Draft Resolution
TransCanada-Keystone Pipeline

9/6/07

Whereas, on April 19, 2006 TransCanada Pipeline Limited of Calgary, Alberta, Canada filed an application on behalf of TransCanada-Keystone Pipeline LLC with the U.S. State Department for a Presidential permit to cross the border and build a 1,078 mile 30-inch buried steel pipeline for the purpose of moving crude oil from the oil sands area of Hardisty, Canada through North Dakota and South Dakota to refineries in Illinois, Oklahoma and eventually Texas, and

Whereas, on April 27, 2007 TransCanada Pipelines Limited of Calgary, Alberta, Canada filed an application with the South Dakota Public Utilities Commission (SDPUC) for a permit to construct and operate the TransCanada-Keystone Pipeline LLC, 220 miles 30-inch buried steel pipeline for the purpose of moving crude oil from the oil sands area of Hardisty, Canada through North Dakota and South Dakota to refineries in Illinois, Oklahoma and eventually Texas, and

Whereas, as currently planned, the TransCanada-Keystone Pipeline route will cross the service areas of seven (7) rural water systems in South Dakota, including: Brown-Day-Marshall RWS, WEB RWS, Clark RWS, KingBrook RWS, Mid-Dakota RWS, Hanson RWS, and B-Y RWS and could impact water systems which draw water supply from the Missouri River downstream of Yankton, SD; all of which provide quality drinking water to towns, farms, homes, businesses, dairies, schools, and ethanol plants in eastern South Dakota, and if the oil line is extended to the oil refinery being proposed at Elk Point, SD a branch pipeline could cross the Clay RWS, and

Whereas, based on information filed with the South Dakota PUC and the U.S. State Department, as currently designed, the TransCanada-Keystone Pipeline will operate at pressures ranging from 1,400 psi to 1,700 psi and will transport 435,000 to 591,000 barrels of oil per day, which at 42 gallons per barrel equals 18,270,000 to 24,822,000 gallons of crude oil per day, and that the crude oil will be heated up to 80 degrees so that the thick crude can be pumped and moved through the pipeline, and will contain Benzene, Hydrogen Sulfide, Toluene and other chemicals and elements which are consider toxic and pollutants by the US Environmental Protection Agency if released into

the environment, which are elements rural water systems test for as part of the Safe Drinking Water Act requirements, and

Whereas, on August 23, 2007 TransCanada Pipeline informed the SDPUC and interveners that April 30, 2007 TransCanada had secured a "Special Permit" from the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) to operate the Keystone Pipeline at pressures 11% higher than other oil pipelines in the U.S.A. The special permit allows TransCanada to operate the Keystone Pipeline at 80% of the pipes design factor while other oil pipelines in the U.S.A. that have operated at 72% or less of pipe design factor and which even at lower operating pressures than TransCanada is proposing, have had some history of leaks and pipeline failures, including the TransAlaska Pipeline which had a leak or leaks every year for the 25 years of operation, and (80 – 72 = 8 : 72 = 11%)

Whereas, during public information meetings held in 2007, TransCanada-Keystone engineers stated that in order to secure the more than 1,078 miles of steel pipe needed to construct the TransCanada-Keystone Pipeline in 2008 so that it will operational in 2009, that some of the steel pipe will be purchased from manufacturing companies located in China and that TransCanada will attempt to have their own inspectors inspect the pipe during the manufacturing and shipping process, and that the pipe wall thickness proposed by TransCanada-Keystone will be 0.375 inch thick, and a thicker walled pipe would provide greater safety and protection for South Dakota , and

Whereas, when asked in public meetings about liability and cleanup of oil spills TransCanada-Keystone officials have said that if for any reason TransCanada doesn't cleanup an oil spill the U.S. federal government would take charge and cleanup the site as part of the "super fund" program, and

Whereas, in the event of a petroleum spill or oil leak on this high pressure crude oil pipeline, it is very likely that the crude oil will come in contact with the PVC plastic pipelines that are used by all rural water systems, and that such contact will do damage to PVC water lines and oil products could enter the pipelines and pollute and contaminate drinking water supplies, as confirmed by an

engineering study completed by Iowa State University, commissioned by the AWWA (American Water Works Association); and

Whereas, pages 1 and 19 of a report dated May 1, 2006, prepared by DNV Consultants, a risk consultant for TransCanada, filed with the SDPUC shows that oil leaks of less than 1.5% pipe volume may not be noticed or detected by the SCADA computer control systems TransCanada will be using and may not be found for as long as 90 days, which could result in oil leaks of 369,847 gallons per day (8,806 barrels per day) which figures out to 11 million gallons of crude oil per month or 33 million gallons of crude oil over 3 months, and

Whereas, the TransCanada-Keystone Pipeline is routed through and across aquifers identified by groundwater studies completed by the SD Geological Survey and the US Geological Survey, and through and across shallow aquifers located in Marshall, Day, Clark, Beadle and other counties of South Dakota, and

Whereas, a leak or oil spill from a high pressure oil pipeline like TransCanada-Keystone Pipeline could pollute and damage underground aquifers that are the only reliable water source and water supply for farms, towns and rural water systems, and

Whereas, the TransCanada-Keystone Pipeline is proposing to cross the Missouri River immediately south of Yankton, SD which if it were to leak or fail could impact the scenic designated section of the Missouri River and could impact or increase the risk of impact to water quality of that stretch of the river which serves as an indirect water source for the Lewis & Clark Regional Water System which supplies water to Sioux Falls, SD and a number of rural water systems, cities and towns in south eastern South Dakota, northwest Iowa, and southwest Minnesota; and

Whereas, land acquisition agents have been contacting the 660 landowners along the proposed 220 mile pipeline route in South Dakota, asking for a 100 ft easement which includes wording asking for "one or more pipelines", often cutting across or through the middle of quarter sections or half sections of farm land and not going along the fence line or quarter line, and TransCanada is offering a one time payment ranging from $1,700 to $2,600 per acre (in Marshall and Day County)

depending on land use, which figures out to around $34 to $52 per acre over 50 years, and cash rent in the area currently runs around $100 to $140 per acre per year and doesn't carry with it the liability or risk of an oil leak that a high pressure oil pipeline like TransCanada-Keystone places on the land, and

Whereas, even though the SDPUC has scheduled formal hearings on the permit application starting on December 3, 2007 and may not reach a decision until as late as April 27, 2008, and even thought the U.S. State Department is conducting an Environmental Impact Statement (EIS) review required by federal law and for which written comments are due September 31, 2007 and a final report is expected to be issued in early 2008; on August 23, 2007 TransCanada sent letters to landowners along the proposed Keystone Pipeline route informing them that if they didn't sign TransCanada's easement and accept their easement payment offer by August 31, 2007, that TransCanada would proceed with eminent domain and condemnation of privately owned lands, even though no permit has yet been issued by the SD PUC, and TransCanada has no right or authority under South Dakota law to claim the right of "eminent domain" until such time as a permit has been issue and the deadline for appeals in Circuit Court have passed; and

Whereas, while counties, cities, utilities and rural water systems in South Dakota that serve the community have the right of eminent domain as a last resort, they use it sparingly and landowners can appeal to local boards of directors and commissions for relief or negotiation, which is not an option available to landowners in the case of TransCanada which is a private investor owned foreign oil company located in Calgary, Alberta, Canada, and

Therefore, Be It Resolved, that the South Dakota Association of Rural Water Systems (SDARWS) does hereby urge the SD Public Utilities Commission, Department of Environment and Natural Resources, South Dakota Legislature, the Governor, the Attorney General of South Dakota, and the South Dakota Congressional Delegation to protect rural water systems, ground water supplies and communities they serve by imposing conditions on any permit issued to Keystone Pipeline that will assure every protection possible under federal and state laws against oil leaks and "spills" and in the event of an oil leak or spill, that TransCanada-Keystone Pipeline LLC, TransCanada Pipeline LP, TransCanada Corporation, Conoco-Phillips and other investors be held financially and legally

liable for all costs incurred to South Dakota landowners, communities, counties and rural water systems, and

Further, that SDARWS would ask for a pipe wall thickness greater than the 0.375 inch being proposed by TransCanada-Keystone, up to as much as 0.75 inch wall thickness when crossing through shallow aquifer areas, rural water systems and near schools, creeks, rivers, homes, road crossing and highway systems, and

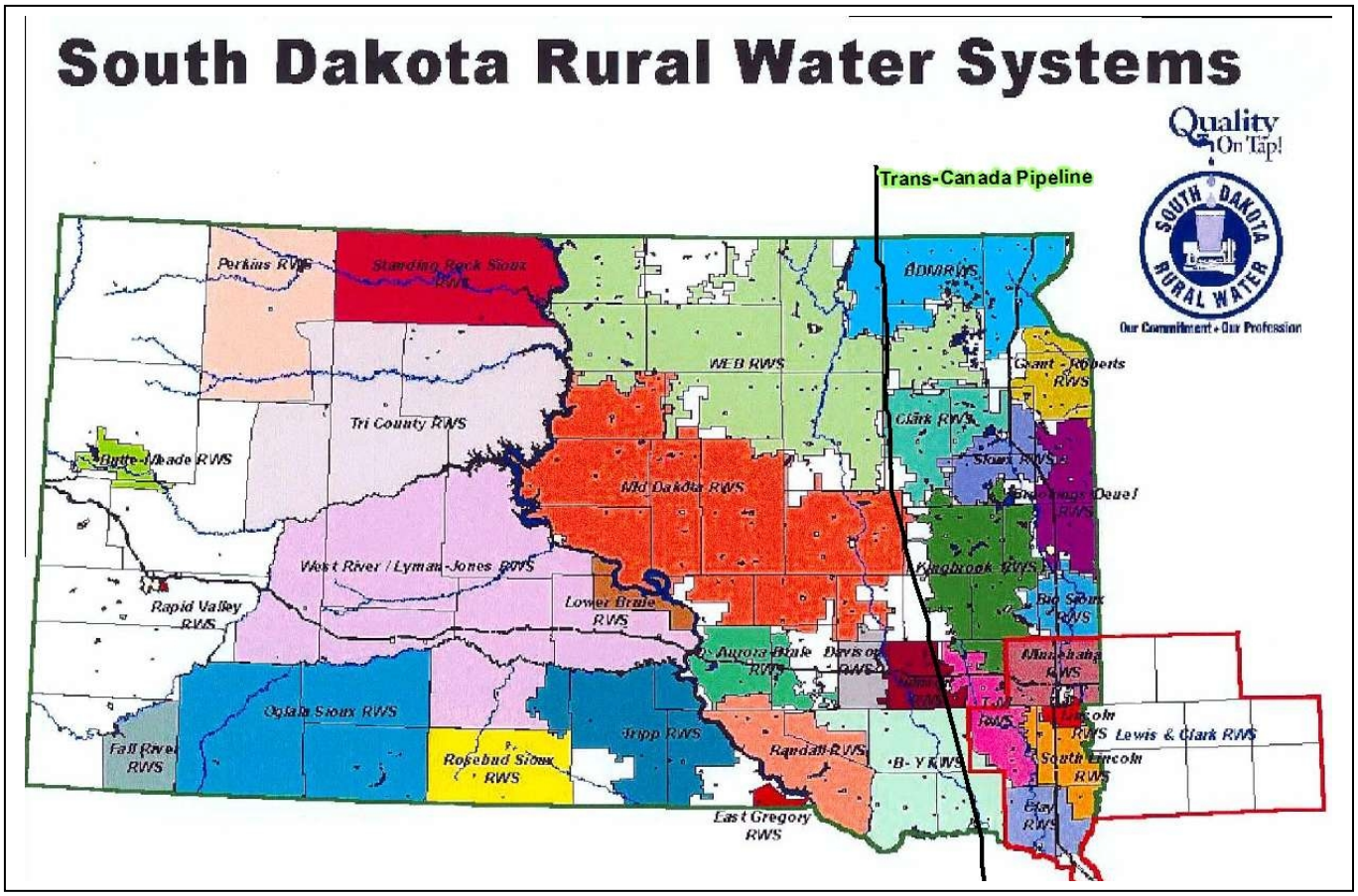
Further, that one of the conditions imposed on the permit by the SD Public Utilities Commission and the State of South Dakota be a fee or tariff on each barrel of oil that passes through South Dakota on the TransCanada-Keystone Pipeline in the amount of $0.15 per barrel which would amount to $23,816,250 per year at 435,000 barrels per day and $32,357,250 per year at 591,000 barrels per day. That high quality and accurate metering device be installed at TransCanada's expense where the pipeline enters the state at the North Dakota Line and leaves the state at Yankton, SD, which will be monitored and maintained by the SD Revenue Department which will be charged with collection of the fee or tariff with the funds collected to be placed in an interest bearing reserve fund to be used to cover the cost of oil spill cleanup, damage to private property, impact to groundwater supplies, impacts to rural water systems, and other costs related to the operating on the TransCanada-Keystone Pipeline, and

Further, that the PUC, the Governor, Attorney General and the SD Congressional Delegation are hereby asked to send letters to TransCanada Pipeline LP and TransCanada-Keystone Pipeline LLC admonishing that they stop threatening condemnation when they don't yet have the authority or right under the law to do so, and stop all land acquisition until after the PUC hearing process and the EIS process have been completed and a permit decision has been made and the process has been allowed to run its course, including any appeals, and that they be asked to negotiate in good faith with South Dakota landowners, farmers and taxpayers, and

Further, that in the interest of the publics right to know, that the SDARWS ask the SD PUC to release all information filed on April 27, 2007 and filed since that date as part of the TransCanada-Keystone Pipeline permit application and that the PUC hearings process be delayed at least 90

days because of the delay TransCanada caused in release of this information, to give the people of South Dakota time to review the information filed and that the information be placed on file with the County Auditor of each county crossed by the proposed project and that the SDPUC hold hearings out along the pipeline route at Yankton, Alexandria, Clark and Britton to make it easier and less costly for landowners, farmers and the public to participate in the formal hearing process, and

Now therefore, be it resolved that SDARWS has serious reservations and concerns with the TransCanada-Keystone Pipeline and asks that state approvals be withheld and decision reserved until such time as the issues raised herein have been resolved to the satisfaction of the rural water systems and communities that would be crossed by the TransCanada-Keystone Pipeline.



WEB Exhibit # 35

The Athabasca Oil Sands in Alberta, Canada.

The Athabasca Oil Sands are a large deposit of oil-rich bitumen located in northern Alberta, Canada. These oil sands consist of a mixture of crude bitumen (a semi-solid form of crude oil), silica sand, clay minerals, and water. The Athabasca deposit is the largest of three oil sands deposits in Alberta, along with the Peace River and Cold Lake deposits. Together, these oil sand deposits cover about 141 000 km² of sparsely populated boreal forest and muskeg (peat bogs). The Athabasca oil sands are named after the Athabasca River which cuts through the heart of the deposit, and traces of the heavy oil are readily observed on the river banks. Historically, the bitumen was used by the indigenous Cree and Dene Aboriginal peoples to waterproof their canoes. The oil deposits are located within the boundaries of Treaty 8, and several First Nations of the area are involved with the sands. The oil sands were first seen by Europeans in 1788.

The key characteristic of the Athabasca deposit is that it is the only one shallow enough to be suitable for surface mining. About 10% of the Athabasca oil sands are covered by less than 75 metres (250 feet) of overburden. The mineable area as defined by the Alberta government covers 37 contiguous townships (about 3400 square kilometres or 1300 square miles) north of the city of Fort McMurray. The overburden consists of 1 to 3 metres of water-logged muskeg on top of 0 to 75 metres of clay and barren sand, while the underlying oil sands are typically 40 to 60 metres thick and sit on top of relatively flat limestone rock. As a result of the easy accessibility, the world's first oil sands mine was started by Great Canadian Oil Sands (now Suncor) back in 1967. The Syncrude mine (the biggest mine in the world) followed in 1978, and the Albian Sands mine (operated by Shell Canada) in 2003. All three of these mines are associated with bitumen upgraders that convert the unusable bitumen into synthetic crude oil for shipment to refineries in Canada and the United States.

The Athabasca oil sands are primarily located in and around the city of Fort McMurray which was still, in the late 1950s, primarily a wilderness outpost of a few hundred people whose main economic activities included fur trapping and salt mining. Since the energy crisis of the 1970s, Fort McMurray has been transformed into a boomtown of 80,000

people struggling to provide services and housing for migrant workers, many of them from Eastern Canada, especially Newfoundland.

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[hide]

[edit] Estimated oil reserves

Alberta Government calculates that about 28 billion cubic metres (174 billion barrels) of crude bitumen are economically recoverable from the three Alberta oil sands areas at current prices using current technology. This is equivalent to about 10% of the estimated 1,700 and 2,500 billion barrels of bitumen in place.[1]. Alberta estimates that the Athabasca deposits alone contain 5.6 billion cubic metres (35 billion barrels) of surface mineable bitumen and 15.6 billion cubic metres (98 billion barrels) of bitumen recoverable by in-situ methods. These estimates of Canada's oil reserves caused some astonishment when they were first published but are now largely accepted by the international community. This volume places Canadian proven oil reserves second in the world behind those of Saudi Arabia.

The method of calculating economically recoverable reserves that produced these estimates was adopted because conventional methods of accounting for reserves gave increasingly meaningless numbers. They made it appear that Alberta was running out of oil at a time when rapid increases in oil sands production were more than offsetting declines in conventional oil, and in fact most of Alberta's oil production is now non-conventional oil. Conventional estimates of oil reserves are really calculations of the geological risk of drilling for oil, but in the oil sands there is very little geological risk because they outcrop on the surface and are extremely easy to find. One risk is economic risk of low oil prices and with the oil price increases of 2004-2006, this economic risk evaporated.

The Alberta estimates in some ways are extremely conservative, since they assume a recovery rate of around 20% of bitumen in place, whereas oil companies using the new steam assisted gravity drainage method of extracting bitumen report that they can recover over 60% with little effort. These much higher recovery rates probably mean that the ultimate production could be several times as high as the already very large government estimates.

At rate of production projected for 2015, about 3 million barrels per day, the Athabasca oil sands reserves would last over 400 years. [2] However, production cannot increase to those levels without a huge influx of workers into northern Alberta, which by 2006 was already occurring. This need created a severe labor shortage in Alberta, which by 2007

drove unemployment rates in Alberta and adjacent British Columbia to the lowest levels in history. Even as far away as the Atlantic Provinces, where workers were leaving to work in Alberta, unemployment rates fell to levels not seen for over 100 years.[3] These manpower limitations imply that, while Alberta is capable of being a major player on the world oil market for the rest of this century, it does not have enough population to replace the Middle East as the main source of American, European and Asian supply.[citation needed]

The Venezuelan Orinoco tar sands site may contain more oil sands than Athabasca (see tar sands article). However, while the Orinoco deposits are less viscous and more easily produced using conventional techniques (the Venezuelan government prefers to call them "extra-heavy oil"), they are too deep to access by surface mining.

Minesite at Syncrude's Mildred Lake plant

[edit] Economics

Despite the large reserves, the cost of extracting the oil from the sand has historically made production of the oil sands unprofitable - the cost of selling the extracted crude would not cover the direct costs of recovery; labour to mine the sands and fuel to extract the crude.

In mid-2006, the National Energy Board of Canada estimated the operating cost of a new mining operation in the Athabasca oil sands to be $9 to $12 per barrel, while the cost of an in-situ SAGD operation (using dual horizontal wells) would be $10 to $14 per barrel. This compares to operating costs for conventional oil wells which can range from less than $1 per barrel in Iraq and Saudi Arabia to $6 and up in the United States and Canada.

In addition, the capital cost of the equipment, such as the huge machines required to mine the sands and the dump trucks used to haul it to processing make capital costs a major consideration in starting production. The NEB estimates that capital costs raise the total cost of production to $18 to $20 per barrel for a new mining operation and $18 to $22 per barrel for a SAGD operation. This does not include the cost of upgrading the crude bitumen to synthetic crude oil, which makes the final costs $36 to $40 per barrel for a new mining operation.

Therefore, although high crude prices make the cost of production very attractive, sudden drops in price leaves producers unable to recover their enormous capital costs - although the companies are well financed and can tolerate long periods of low prices since the capital has already been spent and they can almost always cover incremental operating costs.

However, the development of commercial production is made easier by the fact that exploration costs are virtually nil. Such costs are a major factor when assessing the economics of drilling in a traditional oil field. The location of the oil deposits in the tar sands are well known and an estimate of recovery costs can usually be made easily. Most important, the oil sands are in a politically stable area - there is not another region in the world with energy deposits of

this magnitude where it would be less likely that these expensive installations would be confiscated by a hostile national government, or be endangered by a war or revolution.

As a result of the Oil price increases of 2004-2006, the economics of oil sands have improved dramatically. At a world price of $50 per barrel, the NEB estimates an integrated mining operation would make a rate return of 16 to 23 percent, while a SAGD operation would return 16 to 27 percent. Prices in 2006 have been considerably higher than that. As a result, capital expenditures in the oil sands announced for the period 2006 to 2015 exceed $100 billion, which is twice the amount projected as recently as 2004. However, due to an acute labour shortage which has developed in Alberta, it is not likely that all these projects can be completed.

At present the area around Fort McMurray, Alberta, has seen the most effect from the increased activity in the oil sands. However, although jobs are plentiful, housing is in short supply and expensive. People seeking work often arrive in the area without arranging accommodation, driving up the price of temporary accommodation. The area is isolated, with only a two-lane road connecting it to the rest of the province, and there is pressure on the government of Alberta to improve road links as well as hospitals and other infrastructure.[4]

Despite the best efforts of companies to move as much of the construction work as possible out of the Fort McMurray area, and even out of Alberta, the shortage of skilled workers is spreading to the rest of the province.[5]. Even without the oil sands, the Alberta economy would be very strong, but development of the oil sands has resulted in the strongest period of economic growth ever recorded by a Canadian province and driven Alberta's unemployment rates to the lowest levels in history.[6]

[edit] Oil Sands Production

The Athabasca oil sands first came to the attention of European fur traders in 1719 when Wa-pa-su, a Cree trader, brought a sample of the oil sands to the Hudson's Bay Company post at Fort Churchill. In 1778, fur trader Peter Pond became the first white man to see the outcroppings along the Athabasca River and he noted that the native people used it to waterproof their canoes. In 1883, C. Hoffman of the Geological Survey of Canada tried separating the bitumen from oil sand with the use of water, and reported that it separated readily. However, it was nearly a century before extracting it became commercially viable. Dr. Karl Clark of the University of Alberta, perfected a steam separation process for the tar sands in 1926.

Commercial production of oil from the Athabasca oil sands began in 1967, when Great Canadian Oil Sands (now Suncor) opened its first mine, producing 30,000 barrels per day of synthetic crude oil. Development was inhibited by declining world oil prices, and the second mine, operated by the Syncrude consortium, did not begin operating until 1978, after the 1973 oil crisis sparked investor interest. However, the price of oil subsided afterwards, and although the 1979 energy crisis caused oil prices to peak again, introduction of the National Energy Program by Pierre Trudeau caused the oil companies and the Alberta government under Premier Peter Lougheed to pull the plug on new developments. Once more, prices declined to very low levels, causing considerable retrenchment in the oil industry, and the third mine, operated by Shell Canada, did not begin operating until 2003. However, with Oil price increases of 2004-2006, the existing mines have been greatly expanded and new ones are being planned.

According to the Alberta Energy and Utilities Board, production of crude bitumen in the Athabasca oil sands was as follows:

2005 Production	m^3/day	bbl/day
Suncor Mine	31,000	195,000
Syncrude Mine	41,700	262,000
Shell Canada Mine	26,800	169,000
In Situ Projects	21,300	134,000

TOTAL	120,800	760,000

This was despite a major fire at the Suncor operation, a major turnaround at Syncrude, and operational problems at the Shell operation. Combined oil production in all three Alberta oil sands areas was 169,100 m3/day or 1,065,000 barrels per day

With planned projects coming on stream, by 2010 oil sands production is projected to reach 2 million barrels per day or about two thirds of Canadian production. By 2015 Canadian oil production may reach 4 million barrels per day, of which only 15% will be conventional crude oil. The Canadian Association of Petroleum Producers predicts that by 2020 Canadian oil production will reach 4.8 million barrels per day, of which only about 10% will be conventional light or medium crude oil, and most of the rest will be crude bitumen and synthetic crude oil from the Athabasca oil sands.

[edit] Extraction of oil

See main article on Oil sands extraction

The original process of extraction used at the oil sands was developed by Dr. Karl Clark, working with the Research Council of Alberta in the 1920s.[7] Historically (since the 1960s), the oil sands have been mined in huge open pit mines and extracted from the sand by variations of the Clark water-based extraction process, which separates aerated bitumen from the other oil sand components in gravity settling vessels. More recently, new in-situ methods have been developed to extract bitumen from deep deposits by injecting steam to heat the sands and reduce the bitumen viscosity so that it can be pumped out like conventional crude oil.

The standard extraction process also requires huge amounts of natural gas. Currently, the oil sands industry uses about 4% of the Western Canada Sedimentary Basin natural gas production. By 2015, this may increase by a factor of 2.5 times.[8]

According to the National Energy Board, it requires about 0.4 million cubic feet of natural gas to produce one barrel of synthetic crude oil, which is the energy equivalent of 6 million cubic feet of gas, so the process produces a substantial net gain in energy. That being the case, it is likely that in the short term exports of natural gas to the United States will be reduced to provide fuel to the oil sands plants. In the long term, however, oil upgraders will likely turn to bitumen gasification to generate their own fuel. In much the same way the bitumen can be converted into synthetic crude oil, it can also be converted to synthetic natural gas.

In-situ extraction on a commercial scale is just beginning. A project nearing completion, the Long Lake Project,[9] is designed to provide its own fuel, by on-site cracking of the bitumen mined.[10] It is supposed to start extracting bitumen in 2006, and "upgrading" of bitumen to liquid oil in 2007, producing 60,000 bbl/day of usable oil. If it works, the natural gas problem becomes less of an issue and the problem of disposing of tailings disappears.

[edit] Geopolitical importance

The Athabasca Oil Sands are now featured prominently in international trade talks, with energy rivals China, India and the United States negotiating with Canada for a bigger share of the oil sands' rapidly increasing output. Output at the oil sands is expected to quadruple between 2005 and 2015, reaching 4 million bbl/day, increasing their political and economic importance. Although most of the oil sands production is currently exported to the United States, that could change.

An agreement has been signed between PetroChina and Enbridge to build a 400,000 barrel-per-day pipeline from Edmonton, Alberta to the west-coast port of Kitimat, British Columbia to export synthetic crude oil from the oil sands to China and elsewhere in the Pacific, plus a 150,000-barrel-per-day pipeline running the other way to import condensate to dilute the bitumen so it will flow. Sinopec, China's largest refining and chemical company, and China National Petroleum Corporation have bought or are planning to buy shares in major oil sands development.

India has announced plans to invest $1 billion in the Athabasca Oil Sands in 2006. As many as four different Indian oil companies, such as Oil and Natural Gas Corporation and Indian Oil Corporation, are involved.[11]

[edit] Indigenous peoples of the area

Indigenous peoples of the area include the Fort McKay First Nation and the Fort McMurray First Nation. The oil sands themselves are located within the boundaries of Treaty 8, signed in 1899. The Fort McKay First Nation has formed several companies to service the oil sands industry, and will be developing a mine on their territory.[12] However, support within the First Nation for such development is not unanimous.

[edit] Environmental impacts

Some critics contend that government and industry measures taken to minimize environmental and health risks posed by large-scale mining operations are inadequate, potentially causing damage to the natural environment.

The open-pit mining of the Athabasca oils sands destroys the boreal forest and muskeg, as well as changing the natural landscape. The Alberta government does not require companies to restore the land to "original condition" but only to "equivalent land capability". This means that the ability of the land to support various land uses after reclamation is similar to what existed, but that the individual land uses will not necessarily be identical.[13] Since the government considers agricultural land to be equivalent to forest land, oil sands companies have reclaimed mined land to use as pasture for buffalo, rather than restoring it to the original boreal forest and muskeg.

For every barrel of synthetic oil produced in Alberta, more than 80 kg of greenhouse gases are released into the atmosphere and between 2 and 4 barrels of waste water are dumped into tailing ponds that have replaced about 50 km² of forest. The forecast growth in synthetic oil production in Alberta also threatens Canada's international commitments. In ratifying the Kyoto Protocol, Canada agreed to reduce, by 2012, its greenhouse gas emissions by 6% with respect to [1990]. In 2002, Canada's total greenhouse gas emissions had increased by 24% since 1990.

"A cubic metre of oil, mined from the tar sands, needs two to 4.5 cubic metres of water. Approved oil sands mining operations -- not the in situ kind that extract oil from tar sands far below the surface -- will take twice the annual water needs of the City of Calgary. The water will come from the Athabasca River, from which 359-million cubic metres will be diverted."[14] However, the Athabasca River is much bigger than the small rivers that flow through Calgary, and current oil sands water license allocations are only for about 1% of the flow of the river.[15] The Alberta government sets strict limits on how much water oil sands companies can remove from the Athabasca River, and during low-flow conditions orders them to reduce their withdrawals.[16]

Ranked as the world's eighth largest emitter of greenhouse gases[17], Canada is a relatively large emitter given its population. The United States, which has not signed the Kyoto Protocol, is the world's largest emitter at a fluctuating 25% of the total. China is the second largest emitter at 20%, but as a developing country is exempt from controls. Its economy has been growing rapidly, and as a result the International Energy Agency expects it to exceed the U.S. as the world's largest emitter of carbon dioxide by about 2008. Other developing countries in Asia and Africa have also been increasing their emissions rapidly. However, it is developed nations that are responsible for the vast majority of historic emissions which are now causing climate change. Most European countries have missed their reduction targets, as is Canada. Against this background, Canada's developments in the oil sands are regrettable given the urgent need to reduce global emissions and meet Canada's Kyoto commitments.

[edit] Oil sand companies

There are currently three large oil sands mining operations in the area run by Syncrude Canada Limited, Suncor Energy and Albian Sands owned by Shell Canada, Chevron, and Western Oil Sands Ltd.

Major producing or planned developments in the Athabasca Oil Sands include the following projects:[18]

- Suncor Energy's Steepbank and millennium mines currently produce 263,000 barrels per day and its Firebag in-situ project produces 35,000 bpd. It intends to spend $3.2 billion to expand its mining operations to 400,000 bpd and its in-situ production to 140,000 bpd by 2008.
- Syncrude's Mildred Lake and Aurora mines currently can produce 360,000 bpd.
- Shell Canada currently operated its Muskeg River mine producing 155,000 bpd and the Scotford Upgrader at Fort Saskatchewan, Alberta. Shell intends to open its new Jackpine mine and expand total production to 500,000 bpd over the next few years.
- Nexen's in-situ Long Lake SAGD project is on schedule to produce 70,000 bpd by late 2007, with plans to expand it to 240,000 bpd over the next 10 years.
- CNRL's $8 billion Horizon in-situ project is planned to produce 110,000 bpd on startup in 2008 and grow to 300,000 bpd by 2010.
- Total S.A.'s subsidiary Deer Creek Energy is operating a SAGD project on its Joslyn lease, producing 10,000 bpd. It intends on constructing its mine by 2010 to expand its production by 100,000 bpd.
- Imperial Oil's $5 to $8 billion Kearl Oil Sands Project is projected to start construction in 2008 and produce 100,000 bpd by 2010. Imperial also operates a 160,000 bpd in-situ operation in the Cold Lake oil sands region.
- Synenco Energy and SinoCanada Petroleum Corp., a subsidiary of Sinopec, China's largest oil refiner, have agreed to create the $3.5 billion Northern Lights mine, projected to produce 100,000 bpd by 2009.

etc.

Country/Region	Lowest estimate	Highest estimate
North America	50.7	222.9
Canada	16.5	178.8
United States	21.3	29.3
Mexico	12.9	14.8
Central & South America	76	401.1

Venezuela	52.4	361.2
Brazil	10.6	11.2
Western Europe	16.2	17.3
United Kingdom	4.1	4.5
Norway	7.7	8.0
Eastern Europe & Former USSR	79.2	121.9
Russia	60	72.4
Kazakhstan	9	39.6
Middle East	708.3	733.9
Iran	125.8	132.7
Iraq	115	115
Kuwait	99	101.5
Qatar	15.2	15.2
Saudi Arabia[1]	261.9	264.3
UAE	69.9	97.8
Africa	100.8	113.8

Algeria	11.4	11.8
Libya	33.6	39.1
Nigeria	35.3	35.9
Asia and Oceania	36.2	39.8
China	15.4	16.0
Australia	1.5	4
India	4.9	5.6
Indonesia	4.3	4.3
World total	1082	1650.7

[1]This reserve number cannot be verified.

[edit] See also

- Canadian Centre for Energy Information
- History of the petroleum industry in Canada, part two
- Mackenzie Valley Pipeline

[edit] References

1. ^ Barbajosa, Alejandro (18 Feb 2005). Shell, Exxon Tap Oil Sands, Gas as Reserves Dwindle. Retrieved on 2006-03-29.
2. ^ Department of Energy, Alberta (June 2006). Oil Sands Fact Sheets. Retrieved on 2007-04-11.
3. ^ Canada, Statistics (April 5, 2007). Latest release from the labour force survey. Retrieved on 2007-04-11.

4. ^ NEB (June 2006). "*Canada's Oil Sands Opportunities and Challenges to 2015: An Update*" (PDF). National Energy Board of Canada. Retrieved on 2006-10-30.
5. ^ Nikiforuk, Andrew. "The downside of boom: Alberta's manpower shortage", Canadian Business magazine, 2006-06-04. Retrieved on 2006-10-30.
6. ^ StatsCan (2006-09-14). "*Study: The Alberta economic juggernaut*". Statistics Canada. Retrieved on 2006-10-30.
7. ^ Alberta Inventors and Inventions - Karl Clark. Retrieved on 2006-03-29.
8. ^ Energy Report - Production forecats
9. ^ Long Lake Project
10. ^ Operations - Athabasca Oil Sands - Long Lake Project - Project Overview. Nexen Inc.. Retrieved on 2006-03-29.
11. ^ Alberta wants India to join its oil sands strategy
12. ^ Financial Post Article - Aboriginal implication in the project
13. ^ - Alberta Environment - Environmental Protection and Enhancement
14. ^ Dogwood Initiative - Alberta's tar sands are soaking up too much water
15. ^ Canadian Association of Petroleum Producers - Environmental Aspects of Oil Sands Development
16. ^ Alberta Environment - Athabasca River Water Management Framework
17. ^ Reuters Top 50 countries by greenhouse gas emissions
18. ^ projects Oilsands Discovery - Oil Sands Projects

[edit] External links

- Hugh McCullum, Fuelling Fortress America: A Report on the Athabasca Tar Sands and U.S. Demands for Canada's Energy (The Parkland Institute)--Executive SummaryDownload report
- Oil Sands History - Syncrude Canada
- Oil Sands Discovery Centre - Fort McMurray Tourism
- The Trillion-Barrel Tar Pit - Article from December 2004 Wired.
- Oil Sands Review - Sister publication to Oilweek Magazine
- Alberta's Oil Sands - Alberta Department of Energy
- Alberta's Reserves 2005 and Supply/Demand Outlook 2006-2015 - Alberta Energy and Utilities Board
- Canada's Oil Sands - Opportunities and Challenges to 2015: An Update - June 2006 - National Energy Board of Canada
- Oilsands overview- Canadian Centre for Energy Information
- Alberta Plan Fails to Protect Athabasca River

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