oil sands resources. The proposed project would be developed in two phases, each with 125,000 bpd capacity. Construction period and location are yet to be disclosed.

- **Devon Energy Corporation** has commenced construction of its **Jackfish SAGD Oil Sands Project**. First production is expected in 2007 and full capacity production of 35,000 bpd in 2008.

- **Synenco Energy** has joined with **SinoCanadian Petroleum** to form the **Northern Lights Partnership** for the purpose of developing the **Northern Lights Project**. The project is an integrated mine, extraction and upgrading facility with a design capacity of 114,000 bpd and an estimated construction cost of $5.3 billion. The partnership recently submitted an application for regulatory approval.

  Synenco has retained an interest of 60% and the role of managing partner. The current plan is to develop the mine in two phases, each producing approximately 50,000 bpd of bitumen. Construction of Phase 1 is expected to begin in 2008, with first production in 2010. Construction of Phase 2 is scheduled to commence in 2010, with first production in 2012. Synenco announced in March 2006 its intention to fly workers in and out of the Northern Lights project site.

  Synenco and partners have announced that they will seek regulatory approval to build the **Northern Lights** upgrader complex in Sturgeon County, approximately 40 km northeast of Edmonton. Work on the application for regulatory approval of the upgrader has been initiated. Subject to regulatory approval, construction is scheduled to begin in 2008, with first production by 2010.

- **Fort McKay First Nation** has reached a deal with the Athabasca Oil Sands Project (consortium of Shell, Chevron, Western Oil Sands) to participate in the next expansion of the ASOP Muskeg River Mine project, in exchange for allowing the company access to First Nations land for

future mine expansions. The Muskeg River Mine expansion is scheduled to start in 2009.

- **Imperial Oil** and partner ExxonMobil have filed regulatory applications for their **Kearl Oil Sands Project**. Current planning for the mining project, which does not include an upgrader, envisions an initial 100,000 bpd development with later expansion to production of 300,000 bpd. If a hearing is required, it is expected to take place in the second half of 2006. Subject to timely regulatory approval and other favourable conditions, project construction could extend from 2007 to 2018, with first production of bitumen in 2010. Imperial's interest in the project is about 70%, with the remaining interest being held by ExxonMobil Canada.

- **Husky Energy** has received regulatory approval to proceed with its **Sunrise Project** (formerly known as Husky's Kearl *in situ* Project). The approval relates to Husky's bitumen extraction plans. The company is still considering options for upgrading. The **Sunrise Project** is designed to produce 50,000 bpd initially, increasing eventually to 200,000 bpd over a 40-year period commencing in 2008. Engineering selection and pre-design work is currently taking place. First production is planned for 2008.

- **Total SA** completed its takeover of **Deer Creek Energy** in 2005, acquiring an 84% stake in the **Joslyn Oil Sands Project**. The Joslyn development has both a mine and *in situ* components.

  Phase 2 of the SAGD *in situ* project continues, with initial production expected by mid-2006 and a peak production level of 12,000 bpd. In early 2005, the company filed an application for Phase 3A of its SAGD facilities, which is designed to produce an additional 15,000 bpd. Regulatory approval of Phase 3A is expected sometime in 2006.

  Total has also filed an application for regulatory approval in February 2006 for the initial phase of the **Joslyn North Mine Project**. The application calls for two stages of construction. Phase 1 will produce 50,000 bpd starting in 2010, and Phase 2 will raise output to 100,000 bpd in 2013. Operating aspects of the mining and in situ operations will be combined where possible in order to achieve efficiencies. Total is studying the potential of building an upgrader, but the location and timeline is yet to be determined.

  Total increased its share in the Surmont project by 6.5%, to now hold 50% stake alongside ConocoPhillips, who is the operator of the project.

- **Chevron Corp.** has purchased new leases located 120 kilometres west of Fort McKay, where they plan to develop the **Ellis River Project**. Early estimates call for 100,000 bpd staged production by the middle of the next decade, employing *in situ* extraction methods.

- **Petrobank** is proceeding with work on its **Whitesands Experimental Project**, the first field-scale application of the patented Toe-to-Heel Air Injection (THAI) *in situ* heavy oil recovery technology. Steam injection began in March and is expected to last 3 months, with air injection scheduled by the end of the year. The project is designed to produce up to 1,800 bpd of partially upgraded bitumen. If the THAI process is successful, the first commercial project using the technology could be undertaken on the Whitesands lease or at other locations in the region.

  Petrobank expanded its land holdings with the acquisition of 15 sections of leases offsetting their existing lands, increasing their overall holdings by 33%.

- **MEG Energy** has begun construction of a 3,000 bpd bitumen SAGD pilot facility, the first phase of its **Christina Lake Regional Project**. The company has also applied for regulatory approval for the second or commercial phase of the Christina Lake project, which is designed to produce 22,000 bpd. Pilot project steam injection is expected to begin in the fourth quarter of 2006. The China National Offshore Oil Company Ltd. (CNOOC), the third largest oil company in China, acquired a 16% stake in MEG Energy in 2005.

- **Connacher Oil and Gas** has received regulatory approval for its application to develop the **Great Divide SAGD Project**. Certain long-lead pieces of equipment have been ordered, and subject to regulatory approval, the 10,000 bpd-capacity plant is expected to achieve start-up in early 2007.

- **SURE Northern Energy Ltd.**, a subsidiary company of **Shell EP Americas Unit,** has been formed to evaluate and potentially develop pursue heavy oil resources in Canada. The company acquired 10 properties approximately 80 kilometres north of Fort McMurray in May 2006. The company states that these properties will provide a good opportunity to assess new and emerging technologies.

Table 1 provides a summary of the major oil sands projects in the Wood Buffalo Region.

## TABLE 1 MAJOR OIL SANDS PROJECTS, WOOD BUFFALO REGION

| Organization | Project | Type | Status |
|---|---|---|---|
| Suncor http://www.suncor.com/ | Steepbank and Millennium Mines | Mine/ Upgrader | Producing 264k bpd during Q1 of 2006. |
| | Millennium Coker Unit Expansion, increasing production to 350,000 bpd by 2008. | Coker Unit Expansion | Regulatory approval obtained. Construction currently 35% complete. |
| | Millennium South Tailings Pond | External Tailings Pond | Regulatory application filed. |
| | Firebag 1-4 | *In situ* project with 4 phases | Construction work on Phase 2 is complete. Full production expected later this year. |
| | Firebag 5-6 | *In situ* project | Application in process. |
| | Voyageur Project | Mine/ Upgrader | Regulatory hearings scheduled for July 2006. |
| Syncrude http://www.syncrude.ca/ | Syncrude current operations, including North Mine and Aurora Mine Train 1 and Train 2 | Mine/Upgrader | Producing 205K bpd during Q1 of 2006. |
| | Aurora Mine Train 2 and Upgrader Expansion 1 (part of Syncrude 21, Stage 3, which is designed to increase production by 100,000 bpd). | Mine/Upgrader | Mine Train 2 and Upgrader Expansion 1 completed. |
| | Syncrude 21, Stage 4: Aurora Mine Train 3 and Upgrader Expansion 2 | Mine/Upgrader | EUB approval in place, construction planned for 2007 with completion expected in 2010. Pre-engineering study underway. |
| | Syncrude 21, Stage 5: Aurora Mine Train 4 and Upgrader Expansion 3 | Mine/Upgrader | EUB approval in place for Aurora Mine Train 4. Startup planned for 2015. |
| Athabasca Oil Sands Project Shell http://www.shell.ca/ Chevron http://www.chevron.ca/ Western Oil Sands http://www.westernoilsands.com/ Albian Sands http://www.albiansands.com/ | Muskeg River Mine | Mine and Extraction Plant | Producing 77 K bpd during Q1 of 2006. |
| | Muskeg River Mine Expansion (designed to increase production by 270K-290K bpd by 2009/2010) | Mine and Extraction Plant | Regulatory hearing may be held in August / September 2006. |
| | Shell Scotford Upgrader Expansion | Expansion of Existing Upgrader | Regulatory hearing scheduled for end of June 2006. |
| | Jackpine Mine, Phase1 (with design capacity of 200K bpd) | Mine and Extraction Plant | Regulatory approval obtained. |
| | Jackpine Mine, Phase 2 (with design capacity of 100K bpd) | Mine and Extraction Plant | Disclosed. Tentatively planned for the 2010-2015 period. |

| Organization | Project | Type | Status |
|---|---|---|---|
| SURE Northern Energy Ltd. | Unnamed | *In situ* SAGD | Initial stage of technology testing. |
| Petro-Canada http://www.petro-canada.ca/ | MacKay River (with design capacity of 33K bpd) | *In situ* SAGD | Production averaged 21K bpd during 2005. |
| | MacKay River Expansion Project (with design capacity of 40K bpd) | *In situ* SAGD | Regulatory application filed. |
| | Meadow Creek | *In situ* SAGD | Application approved; Project under review. |
| | Lewis | *In situ* SAGD | Disclosed. |
| Petro-Canada http://www.petro-canada.ca/<br><br>UTS Energy http://www.uts.ca/<br><br>Teck Cominco Ltd http://www.teckcominco.com/ | Fort Hills (with Phase 1 production capacity of 100K bpd and total production capacity of 190K) | Mine/ | Engineering work is proceeding along with construction of an extraction process demonstration project to produce 3.5K bpd. Phase 1 production of 100K bpd anticipated by 2011. |
| | Sturgeon Upgrader | Upgrader (location determined to be Sturgeon County) | Preparation for regulatory application underway. |
| EnCana Energy http://encana.com/ | Christina Lake (with total design capacity of 60K bpd) | *In situ* SAGD | Currently producing 6K bpd, with production expected to increase to 18,000 bpd by the first quarter of 2008. |
| | Christina Lake Expansion (with potential to bring total Christina Lake production to 150K bpd) | *In situ* SAGD | Publicly discussed, with production potential of 150K bpd possible during 2005-2015 period. |
| | Borealis (with production potential of 100K bpd) | *In situ* SAGD | Publicly discussed, with peak production potential of 100K bpd possible during 2010-2015 period. |
| ConocoPhillips http://www.conocophillips.com/index.htm | Surmont | *In situ* SAGD | Phase 1 under construction, with first production expected by the end of 2006. |
| Japan Canada Oil Sands (JACOS) http://www.jacos.com/Company.htm | Hangingstone Pilot | *In situ* SAGD | Currently producing 8K-9K bpd. |
| | Hangingstone Commercial Project (with design capacity of 30K bpd) | *In situ* SAGD | Disclosed, with timing of application uncertain. |
| OPTI Canada and Nexen http://www.longlake.ca/ | Long Lake Phase 1 (design capacity of 70K bpd) | *In situ* SAGD with Upgrader | Currently under construction, with first steam expected in late-2006 and upgrader start-up in mid-2007. |
| | Long Lake Upgrader Phase 2 (design capacity of 70K bpd) | Upgrader | Regulatory approval in place |
| | Long Lake SAGD Phase 2 (design capacity of 70K bpd) | *In situ* SAGD | Regulatory application in progress. |

| Organization | Project | Type | Status |
|---|---|---|---|
| | Long Lake<br>Phase 3 and 4 | *In situ* SAGD | Approval for Phases 3 & 4 expected to follow earlier phases' approval by approximately 24 months |
| Canadian Natural Resources<br>http://www.cnrl.com/ | Horizon, Phase 1 (with design capacity of 110K bpd) | Mine/Upgrader | Construction in progress, with initial production expected in 2008. |
| | Horizon, Phase 2 (designed to increase Horizon production capacity to 155K bpd by 2010) | Mine/Upgrader | Regulatory approval in place |
| | Horizon, Phase 3 (designed to increase Horizon production capacity to 232K bpd by 2012) | Mine/Upgrader | Regulatory approval in place. Company examining potential of combining Phases 2 & 3 for joint operation by 2011. |
| | Horizon, Phases 4 & 5 (designed to increase total Horizon Project production to over 500K bpd) | Mine/Upgrader | Publicly discussed, with total Horizon Project production of 500K anticipated in 2015-2020 period. |
| | Kirby | *In situ* SAGD | Application filed. Project shelved. |
| Devon Energy Corporation<br>http://www.devonenergy.com/ | Jackfish | *In situ* SAGD | Construction in progress, with first production expected in 2007. |
| Synenco Energy<br>http://www.synenco.com/ | Northern Lights, Phase 1 (with production capacity of 50K bpd)<br>Joint project with Sinopec. | Mine and Extraction Facility with off-site upgrader | Application filed. Construction scheduled for 2008, with first production in 2010. |
| | Northern Lights, Phase 2 (with production capacity of 50K bpd) | Mine and Extraction Facility with off-site upgrader | Application filed. Construction scheduled to commence in 2010, with first production in 2012. |
| | Northern Lights | Upgrader (To be located in Sturgeon County) | Environmental Impact Assessment (EIA) preparations in progress, with regulatory submission scheduled in mid-2006. Construction scheduled to commence in 2008, with first production in 2010. |
| Fort McKay First Nation<br>http://www.fortmckay.com/ | Future Albian Sands (Muskeg River Mine) Expansions | Mine / Development<br>Future joint venture opportunities in exchange for access to lands. | Signed partnership agreement. Examining ways to work together. |
| Imperial Oil<br>http://www.imperialoil.com/Canada-English/HomePage.asp | Kearl (with total design capacity of 300K bpd) | Mine | Application for regulatory approval submitted. Subject to approval, construction planned for 2007-2018 with first production scheduled for 2010. |

| Organization | Project | Type | Status |
|---|---|---|---|
| Husky Energy<br>http://www.husky-oil.com/ | Sunrise (previously known as Husky's Kearl *in situ* Project), with design capacity of 200K bpd | *In situ* SAGD<br>Options for Upgrader being investigated. | Regulatory approval for bitumen extraction obtained. Phase 1 scheduled for 2006 with first production expected in 2008. |
| Total SA<br>www.total.com/ | Joslyn SAGD Phase 1 (with design capacity of 600 bpd) | *In situ* SAGD<br>Total SA purchased Deer Creek Energy in 2005. | Producing 260 bpd during Q2 of 2005. |
| | Joslyn SAGD Phase 2 (with design capacity of 12K bpd) | *In situ* SAGD | Construction 30% complete at end of Q2 of 2005, with steam injection to begin in early 2006 and first production expected in mid-2006. |
| | Joslyn SAGD Phase 3A (with design capacity of additional 15K bpd) | *In situ* SAGD | Application filed in early 2005. |
| | Joslyn Mine<br>Phase 1 (with design capacity of 100K bpd) | Mine | Application for Phase 1 & 2 of mine development filed in early 2006. |
| | Joslyn Mine<br>Phase 2 | Mine | Application for Phase 1 & 2 of mine development filed in early 2006. |
| Chevron Corp.<br>http://www.chevron.com/ | Ellis River | *In situ* | Development study. |
| Petrobank<br>http://www.petrobank.com/ | Whitesands Pilot Project (with design capacity of 18K bdp of partially upgraded bitumen) | *In situ* THAI (Toe-To-Heel Air Injection) technology tested | Currently under construction, test results anticipated by year-end. |
| MEG Energy<br>http://www.megenergy.com/ | Christina Lake Regional Project<br>Phase 1 (with design capacity of 3 K bpd) | *In situ* SAGD Pilot | Construction in progress. |
| | Christina Lake Regional Project<br>Phase 2 (with design capacity of 22K bpd) | *In situ* SAGD | Application for regulatory approval submitted. |
| Connacher Oil and Gas<br>http://www.connacheroil.com/ | Great Divide (with design capacity of 10K bpd) | *In situ* SAGD | Application approved. Construction is scheduled to begin in 2007. |
| North American Oil Sands Corp.<br>http://www.naosc.com/ | Kai Kos Dehseh | *In situ* SAGD | Initial studies regarding potential 160k bpd development by 2015. Five phased construction, with first 10k bpd production planned by 2008. |
| | | | |

### 2.2.2 Cold Lake Region

Oil sands industry activities in the Cold Lake Region can be summarized as follows:

- **Imperial Oil** produced 150,000 bpd of bitumen from its **Cold Lake Production Project** during the first quarter of 2006, slightly down from 152,000 bpd during the same period in 2005. Imperial is continuing with its phased development plans for the Cold Lake project. The company has obtained approval for two additional phases of the Cold Lake expansion, as follows:

  - the **Nabiye Project (Phases 14-16**), a Cyclic Steam Stimulation (CSS) project expected to increase production capacity by 30,000 bpd; and
  - the **Mahihkan North Project (an extension of Phases 9 & 10)**, which is designed to replace existing production.

  Work is progressing in the Mahihkan North development area, and Imperial is continuing to assess capacity optimization opportunities for the Cold Lake operation as a whole, including options for development of the Nabiye resource.

- **EnCana Energy** produced 36,000 bpd from its *in situ* **Foster Creek Thermal Project** during the first quarter of 2006, up from 30,000 bpd during the same period in 2005. The first stage of expansion was completed at the end of 2005, adding an additional 10,000 bpd. The second stage of expansion, bringing an additional 20,000 bpd is expected to be completed by the end of 2006. As part of its plan to boost its overall oil sands production to 500,000 bpd over the next ten years, EnCana has publicly announced plans to increase Foster Creek production to 250,000 bpd.

- **BlackRock Ventures** is currently working on the construction of its **Orion Project**, an *in situ* development. Phase 1 is scheduled for completion in mid 2007, with first production expected by the end of the year. The company has revised the original 10,000 bpd design of the second phase up to 20,000 bpd, bringing the total size of the project to 30,000 bpd. Phase 2 is scheduled to commence construction in 2008. BlackRock was purchased by **Shell Canada Ltd.** in May 2006 (See Peace River section for more detail).

- **CNRL** is currently producing 75,000 bpd from its numerous primary ("cold") production projects in the Cold Lake region. The company is also producing 47,000 bpd from its **Primrose/Wolf Lake *in situ* CSS Project**. Work on the **Primrose/Wolf Lake Expansion Project** is proceeding. The

Primrose North Project began steaming in the end of 2005, with first quarter 2006 production averaging 15,000 bpd

The Primrose East CSS Project, which is expected to increase production capacity by another 30,000 bpd, filed for regulatory approval in early 2006. Subject to regulatory approval, construction is expected to begin in 2007, with first production in early 2009. When the planned expansions are complete, the crude oil processing facility will have a production capacity of 120,000 bpd.

- **Husky Energy** has commenced construction of its **Tucker Thermal Project**, a 30,000-35,000 bpd SAGD facility. At the end of the first quarter of 2006, overall facility construction was 82% complete. First production is anticipated in late 2006.

Table 2 provides a summary of the major oil sands projects in the Cold Lake Region.

**TABLE 2 MAJOR OIL SANDS PROJECTS, COLD LAKE REGION**

| Organization | Project | Type | Status |
|---|---|---|---|
| Imperial Oil http://www.imperialoil.ca | Cold Lake Production Project | *In situ* CSS | Producing 150K bpd during first quarter of 2006. |
| | Nabiye Project (Phases 14-16 Cold Lake Project, with design capacity for 30K bpd) | *In situ* CSS | Development options currently under review. |
| | Mahihkan North Project (Extension of Phases 9 & 10 of Cold Lake Project) | *In situ* Designed to replace existing production | Work in progress. |
| EnCana http://www.encana.com/ | Foster Creek Project (with Phase 1 design capacity of 30K bpd) | *In situ* SAGD | Producing 36K bpd during Q1 of 2006. |
| | Foster Creek Project Phase 2 (with design capacity to increase production to over 80K bpd) | *In situ* SAGD | Construction of 10K bpd expansion completed. Further expansion of 20K bpd expected to finish end of 2006. |
| | Foster Creek Project Expansion (with potential to increase production to 250K bpd) | *In situ* SAGD | Publicly discussed, with peak potential production of 250K bpd anticipated during 2005-2015 period. |
| BlackRock Ventures (Purchased by Shell Canada) http://www.blackrock-ven.com/ | Orion Hilda Lake, Phase 1 (with design capacity of 10K bpd) | *In situ* SAGD | Construction in progress, with first production expected by the end of 2007. |
| | Orion Hilda Lake, Phase 2 (with design capacity of 20K bpd) | *In situ* SAGD | Regulatory and company approval obtained, with construction scheduled to commence in 2008. |
| Canadian Natural Resources Limited (CNRL) http://www.cnrl.com/ | Cold Lake Primary or "Cold" Production Projects | *in situ Primary or "Cold"* | Currently producing 75k bpd. |
| | Primrose/Wolf Lake | *In situ CSS* | Currently producing 47K bpd. |

| Organization | Project | Type | Status |
|---|---|---|---|
| | Primrose/Wolf Lake Expansion (Primrose North and Primrose East, designed to increase production to 120K bpd) | *In situ* CSS | Primrose North Project now in production. The Primrose East Project applied for regulatory approval in early 2006. Subject to approval, construction is expected to begin in 2007, with first production in 2009. |
| Husky Energy http://www.husky-oil.com/ | Tucker Project (with design capacity of 30K-35K bpd) | *In situ* SAGD | Construction 82% complete at end of Q1 of 2006. First production anticipated in late-2006. |

### 2.2.3 Peace River Region

Oil sands industry activities in the Peace River Region can be summarized as follows:

- **Shell Canada**'s first quarter production for 2006 at its **Peace River Project** was 7,300 bpd, up from 6,700 bpd during the same period last year.

  Shell is preparing to file for regulatory approval by the end of 2006 for an expansion of its existing **Carmon Creek Project**, located northeast of Peace River. The application is based on a 100,000 bpd capacity recovery facility, up from the current planned capacity of 30,000. The first phase of 50,000 bpd is scheduled to begin construction after 2007, with production targeted by 2010.

  Shell Canada's purchase of **BlackRock Ventures Inc.** in May of 2006, is pending and expected to become finalized by the end of June. A key part of the acquisition is the **Seal Project**, an *in situ* primary ("cold") production facility

- **Peace River Oil (PRO)**, a new private company, has made a public announcement of plans to construct the **Bluesky Upgrader**, near McLennan. The first stage of the upgrader would provide capacity to process 25,000 bpd of bitumen, with a target completion date of 2010. The total planned capacity of the plant is 100,000 bpd, to be developed in four stages. Regulatory application is expected to be submitted by the end of 2006.

- **Penn West** has plans of increasing output at its **Seal Project** pilot plant, from 900 bpd output of heavy oil, to 5,000 bpd, by the end of 2006. Additional phases may expand production of Penn West's Seal project to 20,000 bpd by 2011.

Table 3 provides a summary of the projects in the Peace River Region.

**TABLE 3 MAJOR OIL SANDS PROJECTS, PEACE RIVER REGION**

| Organization | Project | Type | Status |
|---|---|---|---|
| Shell Canada http://www.shell.ca/ | Peace River (with design capacity of 12K bpd) | *In situ* CSS | Currently producing 7K bpd. |
| | Carmon Creek (an expansion of the Peace River Project designed to sustain average production of 100K bpd over the life of the project) | *In situ* CSS | Planning work in progress, with submission for regulatory approval anticipated in late 2006. |
| BlackRock Ventures (Purchased by Shell Canada) http://www.blackrock-ven.com/ | Seal (with design capacity of 18k bpd) | *In situ* Primary ("Cold") Production | Producing with various expansion projects in place. |
| Peace River Oil (PRO) http://www.energyas.com/proupgrading/home.htm | Bluesky Upgrader (with design capacity of 100k bpd) | Upgrader | Regulatory application to be submitted by the end of 2006. |
| Penn West htpp://www.pennwest.com | Seal | Pilot Plant | Estimates of increasing production to 5k bpd by end of 2006. |

### 2.2.4 Other Areas:

Oil sands industry activities in areas of Alberta located outside of the Wood Buffalo, Cold Lake, and Peace River regions can be summarized as follows:

- **Access Pipeline** is beginning construction immediately, after receiving regulatory approval for its proposed pipeline project between Fort McMurray and Edmonton. The company, a joint venture between **MEG Energy Corp.** and **Devon ARL Canada Corp.**, was formed to transport production from the companies' **Christina Lake** and **Jackfish** developments.

- **EnCana Energy** produced 29,000 bpd of bitumen from its *in situ* primary (cold) production **Pelican Lake Project** during the first quarter of 2006, up from 21,000 bpd during the same period in 2005. The Pelican Lake project is located near Wabasca Demerais in north central Alberta.

- **CNRL** produced 29,000 bpd during the first quarter of 2006 from its primary (cold) production **Pelican Lake Project**, up marginally from 28,000 bpd during the last quarter of 2005.

- **Scotford Upgrader**, an integral part of the **Athabasca Oil Sands Project**, produced a record 184,100 bpd of synthetic crude oil in November 2005, compared to the 2005 second quarter average of164,200 bpd. Average production for 2005 was 159,900 bpd. The **Scotford Upgrader Expansion Project** is expected to increase production to between 270,000 and 290,000 bpd by 2009/2010. An EUB hearing was held at the end of June 2006 and a decision is anticipated for late 2006 or early 2007.

- **Petro-Canada** is proceeding with its Strathcona Refinery Conversion Project, which is designed to enable the refinery to upgrade and refine 135,000 bpd of bitumen-derived feedstock. The conversion project is expected to be complete in 2008, at which time the Strathcona refinery will be processing only oil sands feedstock. Petro-Canada has signed a long-term agreement whereby Suncor will process a minimum of 27,000 bpd of bitumen from Petro Canada's MacKay River Project and sell 26,000 bpd of sour crude for processing at the Strathcona refinery. The provisions of the agreement are expected to take effect in 2008.

- **BA Energy** (a member of the Value Creation Group of Companies) has commenced construction upon received regulatory approval to construct and operate its **Heartland Upgrader** in Strathcona County. The upgrader will be developed in three phases, each phase producing 50,000 bpd of bitumen. The first phase of the project is scheduled to begin operations in 2007.

- **North West Upgrading Inc.** filed a regulatory application in early 2006 for its **North West Upgrader** project, to be located in Sturgeon County. Each of the three initial phases of the project is designed with production capacity of 50,000 bpd of bitumen or 77,000 bpd of bitumen blend. The total design capacity of the project is for 200,000 bpd of bitumen or 300,000 bpd of bitumen blend. Subject to regulatory review and approval, it is estimated that construction of phase 1 of the project will begin by 2007 / 2008, with first production expected in 2010.

- **Husky Energy** is proceeding with a major throughput expansion program at its **Lloydminster Upgrader**. The program is expected to nearly double the production capacity of the facility from 80,000 bpd to 150,000 bpd of synthetic crude oil and diluent. Design work is expected to be completed by the third quarter of 2007, and with overall project completion anticipated by 2010.

Table 4 provides a summary of the major oil sands projects located in areas outside of the Wood Buffalo, Cold Lake, and Peace River regions.

**TABLE 4 MAJOR OIL SANDS PROJECTS, OTHER AREAS**

| Organization | Project | Type | Status |
|---|---|---|---|
| Access Pipeline<br>http://www.accesspipeline.com/ | Joint venture: MEG Energy and Devon ARL. | Bitumen transmission line, Fort McMurray – Edmonton | Received regulatory approval this year, proceeding with construction. |
| EnCana Energy<br>http://encana.com/ | Pelican Lake | *In situ* Primary (Cold) | Producing an average of 29K bpd during Q1 of 2006. |
| CNRL<br>http://cnrl.com/ | Pelican Lake | *In situ* Primary (Cold) | Producing an average of 29K bpd during Q1 2006. |

| Organization | Project | Type | Status |
|---|---|---|---|
| Athabasca Oil Sands Project<br>Shell<br>http://www.shell.ca/<br>Chevron<br>http://www.chevron.ca/<br>Western Oil Sands<br>http://www.westernoilsands.com/<br>Albian Sands<br>http://www.albiansands.com/ | Scotford Upgrader | Upgrader | Producing an average of 159K bpd during 2005. |
| Shell | Scotford Upgrader Expansion | Upgrader Expansion | Application for regulatory approval filed in early 2005 with approval anticipated in 2006. |
| Petro-Canada<br>http://www.petro-canada.ca/ | Strathcona Refinery Conversion | Upgrader Expansion | Construction in progress. Project completion scheduled for 2008. |
| BA Energy<br>http://www.heartlandupgrader.com/html/corporate/ba.html | Alberta Heartland Upgrader | Upgrader, in three phases. | Regulatory approval has been obtained. Phase 1 of project scheduled to begin operations in 2007. |
| Northwest Upgrading Inc.<br>http://www.northwestupgrading.com/ | North West Upgrader | Upgrader in three phases | Regulatory application filed in early 2006. Subject to approval, construction of phase 1 is scheduled to begin in 2007, with first production expected in 2010. |
| Husky Energy<br>http://www.husky-oil.com/ | Lloydminster Upgrader | Upgrader enhancements | Engineering design work in progress, with completion expected by end 2010. |

## 2.3 FUTURE OIL SANDS EXPENDITURES

The Canadian Association of Petroleum Producers (CAPP) and the Regional Issues Working Group (RIWG) cooperate on a survey of capital expenditure forecasts for the oil sands industry. Survey results from early 2006 indicate that the Alberta oil sands industry may spend $65 billion on new oil sands projects in the 2006 to 2011 period and as much as $81.6 billion in the 2006 to 2016 period. Another $14.9 billion may be spent on sustaining capital during 2005 to 2015 period. Not all of the projects included in these projections will necessarily go ahead, but the investment already in place and the caliber of the companies involved provides strong evidence of ongoing oil sands industry expansion. In the 1996 to 2004 period, the oil sands industry spent an estimated $29 billion on new projects, plus an estimated $4.8 billion on sustaining capital.

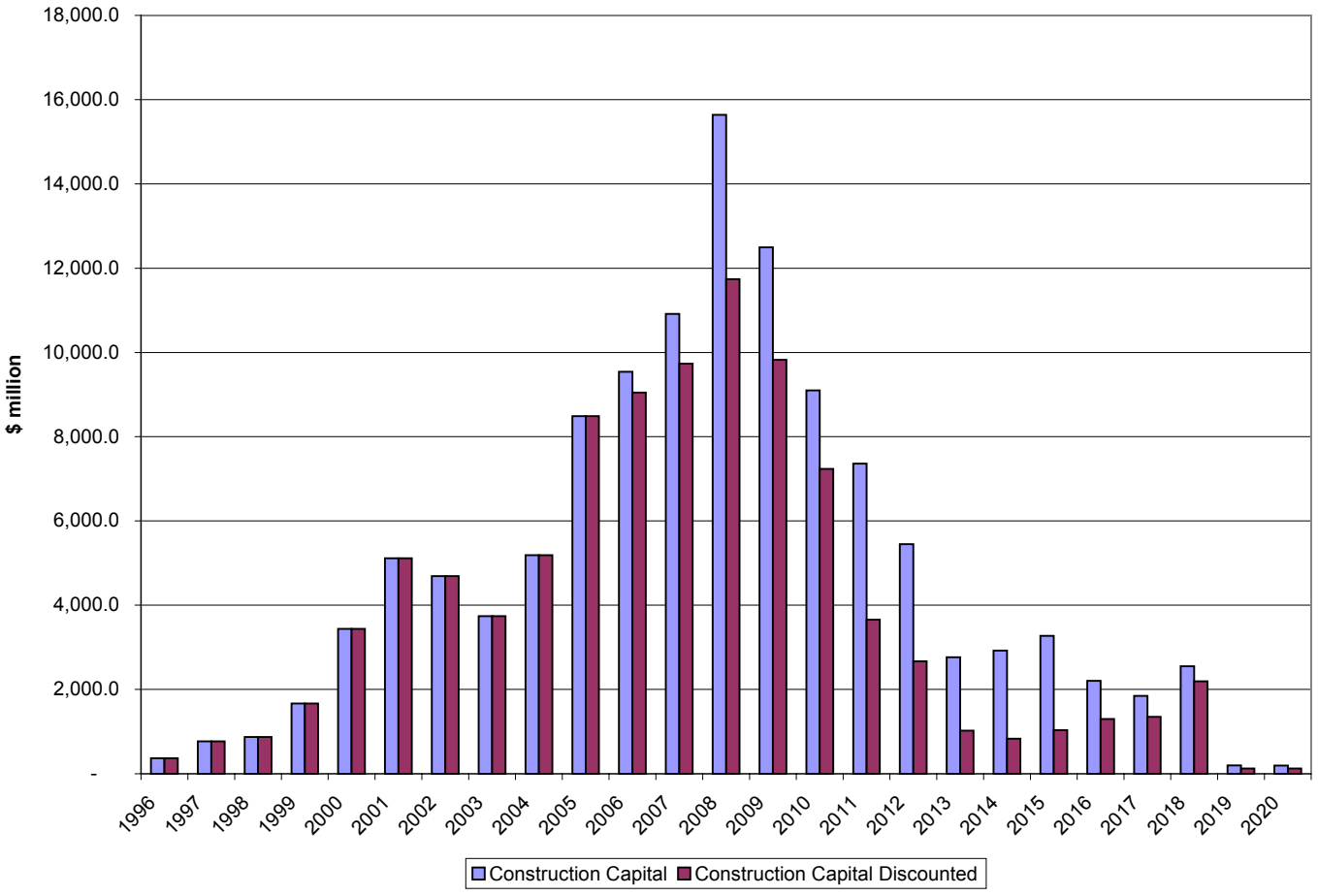
One way in which CAPP and RIWG acknowledge that not all projects will necessarily go ahead is to discount them on the basis of their status in the regulatory approval process, as follows:

- No discount if the project is completed, is under construction, or has commercial and regulatory approval;
- 10% discount if the project has regulatory but not yet commercial approval;
- 40% discount if the project's regulatory approval has been filed;

- 75% discount if the project's regulatory approval process has commenced with a formal project announcement; and
- 90% for projects that have been discussed publicly, but that have not been formally disclosed.

The total discounted or adjusted capital expenditure profile of the industry for the 2006 to 2011 period is estimated at $51.2 billion. The discounted capital expenditure forecast for the 2006 to 2016 is $58 billion. In addition, the industry is expected to spend an additional $14.3 billion in sustaining capital. The figure below gives an overview of the total and discounted capital expenditure profile of the industry in the 1996 to 2020 period.

**FIGURE 1 OIL SANDS INDUSTRY EXPENDITURE FORECAST**



The figure on the previous page supports the following comments:

- Construction expenditures are expected to increase steadily in the 2006-2008 period;

- The anticipated spending in the 2006-2011 period (on an undiscounted basis) is well in excess of that experienced in the previous six-year period (1999-2004); and

- Project capital expenditure is forecasted to peak in 2008, at nearly $16 billion.

Most of the forecast project spending relates to projects in the Fort McMurray area. An estimated $67 billion of the forecasted $81.6 billion in new oil sands projects are related there. In discounted terms, the Fort McMurray region accounts for $47 billion of the forecasted $58 billion in new construction capital in the 2005-2015 period.

## 2.4 CO-OPERATIVE INITIATIVES

Rapid oil sands expansion in the Wood Buffalo region has prompted a number of co-operative initiatives to promote orderly growth and minimize adverse impacts. They include:

- The **Regional Issues Working Group** (RIWG) is a board-governed organization of oil sands-related developers in the Regional Municipality of Wood Buffalo. The main purpose of this group is to identify priority items with respect to physical and social infrastructure, scope out challenges, and identify the authority responsible for addressing those challenges. If appropriate, RIWG works with the responsible authorities to identify options.

  **RIWG committees** address specific areas of concern. The membership of these committees depends on the issues at hand. For example, the Transportation Subcommittee has involvement from Alberta Infrastructure and Transportation and the Regional Municipality of Wood Buffalo. The following is a listing of active RIWG committees.

  | | |
  |---|---|
  | Aboriginal Affairs | Health Services |
  | Transportation | Housing |
  | Cogeneration/Transmission | Regional Economics |
  | Communications | Regional Environmental and Regulatory Affairs |

  The RIWG website is www.oilsands.cc. For further information, contact:

  Phone: (780) 790-1976
  Email: dianne.farkouh@shaw.ca

- The **Cumulative Environmental Management Association (CEMA)** (www.cemaonline.ca), consists of representatives of industry, all levels of government, local First Nations, and environmental groups. CEMA examines the cumulative impacts of large-scale industrial development on the environment and makes recommendations to government regulators and industry on how to best manage those impacts to protect the environment. CEMA works closely with the Regional Sustainable Development Strategy (RSDS), which forms the regulatory backstop. The key contact is:

  Executive Director
  Phone: (780) 799-8140
  Email: cema.ed@shawlink.ca

- The **Wood Buffalo Environmental Association** (http://www.wbea.org/), a collaboration of community, industry and government in the Regional Municipality of Wood Buffalo. The chief objective of the association is to monitor the ambient environment. The key contact is:

  Carna MacEachern
  Executive Director
  Phone: (780) 799-4420
  Email: wbea.ed@shawlink.ca

- The **Athabasca Tribal Council/Athabasca Resource Developers (ATC/ARD)**, which has the mandate to ensure that First Nations people have an opportunity to take part in and benefit from the industrial development taking place in the area. The ATC/Industry Working Group has a number of subcommittees.

  The key contacts are:

  Mr. Roy Vermillion,
  Chief Executive Officer, ATC
  Phone: (780) 791 6538
  Email: roy.vermillion@atc97.org

  Ms. Lee Nehring,
  Shell Canada
  (403) 691-2964

  The ATC/ARD All Parties Core Agreement provides for industry funding of **Industry Relations Corporations (IRCs)**, which are designed to help the five First Nation members of the ATC to deal with the challenges and opportunities of industrial development in the Wood Buffalo region. A crucial part of the agreement is the Standards of Consultation. The agreement also provides a forum for all parties to work together to resolve issues. The key contacts for the IRCs are as follows:

  Mikisew Cree First Nation — Ms. Melody Lepine (780) 714-6500

| | |
|---|---|
| Athabasca Chipewyan First Nation | Mr. Blair Whenham (780) 791-9131 |
| Community of Fort McKay | Ms. Lisa Schaldemose (780) 791-2505 |
| Fort McMurray First Nation | Mr. Noela Harp (780) 334-2293 |
| Chipewyan Prairie First Nation | Ms. Betty Kennedy (780) 792-7679 |

The ATC/ARD All Parties Core Agreement also provides for industry funding of the **Metis -- Industry Consultation Office (MICA)**. The purpose of the office is to provide Metis communities in the Wood Buffalo region with the capacity to consult with industry about development in the region and to develop strategies to deal with impacts and issues relating to this industrial development. The office is currently closed and under review.

Industry signatories to the ATC/ARD All Parties Core Agreement include Alberta-Pacific Forest Industries, Albian Sands Energy, ATCO Group of Companies, Canadian Natural Resources, ConocoPhillips, Deer Creek Energy, Devon Canada, Enbridge Pipelines, EnCana Resources, Imperial Oil, Japan Canada Oil Sands, MEG Energy, Nexen Petroleum Canada, OPTI Canada, Petro-Canada, Terasen Pipelines, Suncor Energy, and Syncrude Canada.

The main cooperative initiative in the Cold Lake area is the **Lakeland Industry and Community Association (LICA)**. This board-governed organization seeks to benefit all community members by sharing information and providing a mechanism to resolve conflicts. It maintains a staffed office, but relies extensively on industry and community volunteers to conduct its business. LICA has the following committees:

- New Development Committee
- Resolution Committee
- Regional Environmental Water Monitoring Committee
- Regional Environmental Air/Soil Monitoring Committee
- Communications Committee

The key contact is: Mr. Robert Deresh, Chair, LICA (780) 812-2182.

# 3. OIL SANDS REGIONS

The following provides a short overview of some of the challenges faced by the regions where the oil sands industry development takes place. The focus is on socio-economic issues in the Wood Buffalo region where most oil sands industry expansion is located. The regions are defined in socio-economic and not geological terms.

## 3.1 THE WOOD BUFFALO REGION

### 3.1.1 Population Growth

Population growth in the Wood Buffalo region, especially in Fort McMurray, is driven largely by the employment opportunities created through oil sands industry expansion. The direct employment created at the oil sands plants is augmented by employment creation among suppliers to the industry and in the economy in general. Under the influence of oil sands industry expansion, the population of Fort McMurray has grown from 34,000 in early 1996 to approximately 72,000 predicted by the end of 2006, an increase of 110% during a period of ten years. If all planned oil sands projects proceed as envisioned, the population of Fort McMurray may reach over 110,000 in the early years of the next decade, and near 130,000 by 2021. Some of the small communities in the region are also experiencing growth.

### 3.1.2 Aboriginal People

Oil sands industry expansion has increased employment and contracting opportunities and reduced opportunities for traditional pursuits. Several initiatives are underway to enhance the employment and contracting opportunities, including company-specific commitments to hire aboriginal people and company-specific and co-operative initiatives to support education and training of aboriginal people. The main action on the reduced opportunities for traditional pursuits is progressive reclamation of disturbed sites.

The Athabasca Tribal Council (ATC) and the oil sands industry developers signed a "Capacity Building Agreement" in March 1999 and a second agreement in January 2003. The latter agreement provides base funding of $230,000 to each First Nation for an Industry Relations Corporation, which will assist each community to consult with industry and identify issues related to industrial development. A crucial part of the Agreement is the Standards of Consultation. The Agreement also provides a forum for all parties to work together to resolve issues.

Oil sands industry expansion has increased employment and contracting opportunities. Several initiatives are underway to enhance these opportunities, including company-specific commitments to hire aboriginal people and company-specific and co-operative initiatives to support education and training of aboriginal people.

### 3.1.3 Traffic

Traffic in the Wood Buffalo region is increasing. Trucks, buses, and private vehicles associated directly with the oil sands industry create some of this traffic and some is associated with the general population growth. Traffic increases in the region have been substantial during recent years. The section of Highway 63 between Fort McMurray and Suncor, for example, has seen a change from an estimated 4,300 vehicle movements in 1996 to 13,100 in 2005, an increase of 200%.

### 3.1.4 Housing

The average price of a single-family dwelling in Fort McMurray in May 2006 was approximately $441,924, more than double than the average price of $282,208 of a single family dwelling in Edmonton during the same time period. Rental rates in Fort McMurray in February 2006 for an average bachelor, one, two and three-or-more-bedroom apartments were $987, $1,226, $1,387, and $1,672 per month respectively.

The Wood Buffalo Housing and Development Corporation, a municipal corporation with the mandate to create and manage affordable housing projects in the RMWB, has identified the need for about 2,000 additional affordable dwellings for both rental and ownership in the 2005 to 2009 period.

### 3.1.5 Infrastructure and Services

A recent RIWG report: *Wood Buffalo Business Case* 2005: *A Business Case for Government Investment in the Wood Buffalo Region's Infrastructure* identified the need to invest $1.2 billion in public infrastructure during the 2005-2010 period. The proposed investment covers improvements to regional highways, upgrades to municipal water and sewer systems, new schools and recreation facilities, and expanded health facilities. The report was a cooperative initiative involving RIWG, the Fort McMurray Catholic School District, the Fort McMurray Public School District, Keyano College, and the Northern Lights Health Authority,

Many public service agencies have indicated that the high cost of living in Fort McMurray and its geographic isolation make it difficult for service providers to recruit and retain the staff they require.

### 3.1.6 Environment

All proposed oil sands projects in the region, like projects elsewhere in the province, are required to conduct an Environmental Impact Assessment as part of their regulatory approval process. Work on environmental impact assessment is ongoing. A comprehensive co-operatively planned and integrated air monitoring system is in place. Operated under the authority of the Wood Buffalo Environmental Association (WBEA), the system is part of the Clean Air Strategic Alliance (CASA), which monitors a number of Alberta air sheds to ensure that provincial air standards are met.

Recognizing the increasing importance of the cumulative environmental impacts, the Alberta Department of the Environment has developed a Regional Sustainable

Development Strategy (RSDS) (http://www3.gov.ab.ca/env/regions/neb/rsds/). This strategy, and the oil sands companies' cooperation with and involvement in it, has been noted by the Alberta Energy Utilities Board as an element in granting regulatory approval for the various oil sands projects. The stated purpose of the RSDS is "to ensure implementation of adaptive management approaches that address regional cumulative environmental effect, environmental threshold, appropriate monitoring techniques, resource management approaches, knowledge gaps, and research to fill gaps." The strategy document identifies fourteen themes ranging from "sustainable ecosystems" and "soil and plant diversity" to "effects of emissions from tailing ponds" and "cumulative impacts on groundwater quality". For each of these themes, the strategy outlines objectives, options, and management tools available. It also indicates a timeline for action. CEMA is a main forum for action under the umbrella of the RSDS.

## 3.2 COLD LAKE REGION

The development of the oil sand industry in the Cold Lake region has been less intensive than in the Wood Buffalo Region. The municipal and social infrastructure in the area is well placed to meet the challenges posed by the recent upswing in the oil sands activity (http://www.coldlake.com/, http://www.town.bonnyville.ab.ca/, http://www.md.bonnyville.ab.ca/). The area generally has a diversified regional economy based on oil and gas exploration and production, agriculture, forestry, and recreation. It has seen swings in economic activity, mostly due to the changing fortunes of the oil sands and heavy oil industry in the region. The municipal and transportation infrastructure in and around the major population centres has sufficient capacity to accommodate growth in the near term.

## 3.3 PEACE RIVER REGION

Oil sands activity in the Peace River region in the past has been modest, but activity appears to increasing. The two major developments operated by Shell Canada (one of which was formerly BlackRock Ventures) are located in Northern Sunrise County (http://www.eastpeace.govoffice.com/). The main service centre in the region is the Town of Peace River (http://peaceriver.govoffice.com/). The principal drivers of the economy in the Peace River region are oil & gas, forestry, and agriculture.