Alberta Bound: the Interface between Alberta's Environmental Policies and the Environmental Management of Three Albertan Oil Sands Companies

By

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ABSTRACT

The Athabasca Oil Sands, located in northeastern Alberta, Canada, were for many years anomalous. Two oil sands operators developed their extraction techniques for 30 years, refining their technology before production became economically profitable. In the last 15 years as oil prices climbed, a tremendous amount of growth has occurred in the oil sands. Dozens of new projects are under construction or awaiting approval, creating one of the largest and most capital intensive mining operations in the world.

Curiously there is a significant difference in environmental performance among three companies involved in open pit mining of the oil sands, Syncrude, Suncor Energy and Shell Canada's Muskeg River Mine. Suncor Energy is known for their reputation in stakeholder collaboration and reporting initiatives but has one of the most problematic environmental legacies. Meanwhile, Syncrude is seen as a relative leader in land reclamation but has taken the least action with regard to climate change. Shell Canada's Muskeg River Mine, draws from the resources of their parent company, Royal Dutch Shell, to proactively frame climate change management but has no public indicators of their land reclamation progress. What is the cause of this variation in environmental performance? Is it a result of difference corporate environmental governance strategies or of government policies?

I suggest the variation of environmental performance is an organic response to the innate discretionary nature of environmental policymaking in Alberta, the lack of government leadership and the degree of initiative demonstrated by each company. From my research it is clear that the inconsistent and at times vague government policy and regulations, opaque government agencies, poor monitoring and enforcement, inadequate incentives and penalties does not effectively encourage stronger environmental performance among oil sands developers. At the same time, internal corporate strategy, often in response to the recent pressure from environmental groups, First Nations communities and international media compels some companies to innovate and others to simply follow the regulations. Maintaining their social license, reducing costs, and anticipating future regulations have all been cited as motivation for innovation. Those advocating the status quo cite the exemplary regulatory framework already in place and the adequacy of existing stakeholder engagement processes; whereas corporate environmental leaders are frustrated by the uncertainty around environmental policies created by the provincial government.

Ultimately the responsibility for the environmental management of the oil sands lies with the province. Companies can strive to innovate and compete with other developers, but they are not accountable for the management of cumulative effects in the region. If Alberta is going to improve the environmental performance of oil sands developers then a more transparent, credible and strategic environmental planning process must be created. I conclude with three areas of policy improvements the Province can make to not only improve the environmental performance of the oil sands but also regain public trust in their role as manager of Alberta's natural resources: transparency, monitoring and enforcement, and responsible leadership.

ACKNOWLEDGEMENTS

Many thanks go out to Professor Susskind for his patience in watching this kernel of an idea evolve into the following work, Bill Tilleman for his valuable guidance as my thesis reader, my fellow classmates within the Department for being excellent sounding boards and several key anonymous individuals embedded within Alberta for whom I vetted my initial thoughts.

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CHAPTER ONE:

INTRODUCTION

DESCRIPTION OF ALBERTA

Geography

The province of Alberta (2008 population, 3.6 million; Statistics Canada 2009a) join Confederation in 1905 and covers an area of 661,848 square kilometers (255,541 sq mi), roughly 5% smaller than Texas or 20% larger than France. Edmonton, (2006 population 1,034,945) is the province's capital serves as the government centre and home to most of Western Canada's oil refining capacity. Calgary (2006 population 1,019,942), 300km to the south of Edmonton, is the province's financial centre and headquarters for 95% of Canada's oil and gas companies (Interview #1) (see Figure 2). Nearly 75% of Albertans live in the Calgary-Edmonton corridor.

Demographics

Prior to the beginning of European settlement in the late 18th and 19th centuries, the area was settled by First Nations 8000 years ago (Government of Alberta 2009a). As a result of the fur trade in the 19th century and the massive migration of settlers from Eastern Canada, the United States and Europe during the turn of the 20th century, First Nations now only comprise 4.9% (92,060) of the province's population. The vast majority of Albertans come from European origins (English, German, Scottish, Irish, French, Scandinavian, Dutch) with increasing numbers of East Indian and Chinese (Statistics Canada 2009b). The most recent flux of immigrants has been from the latest oil boom. Between 1996 and 2006, 700,000 people immigrated into the province (Nikiforuk 2008, 24).[1]

[1] While I have done my best to cite from 'balanced' sources, I have cited both Andrew Nikiforuk and William Marsden in this introductory chapter. Both authors are admittedly known for their polemic tone and position against oil sands development, however I feel they, in some examples, have done a better job at daylighting information about oil sands development that the Government of Alberta, oil sands companies or academics. Conflicting and questionable numbers were common during my research from both government, industry and environmental groups. Bias towards oil sands development can be equally

Politics

Alberta tends to have more conservative politics than other provinces in Canada. The current Progressive Conservative Party has 72 of 83 seats in the Legislative Assembly and has been in power continuously since 1971. The conservative politics which dominate the most 'American' of Canadian provinces can be linked to two great influxes from south of the border: ranchers and farmers during the late 19th and early 20th centuries and then with Texan oilmen in the 1950's. With these newcomers came the largely American values of conservative social attitudes, Christian fundamentalism and anti-government political views. The Alberta Advantage, a term developed by the provincial government to market the province's booming energy-based economy, is characterized by the lowest taxes in the country (a flat tax of 10.5%), a debt-free government, and a skilled labour force. Ralph Klein, four-term Progressive Conservative premier of the province from 1993-2006, inspired by neo-liberal political ideologies, restructured the province, privatizing many province owned utilities and energy companies and in three years reduced government expenditures by one third (Bruce et al. 1997, 1). As a result the 3.4 billion CAD deficit became a 1 billion surplus in two years and the 23 billion CAD provincial debt was eliminated in 10 years (Bruce et al. 1997; Government of Alberta 2009d). Under the leadership of Klein's successor, Progressive Conservative Premier Ed Stelmach, the government has taken a more proactive role in managing growth than with the laissez-faire attitude of the early Klein years (Interview #18).

Economy

The economy of Alberta is largely dominated by oil and gas, information, communication and technologies, agriculture and forestry sectors (Figure 1). Before the economic crash in fall 2008, Alberta was experiencing the strongest period of economic growth by any province in Canada's history, with 12.7%

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polemic and narrow-minded. Moreover, much information was simply impossible to acquire given the time and budget of my thesis. As a result, Nikiforuk and Marsden are quoted when information from other more 'reliable' sources was difficult to obtain.

growth between 2002 and 2006 and an unemployment rate of only 3.5 per cent in 2007 (Alberta Environment 2008b, 17). In 2006, the GDP per capita was nearly double the national average (66,275 CAD, 33,553 CAD respectively) (Cross and Bowlby 2006). In 2008, the Fraser Institute, a conservative Canadian think-tank, ranked the Alberta government 2nd in North America for it's degree of economic freedom[2], ahead of third place Texas. Interestingly, the 9 other Canadian provinces placed were all the least 'economically free' jurisdictions in North America (Karabegovic and McMahon 2008).

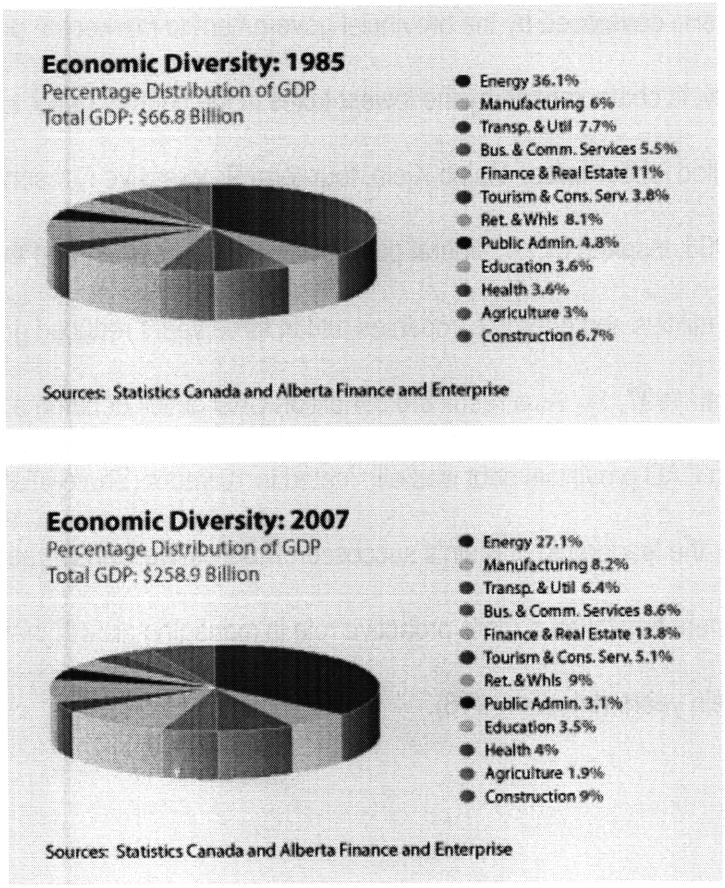

Figure 1: Economic diversity of Alberta, by sector, 2007.

Source: http://www.albertacanada.com/images/AE-ER_chart_sota.gif Accessed 27 Mar 2009.

[2] The freest economies, as defined by the Fraser Institute, "operate with minimal government interference, relying upon personal choice and markets to answer the basic economic questions such as what is to be produced, how it is to be produced, how much is produced, and for whom production is intended. As government imposes restrictions on these choices, there is less economic freedom."

Oil and Gas Sector

Alberta is the energy capital of Canada. It is the largest producer of conventional crude oil, synthetic crude, natural gas and gas products in the country, the second largest natural gas exporter in the world and ninth largest oil producer in the world. In 2006-2007, oil and gas accounted for 25% of the provinces GDP (Government of Alberta 2009c), their royalties accounted for 30% of the Alberta Government's total revenue (Alberta Energy 2009a) and represented 68% of exports from the province (Alberta International and Intergovernmental Relations 2008). According to the Canadian Association of Petroleum Producers (CAPP), the energy industry directly and indirectly employed 275,000 Albertans (CAPP 2009a).

CAPP estimates Alberta has 223 trillion cubic feet of natural gas reserves (CAPP 2009a).[3] Natural gas remains the province's largest source of revenue from non-renewable sources, more than royalties from oil sands or coal mining (Alberta Energy 2009b). The current pro-development royalty structure in place only charges oil and gas producers 1 per cent royalties until they have paid off their entire capital costs (Nikiforuk 2008, 35).

During the incredible growth the oil and gas sector has witnessed in the last 10 years, the Government of Alberta has increased it's lobbying power, employing promoters in Ottawa and Washington, DC to highlight the benefits of investing in Alberta's oilfields. Alberta also recently sent a contingent of provincial delegates to the United Nations Framework Convention on Climate Change's Conference of Parties 14 in Poznan, Poland, in November of 2008 (Interview #1).[4]

[3] One trillion cubic feet is enough to heat all gas-heated homes in Canada (5 million) for one year

OIL SANDS

Size

Oil sands reserves, dwarf natural gas reserves and conventional oil reserves, and are much more valuable to energy companies, investors and the province. Using today's technology, the Alberta oil sands have 174 billion barrels of recoverable oil, which is enough to meet Canada's demand for petroleum products, based on current consumption for 250 years (Energy Information Administration 2007). This amount, difficult to appreciate, is so significant that when Alberta's ERCB included the oil sands in Canada's "proven reserves," OPEC's share of world petroleum reserves dropped from 79 to 68 percent (Yergin 2003). Only 4% of the 174 billion barrels have been extracted to date (Marsden 2007, 145). The total volume of oil sands deposits, including those deposits not economically recoverable, is between 1.75 and 2.5 trillion barrels (Chastko 2004, xiii). This figure of 174 billion barrels of recoverable oil has been subject to dispute by a few minority voices. Outspoken Geological Survey of Canada geologist David Hughes says the number is speculative at best, claiming the number of marketable barrels could be as low as 11 billion (Marsden 2007, 121).

Location

Alberta's oil sands (Figure 2) underlie 140,200 square kilometers (54,132 square miles) of primarily northern Alberta; an area larger than the state of Florida (Alberta Energy 2009a). The oil sands region is located in the Boreal Forest, a vast circumpolar ecosystem covering 58% of Canada. The Boreal Forest is the largest terrestrial carbon sink in the world and one of the largest intact ecosystems in the world, containing 80% of the world's liquid freshwater (Boreal Forest Initiative 2009).

[4] This raises the question why the Province needs to send their own representatives to international treaty making conferences when the ability to sign international treaty likes constitutionally with the federal government.

The oil sands are situated in the Athabasca River watershed. The Athabasca flows from its headwaters in the Columbia Icefields of Jasper National Park, 1232 kilometers to Lake Athabasca in Alberta's northeastern corner and eventually into the Mackenzie River, Canada's longest and the world's third largest watershed. The Athabasca is the only major river in the province that has not been dammed and currently has five pulp mills and five oil sands projects withdrawing water from it (Marsden 2007, 11). The forest around the Athabasca Oil Sands consists of 3000 - 4000 years accumulation of peat, pine trees surrounded by wetlands, bogs, rare fens, natural canals and shallow lakes. Wetlands cover half of all land in the oil sands region (Alberta Environment 2007c).

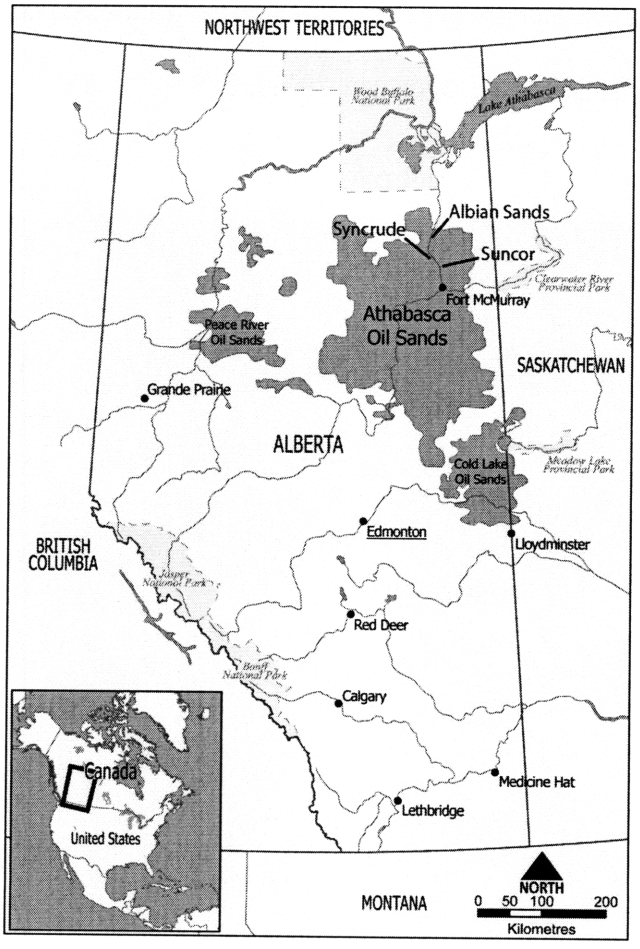

Figure 2 – Map of the Athabasca Oil Sands in Alberta, Canada with location of Albian Sands, Syncrude and Suncor Oil Sands Facilities

Modified from: http://upload.wikimedia.org/wikipedia/commons/7/7a/Athabasca_Oil_Sands_map.png Accessed 27 Mar 2009.

Bitumen

Oil sands, also referred to as tar sands or bituminous sands, unlike conventional crude, are composed of 10-12% bitumen, and the remaining, rich mineral clays and water (Figure 3). Bitumen in its unrefined state resembles tar or asphalt and requires upgrading before it can be transported through pipelines and used in conventional refineries. Oil sands results from decaying vegetation and animals mixed with bacteria that have been under extreme pressure and heat for 200-300 million years. Many other countries have deposits of oil sands but none are as large as Canada's. Bitumen has in the past been used to waterproof boots and in early photographic technology. Greek historian Herodotus said hot bitumen was used as mortar in the walls of Babylon (Alberta Environment 2008a, 2).

Figure 3: Unrefined bitumen as found in the Athabasca Oil Sands

Source: http://1.bp.blogspot.com/_sxuZaa9eCLE/R5tdDCynrrI/AAAAAAAAAH0/F-IsxYn6niU/s400/HandFulofOilSand.jpg

Accessed 27 Mar 2009.

Extraction Process

Currently, oil sands can be extracted in two ways: open pit mining or in-situ mining using steam assisted gravity drainage (SAGD). Open-pit mining has been used the longest and produces the most amount of oil from the oil sands. The oil sands deposits that are accessible with current mining techniques cover 3,000 square kilometers, or four times the surface area of Calgary (Dyer et al. 2008).

For open pit mining, before extraction begins the overburden must be removed. This process entails draining existing wetlands, which can cover up to 50% of the landscape, diverting rivers, scraping away the forest and organic layers of soil, so that equipment can reach the oil-bearing sand. The most cost effective extraction method for open pit mining uses power shovels and large trucks. These shovels, 15 million CAD electric Bucyrus shovels, the largest shovels in the world, shovel the bitumen ore into large trucks (four hundred metric tonnes, three storey Caterpillar trucks, also the largest of their kind in the world) capable of carrying 100,000 CAD worth of bitumen per load. These trucks move 24 hours a day dump the ore into a crusher, the ore then travels on a conveyor belt,[5] mixed with water and piped in a slurry mixture to the extraction plant. At the extraction plant, the bitumen is separated from the sand using hot water heated from natural gas. This hot water extractions process is essentially the same as the one Dr. Karl Clark, working with the Alberta Research Council, developed in 1923 (Suncor 2009a).

A byproduct of the extraction process are tailings, a clay/water mixture that remains after the bitumen is removed. Tailings are pumped to large tailing ponds where over time, the fine clay particles settle and form

a fluid-like deposit called mature fine tailings (Suncor 2007a, 38). These mature fine tailings can then over 40-50 years be reclaimed. Besides tailings, two tons of sand also results from the extraction of one barrel of oil. Oil sands mines move enough overburden (Boreal Forest) and oil sands every two days to fill Toronto's Skydome or New York's Yankee Stadium (Nikiforuk 2008, 14). This sand is used during the reclamation process to fill in the mine pits and create hills.

While the focus of this research will be on open-pit mines, only 20 per cent of the Athabasca oil sands are reachable using this extraction technique. The rest must be extracted through steam assisted gravity drainage (SAGD). SAGD involves drilling a network of holes deep into the forest floor and pumping steam down the pipes which eventually over the period of a few months cooks the oil sands, reducing their viscosity and allowing the gravity and the pressure from a system of pumps to extract the bitumen. This method is thought to use 90% less water than open-pit mining methods (Canadian Centre for Energy Information 2006).

Typical projects are three miles by three miles and occupy 7-10 per cent of the landscape, compared to 100 per cent for open pit mining (Suncor 2007a, 39). While only 7-10 percent of the forest is removed for the extraction of the oil, the supporting infrastructure (e.g. pipelines, roads, seismic lines) fragment the landscape to the point of potentially extirpating (regionally eliminating) populations of caribou, fish, bear and moose over a region of one to three million acres (Nikiforuk 2008, 14).

The extraction process for both techniques is energy and resource intensive. It takes one barrel equivalent of natural gas to obtain two barrels of oil (Marsden 2007, 121). To achieve the Province's goal of producing 4 million barrels per day of oil sands, it will take the total planned daily production of the Mackenzie Valley,

[5] Shell Canada's conveyor belt in their Muskeg River Mine is the longest in the world at 1463 metres long (Nikiforuk 2008, 24)

Canada's last remaining untapped natural gas field. Open pit mining requires about two to five barrels of water to extract one barrel of bituminous oil (Woynillowicz 2005). The economic costs to extract one barrel of oil sands is also substantial. Operating costs for one oil sands mine was 38.50 CAD per barrel in 2008, up from 27.80 CAD per barrel in 2007, a reflection of the labour shortages in the region and technology needed to refine the bitumen (Suncor 2008a, 7). Cost of oil production in Saudi desert is 2 dollars per barrel (Marsden 2007, 122)

After the bitumen has been extracted it can be sold on the market or upgraded into a variety of crude oil products (Canadian Centre for Energy Information 2006). Because bitumen is a heavy oil, containing large, carbon-rich molecules and more sulphur and metals than conventional light crude oil, it requires special upgrading at special refineries capable of processing heavy oil. Upgrading involves cracking these larger carbon molecules, with heat, pressure and catalysts, into smaller molecules. Hydrogen molecules can be added to form hydrocarbons and additional refining can remove other impurities (e.g. sulphur).

Bitumen in its refined state can be transported through pipelines; otherwise it must be diluted using a synthetic oil condensate, a mixture of pentanes and heavier hydrocarbons resulting from natural gas processing). Currently a pipeline system from the Alberta oil sands extends to refineries in Alberta's Industrial Heartland, Eastern Canada, the US Midwest and the Gulf Coast (Centre for Energy Information 2006).

HISTORY OF OIL SANDS

The potential of the Athabasca Oil Sands as a seemingly inexhaustible energy source has been researched for over 80 years. Sidney Ells, a mining engineer and surveyor with the federal government's Mining Branch, completed in 1917 the first research expedition to the Athabasca Oil Sands (Marsden 2007, 29).

From the 1920's to the 1950's provincial and federal government sponsored research focused on developing a cost effective method of separating the oil from the sand and clay (Chastko 2004).[6] Productions costs throughout this time period remained too high to become competitive with conventional oil, as a result large scale development of the oil sands took nearly 50 years to produce oil.

In 1968, the Great Canadian Oil Sands, now known as Suncor Energy, a Canadian company backed by Sun Oil, a U.S. energy multinational began production. Suncor was the first fully integrated oil sands facility in the Athabasca Oil Sands, extracting, refining and upgrading the raw bitumen. In 1969, Syncrude, a consortium of Canadian and US investors, were approved to develop another integrated oil sands development; however it was until 1978, that Syncrude began producing oil (Syncrude 2006a).

The 1973 OPEC oil crisis moved energy security to the forefront of many national agendas as well as energy exporting provinces like Alberta. That same year Alberta Premier Peter Lougheed created a crown corporation that Albertans could invest in, the Alberta Energy Company, raised royalties to 40% of total oil and gas income and put in place a Heritage Fund (Nikiforuk 2008, 157). In 1975, both the Province of Alberta and the Government of Canada invested in Syncrude. The federal government under the leadership of Liberal Prime Minister Pierre Trudeau began their own plan for energy security and sharing the profits from Alberta's immense energy resources, creating the crown corporation Petro Canada and in 1980 the National Energy Program (NEP).[7]

[6] For an much more detailed account of the development of Alberta's Oil Sands, read historian Paul Chatsko's book, *Developing Alberta's Oil Sands* (2004).

[7] The National Energy Program (NEP) was designed to promote energy self-sufficiency in Canada, alternative energy and increase government revenues. This program was met with fierce resistance from Alberta, whose conservative, independent ideologies ran counter to the policies proposed by the NEP. Threats of western separatism were given to Ottawa in light of what seems an attempt to appropriate the region's wealth.

After the defeat of Trudeau in 1984 to Progressive Conservative Prime Minister Brian Mulroney, the National Energy Program collapsed as well. The 1980's also saw soaring capital costs, rising inflation, ballooning provincial debt and low oil prices. Combined with significant maintenance issues, several refinery fires, elusive profits and sizeable spills into the Athabasca River, Suncor and Syncrude remained the only two players in the Alberta Oil Sands.

Soon after the 1992 election of Progressive Conservative Premier Ralph Klein, a massive and unprecedented reform of the provincial government took place. Similar to the neo-liberal reforms of Thatcher and Reagan, Klein slashed the provincial government budget while implementing tax breaks. He soon fired a host of Alberta Energy analysts, dropped royalties to 15% and sold off the Alberta Energy Company at one third its market value (Nikiforuk 2008, 158)

In 1993 the National Oil Sands Task Force was convened. Comprising of industry representatives and government officials, the Task Force drafted a framework which set the stage for the 1995 report which outlined a 25 year strategy for the development of the oil sands (Woynillowicz et al. 2005, 3). In 1997, the same year as the Asian economic crisis, the federal and provincial governments, acting on one of the recommendations of the report, introduced a generous royalty scheme and significant federal tax breaks for oil sands developers (Interview #18), creating one of the most attractive areas in the world to invest in energy. Between 1995 and 2004 as oil process rose (Figure 4), oil sands production doubled, sixteen years ahead of the Province's own schedule (Wonillowicz et al 2005, 4).

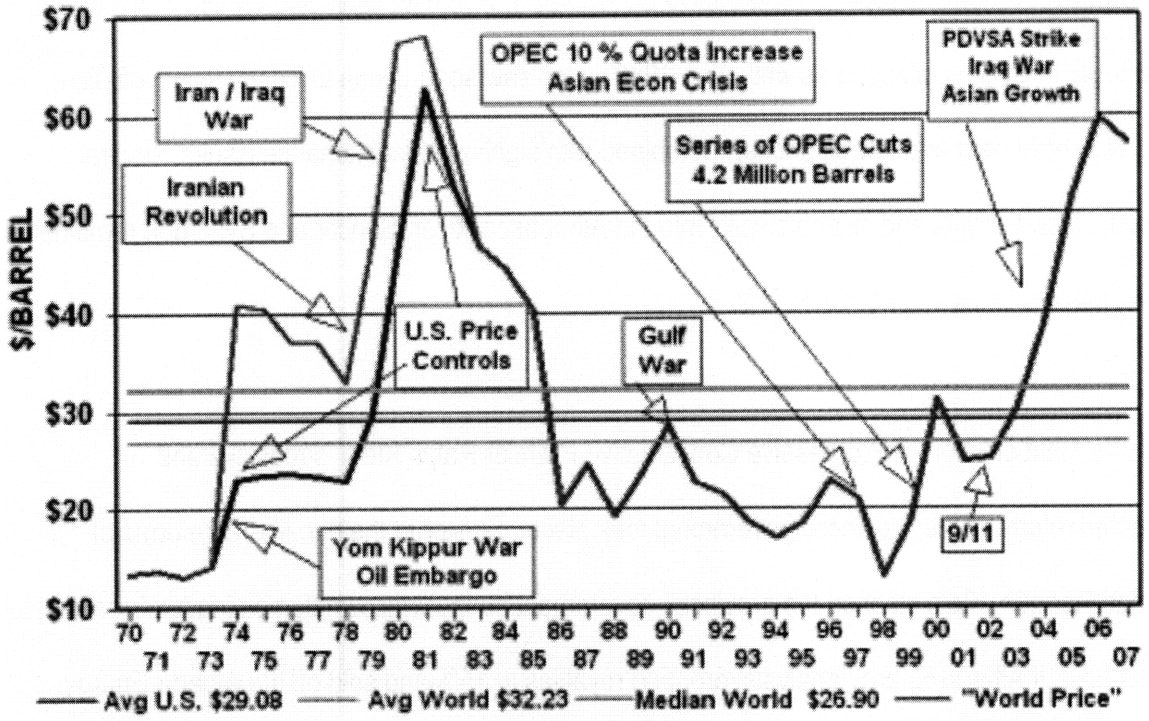

Figure 4: Historical Oil Prices in USD, 1970-2007

Source: http://www.oilism.com/oil/2007/12/15/crude-oil-price-history-1950-2008/ Accessed 27 Mar 2009.

Proximity to US

The proximity to the seemingly insatiable US economy has been instrumental in securing a reliable market for Alberta's energy products. Many American multinational oil companies and their Canadian subsidiaries were heavily involved during the initial development of Alberta's oil and gas industry. As a consequence to their involvement and the province's often tense relationship with Ottawa, exacerbated by the NEP, the Alberta government allowed pipelines to extend south into the American Midwest and not east to Canada.[8]

This ongoing relationship with the US has meant that Alberta's extensive pipeline infrastructure, now totaling 332,464 kilometers of pipeline (Alberta Energy 2009a), is oriented North-South. Combined with the

[8] Currently, Eastern Canada still relies on Middle Eastern imports while Western Canada exports oil to the United States.

recent surge in oil sands production, Canada has, since 2002, been the largest exporter of oil to the United States, exporting 43% more oil to the US than Saudi Arabia, accounting for 18 percent of all US oil imports. (Energy Information Administration 2009; Nikiforuk 2008, 30). 99% of Alberta crude oil exports go to America, although the province is now starting to export to China and Singapore (Alberta International and Intergovernmental Relations 2008).

Since 2001, American energy policy has been advocating for the reduction of America's dependence on foreign oil. As a consequence to this policy shift, and the post-NAFTA, liberalized trading environment, many eyes have been on Alberta's seemingly endless supply of cheap and secure oil as a solution to the growing destabilization in the Middle East. Even more foreign oil companies are getting involved (Figure 5). The current value of proposed projects is 170 billion CAD; 2008 saw 18 billion in construction alone (Ethical Funds Company 2008). As of February 2009, current oil sands production was 1,018,000 barrels per day, while planned production of projects already approved or publicly announced surpasses 3,395,500 barrels per day (Dunbar 2009).

Major publicly-traded companies involved in one or more oil sands projects at the operating, construction, approval or application stage.

Company	Operating	Construction	Approved	Application
BP			X	
Canadian Natural Resources	X	X	X	X
Canadian Oil Sands Trust (Syncrude)	X			X
Chevron	X	X	X	X
Connacher Oil & Gas	X			X
ConocoPhillips	X	X	X	X
Devon Energy		X		X
EnCana	X	X	X	X
ExxonMobil			X	
Husky Energy	X		X	
Imperial Oil	X		X	X
JAPEX (JACOS)	X			
Marathon Oil	X	X	X	X
Nexen	X			X
OPTI Canada		X	X	
Petro-Canada	X		X	X
Shell	X	X	X	X
Sinopec				X
StatoilHydro (NAOSC)		X		X
Suncor Energy	X	X	X	X
Synenco Energy				X
Total	X			X

Figure 5: As of October 2008, oil sands projects that are operating, under construction, in the approval phase or have submitted an application to the ERCB.

Source: Ethical Funds Company (2008)

The recent downturn in the economy, has affected growth in the oils sands. The construction deadlines for two twenty billion CAD projects were being been pushed back as early as October 2008 (Scott 2008). The exorbitant construction prices for oil sands ventures make them very sensitive to fluctuations in the market. Andrew J. Leach, a professor of environmental economics at the University of Alberta in Edmonton, estimates that long-established plants can operate with prices as low as $30 a barrel. But he said newer operations need $60 to $70 a barrel for acceptable returns, and no one will proceed with proposed projects until prices return to the $80 to $90 range (Austen 2009). At the time of writing oil was trading at 52 USD per barrel.

OIL SANDS ISSUES

A growing litany of concerns have been accumulating about the method used to extract Alberta's oil sands and the pace at which this development is taking place. These concerns, being made by increasingly diverse stakeholders, are summarized below.

Water

Extracting and upgrading oil sands is a water intensive process. It takes 12 barrels of water to produce one barrel of oil (Nikiforuk 2008, 61). Since water used in the extraction and refining of the oil sands cannot be returned to the Athabasca River, oil sands operators have had to recycle water or use saline water, sometimes, as in the case of Syncrude, recycling their water up to eighteen times. The net result is two to five barrels of fresh water to produce every barrel of oil (Marsden 2007, 122; Oil Sands Ministerial Strategy Committee 2007, 112). When this two barrels is aggregated on a daily basis this amounts to the water supplied to the cities of Calgary (pop. 1 million) Lethbridge (79,000) and Red Deer (82,900) (Marsden 2007, 167). As of December 2008, approved oil sands mining operations are licensed to annually divert 349 million cubic metres from the Athabasca River (Dyer et al 2008). In low winter flows, oil sands companies have withdrawn up to 15.7% of the total flow (Imperial Oil 2005), causing concern that this may damage aquatic ecosystems downstream. Groundwater seepage from nearby leaking tailing ponds along with contaminated dust blowing into the river have also been raised as concerns to the health of the river and downstream communities.

Air Emissions

In the late 1990's and early 2000's before Prime Minister Jean Cretien ratified Kyoto in 2002, Alberta Oil Sands historian Paul Chastko (2004, 228), saw Canada's commitment to the Kyoto treaty as the "single

greatest threat to the future of the oil sands" because of the uncertainty it created for investors and stakeholders in oil sands projects.

Nationally, Canada is not doing a stellar job at reducing their greenhouse gas emissions. Carbon dioxide emissions in Canada have risen 27 per cent since 1990, the highest increase of any industrial nation (Nikiforuk 2008, 117). Our international obligations under the Kyoto Protocol, require Canada to reduce their emissions six percent below 1990 levels. In 2006, Johanne Gelinas, Canada's former environmental commissioner noted that (in Nikiforuk 2008, 118):

> "...few federal efforts are underway to reduce these emissions and those efforts have resulted in minimal changes to date. For its part the federal government is counting on regulatory and long-term technological solutions....However, it is not leading the way by clearly stating how and to what degree Canada will reduce greenhouse gas emissions when oil and gas production is expected to increase."

Per barrel of oil sands produced, carbon dioxide emissions have been reduced by 45 per cent since 1990 (Alberta Environment 2008a, 4). Despite the decline in per barrel intensity of greenhouse gas emissions, the absolute amount of greenhouse produced has increased dramatically making oil sands companies among the highest greenhouse gas emitters in the country (Oil Sands Ministerial Strategy Committee 2007, 113; Environment Canada 2009a). Besides carbon dioxide, oil sands projects are also major emitters of sulphur dioxide and nitrogen oxides, key components in acid rain, and major byproducts of oil sands refining (Woynilliowicz et al 2005, 15). Volatile organic compounds are known to cause serious human health effects and along with NO_x and SO_2 contribute to smog.

Tailing Ponds

Despite their name, tailing ponds are rather large reservoirs that contain the liquid by-products of oil sands extraction. Oil sands developers produce 1.5 million cubic metres (400 million gallons) of mine tailings daily (Nikiforuk 2008, 78) which pour into the over 130 square kilometers of tailings ponds (Government of Alberta 2008c). At the end of 2006, Syncrude's dams alone contained about 600 million cubic metres of mine tailings, making it the second largest dam system in the world after the Three Gorges Dam in China (Marsden 2007, 168), rising on average 270 feet above the boreal forest (Nikiforuk 2008, 78).

Besides their size, tailing ponds are also extremely toxic, containing napthenic acids, cyanide, heavy metals (e.g. arsenic) and polycyclic hydrocarbons, such as benzene, antracene and chrysene, which are carcinogenic and deadly to marine life (Marsden 2007, 168). For instance, in the Spring of 2008, 1606 ducks landed in Syncrude's Aurora North Settling Basin, all dying (Christian 2009). Despite noise cannons, flashing lights and moving scarecrows in the shape of Peregrine falcons, some birds still land in tailing ponds. This is even more likely during spring when many of the lakes and rivers in the region are still frozen, except for the often steaming tailing ponds. Oiled ducks have been found by Metis and Dene hunters 135 miles north of the tailings ponds (Nikiforuk 2008, 81).

Leaking tailing ponds are a major liability for the Government of Alberta and for oil sands companies because of the potential effects on downstream water users. Recently government agencies have admitted that the tailing ponds have been leaking into the groundwater. A report by Environmental Defence (2008), a Toronto-based environmental group, used development applications to calculate that 11 million litres of tailings leak into the groundwater and the Athabasca River daily.

Reclamation

Current industry practice for reclamation of the open pit mines is to plow back the excess sand, replace the overburden and topsoil and plant native vegetation. The Alberta government requires the disturbed land to be returned to 'equivalent capability'. Jim Carter, CEO of Syncrude, claims that his company is rendering the land "more productive than it was before we got here" (Marsden 2007, 170). Journalist William Marsden (2007, 168) jibes the reclaimed land looks instead like "an artificial golf course with water hazards." Some of the reclaimed land has been turned into parks, while others have been stocked with herds of wood bison (Marsden 2007, 169; Suncor 2007a, 40;Thompson 2009). According to Don Thompson of the Oil Sands Developers Group, as of the beginning of 2008, there was 42,000 hectares of disturbed land, 6,500 hectares of reclaimed land and 104 hectares of certified land (Oil Sands Developers Group 2008). Figure 6 indicates the disproportionate increase in disturbed land relative to reclaimed land. The current lag is a result of the time it has taken for land to be reclaimed but also the lack of priority given to reclamation by the government and oil sands companies.

Reclamation of tailing ponds requires a different technique. Currently the standard practice has been to pump the discarded silt and sand from bitumen extraction process in a slurry mixture into the tailings ponds and wait for the silt and sand to slowly settle on the bottom, gradually filling up the tailing pond. Once it has been backfilled and dewatered, vegetation can be replanted. This whole process can take upwards of 30 – 40 years (Interview #19).

Increasingly another tailing pond reclamation technique uses a technology called consolidated tailings, which uses gypsum, a by product of the sulphur recovery process, to reduce the amount of water used in extraction and consequently the size of tailing ponds needed. This technology is however, unproven. To date no ponds have been reclaimed using this technology (Suncor 2008a, 21).

Another experimental tailing pond reclamation technology uses end pit lakes. In this case an abandoned mine pit is filled with mature fine tailings, a dense liquid mixture of clay, silt and water, and then covered with lighter freshwater from the Athabasca River, creating an end pit lakes. Syncrude has researched this technique since the 1980's and 1990's using pilot-scale test ponds and shown that water capping is an effective way to reclaim tailings and support a healthy aquatic ecosystem (Syncrude 2007a, 52). Many environmental groups and First Nations groups are skeptical of the end pit lakes, as the concept of them has been approved in ERCB applications, but as of 2008, end-pit lakes have not undergone a full-scale test (ERCB 2008a).

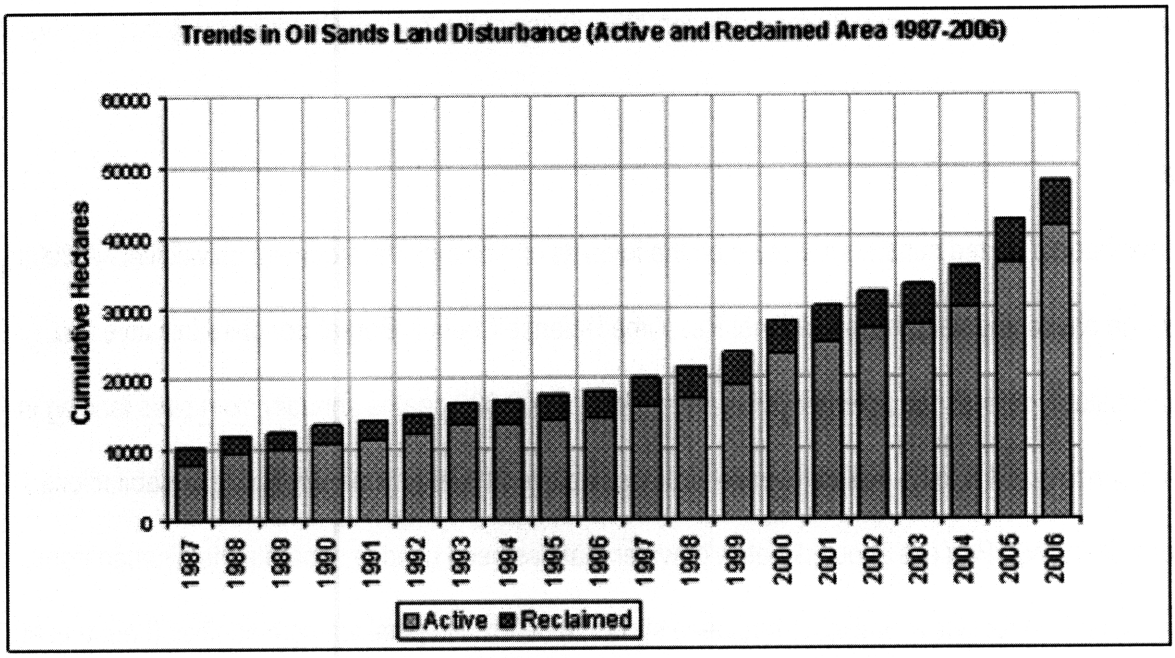

Figure 6: Trends in oil sands land disturbance (active and reclaimed area 1987-2006)

Source: Alberta Environment 2007c

Fisheries

The impact of oil sands development on the Athabasca River and Lake Athabasca fisheries has been in debate for many years. In 1982, an accidental spill from a Suncor wastewater treatment plant closed down the Lake Athabasca commercial fishery for three years (Gilles 2008). Alberta Environment laid twenty two charges against Suncor for polluting the river. The trial, which showed the government had been aware of the oil spill but had not taken action until a local First Nations Chief lodged official complaints with the government (Marsden 2007, 184). 42,000 CAD was divided among twenty fisherman in agreement that they not sue Suncor.

Besides water pollution from spills, groundwater seepage, or polluted wind-borne sediment, recent low-flows on the Athabasca threaten fish populations in the river and the lives of those who will have to search for other more costly (air-transported) food (Weber 2006; Office of the Auditor General 2008).

Wildlife

There have been a limited number of studies on the impacts of oil sands development on wildlife. A 2008 report by the environmental groups, National Resource Defense Council, Boreal Songbird Initiative and Pembina Institute, outlines the potential avian loss: 8,000 to 100,000 deaths annually from birds landing in oily tailing ponds and 4.8 to 36 million juvenile birds deaths over a twenty year period due to habitat loss (Wells et al 2008, iv). Process affected water, or water that has been used to separate the bitumen from the sand, present in reclaimed wetlands has been shown to be toxic to plankton communities (Leung et al. 2003), fish (van den Heuvel et al. 2002), amphibians (Pollet and Young 2000) and swallows (Gentes et al 2007).

Fort McMurray

Approximately the size of Ireland (68,450 sq. km), the Regional Municipality of Wood Buffalo, of which Fort McMurray is the commercial centre, is one of the largest amalgamated municipalities in the world. In seven years, from 1999-2007 the municipality's population doubled from 42,847 to 89,167 (Regional Municipality of Wood Buffalo 2007). During this time the shadow population, those living in hotels, trailer parks and remote company camps increased 520% to 18,572 and within the last three years the official number of homeless have doubled to 441 (Regional Municipality of Wood Buffalo 2007). Because of the town's significant growth, there is a significant infrastructure debt within the region as more and more people arrive to work on the oil sands projects or in one of the many support industries. Overall in Alberta, the infrastructure debt in roads, schools and hospitals is over 7 billion CAD (Alberta Teachers' Association 2009). Dr. Michael Sauvé, President of the Fort McMurray Medical Staff Association, counted 38 physicians for 60,000 people, a ratio three times lower than reported for Argentina, China, Mexico, Mongolia and Uzbekistan (Nikiforuk 2008, 51).[9]

In the current municipal tax arrangements, oil sands companies have a separate tax formula, and are taxed around 40% of their market value, as opposed to 100% for residents and other businesses (Marsden 2007, 140). This disparity, created to incent oil companies to locate in region, has imposed considerable financial burden on the municipality, preventing them from delivering services sufficient to sustain a booming population. In 2007-8 the provincial government has responded to this mounting infrastructure and social services debt by committing over 815 million CAD to address the infrastructure, housing, health care and education needs of the region (Alberta Environment 2008b, 13).

Labour

[9] "Investing in Our Future" (*i.e. The Radke Report;* Oil Sands Ministerial Strategy Committee 2007), provides a much more detailed summary of the current challenges to communities affected by oil sands development, identifying gaps in current

The demand for labour, and consequently the wages in Fort McMurray are much higher than provincial or national averages. The 2007 average hourly wage for those working in the oil and gas sector was nearly double the wage for the same job elsewhere in the province (Alberta Learning Information Services 2009). The cost of living in the region is also significantly high. Average cost for a mobile home 426,278 CAD (December 2008) while a single family home is 656,081 CAD (WoodBuffalo.net 2009), causing people who make less than 70,000 CAD, 30% of the population, to be considered living below the poverty line (Nikiforuk 2009, 23). The energy industry has caused a shortage of jobs not only in their own industry but the high wages has attracted workers from many other sectors and regions of Canada and the world. In 2007, Alberta employers applied for 100,000 temporary foreign workers to work in the province (Nikiforuk 2008, 23). This is 12.5 times the average per capita of temporary foreign workers than in the United States (Alberta Federation of Labour 2009).

Social Issues

Despite the wealth generated by Alberta's energy boom, Alberta is the province with the highest divorce rate (246.4 per 100,000; Statistics Canada 2005). Alberta also has the second highest high school drop rate in the country, where because of the booming economy, drop outs have no problem finding well paid work (Bowlby 2005). Alberta women also suffer from the second highest rates of spousal abuse among all provinces (Statistics Canada 2008). Compared to the rest of Alberta, Fort McMurray has 5 times more drug offences, 89 per cent more assault and 117 per cent higher rates of impaired driving (Nikiforuk 2008, 44).

Human Health Effects

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government services and making recommendations for future action.

The human health effects of the oil sands are difficult to prove. The difficulty arises from a small population size downstream, mostly in two pre-dominantly First Nations communities – Fort McKay and Fort Chipewyan, and historically higher levels of arsenic and other pollutants in the river. While it is true oil sands naturally erode into the Athabasca River and some pollutants, such as arsenic, can be found in trace amounts, there has been a noted increase in health issues for downstream communities. Dr. John O'Connor, was a general practitioner and outspoken advocate for the First Nations community of Fort Chipewyan. In 2003 after 10 years in the Fort Chipewyan, Dr. O'Connor began to see more cases of rare cancers and autoimmune diseases (Marsden 2007, 186). Six cases of a rare bile duct cancer was found in Fort Chipewyan, a community of 1200 people, which normally has a 1 in 100,000 occurance (Ethical Funds Company 2008). No baseline health study has ever been on downstream communities (Marsden 2007, 187). Meanwhile, local residents have been warned not to eat fish more than once a week because of mercury contamination and other toxins.

In May 2008 Health Canada responded to a petition filed in January 2008 by the Fort Chipewyan First Nation with the Auditor General of Canada (Office of the Auditor General 2008). Health Canada said that upon reviewing the available data no cancers or other elevated health conditions mentioned by the community were found to be higher than compared to other areas in the province (Office of the Auditor General 2008). In February 2009, the Alberta Cancer Board and the Nunee Health Board released a report, reviewed by experts in Australia, New Zealand, the United States and Canada, that found 24% more cancer cases in the community than expected (51 found; 39 expected; Brooymans 2009a). The Alberta government has responded that substantial follow-up studies are necessary (Brooymans 2009a).

First Nations

There are a number of First Nations (primarily Cree Dené and Métis), or aboriginal peoples affected by oil sands development include, most of them are based near Fort McKay, whose reservation is surrounded by oil sands development and Fort Chipewyan, located on Lake Athabasca 280 km downstream from Fort McMurray, and in Fort McMurray itself.

Despite the effects of pollution on the health and traditional livelihoods of local First Nations, many First Nations are employed by oil sands operators and economically benefiting from the development, especially those from the nearby Fort McKay First Nations. In 2006, 1500 aboriginal people were employed in oil sands operations and 412 million CAD in contracts were awarded to Alberta aboriginal companies (Alberta Environment 2008a, 14). Fort McKay First Nation has been in the difficult situation of being surrounded by oil sands leases. The oil sands have surely profited this First Nation, whose Chief Jim Boucher, has had to balance the economic prosperity of his people and the stewardship of the land (Fort McKay First Nation 2009).

The Mikisew Cree First Nation, whose traditional land lies over half covered in oil sands leases, have expressed considerable concern over the development of the oil sands. They feel the living ecosystems, the survival of the Mikisew Cree culture, and the economic and physical well-being of the First Nation people are threatened by the oil sands. They still heavily rely on the land. Over 80% of their community in Fort Chipewyan still consume wild meat (Mikisew Cree First Nation 2007). Yet they have seen a decline in wildlife for the past forty years, lower water levels in the Athabasca make it more difficult to continue their way of life. They feel the pace of oil sands development and the lack of regard for their First Nations violates their Treaty and Aboriginal Rights.

Cumulative Effects

Cumulative effects of oil sands development has only gained political traction in the late 1990's early 2000's. Before this time period, there were only two developers present and production levels remained modest. However, once development began to take off, many of the individual effects, described above, agglomerated into a much more complicated, and for many, overwhelming issue. The Pembina Institute, an Albertan environmental group, has described the accumulation of the above issues, "death by a thousands cuts" (Woynillowicz et 2005, 27). The Alberta government has responded with a number of measures meant to address cumulative impacts which are discussed in Chapter One.

CAMPAIGNING ON OIL SANDS

Coalitions

Environmental activists have been campaigning against oil sands development for over twenty years. During those initial campaigns, groups such as the Pembina Institute, Friends of the North and several First Nations, rallied around air quality issues. After air quality regulations improved, water became a major issue, then land disturbance, greenhouse gases and most recently climate change (Interview #21). As development in the oil sands have continued, traditionally more moderate environmental groups, such as the Sierra Club (2009) and the Pembina Institute (2009a), have taken more aggressive stances against the pace of development of the oil sands. In 2005, national coalitions began forming with the Canadian Parks and Wilderness Society, the David Suzuki Foundation, Greenpeace Canada, Pembina Insitute, Prairie Acid Rain Coalition, Sierra Club of Canada, West Coast Environmental Law and the World Wildlife Fund of Canada (CPAWS 2005).

Since 2005 the coalition building has expanded internationally to include the Washington, DC based National Resource Defense Council and the international offices of major environmental groups. In 2007,

Greenpeace opened an Edmonton office and began staging media-savvy direct action protests against oil sands development. The coalition has also broadened to include faith-based groups such as the Catholic Church (Bouchard 2009), and Kairos, the Canadian Ecumenical Justice Initiatives (Kairos 2009), as well as shareholder advocates, CERES who work with the international finance and investment community (Ceres 2009). One Alberta Environment employee has noted that environmental groups are producing more extensive, better researched reports than the environmental ministry themselves (Interview #5), helping to increase the transparency of the industry and pressing the need for the provincial government to improve their reporting practices.

Media

Alongside the progressively vociferous campaigns by civil society groups, many large media outlets have had special reports on the oils sands, including CBS's 60 Minutes (CBS 2006), the New York Times (2009), BBC News (2008), and the National Geographic and New Yorker magazines (Kunzig 2009; Kolbert 2007). The unparalled size and impacts of the oil sands development help make the oil sands to be a newsworthy issue. In a time when many people are increasingly concerned about understanding the impacts of their lifestyles, many media groups are using the oil sands as an archetype of a backwards-looking economy.

THEORETICAL FRAMEWORK

Process (bottom-up) versus Goal Oriented (top-down) Policies

Underneath the issues and innovations of the Athabasca Oil Sands lies an unspoken tension between two fundamentally different theories of how to create a more sustainable and healthy ecosystem. One theory, advocates engaging industry, government, community members and NGOs in a common forum, working collaboratively towards commonly-held values (Susskind et al. 1999). In this way, mutual gains can be

created and solution sets realized that were previously, impossible to achieve. What results are policies that are more durable than conventional politics as a result of the relationships made during joint-fact finding, and also more adaptive as a culture of learning and continual feedback is formed. This bottom-up approach, proponents say, will also be effective at reducing future conflict between stakeholder groups, as co-created targets and timelines, were drafted in a consensual process. It will also build legitimacy and credibility for the government's actions. Demonstrating to participants, observers, and critics, the democratic, deliberative and transparent nature of their policymaking.

The other theory posits that rather than creating new governance structures, working within the existing political fora and de-facto decision-making pathways, which are often top-down, will result in more resilient ecosystems, faster and at less expense than bottom-up approaches (Layzer 2008). Not naïve to the political inertia that exists within and colludes among industry and government agencies, this top-down theory capitalizes on well-established back-doors and communication short-cuts. It exploits the second-nature of politics to achieve better environmental outcomes. It self-critically admits the inadequacies of conventional politics while at the same time not idealistically basing change upon a radical reworking of how things get done.

This tension, then, of process (bottom-up) versus goal (top-down) oriented policymaking, inserts itself into the narrative of the Athabasca Oil Sands. The Government of Alberta throughout the history of the oil sands has wandered back and forth between these two frameworks as have industry and the public. When commercial oil sands development began, public input was minimal and environmental impacts small. As neo-liberal views slashed government services, a shrunken civil service shifted the discourse away from top-down, stakeholders re-aligned themselves around government initiated public-engagement and co-management opportunities. In recent years, as the scale and pace of oil sands development quickened,

these bottom-up structures proved insufficient to effectively manage the by-products of the development. In reaction to this, and spurred by international pressure, the Province has begun to co-opt these institutions and shift once again back to top-down approaches. Strangely, as industry realizes their own exposure to risk in this inadequate policy framework, they advocate the government for more environmental regulation

From this tension-supported theoretical framework, the question of why variation in environmental performance exists among three oil sands operators can be wrestled. First, however, a survey of the provincial and environmental regulations and policies needs to take place to provide a regulatory context in which oil sands development has taken place. Then, the corporate environmental management practices of Suncor, Syncrude and Shell Canada will be summarized, compared and transposed over the regulatory context. Finally, a strategy aimed at improving overall environmental performance of oil sands development will advanced for the Government of Alberta.

Chapter Two:

Regulatory and Policy Review

INTRODUCTION

To better understand the regulatory context in which Oil Sands development takes place in Alberta, I will first review the most important provincial and federal environmental laws and regulations. Second, I will relate how those regulations apply to oil sands development and what oil sands specific policies currently exist. Third I will analyze the strengths and weakness of the current regulatory and policy framework. I will finish with a discussion on how I can test the how the assumptions about the weakness of the system is correct. Throughout this analysis, I will examine the discretion allowed, either explicitly or implicitly, to environmental agencies with regard to the implementation of environmental standards and emphasize the historical, evolving nature of oil sands and environmental policy.

Background

Canada's parliamentary, Westminster-style government blends legislative and executive power at the federal level and assigned responsibility for the management of crown (public) land and natural resources to the provinces (Illical and Harrison 2007). Compared to the US presidential system, which has greater emphasis on separation of powers and greater federal control of public land, Canada's parliamentary system grants a great deal of discretion to government agencies.[10] Consequently, in Canada both federal and provincial environmental statutes "typically authorize, but do not compel, a broad range of actions by the executive" (Illical and Harrison 2007, 370). It follows that government policies in Canada and the interpretation of existing statutes have the potential to change quickly, depending upon which political party controls the federal House of Commons or provincial legislative assemblies. The discretionary nature of the system also limits the ability for parties to sue the government for actions based on past policy

[10] That said, the Hoberg (1991) does argue that the United States influences Canadian environmental regulation by the export of costs and knowledge from the US to Canada. He believes the pattern of this pervasive influence is one of emulation driven either by elites or activists.

decisions. Historically there has been little public support for federal involvement in provincial matters and significant provincial opposition to federal intervention. Indeed the As a result, there is little precedence in Canada for the federal government to "test the limits of its environmental authority" often deferring to provincial governments (Harrison 1996). Hence, this legislative and policy review, while touching on relevant federal statutes, will focus on Albertan legislation and policies.

FEDERAL AND ALBERTAN ENVIRONMENTAL LEGISLATION

HISTORY OF FEDERAL ENVIRONMENTAL LEGISLATION

The *Canadian Constitution Act* of 1867 laid the legal foundation for environmental policy in Canada. Environmental issues are not explicitly mentioned in this Act and as a result most environmental matters in Canada involve shared jurisdiction over proprietary powers and legislative powers. Section 109 of the *Constitution Act* also maintains that all 'lands, mines, minerals and royalties' located within the provinces belong to them, while canals, harbours and lighthouses became property of the Federal Government. Sections 91 and 92 of the *Constitution Act* outline that Federal powers include discrete subjects like fisheries, navigation and shipping, 'Indians and land reserved for the Indians', and federal works and undertakings. But the Constitution Act also gives the Federal government conceptual powers over 'Peace, Order and Good Government', taxation, the spending power, trade and commerce, criminal law and the ability to enter treaties with other countries. Also, if interprovincial environmental effects occur, the matter is deferred to the federal government.

In Canada there are seven major statutes that influence environmental managment. Treaty Law, the *Migratory Birds Convention Act*, the *Canadian Environmental Protection Act*, the *Canadian Environmental*

Assessment Act, the *Fisheries Act,* the *North American Free Trade Agreement*, and the *Species at Risk Act*.

Treaty Law

In Canada, the earliest treaties signed between the Crown and Aboriginal groups extend back the early 18th century. However the majority of treaties were signed between 1871 and 1921, primarily as a way to settle land disputes between the federal government and First Nations, Metis or Inuit groups. As the railroad and white settlers journeyed further West, the Canadian government proceeded with this series of treaties. Each treaty identifies a region thought to be the traditional territory of the First Nation or Nations signing that particular treaty. In exchange for surrendering their rights and title to these lands, the First Nations were promised a smaller parcel of land as a reserve, annual annuity payments, implements to either farm or hunt and fish and the right to continue to hunt and trap or hunt, trap and fish on the tract surrendered. Treaty Eight, signed in 1899, is the treaty that applies for the majority of Northeastern Alberta.

Section 35(1) of the *Charter of Rights*, 1982 upholds 'existing aboriginal and treaty rights'. Indeed, since 1982 most of the 'rights cases and some of the treaty cases have focused on claims by First Nations to natural resources, particularly fish and game and timber (Valiante 2002, 10). Valiante (2002, 10) describes that because of the special status of Fist Nations, "their involvement in decisions that affect their entrenched rights is profoundly different from, and judged by a higher standard than, any other type of public or stakeholder consultation."

Migratory Birds Convention Act

The *Migratory Birds Convention Act* protects most migrating birds found in Canada (Department of Justice Canada 1994). Arising from the *Migratory Birds Convention* of 1916, signed by the US and Canadian

governments, this relatively old act has been described as 'problematic' by Environment Canada and is in the process of getting upgraded (Interview #22). The *Migratory Birds Convention Act* is largely a complaint-driven act, meaning there is no active monitoring to ensure that migratory birds or their habitat is being harmed by development (Interview #22). It is the responsibility of the Canadian Wildlife Service, the Royal Canadian Mounted Police, and provincial law enforcement authorities to enforce the act.

Until the 1960's environmental concerns were addressed in the private sphere and did not directly involve government legislation or action (Elder 1973).

Fisheries Act

The Fisheries Act was signed in 1985 and arose out of the roles of the federal government on the management of fish and fish habitat arising from the Consitution Act of 1982 (Fisheries and Oceans Canada 2007b). Fisheries and Oceans Canada manages Section 35 (fish and fish habitat) of the *Fisheries Act*, which prohibits the 'harmful alteration disruption or destruction of fish habitat' unless authorized by the federal agency. Section 36 of the Act (water quality), which prohibits the introduction of 'deleterious substances' into fish-bearing waters, is managed by Environment Canada (Interview #17). The *Fisheries Act* unlike the *Species at Risk Act* has more regulatory reach with respect to it applicability to crown and private land, and it more actively enforced than the *Migratory Birds Convention Act.*

Canadian Environmental Protection Act.

In 1999, the *Canadian Environmental Protection Act* (CEPA) was adopted. It regulates the prevention and control of pollution, protecting the environment and human health. It is also seen as a tool to achieve sustainable development (Environment Canada 2007). Updated from a 1988 version, CEPA 1999, allows for 'citizen suits' known as 'environmental protection action' permitting individuals to bring a court action

against a person who has committed an offence under the Act. While commonplace in US environmental statutes, this clause is rare in provincial or federal Canadian legislation (Valiante 2002, 16).

Canadian Environmental Assessment Act.

Environmental assessments legislation is in place in provinces, territories, the federal government and Aboriginal governments across Canada. The nature and application of environmental assessments (EA) vary widely among jurisdictions (Valiante 2002, 17). The federal EA process was the first in Canada, starting in 1973 as a cabinet directive and then as ministerial order in 1984. But it was not until 1992 that the federal government passed the *Canadian Environmental Assessment Act* (CEAA) (Department of Justice Canada 2009). The CEAA has six main objectives, to (Canadian Environmental Assessment Agency 2009):

- ensure that the environmental effects of projects are carefully reviewed before federal authorities take action in connection with them so that projects do not cause significant adverse environmental effects
- encourage federal authorities to take actions that promote sustainable development
- promote cooperation and coordinated action between federal and provincial governments on environmental assessments
- promote communication and coordination between federal authorities and Aboriginal peoples
- ensure that development in Canada or on federal lands does not cause significant adverse environmental effects in areas surrounding the project
- ensure that there is an opportunity for public participation in the environmental assessment process

The Canadian Environmental Assessment Agency administers the Act and coordinates the federal government's involvement with the provincial environmental assessment process through EPEA. Due to

the Canada-Alberta Agreement for Environmental Assessment Cooperation signed between the federal government and the province of Alberta in 1999 and again in 2005, there is a single cooperative environmental assessment for a project that triggers EPEA and CEAA (Canadian Environmental Assessment Agency 2005).

NAFTA

The 1994 North American Free Trade Agreement carries significant implications for environmental management in Canada. Chapter XI of NAFTA, which focuses on government procurement, has been a hotly contested issue for Canada's environmental sovereignty. Article 1110 of Chapter XI addresses national expropriation and protects foreign direct investment from being unduly harmed by national legislation. They hold that, under Article 1110, if an environmental measure is taken which is seen as a 'regulatory taking' or an expropriation, it may be considered in violation of NAFTA. Cumming and Froelich (2007), explore the significance of Chapter XI on Alberta's Water Act. In particular they explore the case of the Government of Alberta hypothetically canceling a Water Act approval for an oil sands operators with US-based investors. They found that this action has a 'strong argument' for triggering Chapter XI of NAFTA that would enable the oil sands company to sue the Province for lost revenue.

NAFTA also contains a proportionality clause (Article 605), which forces Canada to maintain a proportional[11] export (70% of oil sands production) to the United States (Nikiforuk 2008, 114). Should the need arise for Canada to restrict oil sands production for environmental reasons, the Government of Alberta must maintain the same percentage of exports to the US from the last years, even if it means

[11] Proportional in this circumstance means, the ratio of oil production for domestic consumption to the amount exported to the United States.

Canada will not have sufficient energy supplies, or risk being sued by the US Government (Marsden 2007, 74). This can also apply to Canada's exports of electricity, timber and livestock to the United States.

Species at Risk Act

The *Species at Risk Act* (SARA) is the federal statute that gives federal government the regulatory mandate to protect endangered species, helping engendered populations to recover and to prevent other species from being listed (Department of Justice Canada 2009b). Markedly different from the US *Endangered Species Act* (ESA), passed in 1973, which relies exclusively on regulation, the 2002 SARA uses voluntary, subsidized stewardship and sometimes compensation to protect at risk wildlife (Illical and Harrison 2007, 367). The ESA has little discretionary language and permits the federal government to have a more activist role, whereas SARA's language is much more permissive and often initially defers to the provinces.

HISTORY OF ENVIRONMENTAL REGULATION IN ALBERTA

Compared the federal government, provincial legislative powers are much more sweeping. Consequently, most environmental regulations occur at the provincial level. Valiante (2002, 7) summarizes that provincial legislative power extends to the management of public lands and resources, non-renewable natural resources, forestry, electricity generation, municipal institutions, property and civil rights and matters of a local or private nature.

Before Alberta joined Confederation in 1905, water use in the province was dictated by riparian rights until 1894 when the federal government passed the *North West Irrigation Act*, which allocated water according to a "first in time, first in right' principle which continues to the present and is similar to many water

management regulations in the American West, where senior license holders have priority in water use over junior licensees.

1930 – 1970: Energy Resources Conservation Board and the Water Resources Act

In 1930 the Dominion of Canada signed the *Natural Resources Transfer Agreement,* which gave ownership and management of natural resources to the provinces. Shortly thereafter, Alberta promulgated the *Water Resources Act* in 1931, which was designed as a tool to allocate water rights.

Following the shift to provincial management of natural resources, the Energy Resources Conservation Board (ERCB) was founded in 1938, to be the Government of Alberta's energy regulator and an independent quasi-judicial agency. Their mission is to "ensure that the discovery, development and delivery of Alberta's energy resources take place in a manner that is fair, responsible and in the public interest" (ERCB 2009a). The politically appointed board is directed by mostly engineers and lawyers and largely funded by the energy industry. For the next thirty years after the inception of the ERCB, there were no explicit environmental regulations promulgated in Alberta until the 1970's.

1970 – 1992: Early Environmental Regulations

In 1970, Alberta's Department of Environment was created one year before the federal Department of the Environment (renamed Environmental Canada). EIAs were not required business practice until the creation of the Environmental Assessement and Review Program, under the *Land Surface Conservation and Reclamation Act* in 1973 (Chastko 2004, 162).

Overall, from the inception of Alberta Environment in 1970 to 1992, Alberta Environment, along with many other jurisdictions across North America, focused on point source pollution of air and water. Both air and

water pollution had been the most studied of environmental issues at the time and they were also the easiest to measure and prosecute. Indeed, Davidson and MacKendrick (2004), label this period in Alberta's environmental policy as traditional pragmatism. The environmental regulations and policies developed during this time reflected this bias towards monitoring air and water quality and against in-stream flow needs and managing for biodiversity. As a result of the discursive strategy chosen by the Province and the science of the day, problem statements and goals were much more clearly constructed. Granted, even with today's science and technology determining in-stream flow needs and managing for biodiversity are challenging, ambiguous goals.

1993 – 2004: EPEA and the Water Act: increasing public involvement, flexibility and outsourcing

From 1993 to 2004, a policy shift in environmental management happened in the province. There was, as Ernie Hui, Assistant Deputy Minister of Oil Sands Environmental Management for Alberta Environment frames it, a recognition that many of the regulatory tools have been command and control and that there were other policy tools, particularly market-based, that had not been recognized until that period as options (Interview #7). Two of the most important environmental regulations in the Province were passed during this time, the *Environmental Protection and Enhancement Act* (EPEA) and the *Water Act*.

Promulgated in 1993, EPEA is a comprehensive statute that promotes "the protection, enhancement and wise use of the environment" (Government of Alberta 2009b) The EPEA mandates the Minister of Environment, directors, inspectors and investigators designated by the Minister to deal with certain matters (Blakes 2009). Specifically it regulates the process for conducting environmental impact assessments (EIAs), as well as their approval and registration.

EPEA allowed for significantly more public input than previous environmental legislation (Interviews # 7,10). Prior to EPEA the only way to appeal development on environmental grounds was through the civil and criminal courts. Now public engagement was formalized through EPEA by creating public hearings and the Environmental Appeals Board. During this time the Canada-Alberta Agreement for Environmental Assessment Cooperation was signed (1999) as policies and regulations between the federal and provincial governments concerning environmental impact assessments became more streamlined.

While EPEA was a step forward in environmental management in Alberta, compared to the US's National Environmental Protection Act, EPEA was permeated with the hallmark discretion of Canadian environmental legislation. Table 1 shows two examples of the discretional differences between these two statutes.

Table 1: Comparison of US National Environmental Protection Act and Alberta

Attribute	NEPA	EPEA
Consideration of alternatives	Mandatory	Optional
EIS author	Government Agency	Proponent

After extensive public input and a review of water legislation in other jurisdictions, the Government of Alberta promulgated the *Water Act* in 1999 and is Alberta's current water management legislation (Government of Alberta 2004). The *Water Act*, which grandfathers water licenses under *Water Resources Act*, is focused on managing and protecting Alberta's water resources and streamlining administrative processes (Alberta Environment 2005b). The new act mandates in-stream flow needs requires the development on water management planning frameworks. Like many state jurisdictions in the Western United States, Alberta uses a 'first in time, first in right' that gives water use priority to older water license

holders. Like, EPEA, Water Act approvals are renewed every ten years, having the terms of the approval modified to current or planned conditions.

Also during this period the Province reduce its monitoring and enforcement and outsourced it's monitoring responsibilities to two industry-funded multistakeholder groups: the Wood Buffalo Environmental Association (WBEA) and the Regional Aquatics Monitoring Program (RAMP) and the Clean Air Strategic Alliance (CASA). Industry now worked closely with the same environmental consulting firms they work with to create their EIAs, to monitor industry operations.

In summary the period from 1993 – 2004 was marked by significant changes to Alberta's environmental regulations. The nature of these regulations changed from the command and control of the previous regulations to increased flexibility in implementation. This was evidenced by the government advocating compliance through education and not just enforcement (Interview #4); monitoring was outsourced to multistakeholder groups.

2005 – 2009: Climate Change Regulation

During this period the government developed significant environmental policies but did not pass many new environmental regulations. One exception was the 2007 *Climate Change and Emissions Reductions Act,* the first such bill in North America to legislate mandatory greenhouse gas reductions for large industrial facilities (Alberta Environment 2008a, 4). Large facilities in the province, those who emit more than 100,000 tonnes of greenhouse gas (GHG) emissions, are now required to reduce their emission intensity by 12 per cent below 2007 levels. The facilities have three options: improve their operations, but Alberta-based offset credits, or pay 15 CAD for every tonne of GHG above their limit. These funds in turn, go into a

Climate Change and Emissions Management Fund for project and new technologies aimed at reducing GHG emissions in the province (Alberta Environment 2008b, 16).

To summarize, 2005 – 2009 saw a much more earnest and concerted effort by the province to address the increasingly evident signs of poorly managed growth throughout the province, very little few regulatory backstops were provided. Cumulative effects management, stakeholder consultations, efforts at agency coordination, long-term planning, and increasing environmental litigation and regulations are becoming dominant during the time period.

SECTION TWO - OIL SANDS REGULATIONS AND POLICIES

This section outlays how federal and provincial environmental regulations, mentioned in the previous section, apply specifically to oil sands mining and also outlines the oil sands-specific policies that have developed over time. This section opens with an examination of oil sands strategic planning since they became commercially developed in the 1960's. The regulatory role of EPEA and the Energy Resources Conservation Board in relation to oil sands approvals, followed by how current regulations and policies address land management and reclamation, air emissions, water management, climate change and stakeholder engagement. The monitoring and enforcement of environmental regulations will also be outlined.

STRATEGIC PLANNING

Prior to 1975, there was not a coherent environmental strategy to guide development of the oil sands (Chastko 2004, 162). A senior ERCB employee agreed, sharing that originally the oil sands were managed

in an 'out of sight out of mind' fashion; those impacted by the oil sands, including the First Nations, lived in very small and remote communities (Interview #21).

Construction of the first oil sands plant, which began in the 1960's, encountered few environmental restrictions specifically designed to monitor environmental impacts (Chatsko 2004, 161). By the time the province/Syncrude wanted to build the second oil sands plant in the early 1970's, the province did not even posses the most basic 'baseline' data about the local environment. At this point in time, Intercontinental Engineering completed the only major survey of the environmental impacts of oil sands development in 1973 (Eglington and Uffelmann 1984, iv).

Once the size and scale of the proposed Syncrude expansion became clear, in late 1973, both Alberta Environment and Environmental Canada produced internal reports recommending the creation of a comprehensive environmental research program (Chastko 2004, 161). By 1975, the Canada-Alberta Agreement was signed creating the Alberta Oil Sands Environmental Research Program (AOSERP).[12] While baseline monitoring was mandated by AOSERP in 1975, their surveys were impacted by the environmental effects of commercial operations since 1968, including two oil spills into the Athabasca River by the GCOS plant. In its first five years AOSERP built up a solid base of knowledge about the environmental effects of oil sands development (Stevenson 1982). In 1979, due to budget cuts and an increasingly tense relationship with Alberta over energy development, Ottawa unilaterally retracted its

[12] AOSERP's first year operations plan outlined six objectives for the program (Foster 1982, 200):

1. To receive approval for research projects
2. To establish a program coordination and administrative capability
3. To design in detail ongoing research projects
4. To assist project mobilization where required by detailed planning, recruiting and staffing, and provision of resources
5. To establish some level of field support for all projects
6. To satisfy the federal/provincial Agreement regarding reporting

funding from AOSERP, six years before the planned 10 year mandate of the program (Chastko 2004, 165). Alberta pledged funding until 1980 after which the program was disbanded.

In the 1980's the province began developing, through public consultations, integrated resource plans for various regions across Alberta. Besides lacking the financial and political capital to implement the plans that were created (Kennett 2002), the province was busy developing resources on provincial land while giving the public the 'option' to conserve (Davidson and MacKendrick 2004). This sentiment also recently appeared from members of the Cumulative Environmental Management Association when they were planning to protect an area that the government has sold the mineral rights to during the planning effort (Interview #20).

Up until the late 1990's there were only two oil sands mines operating with relatively small footprints during this time, the rigour of the environmental regulations, kept pace with the slow development of those mines (Interview #16). The Province saw that expected future growth using business-as-usual planning approaches would not be sufficient.

In 1999, Alberta Environment created the Regional Sustainable Development Strategy (RSDS) for the Athabasca Oil Sands area. The purpose of RSDS was to "provide a framework for balancing development with environmental protection and provides for government and stakeholders to work together to set new, specific regional resource goals and targets" (ABENV 2007a).

In 2005, another major strategic environmental policy shift happened which carries on to the present (2009). This shift saw the Government of Alberta recognizing the need for a more systemic response to oil sands development (Interview #9). The result is a shift in roles for the provincial government. The

provincial government changed from being a benevolent partner of industry to that of a regulator, in part because of increasing public support for Alberta Environment to be stricter with mine operators (Interview #2) and to manage for cumulative effects. Indeed oil sands operators and the ERCB acknowledge the increase in regulations (Interviews #14, 15), though they will not go so far as to admit oil sands development has outrun current environmental policies (Interview #14).

Three back-to-back large oil sands mining projects were up for approval in 2005, Imperial Oil's Kearl Mine, Suncor's Millennium Mine and Shell's Muskeg River Mine Expansion (Interview #2). In the late 1990's ninety percent of questions in mine approval hearings were about direct effects of the mine and ten percent about global policy. By 2005, ninety to ninety-five percent of the questions were about cumulative effects and the social implications of the oil sands mines which being to extend beyond the mandate of the provincial/federal joint panel (Interview #5). At this point, according to an Alberta Environment employee, the government realized that there are social challenges and cumulative effects that must be addressed (Interview #3).

In 2006 Doug Radke, former deputy minister of the environment, was asked to create a report on the effects of the current pace of oil sands development. In what became popularized as the Radke Report, "Investing in our Future" was considered a frank report on the challenges resulting from the rapid pace of oil sands development (Oil Sands Ministerial Strategy Committee 2007). In 2007, Alberta Environment created the Oil Sands Environmental Management Division, and the Oil Sands Secretariat was formed to coordinate oil sands development across 16 provincial agencies. Responsible Actions is discussed further in the Future Trends/Policy Section.One official with the Alberta Oil Sands Secretariat noted that all thirty of the Radke Report recommendations were accepted and implemented (Interview #9). While this may be a little overly optimistic, the provincial did make substantial improvement in they are addressing oil sands

development. For example, in 2007 the provincial government did invest 815 million CAD into the Fort McMurray region to address their infrastructure debt (Alberta Environment 2008b, 13). In February of 2009, the province released Responsible Actions, a twenty-year long-term strategic plan for oil sands development (Alberta Treasury Board 2009).

APPROVAL

To receive regulatory approval oil sands projects must follow the steps outlined in Figure One. They must abide by Treaty Law and consult First Nations Groups. They also need approval from Alberta's energy regulator, the Energy Resources Conservation Board (ERCB), EPEA, Water Act, CEAA,[13] and Fisheries Act approval. This subsection will focus on ERCB and EPEA approval because of their importance in the approval process.

Steps to Development in the Oil Sands

1. A private company purchases mineral rights for a specific area.
2. The company consults with First Nations groups in the area.
3. The company makes an application for development to the Alberta Energy Resources Conservation Board (ERCB), which regulates safe, responsible and efficient development of Alberta's energy resources.
4. An environmental impact assessment, water use request and socio-economic impact study are submitted by the developer to the Alberta government.
5. Public hearings may be held.
6. A decision on the project application is made in the public's interest by the ERCB.
7. If approved, development proceeds based on terms set out in the project approval.
8. Annual reporting and 10-year renewal required.

Source: Alberta Environment (2008a, 3)

[13] Oil sands projects automatically trigger the Canadian Environmental Assessment Act (Interview #17). But due to the Canada-Alberta Agreement for Environmental Assessment Cooperation signed between the federal government and the province of Alberta in 1999 and again in 2005, there is a single cooperative environmental assessment for a project that triggers EPEA and CEAA (Canadian Environmental Assessment Agency 2005).

ERCB Approval

Under the *Oil Sands Conservation Act,* the ERCB has the power to approve or deny oil sands mines and processing plants (Sections 10 and 11*)*, inspect or investigate an oil sands operation (Section 8), require operators to adopt certain methods or equipment or ultimately, suspend in part or in whole the operations of a plant (Section 9, Government of Alberta 1983). Section 3 of the Oil Sands Conservation Regulation requires oil sands operators to have ERCB approval to commence, suspend or abandon an oil sands site or make substantial modification to the site (Government of Alberta 2003). While oil sands operators guilty of an offense under the *Oil Sands Conservation Act (Section 26)*, face a maximum fine of only 5000 CAD, it is ability to suspend or cancel an approval that is the most significant. In general, ERCB regulations tend to have more teeth than many policies coming from Alberta Environment (Interview #22).

Every ERCB approval is unique. One ERCB employee described that the application process is designed to get the ERCB the sufficient information they need to make a decision (Figure One). Industry will file information with the ERCB. Technical specialists from the ERCB review the information and determine if clarification is needed, then a formal submission is made (Interview #15). Each oil sands developer has specific air, water and soil conservation requirements approved individually by the ERCB (Interview #10, 12).

When the ERCB wants to emphasize a particular requirement, they can make approval conditional on that requirement (Interview #21). This necessarily requires the ERCB to be more diligent in monitoring what is described in a particular condition. If there is an unconditional requirement that is simply listed in an approval, the ERCB is less likely to monitor if that requirement has been carried out (Interview #21).

While the ERCB has always had a standard, and in the eyes of one ERCB official, 'fundamentally proactive' application process, the board has elaborated and improved the process over time (Interview #15). There is now and expanded scope of public notification, more consultation with the public (ERCB 2006) and use of alternative dispute resolution (ERCB 2006). The ERCB also works more closely with Alberta Environment (Alberta Energy and Utilities Board 2007, Interview #15) with regards to streamlining the approval process and the monitoring of groundwater, and with the federal government with regards to integrating the Canadian Environmental Assessment Act approval process into the ERCB/EPEA process (Canadian Environmental Assessment Agency 2005).

The ERCB also attempts to improve their regulations over time to reflect technological innovations or emerging environmental issues. As of February 2009, stricter regulations concerning tailings management (e.g. Directive 074: Tailings Performance Criteria and Requirements for Oil Sands Mining Schemes; ERCB 2009c; Interview #21) will make it clearer and easier for the ERCB to enforce tailing management plans than previous regulations (Interview #14). This new directive specifies performance criteria for the reduction of fluid tailings and the rate of reclamation. Before these criteria were vague and enforcement by the ERCB and Alberta Environment lax, resulting in more fluid tailings than had been approved in their ERCB approvals. This change resulted from an increasing pressure from the public on improved tailings management and from the realization that the ERCB's own approvals were not being enforced.

It is important to note that while the ERCB can create directives to increase the diligence of oil sands operators to abide by government regulations, they cannot, as an arms-length quasi-judicial agency, create new regulations. Those ERCB officials interviewed stressed it is the job of the ERCB to make sure government regulations are carried out in the design and operation of energy facilities. They can make

recommendations to the provincial government for new regulations, but it is left to the provincial government to implement the recommendations (Interview #15). Ultimately, all the ERCB needs to do is make sure the applications meet the existing regulations. This was patently clear in the hesitancy, and often refusal, of many of the ERCB officials I contacted to discuss how effective they felt the current regulations are in protecting ecosystem and human health. For those who turned down interview request, they saw little role for agenda setting within the ERCB approval process and questioned why I was asking their opinion on the effectiveness of current environmental regulations.

EPEA Approval

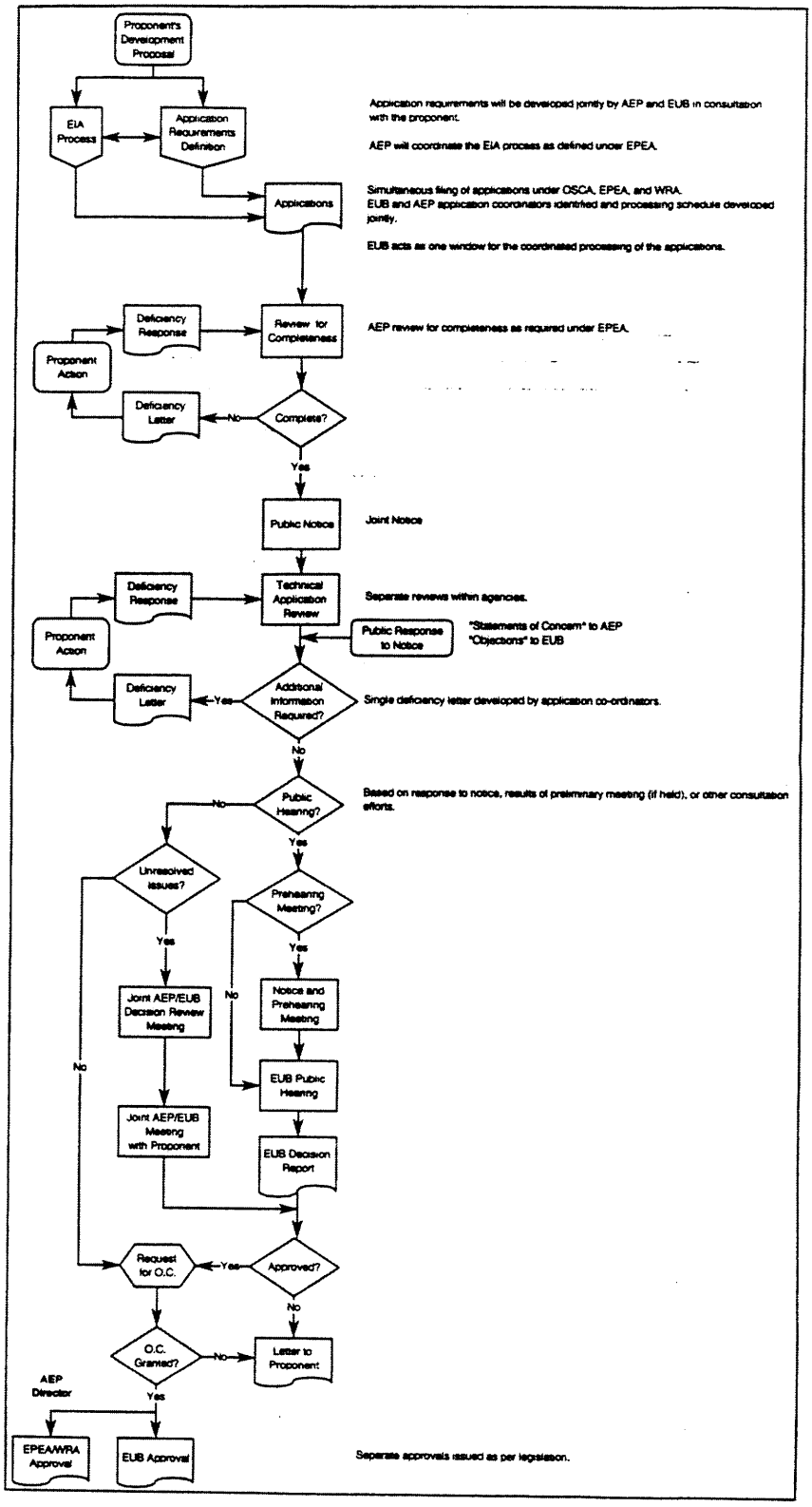
Under EPEA, there is a list of designated activities for which environmental assessments are mandatory: open-pit oil sands mining are on the designated list and automatically trigger an EIA report. While every open pit oil sands mine, such as those in this study, require and EIA and EPEA approval, no oil sands mine has ever been denied approval (Interview #2). In Alberta there are three stages in an EIA: an initial review, a screening report and an EIA report (Figure 7).

During the approval process, Alberta Environment typically works with the oil sands companies, as it is in the best interest of the company to get approval (Interview #2). EPEA approvals must be renewed every ten years in order to make them relevant to a proponent's current operations and also the most recent in environmental research and policy.

As oil sands became increasingly complex and larger developments it became necessary to streamline EPEA and CEAA. In 1999, the Canada-Alberta Agreement for Environmental Assessment Cooperation was signed. One senior Fisheries and Oceans Canada official noted that before information that their

ministry needed was not well communicated. Now there is a team of Fisheries and Oceans Canada employees in Edmonton working with oil sands developers from the early design stages (Interview #17).

The EPEA approval process is the one regulated opportunity where the Province is required to consider the cumulative impacts of development. ERCB approval considers the merits of individual projects. The only mention of cumulative effects in EPEA is limited to Section 49 which requires proponents to describe their potential impacts, analyze their significance, and identify plans to mitigate those impacts (Government of Alberta 2009b). Given the scale of oil sands development, cumulative effects management will play an increasingly important role in the EPEA approval process.



Approval Process For Major Oil Sands Projects

Figure 7: Approval Process for Major Oil Sands Projects

Source: Alberta Energy and Utilities Board 1996, 11

LAND MANAGEMENT

EPEA is the primary regulatory driver of land management and reclamation standards for oil sands developers. Unlike regulations concerning water or air, land and wildlife-centered regulations are much more difficult to measure, monitor and enforce.[14] Reclamation, in particular, has been a troublesome definition for EPEA. According to the Act, reclamation means returning the land to an "equivalent capability" (Government of Alberta 2009b, Section 146-b). More specifically this requires an oil sands operator to be responsible for (Government of Alberta 2009b, Section 1-ddd):

> (i) the removal of equipment or buildings or other structures or appurtenances;
>
> (ii) the decontamination of buildings or other structures or other appurtenances, or land or water;
>
> (iii) the stabilization, contouring, maintenance, conditioning or reconstruction of the surface of land;
>
> (iv) any other procedure, operation or requirement specified in the regulations;

Industry scientists envision a reclaimed landscape to be "a self-sustaining ecosystem with no long-term toxicity" (Nikiforuk 2008, 95). Similarly, Alberta Environment aims to "conserve and reclaim disturbed land to an equivalent land capability" but admits that oil sands developments "fundamentally alter the topography, geochemistry and hydrology of the land. Reclamation must incorporate or accommodate these post-mining elements" (Alberta Environment 2007c, 2)

Alberta Environment in their 2007 'Guidelines for wetland establishment on reclaimed oil sands leases', confesses "Reclamation of wetlands on oil sands leases is still in its infancy, even though small-scale

[14] One Alberta environment employee admitted that regulatory gaps exist in land management and that the province would benefit from more regulation or policy guidance in this arena (Interview #10).

research projects have been underway for about twenty years" (Alberta Environment 2007, 84). After mentioning the impacts of oil sands development on the landscape, the report goes on to mention the decades long impact that beavers make on landscapes as well (Alberta Environment 2007c, 85). This not-so-subtle analogy implies that oil sands development, like beavers, will affect the environmental characteristics of a region for significant period of time as well and that nature is familiar with disturbed landscapes and can be resilient to these disturbances.

Currently there is little incentive to reclaim land, according to Ernie Hui, the Assistant Deputy Minister of Environmental Assurance and Oil Sands Environmental Management, citing only one reclamation certificate issues by the government after forty years of oil sands development (Interview #7). The environmental watchdog, The Pembina Institute, points out there are no standardized reclamation guidelines, no standards for certification for reclamation, only 0.2% of landscape is reclaimed yet more than 130km^2 of legacy tailings exist (Interview #20).

The Government of Alberta also has a Mining Liability Management Program which looks at the overall performance of reclamation land and assesses the yearly value of reclamation bonds (Interview #1). The Province must collect the bonds to cover the liability and care of the facility until a new buyer is found (Interview #1). This program is however, unsuitable for the current pace of development in the oil sands, as the ERCB who operates the program only holds as of 2008, 35 million CAD in bonds for 18 billion CAD worth of liabilities (Nikiforuk 2008, 102).

There are relatively few environmental regulations managing the impacts of oil sands development on wildlife. Specific actions (such as bird deterrence measures) can be dictated in an EPEA approval although there is little regulatory reach for wildlife regulations on the oil sands. The federal *Species at Risk Act*

(SARA) and the *Migratory Birds Convention Act* have permissive language often initially defers to the provinces. Furthermore, according to Environment Canada, there are few SARA-listed species in the oil sands area and there is no active federal monitoring (Interview #22). The Canadian Toad (*Bufo hemiophyris*) has been listed as 'may be at risk' under Alberta's Wildlife Act and has been found in the oil sands area (Suncor 2007a, 40). Although Alberta Environment officials admit that compared to air and water monitoring programs, wildlife monitoring and enforcement in the region has been much less rigorous. That said, there is a shift occurring of increased enforcement of wildlife regulations as seen by the recent conviction of Syncrude under EPEA for failing to provide wildfowl deterrents at one of their tailing ponds, where over 1500 ducks died in April 2008. The federal government has also weighed into this event and has charged Syncrude with contravening Section 5.1 of the *Migratory Birds Convention Act* (CBC 2009a; Syncrude 2009b).

AIR EMISSIONS

Air emissions are regulated for the oil sands projects under EPEA. Oil sands operators are required to self-report their air emissions to Alberta Environment as dictated in their EPEA approval. Ambient air emissions for the Athabasca oil sands region are monitored by the Wood Buffalo Environmental Association (WBEA). Founded in 1997, WBEA describes itself an "independent, community-based, not-for-profit association (RAMP/WBEA/CEMA 2008, 5). They have 14 monitoring stations that measure ambient air quality and the potential effects of air emissions on the health of local residents.

Currently Alberta Environment is creating regional strategic assessments (Interviews #1, 5) and developing co-created air emissions thresholds and goals for each region (Interview # 7). For example, in a region just east of Edmonton where many upgraders and refineries are sites, air emission thresholds have been set for NO_x and SO_x. These thresholds place an absolute cap on air emissions so that companies know exactly

what the limits are, helping them with long-term planning and risk management (Interview #7). This policy is seen as a prototype by the government for moving industry and the public towards a cumulative effects regime (Interview #7).

WATER MANAGEMENT

Water management for oil sands developments is regulated under the Act, oil sands developers are required to obtain *Water Act* approval before withdrawing any water. If a watershed has reached it's limit for withdrawals, the Water Act, allows any unused water licenses to be transferred to other licensees (Alberta Environment 2005b), thus encouraging all of the available water that can be legally taken from a watershed to be withdrawn. While modification of the *Water Act* approvals does happen occasionally (Interview #2), oil sands developers tend to ask for more water than they require (Interview #22) and hence do not need to modify their approvals.

There are relatively few environmental triggers for Fisheries and Oceans Canada to become involved in oil sands development (Interview #17). Fisheries and Oceans Canada manages Section 35 (fish and fish habitat) of the *Fisheries Act*, which prohibits the 'harmful alteration disruption or destruction of fish habitat' unless authorized by the federal agency. Section 36 of the Act (water quality), which prohibits the introduction of 'deleterious substances' into fish-bearing waters, is managed by Environment Canada (Interview #17). The *Fisheries Act* unlike the *Species at Risk Act* has more regulatory reach with respect to it applicability to crown and private land, and it more actively enforced than the *Migratory Birds Convention Act*.

That said it was not until 2008 that a charge under the *Fisheries Act* was laid against an oil sands developer. That year, in response to a lawsuit by four environmental groups, a federal court judge found

the environmental assessment for Imperial Oil's Kearl project had not followed federal guidelines and was sufficiently flawed that for the first time in the development of the oil sands, Fisheries and Oceans Canada temporarily withdrew a project's water permit because it violated the *Fisheries Act* (Interview #17; Nikiforuk 2008, 59). The massive Kearl project currently under construction, will directly remove the equivalent of 20,000 football fields of forest for oil sands extraction, draw 3.7 billion cubic feet per year from the Athabasca River and annually withdraw 317 million cubic feet of groundwater (Nikiforuk 2008, 61). The federal cabinet quickly reissued the permit a few months later after a joint federal-provincial panel explained why 'it was not concerned with Kearl's environmental impact' (CBC 2008b).

Older oil sands developers, Suncor and Syncrude, were both issued their water licenses before the *Fisheries Act* existed, and therefore are not required to have a *Fisheries Act* authorization. Shell Canada, on the other hand, has had to receive authorization for their Muskeg River Mine. If any oil sands developer would want to increase their water withdrawals, they will need *Fisheries Act* authorizations (Fisheries and Oceans Canada 2007a).

There are relatively few environmental triggers for Fisheries and Oceans Canada to become involved in oil sands development (Interview #17). A Fisheries and Oceans Canada spokesperson noted the goal for the agency is not to issue a *Fisheries Act* authorization (Interview #17). Their strategy is to work with the oil sands developers enough in the design phases to avoid altering any fish habitat, which would trigger the *Fisheries Act* (Interview # 17). Fisheries and Oceans Canada admitted it is very challenging to use the Fisheries Act and the Navigable Waters Act, both managed by Fisheries and Oceans Canada, to examine ecosystem level or cumulative effects (Interview #17). Both statutes were written during a time when cumulative effects and ecosystem-based management were completely off the radar of policy makers.

The 2006 Radke Report identified a rather large hole in the management of Alberta's aquatic resources. It stated that, "Alberta Environment has not had the opportunity or the resources to undertake a review to determine whether there is sufficient water available from the North Saskatchewan River to support these upgraders" (Oil Sands Ministerial Strategy Committee 2007, 113).

Within a few months of the Radke Report, the Lower Athabasca Water Management Framework, was issued on March 1, 2007. This new framework was called by Alberta Environment "Alberta's regulatory backstop to protect the Athabasca River" (ABENV 2007b). Phase one of this framework divided the naturally occurring flow into three categories: green, yellow and red. Green allows water withdrawals of up to 15 per cent; yellow occurs around 14 per cent of the time and allows cautious and perhaps limited water withdrawals; red occurs 4 per cent of the time and limited the total water withdrawal to ensure fish habitat loss is minimal. The framework was jointly developed with the federal government (Interview #17).

Critics have noted that science used to developed the in-stream flow needs for the Athabasca River was developed using an untested model from the South Saskatchewan River Basin in the South of the province because neither ABENV or CEMA has sufficient data from the Athabasca River (Marsden 2007, 177). Besides flow rates, a senior Fisheries and Oceans Canada official admitted their skepticism that a good baseline of data exists for fish and fish habitat along the Athabasca River (Interview #17). One Environment Canada employee feels that the instream flow needs where "driven entirely by the nature of the industry," implicitly accepting the fact that current bitumen extraction techniques are extremely water intensive (Interview #22). Moreover, scientists at the University of Alberta have shown that Phase one of the framework does not take into consideration the potential effects of climate change on the flow regime of the Athabasca River (Schindler et al 2007, 6). When applying historical flow rate data to the stoplight

approach, low flows would have mandated water restrictions for forty three weeks in 2001 (Nikiforuk 2008, 64).

Preston McEachern of Alberta Environment calls the plan conservative and precautionary, "compared to the industrialized rivers in Europe or the United States" (in Nikiforuk 2008, 64). The problem is that the Athabasca River, undammed and relatively pristine, should not be compared to industrialized rivers. The Alberta government has the opportunity to conserve the Athabasca and learn from the costly lessons gained from their American or European counterparts. Oil sands companies have made major headway recycling water or using saline or brackish groundwater. Some companies have built upstream, off-site water storage for water taken during the high-volume spring runoff.

CLIMATE CHANGE

Climate change planning and the management of greenhouse gas emissions have had a turbulent history in Alberta. In 1990, the Energy Efficiency Branch of Alberta Energy began to study the effects of climate change and how to reduce greenhouse gas emissions in Alberta. It produced a report that year that outlined a strategy to reduce Alberta's GHG emissions to 20% below 1990 levels through energy conservation and fuel switching and see a rate of return of 30% from 6.7 billion initial investment (Alberta Energy 1990). This figure was substantially below Canada's goal for Kyoto Protocol of six percent below 1990 levels. The report however, did not receive much publicity, and the environment minister at the time, Ralph Klein, filed it in government archives (Marsden 2007, 126). It was only until 2002, when local environmentalist Tooker Gomberg uncovered the report that it became public knowledge (GreenOntario 2002). When Klein became Premier of Alberta two years later he gutted the Energy Efficiency Branch, along with the budgets of the energy and environment departments. Klein also campaigned actively

against Kyoto and is well-known for his comment that global warming is caused by dinosaur farts (McDonald 2006).

Seventeen years later, after Klein had retired, the Alberta legislature passed in 2007 the *Climate Change and Emissions Reductions Act*, the first such bill in North America to legislate mandatory greenhouse gas reductions for large industrial facilities (Alberta Environment 2008a, 4). There has been considerable criticism from the environmental community on the weakness of the targets and the absence of absolute targets on oil sands emissions. Although one former Alberta Environment employee felt that the *Climate Change and Emissions Reductions Act* provides a good framework, weak as the targets may be, and will generate good data for future, tougher targets (Interview #11).

Emerging from the 2007 *Climate Change and Emissions Reductions Act* was Alberta's 2008 Climate Change Strategy (Alberta Environment 2008b, 16) the province set a goal of having a 24 Mt reduction in GHG emissions by 2050 through conservation and energy efficiency measures. Ironically, in 1990, Alberta Energy (1990, 28) recommended energy efficiency measures that would have saved 61.5 Mt by 2005 using the best available technology at the time (1990).

In July of 2008, the Alberta government committed 2 billion CAD to carbon capture and storage (CCS) as a way to mitigate the greenhouse gas emissions produced from oil sands mining. Carbon capture and storage is a process that collects the carbon dioxide generated in oil refining, piping the gas through a network of pipes to be stored in stable geological formations. The Alberta government says the technology is safe and produces positive environmental results and has garnered the support of the United Nations Intergovernmental Panel of Climate Change and the International Energy Agency (Alberta Environment 2008b, 10). This project, the largest of its kind in the world, will store up to five million tones of carbon

dioxide per year by 2015 (Alberta Environment 2008b, 11). It will also allow the government to continue increasing their greenhouse gas emissions indefinitely.

STAKEHOLDER ENGAGEMENT

There are also several avenues for stakeholders to be engaged in the environmental management of the oil sands. First Nations have influence on the development of the oils sands through Statutory and Treaty Law. As a consequence of Treaty Law, First Nations groups must be consulted prior to development. Granted, the nature of the consultation can be ambiguous and despite the objections raised by First Nations communities of Fort Chipewyan, oil sands development has still been allowed to proceed. The *First Nation Industrial Development Act* recognized a land claim from the Fort McKay Band, adjacent to the Shell Jackpine Lease, where they worked to develop environmental regulations consistent with provincial legislation.

As mentioned earlier, the degree of stakeholder consultation increased significantly between 1993 – 2004. Additional opportunities to provide input into the EIA process and the creation of an Environmental Appeals Board helped address some of the concerns about poor quality engagement with stakeholders. The public consultation leading up to the 1999 *Water Act* and the subsequent Water for Life Strategy was unprecedented in Alberta's history. Three stakeholder led monitoring programs were also formed during this time period. The Wood Buffalo Environmental Association (WBEA), established in 1997, to monitor air quality in the region. The Regional Aquatics Monitoring Program (RAMP), also formed in 1997, to assess the health of rivers and lakes in the oil sands region. The Cumulative Environmental Management Association (CEMA) was created in 2000, to study the cumulative environmental effects of the oil sands and produce guidelines and management frameworks.

In 2005, the Government of Alberta sought consultation on a proposed Mineable Oil Sands Strategy (Government of Alberta 2005a). This strategy received harsh criticism regarding its consultation process, poor reclamation standards and myopic focus on productivity (Interview #12) causing the province to broaden the scope of the consultation and form a Multistakeholder Committee in 2006. By 2007, the Multistakeholder Committee had completed their consultations and created a final report plus one 'companion' which contained recommendations by First Nations and the Metis (Government of Alberta 2007a).

MONITORING

Monitoring has appeared as a dominant issue facing the environmental management of the oil sands. In part this is because how the Province has designed and implemented their regulations. Environmental monitoring provides information for the enforcement of many provincial and federal regulations as well as the strategic planning and policies that both government and industry need to operate sustainably. In addition, monitoring also informs the public on the effects that the oil sands have on ecosystem and human health.

Since 1993, over 30% of Alberta Environment staff have been eliminated and the province has closed its chemistry laboratory (Marsden 2007, 110). Currently there are only 850 full time employees with Alberta Environment (Interview #4). Schindler says, "[the province] can't even patrol the once-thriving cold water fisheries because it doesn't have a budget for gas" (Marsden 2007, 110). Despite growth in the oil sands, the ERCB also cutback on their inspection personnel in Fort McMurray from 1.5 full-time employees to 0.5 in the 1990's (Interview #21).

Concurrent to these massive cutbacks in Alberta Environment, the government began a collaborative approach to monitoring, starting with the Clean Air Strategic Alliance and then creating three local environmental organizations to monitor and analyze the effects of the oil sands projects on the Athabasca region, WBEA, RAMP and CEMA. By creating these groups the Province felt they were achieving multiple objectives: reducing costs and size of government, increasing partnerships with industry and local communities, improving the environmental management of the Athabasca Oil Sands Region. The combined budget of these three organizations in 2007 was 13 million CAD, which was entirely funded by industry (RAMP/WBEA/CEMA 2008, 4). Industry who is required in their EPEA approvals to participate (Alberta Environment 2007e) also represents the majority or largest voting-bloc on the boards of these three organizations. Local, provincial and federal governments along with First Nations and environmental groups also sit on the boards of these groups. These three groups are not regulated by any particular environmental statute and as such have limited legal liability or formal accountability. Reports and recommendations produced by these groups need only be considered by the government and is not required or expected to be adopted into official policy or regulation. Currently the monitoring system for WBEA and RAMP is managed by consultants with third party accreditation.

To date there has been little direct federal monitoring of federal regulations on oil sands mines. Violations of federal statutes such as the *Species at Risk Act* and the *Migratory Birds Convention Act* are not actively monitored, rather when a violation is observed through industry self-reporting or Alberta Environment inspections. Fisheries and Oceans Canada has increased the number of staff in the past five years monitoring *Fisheries Act* violations.

Monitoring of individual oil sands companies is the responsibility of companies themselves. Industry self-reporting is required under EPEA. Currently, Alberta Environment receives monthly/annual reports from oil

sands operators who report what was required in their EPEA approval. These reports are not available online and have to be requested (in paper format) from Alberta Environment (Interview #4). The monitoring requirements of each oil sand developer are different as a result of the location of the mine, the industrial processes, and the negotiating tactics or a particular developer during the EPEA approval process (Interview #11). Because these requirements are negotiated, it is difficult to scientifically compare the monitoring data gathered at different stations if they are not all measuring the same factors. If there is a critical incident, companies are required to call Alberta Environment. Alberta Environment also audits industry reported data and does random site visits.

ENFORCEMENT

Overall, there has been minimal enforcement of federal environmental regulations in the oil sands. While Fisheries and Oceans Canada says they have been monitoring for *Fisheries Act* violations, there have been no compliance issues to date from oil sands developers (Interview #17). The significant fines and jail time with the strongly worded *Fisheries Act* are a major deterrent for non-compliance. A senior official with Fisheries and Oceans Canada has noted there has historically been a high level of cooperation with oil sands operators (Interview #17). According to an Environment Canada employee, the only Environment Canada enforcement order issued against an oil sands developer was through the *Migratory Birds Convention Act* with the recent deaths of 1500 ducks in one of Syncrude's tailing ponds (Interview #22). To date, there have been no *Species at Risk Act* or *Canadian Environmental Assessment Act* enforcement orders ever issued against an oil sands developer (Interview #22).

Provincially, non-compliance to an approval issued under EPEA or the Water Act is identified through mandatory reporting inspections or a phone call from the public. Charges can also be laid under EPEA and the Water Act by municipalities and the RCMP (Interview #6). If there is an infraction, then, Alberta

Environment determines if the company was acting with due diligence or neglect. The degree of neglect will influence what action is imposed. Alberta Environment has a number of enforcement tools available if there are grounds for non-compliance (adapted from Alberta Environment 2005a).[15]

Besides prosecuting using statutory law with EPEA or the Water Act, Alberta Justice can also prosecute offenders under criminal law (Interview #6). In addition, Alberta Environment can threaten companies with the ability to enact an enforcement order of up to one million CAD; however, the penalties are 'meaningless' to oil sands companies (Interview #6), the largest and most costly threat, in the eyes of an

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- [15] **Notices of Non-Compliance**
  Notices are issued for minor contraventions or when there is the potential for an adverse environmental effect. These warnings, normally given to first-time offenders, are designed to encourage voluntarily compliance. Repeat non-compliance may lead to a more significant enforcement response.

- **Administrative Penalties**
  Administrative penalties are monetary fines designed to deal with minor administrative offences, such as failure to file reports required under an approval or code of practice. An adverse environmental effect does not have to occur in order for an administrative penalty to be issued.

- **Orders**
  Orders are issued when immediate action is required to prevent or stop an adverse environmental effect. Alberta Environment issues three types of orders:

  - **Environmental Protection Order** - issued to prevent or stop contraventions to the *Environmental Protection and Enhancement Act* and ensure action is taken to fix environmental problems. Largest fine 5,000 CAD.

  - **Water Management Order** - issued to prevent or stop contraventions under the *Water Act* and ensure action is taken to fix environmental problems

  - **Enforcement Order** - issued to compel a regulated party to remedy a contravention and, where appropriate, require actions to prevent future contraventions. Largest fine 1 million CAD, very rarely issued (Interview #22).

- **Prosecutions**
  All legislation enforced by Alberta Environment includes the option of prosecution. Penalties depend on the severity of the contraventions and may include fines or jail time.

- **Creative Sentencing**
  Creative sentences are used to make prosecution penalties more meaningful and result in clear benefits for the environment. Coupled with a standard fine, creative sentences are imposed in situations where a monetary penalty may be inappropriate because of limited financial resources. Alberta Justice has a history of working with Alberta Environment to develop creative sentencing for violating companies (Interview #2, 6).

Alberta Environment employee, comes from the press release which accompanies and resultant damage to a companies social license (Interviews #2, 4).

The ERCB has the mandate to follow through on enforcing certain operations and management requirements of an oil sands operator as outline in their ERCB approval (Interview #21). As mentioned earlier, the ERCB does have considerably more regulatory teeth and power than Alberta environment over enforcement over oil sands management; however, as on Suncor official has noted, the ERCB is more focused on resource conservation than issuing fines and production orders (Interview #14).

Not surprisingly, the ERCB found out ten years ago many oil sands companies do not abide by all of the requirements set forth in their ERCB approval, particularly with respect to tailings management and reclamation timelines (Interviews #10, 21). The epiphany resulted in two joint panel decision reports in 2004 that eventually led to Directive 74, which outlines more stringent requirements for tailings management and also caused the ERCB to increase the number of staff working on the oil sands. Before 2003, the regulator did not even have an office in Fort McMurray, now there are 43 people in the office. The number of full-time inspectors in the region has increased to 2.5 from a low of 0.5 in the 1990's. Though one anonymous ERCB official noted that even this number is not nearly sufficient (Interview #21). The ERCB plans to double the number of inspections of oil sands mines in 2009 (Harrison 2009).

To create and enforce Directive 74, the ERCB increased the number of tailings engineers from being shared across a few employees to four full time engineers (Interview #21). The ERCB is also planning on

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- **Appeals**
  Alberta's environmental legislation allows for companies or individuals to appeal an order or an administrative penalty to the Environmental Appeals Board. All prosecutions may also be appealed in court.

creating a landscape design directive, which is made with the same spirit of Directive 74 (i.e. not relying on industry to follow approvals), to enable the ERCB to be specific and diligent in their monitoring of reclamation timelines (Interview #21).

SECTION THREE - ASSESSMENT OF CURRENT ENVIRONMENTAL REGULATIONS

In this section I will address three significant issues that result from discretionary nature of the current environmental regulations of Alberta's oil sands: transparency, credibility and leadership. While this list is far from exhaustive, I believe it captures several critical areas of technical and tactical disagreement that continue to polarize the environmental management of the oil sands.

TRANSPARENCY

The perceived degree of transparency in oil sands environmental policies is remarkably varied. Transparency involves access to information, benchmarking and performance indicators, and data management and interpretation. While government officials interviewed largely defended the status quo and emphasized the change that is occurring within the government, environmental groups and some First Nations deride the professed transparency citing cryptic, incomparable and inaccessible information. I believe that the discretionary nature of the regulations and policies allow the traditional power-blocs and decision-making processes to work against efforts at transparent environmental management. Consequently, the current policies amplify the dissonance observed by the public when they read about government initiatives to increase transparency but do not witness the consequences of transparent policies. The following are examples which demonstrate the degree of transparency that exists in oil snads environmental policies.

Public Interest

As mentioned earlier in this chapter, after extensive public hearings the ERCB's board of lawyers and engineers make decisions to approve oil sands operations they feel serve the public interest. This term 'public interest' is a classic example of the discretionary regulatory language that guides the environmental management of the oil sands. It comes as no surprise when officials from Alberta Environment and the ERCB have conflicting opinions on what is included in determining the public interest. Randall Barrett from Alberta Environment Oil Sands Environmental Management Division, felt the ERCB does not consider the socio-economic impacts of oil sands development; whereas an ERCB employee felt strongly that they consider both the environmental and socio-economic impacts of development (Interviews #5, 11). This is a fundamental distinction in the roles of the government agencies yet it appears under debate by government managers. By giving the energy regulator such a broad mandate that arguably goes beyond the specialized skill set of ERCB board members, you are inviting confrontation and confusion among the public whose interest the ERCB is called to serve.

Instead the role of the ERCB could be refined to approving energy projects on technical grounds, leaving environmental considerations to Alberta Environment and social considerations to another government agency. Conversely, the mandate could be kept wide but the membership of the board broadened to include First Nations, environmental scientists and community advocates. Board members could also be democratically elected by Albertans. The degree of litigation or voter turnout could act as indicators to measure if the public interest is being adequately accounted.

Information Sharing

The degree of information sharing can be an indicator of the level of transparency within a government. One former Alberta Environment employee felt that the ERCB has better environmental data than Alberta Environment and that Alberta Environment has a difficult time collecting data from their own agency let

along the ERCB (Interview #11). That data, critical for determining, the environmental or social impact of a development, may not always be shared across agencies, for reasons of proprietary knowledge (Interview #11). This is despite of the 1996 MOU on ERCB / Alberta Environment coordination "ERCB and Alberta Environment staff will, upon request, exchange information or data compiled regarding their areas of respective jurisdiction" (Alberta Energy and Utilities Board 1996, 10).

One example of this is the degree of disclosure when a company is charged with contravening their ERCB approval. If the company has a contravention that involved a patented process, then there may be grounds to limit what can be publicly shared about the incident. Also, production enforcement orders have not historically been in the public domain. It has only been in the last year and a half that high-risk orders have been published on the ERCB website. One ERCB official, when asked what caused this shift in policy, said, to help people understand the full picture in a better way (Interview #15).

Another example of the poor transparency is conservation reclamation reports. These reports, submitted annually by oil sands developers to Alberta Environment, have traditionally been extremely difficult to obtain from either Alberta Environment or oil sands operators. According to Alberta Environment the reports were unable to be sent digitally; those wanting copies must physically go to the Alberta Environment library in Edmonton and photocopy the reports themselves. Despite the recommendation from the Oil Sands Developers Group to establish transparent reclamation standards, two out of three operating oil sands mine required 'teeth-pulling' for the Pembina Institute to be able to access their conservation reclamation reports (Oil Sand Developer Group 2008, 19; Interview #20)

While the ERCB website freely states, "The availability of compliance and enforcement information demonstrates the ERCB's commitment to open and transparent communication with all stakeholders"

(ERCB 2009b), I believe there is room for considerable improvement. How does the ERCB ensure open and transparent communication with all stakeholders? What are the metrics in place? Is the information they have on their website and in their hearings readily comprehensible by all stakeholders? Judging from their website, I question the credibility of this claim.

Meanwhile environmental consulting companies takeover the role of information brokers, as the same companies who are hired by the government to do the independent monitoring are also hired by the oil sands developers to help create the EIAs (Interview #11). Often times it is the consulting companies that have better databases on monitoring information than the government (Interview #11).

Compiling information on compliance levels of oil sands developers from Alberta Environment is an expensive and time-consuming process in Alberta. Kevin Timoney, a local researcher and environmental scientist, has recently been trying to obtain data and have it published by environmental groups but curiously even the environmental groups are remaining secretive about this information and were unwilling to share many of these documents (Interview #22).

While it is true the amount of information publicly available by the ERCB and other government agencies has increased substantially,[16] special attention must be given to the accessibility and ownership of that information and degree of interpretation. Given such a complex and contentious issue as the environmental management of the oil sands and the ease at which un-interpreted data can be

[16] In 1999, the Canada-Alberta Agreement for Environmental Assessment Cooperation was signed. One senior Fisheries and Oceans Canada official noted that before information that their ministry needed was not well communicated. Now there is a team of Fisheries and Oceans Canada employees in Edmonton working with oil sands developers from the early design stages (Interview #17).

mismanaged, it would serve the Province well to give special attention to how their data on oil sands developers is managed.

CREDIBILITY

A major source of contention in oil sands environmental regulations is their credibility. This specifically relates to monitoring and enforcement of the current regulations. Government policies made within a neo-liberal ideology have attempted to enhance the credibility of the government. Divesting the responsibility to monitor industry has been given to multistakeholder groups. While this action certainly reduced the size and cost of the government it was also seen as a way to improve the credibility of environmental policies. There were, however, a number of issues unforeseen to policy makers that would undermine the very credibility the Province was attempting to gain. In particular, these issues effected the monitoring and enforcement of environmental regulations.

Monitoring

A critical issue that is not being discussed openly is what role the government should be playing in the monitoring of oil sands development. I believe the Government of Alberta, in representing Albertans, should have a unique interest in the long term and on the large scale. Yet the government has largely outsourced environmental reporting of oil sands operations to industry and multistakeholder groups. According to one Alberta Environment employee who has worked closely with WBEA/RAMP/CEMA, these organizations easily become "concerned in the day-to-day operations, which occupy the majority of their time. They are not experts on the [scientific] matters, so they become much less efficient" (Interview #10). Despite their fixation on day-to-day matters they hire outside consultants to collect data. Moreover, these consultancies face a high degree of turnover, loosing potential intellectual capital gained from a more

tenured relationship and each company operates with slightly different assumptions and scientific methodologies.

One Environmental Canada employee gave an example of the issues facing the current monitoring framework in reference to water quality of the Athabasca River (Interview #22):

> *"...on paper companies are directed on a zero discharge basis into the river, and are encouraged to recycle intensively based on EPEA or ERCB approvals. Ultimately a lot of water ends up in tailings ponds. The reality that most people suspect, to some degree the companies admit this: the tailing ponds leak – they leak either, in the case of Suncor, directly into the river, or with the other developers into the groundwater and then with unknown fate but there isn't the info available because it would be a fairly complicated technical exercise to determine what chemicals leak where and interact with what other chemicals and is the interaction with surface water enough to cause measurable effect to aquatic or life of downstream communities. Many would be of the view there are likely impacts – this goes against what is given in approvals but they aren't in the position to prove this. This is largely a case of monitoring. Monitoring is a dominant theme throughout the environmental management of the oil sands."*

Kem Singh of Alberta Environment felt that during this period the "government may have deferred too much from its own responsibility," resulting in a "lack of government leadership on monitoring" (Interview #10). Singh even admits the government monitors less than they did twenty years ago. Archie Waquan, a Fort Chipewyan elder cited, "the Alberta government has given away its regulatory responsibility to a group of people controlled by industry....it's [CEMA] controlled by one group that wants development to occur and yet they are given the responsibility to look after the environment. It's crazy" (Marsden 2007, 164).

The discretionary language of Alberta's environmental policies may influence how the government monitors. An Alberta Environment employee suggested that manpower and the ability to assess

environmental issues are all at the discretion of the director of the Act, are not written into EPEA or the Water Act (Interview #2). While this language aids in the flexibility in implementation it also creates jurisdictional issues, which the ERCB and Alberta Environment have to address.

Even the government-sponsored Radke report acknowledges that progress on some environmental issues are directly related to staffing shortages in Alberta Environmental and Alberta Sustainable Resource Development (Oil Sands Ministerial Strategy Committee 2007, 7). The report goes further suggesting "these shortages have the potential to delay the processing of oil sands and other development applications and to adversely affect environmental planning, monitoring and enforcement" (Oil Sands Ministerial Strategy Committee 2007, 7).

The question arises, who is going to archive, interpret and distribute the data collected by collaborative efforts such as WBEA, RAMP and CEMA, let alone use the data to inform policy? The oil sands region has the highest amount of monitoring data than anywhere else in the province, yet the government still struggles to provide credible information to the public and decision makers (Interview #10). Singh claims the government and WBEA, RAMP and CEMA can do a much better job at managing, interpreting and sharing the data (Interview #10). Environmental groups find it challenging to prove the monitoring is effective, because of the lack of transparency (Interview #20).

The federal government has had similar challenges in managing their monitoring data. For instance Environment Canada maintains a climate database that tracks data across the country. Until scientists David Schindler and William Donahue obtained the data in 2001, the data had not been analyzed (Marsden 2007, 109). They found that the flow in the Athabasca had decreased 30% since 1970. The South Saskatchewan based, subject to heavy withdrawals for irrigation had reduced its flow by 84%. Yet this

analysis had ostensibly not been used to inform government decision makers.

Attempts have been made in the past to clarify roles of monitoring for Alberta Environment and the ERCB. Based upon the 1996 MOU (Informational Letter 96-07) between the ERCB and Alberta Environment on the regulation of oil sands development, the ERCB has "primary responsibility for issues related to resources recovery, energy efficiency and product disposition matters." Alberta Environment has responsibility related to "overall environmental performance, environmental impacts, emissions and compliance with its approvals" (Alberta Energy and Utilities Board 1996, 8).

When asked if the ERCB can assist in the monitoring of the oil sands, an ERCB official responded that the ERCB is more concerned with structural requirements and less on the impacts of the development and consequently will not replicate what Alberta Environment is already monitoring (Interview #15). The 1996 MOU reflects this division of labour, stating that "AEP [Alberta Environment] will rely on inspections and investigations, while the EUB [ERCB] will primarily rely on an audit process" (Alberta Energy and Utilities Board 1996, 8). Despite the ERCB preferring to audit and conduct, "limited routine surveillance" and the minimization of "any operator inconvenience or disruption at project sites" (Alberta Energy and Utilities Board 1996, 8), the *Oil Sands Conservation Act* empowers the ERCB to be much more active in onsite inspections and investigations (Section 8, Government of Alberta 1983). This is another example when the discretionary language permitted in environmental regulations limit the effectiveness of the government to monitor industry.

Despite this demarcation of monitoring responsibilities, the ERCB self-admittedly over relied on companies to do what they said they would do in their ERCB approvals (ERCB 2009c) and audits of company submitted information. In attempting to streamline monitoring and inspection, both the ERCB and Alberta

Environment missed an opportunity to provide an additional 'set of eyes' on oil sands developers. Undoubtedly motivated by reducing monitoring costs and the regulatory pressure on oil sands operators, a policy gap was created which the oil companies found their way through, increasing the financial risk for the companies and the development, and the environmental burden carried by the local environment and communities.

Enforcement

Enforcement has been another issue that current environmental policies avoid. One Alberta Environment employee believes the public perceives there is not enough enforcement of oil sands developers but feels the public is unwilling to pay for expensive monitoring and enforcement costs (Interview #2). A more forthright Environmental Canada employee called the current level of enforcement of environmental regulations "somewhat deficient" (Interview #22). Although not all stakeholders carry this opinion, Suncor feels there is very effective environmental monitoring and enforcement of oil sands developers with substantial impacts on how developers operate (Interview #14). However, it is rather unlikely that industry would ever say that there is poor monitoring and enforcement of environmental regulations.

Overall, given the number of polluting industries in Alberta, there is a remarkably low number of environmental violations. I question whether it is because companies have exceptional compliance levels. Rather, it is more plausible that enforcement is used as a last resort or that there simply isn't enough enforcement staff. In Alberta Environment's 2005/2006 Compliance Assurance Annual Report (Alberta Environment 2006a, 17), under EPEA there were 51 notices of non-compliance, 22 administrative penalties with 92,051 CAD in total fines, 10 environmental protection orders, 2 enforcement orders and one appeal of environmental protection order, 11 creative sentencing orders, and 23 convictions with 744,397 CAD in total fines. When asked why these number of convictions and fines are so low, one Alberta Environment

employee who works with oil sands companies shared, "it's not just the fines that makes companies more effective at compliance" (Interview #4). Indeed the Province has been pursuing creative sentencing as a less confrontational method to encourage compliance among oil sands operators. However, given the willingness of the public to increase enforcement and the declining credibility of the Province, the low levels of enforcement seem to run counter to the Government of Alberta's interests and arguably the interests of the environment.

The ERCB has also seen similar low levels of enforcement, despite recent admissions of gross non-compliance of oil sands operators. In the media release to the ERCB's Directive 74, the ERCB admits that oil sands operators "have not met the [reclamation] targets set out in their applications; as a result their inventories of fluid tailings that require long-term containment have grown" (ERCB 2009d). While industry can complain that environmental groups speak in hyperbole, the above statement is a rather large understatement, as over 130 square kilometers of forest are now covered in tailings ponds (Government of Alberta 2008c). Despite the admission of the ERCB that tailing pond management has become a problem and that reclamation targets have not been met, the Pembina Institute, a Calgary-based environmental watchdog, is unaware of any penalties ever being enforced because of failure to meet those targets (Interview #20).

Is the hesitancy to enforce environmental regulations a result of discretionary language in the policies and regulations? Susan McRory, lead environmental prosecutor for Alberta Environment, feels "policy does not impact how Alberta Justice enforces regulation" (Interview #6). However, the discretionary nature of the regulations themselves inevitably leads to discretionary monitoring and discretionary enforcement. Lack of clarity on reclamation standards and timelines results in ambiguity for those responsible for enforcing those standards and timelines. Moreover, the severely limited resources for Alberta Environment

to monitor and enforce causes the Ministry to make hard decisions on what gets overlooked or what is acted upon. "If you can't monitor, you can't enforce," says one former Alberta Environment employee (Interview #11). The ERCB admits to using a 'risk-based' approach to enforcing requirements, that looks at some requirements all the time, while others are hardly monitored, and therefore enforced (Interview #21).

Another example of discretionary enforcement regards the ERCB's conditional approval for Suncor's Steepbank Mine. Currently the Steepbank Mine is not going forward because the tailings reclamation rate for an existing Suncor mine, as dictated in their ERCB approval, has not been reached (Interview #21). The ERCB calls their decision to condition approval of future projects on the performance of existing mines precedent setting in its severity (Interview #21). That being said, the ERCB is still underutilizing a much larger suite of options (capping production limits, for example) which could incentivize oil sands companies much more than stalling future oil projects when oil prices are low and access to capital difficult. The ERCB acknowledges they have never cut the production levels of an oil sands mining company, even though it is within its capability; it is much more common to call an inquiry, change regulations or company operations and then review performance (Interview #21). The latter tactic while being less confrontational has resulted in the current situation of non-compliance.

Finally, the ability to retain staff is an unaddressed though critical issue to ensuring enforcement of Alberta's environmental regulations. When asked what the weakest link is for enforcement, Susan McRory of Alberta Justice, noted staff changes. She lamented that the best staff go to industry or upper management with very few being left to prosecute those companies in non-compliance (Interview #6). With a small and lean enforcement division, Alberta Environment, cannot compete with higher paying industry or environmental consulting positions.

LEADERSHIP

One Alberta Environment employee noted that Alberta has a tradition of being policy leaders, recalling that Alberta was the first province in Canada to have an environmental ministry (1971) and climate change legislation (2007) (Interview #3). Unfortunately, being first in line does not necessarily reflect the responsible leadership the Province needs.[17] Indeed, there are other aspects to leadership that are not captured in that one employee's example. Having the first climate change legislation may be a reactive response; the bill may reflect regressive and short-sighted goals not congruent with most popular conceptions of leadership.

It is both incredibly easy and incredibly challenging for the Government of Alberta to demonstrate leadership in the environmental management of the oil sands. On the one hand, no jurisdiction, anywhere, has ever developed oil sands deposits on the scale that the Albertan government has done. Every policy is precedent setting. There are very few circumstances bureaucrats can turn to for guidance on how to mitigate environmental concerns on the scale seen north of Fort McMurray. Often Canadian governments have modeled legislation after similar statutes in the United States; however, in this case, there are no other oil sands environmental regulations or policies. Therefore, there are countless opportunities for the Government of Alberta to model leadership in environmental management without the complications associated with precedence.

While on the other hand, the environmental and social issues associated with oil sands development, as outlined in the introductory chapter, are not to be taken lightly. What headway the Province is making on

[17] See Alberta Environment (2008a) and Alberta Treasury Board (2009) for examples of the Government of Alberta's attempts to reframe their environmental management as responsible.

environmental management is being negated by the massive increases in production over the last ten years. The lack of precedence necessitates considerable political will, human and financial resources for Alberta Environment to take a confident step forward and begin addressing these rather daunting issues.

The Cumulative Environmental Management Association, CEMA, provides an interesting case for assessing the quality of leadership shown by the provincial government on environmental management issues of oil sands production. Created in 2000 out of the Regional Sustainable Development Strategy, CEMA is the multistakeholder program than manages for cumulative effects of oil sands development. CEMA started small, beginning with portions of people's times, in addition to their normal day jobs, now there are a few people dedicated full time to CEMA (Interview #21). The Clean Air Strategic Alliance, with only one issue and a modestly growing economy, came up with improvements and eventually regulations for sulfur management within ten years. CEMA had over ten issues and a rapidly changing industry, resulting in a task that is orders of magnitude more challenging. One ERCB official initially thought CEMA's task could be done in five years but the problem quickly became seen as monumental, eventually questioning if the government actually put in the resources into CEMA that it required to succeed (Interview #21). An Environment Canada official felt CEMA struggles from a lack of provincial government leadership and a commitment to implement (Interview #22).

CEMA currently has 44 stakeholder members, including industry, government, Aborginal, and environmental groups, but that number is declining as the Mikisew Cree left CEMA in 2006 followed by the environmental group, the Pembina Institute in 2008. Decisions and recommendations from CEMA must be made with conensus. This has become problematic, with one vote per organization, there is considerably more industry groups, than environmental or Aboriginal.

Dr. Michael Sauve, a doctor of internal medicine in Fort McMurray on CEMA: "If you are ever going to design a committee to be completely impotent, then you are going to make sure it has so many voices it can never make a decision (Marsden 2007, 188). Even Shell Canada and Fisheries and Oceans Canada feels that there are too many people involved in CEMA (Interviews #16, 17). The consequence of having too many and too diverse members operating on consensus is that decisions take a considerably longer amount of time than the traditional bureaucratic machinery. Besides failing to deliver a water management plan in time for the Lower Athabasca (Interview #17), CEMA also failed to produce in time a watershed management plan for the Muskeg River before half of the basin had already been issued development permits (Nikiforuk 2008, 63).

The Radke Report also echoed these critiques, finding similar limitations for contentious issues within the consensus building.

> *"With controversial issues, a consensus approach can result in decisions being watered down to the extent that they do not meet the best interests of any party or the environment. There also is an incentive to delay the decision making process as long as possible. The default position is that the issue is forwarded to Alberta Environment or another regulator for a decision. This provides additional work load for the department often after a long period in the consensus building process and after positions have hardened."* (Oil Sands Ministerial Strategy Committee 2007, 115)

Considering the diverse membership within CEMA and their mandate to pursue minimize cumulative environmental impacts AND develop the oil sands, contentious issues would be more often the norm, suggesting other decision making processes would be more effective. The Radke Report goes on to say that, "careful consideration should be given to the type of decisions that are put into the process and the length of time decisions are allowed to remain in the consensus process. Certain issues are best

addressed by the government after stakeholder consultation but without a long consensus building process." (Oil Sands Ministerial Strategy Committee 2007, 115)

Reports and recommendations produced by CEMA need only be considered by the government and are not required or expected to be adopted into official policy or regulation (Interview #5). As mentioned earlier, CEMA is not regulated by any particular environmental statute and as such has limited legal liability or formal accountability. It is interesting that by December of 2007 the provincial government still considered CEMA effective enough for it to be the main forum for action for the Regional Sustainable Development Strategy (Alberta Employment Immigration and Industry 2007, 34).

The Government of Alberta invested the political and financial capital to create CEMA (or RAMP or WBEA). Their very precedence-setting existence represents an example leadership from the Province, collaborating with industry, environmental and Aboriginal groups on monitoring cumulative effects. Although from my analysis, it appears that the provincial government wanted to both have outwardly collaborative environmental management efforts, but make whatever comes out of those groups to merely be recommendations. They wanted to remain in absolute control while giving the appearance of facilitative leadership. This dissonance in leadership styles was quickly perceived by many of the historically-marginalized groups sitting on CEMA's board. Not surprisingly, Syncrude feels that CEMA has been very successful with water management (Interview #19), despite CEMA missing the deadline, and having Alberta Environment take over the process. CEMA, then, represents an opportunity lost for responsible leadership by the Government of Alberta to improve the environmental management of the oil sands, while empowering stakeholders.

Lastly, leadership in environmental management needs sufficient political will for it to attract the right attention, carry authority and be sustained over time. It has been a rare occasion in Alberta, when environmental initiatives have garnered enough political will to be effective. The Clean Air Strategic Alliance and the Foothills Model Forest are notable exceptions. However, recently, in response to increasing public expectation and media pressure for regulators to better manage oil sands development, one senior Fisheries and Oceans Canada official noted that litigation has also increased, federal government agencies have more incentive to fulfill their mandate and work with the province (Interview #17). This has been seen with the recent conviction of Syncrude under EPEA for failing to provide wildfowl deterrents at one of their tailing ponds, where 1606 ducks died in April 2008.

The federal government has also weighed into this event and has charged Syncrude with contravening the Migratory Birds Convention Act (CBC 2009a). This type of litigation is unprecedented in the development of the oil sands. An Environment Canada employee pointed out, "a few years ago the Syncrude duck conviction under the Migratory Birds Convention Act would never have happened" (Interview #22). The same could also be said for the ERCB's Steepbank mine decision and their Directive 74.

Part of the reason that environmental litigation is not common in Alberta, beside those factors mentioned earlier (poor monitoring, discretionary regulations, staff retention) is that in general, the judiciary in Alberta is not familiar with testing environmental issues in court (Interview #6). The historically close relationship of industry and government is another cause for low levels of environmental litigation. As pressure grows on the Government of Alberta to assume a more responsible leadership position, I expect for not only litigation to increase in frequency and severity (from stricter interpretation of existing discretionary environmental regulations) but also for reforming CEMA's mandate and management structure.

CONCLUSION

In conclusion, this chapter outlined the regulatory context in which current oil sands environmental policies are carried out in the Province of Alberta. The evolving and discretionary nature of the environmental policy through time was highlighted as well as the jurisdictional roles between the Government of Canada and the Government of Alberta. It is important to note the different approaches to environmental management between the United States and Canada, as often policy recommendations appropriate for one country may be inappropriate for another.

The weaknesses of the regulatory system as they pertain to the environmental management of the oil sands noted in the previous section included poor transparency with regards to determining the public interest and information sharing. Poor monitoring and enforcement was also mentioned, particularly with regards to role clarification, monitoring and enforcement efforts, and discretionary regulatory language. Leadership was also brought forward as an issue, highlighting the need improved coordination and role clarification with stakeholder groups as well as sufficient political will.

These assertions were reached after twenty-three interviews with key stakeholders involved in the environmental management of the oil sands as well as from an extensive search of relevant secondary literature (see References - Appendix 1). Testing the validity of these assertions can come from vetting these ideas with those stakeholders interviewed or by spending additional time collecting environmental performance data. However, the very nature of some of these assertions, poor-transparency for example, is difficult to test. Even if it could be, along with many other weaknesses identified, you will find contradictory information, as I have, within and among stakeholder groups. Thus it would be rather challenging to find an objective statement on the accuracy of my assertions.

The final chapter will outline specific recommendations, in light of the analysis on the corporate environmental management practices of three oil sands operators, on how to address the weaknesses in the regulatory system that threaten the transparency, credibility and leadership of the Government of Alberta.

CHAPTER THREE:

Environmental Management of Three Oil Sands Operators

INTRODUCTION

The purpose of this chapter is to briefly outline how three oil sands mine operators, Suncor Energy, Syncrude, and Shell Canada, have interacted with the regulatory environment described in the previous chapter and developed their environmental management policies. The history of each operators involvement in the Alberta oil sands is explained and followed by what information that was able to collected regarding the corporate structure of their environmental management division. A composite of the company's reputation is then given, as described by the twenty-three stakeholders interviewed for this research, after which the company's overall environmental policies are outlined, as shared by company spokespersons and corporate publications. Subsequently, descriptions of the company's specific policies with respect to land, air, water and climate change management are outlined. Lastly stakeholder engagement efforts and reporting initiatives, both critical to effective environmental management, are summarized for Suncor, Syncrude and Shell.

SUNCOR ENERGY

History

Suncor Energy, a wholly owned subsidiary of Sun Oil of Philadelphia, began conducting business in Canada in 1917. By 1953 Sun Oil incorporates the Great Canadian Oil Sands Limited (GCOS) and began obtaining patents and leases in Fort McMurray (Suncor 2009a). By 1962, the company received government approval to build the mine (Chastko 2004, 111). During the 1960's Sun Oil invested 250 million CAD in GCOS, at the time, the largest single private investment in Canadian history (Suncor 2009b). It took fourteen years before the company began producing its first barrel of oil in 1967. Shortly after production began there were major spills into the Athabasca in the 1960's and the 1970's (Interview #2). In

1979, Great Canadian Oil Sands changed its name to Suncor when all the Canadian operation of Sun Company were amalgamated.

The 1980's were very difficult for Suncor, who were nearly forced to shut down their oil sands operations (Interview #21). The controversial National Energy Program, sought to increase Canadian control and ownership in the energy industry, the collapse in world oil prices to under 10 USD per barrel (Figure 4), a major fire in their Fort McMurray refinery, a long and contracted labour dispute, and the untimely death of President and CEO, Ross Hennigar all contributed to the company's struggles (Suncor 2009b). The 1980's also brought many environmental challenges. Most notable were an accidental discharge into the Athabasca River in 1982 that shut down the Fort Chipewyan fishery for three years (Gilles 2008; Marsden 2007, 184) and, in the mid 1980's, an emissions problem from one of their older upgraders which resulted in the ERCB denying approval for a river pipeline crossing until the problem was fixed (Interview #21). By the end of the 1980's Suncor had transformed their operations from 40,000 barrels per day to 150,000 barrels per day (Interview #21).

By the late 1980's and the early 1990's, Suncor began to take a company wide shift in their approach to the environment. In 1991, Rick George became CEO of Suncor who rebrands the enterprise as a 'sustainable energy company' (Suncor 2009c). In 1992, Suncor became publically traded, with Sun Oil reducing it's interest to 55% in 1995 (Suncor 2009c). This shift towards sustainability, in the eyes of a senior prosecutor for Alberta Environment, did not happen due to pressure from the Government of Alberta or other oil sands developers, it came from the international community (Interview #23).

Suncor saw opportunities in renewable energy and sustainability initiatives and in the 2000's began diversifying into wind energy. In 2000, Suncor announced they plan to invest 100 million CAD by 2005 in

alternative and renewable energy. Subsequent to this announcement, Suncor opened its first 11MW wind farm in Saskatchewan in 2001 and its second 30 MW wind farm in southern Alberta. By 2005, Suncor's third (30MW) and fourth (76 MW) windfarms open (Suncor 2009f).

Concurrent to their development of renewable energy, Suncor continued to expand its oil sands operation. In 1999, Suncor opens up its Millennium mine, increasing output to 225,000 barrels per day and in 2004, they begin production at the Firebag in situ oil sands facility. Two years later, Suncor receives approval for the Voyageur upgrader, which will increase output to 550,000 barrels per day by 2012.

2007 was a trying year for Suncor with missed production targets, reliability issues and environmental issues (Interview #14). Their response in 2008 was a policy called "Operational Excellence" which takes an 'opportunistic and visionary approach to being a beyond compliance sustainable energy company' (Interview #14).

Suncor's mining and in-situ leases currently cover 1800 square kilometers that contain nearly 13 billion barrels of bitumen (InfoMine 2008). Recently, market slowdowns have significantly reduced planned capital investments from 20.6 billion CAD to 3 billion CAD (Suncor 2008a, 2). On March 23, 2009, Suncor proposed a merger with Petro Canada and have a combined production of 680,000 barrels of oil equivalent (Suncor 2009d) and a combined market capitalization, of 55.97 billion CAD. If the merger is approved, Suncor will become Canada's largest energy company (CBC 2009b).

Corporate Structure

Suncor Energy has three business units, oil sands, natural gas and renewable energy, and energy marketing and refining. As of 2006, Suncor has 5834 employees, 3260 (56%) of which are employed in the

oil sands division. VP of Sustainability Gord Lambert reports directly to CEO. Suncor has a Centre for Environmental Excellence, directed by Brian Doucette. As of 2006, Suncor had 37 environmental health and safety staff working for their oil sands operations (Suncor 2007a, 66).

Reputation

Suncor has had a mixed history of environmental performance over the years. By far the longest running oil sands operation, Suncor has had to manage the consequences of being the first company in the field. Their aging infrastructure leaves, what one Alberta Environment employee calls, "a most problematic environmental legacy" that newer companies do not have to face (Interview #10).

Suncor has a reputation among government agencies and NGOs as "most agreeable" and "quick on their feet but hard to pin down" and "sometimes short on delivery" (Interviews #10, 21). More explicitly they have a reputation of having a good communications department (Interview #21) but have been falling short in implementation. In part this is because of their high growth rate and turnover in staff but also because of their priorities being in other areas (Interview #10). That being said, Suncor has a reputation with Alberta Environment to be influential in regional monitoring (Interview #5). Another senior official at Alberta Environment describes them as being excellent in environmental management, often going beyond compliance (Interview #1).

Overall Environmental Policies

Suncor has five focus areas for environmental management: air, water, land, biodiversity and climate change. Suncor has had a climate change action plan since 1997 (Suncor 2007, 31). In 2002, they implemented a greenhouse gas management program which reached across traditional divisions within Suncor (Suncor 2008c, 16). In 2006, Suncor created Environmental Excellence Strategy and launched a

company wide Environmental Excellence Summit, where 130 employees, brainstormed about the environmental risks and opportunities for the company (Suncor 2007a, 27). When asked what incentives are in place for Suncor to go beyond compliance, a company spokesperson said building credibility, reducing operating costs, managing business risks, improving share/stakeholder relations and maintaining societal license to operate (Interview #14).

Land

Since Suncor began its operations in 1967, over 13,000 hectares of land has been disturbed. As of 2006, they have reclaimed 949 hectares or 7% of the disturbed land. From 2002-2006, the amount of land reclaimed grew by 217 hectares while the amount of land disturbed increased by 5483 hectares during the same period (Suncor 2007a, 65). Reclamation in the past used exotic species and straight angle lines, after consulting with local First Nations and the local community, Suncor now plants native species and contours the reclaimed land (Suncor 2007, 40).

In 2003, Suncor opened the Crane Lake Nature Trail on reclaimed land at a former mine site, which now boasts 170 species of bird (Suncor 2007a, 40; Suncor 2009c). Also in 2003, Suncor initiated a 1 million CAD conservation offset near Winagami Lake in partnership with the Alberta Conservation Association that preserved 470 acres of boreal forest to offset land impacted by its mining developments (Alberta Conservation Association 2008). Suncor is also working with Canadian Forest Products, Ltd to coordinate planning and operations in a 650,000 hectare area where both companies work (Canadian Boreal Initiative 2008). The company recently planted its three millionth tree on over 900 ha of 'reclaimed land' at the Steepbank Mine site (Suncor 2009c, 37). Suncor is also a signatory to the Boreal Leadership Council's Boreal Forest Conservation Framework, which supports a goal of protecting 50% of Canada's boreal forest from industrial development (Canadian Boreal Initiative 2009). Suncor's 2009 Annual Action Plan,

developed in conjunction with the Canadian Boreal Initiative, outlines four strategic focus areas and priorities: regional collaboration, environmental research and monitoring, land conservation and reporting their progress (Canadian Boreal Initiative 2008)

Tailings ponds have had a much more problematic legacy for Suncor. For instance, Suncor's first tailing pond, Tar Island, was built in 1967 immediately adjacent to the Athabasca River. In 1997, Suncor admitted that the pond leaked approximately 1600 cubic metres of tailings every day into the Athabasca River (Marsden 2007, 170). These early practices of siting tailing ponds adjacent to water courses are no longer allowed (Interview #5). From 2002-2006 the surface area of tailings ponds increased from 2100 hectares to 3013 hectares, an increase of 43% (Suncor 2007a, 65).

Suncor employs a technology called consolidated tailings, which uses gypsum, a by product of the sulphur recovery process, to reduce the amount of water used in extraction and consequently the size of tailing ponds needed. Suncor admits this technology is unproven, that to date no ponds have been reclaimed using this technology (Suncor 2008a, 21). For the ERCB the issue of Suncor's tailing management has become so problematic that Suncor must be able to meet certain consolidated tailings performance targets in their current operations before the ERCB will approve their North Steepbank Mine (Suncor 2007a, 38). Suncor plans to have its first tailings ponds as a sold surface in 2010 (Suncor 2008a, 5)

Air[18]

Suncor focuses on minimizing the release of sulpher dioxide, nitrogen oxides, volatile organic compounds, and greenhouse gas emissions (addressed under Climate Change, below) (Suncor 2007a, 28). In 1996,

[18] For a detailed list of Suncor's air emissions from 2002-2006, see page 64 of the 2007 Sustainability Report (Suncor 2007a).

Suncor was the first oil sands company to install Flue Gas Desulferization mechanisms for their coke boilers. At a cost of 200 million CAD, this technology went beyond compliance and avoided many future ground level exceedences of air pollution (Interview #15).

While pollution intensity may be decreasing, the substantial increases in production levels are causing overall emissions to rise. Between 2002 and 2006, oil sands NO_x emissions increased 17%, while NO_x intensity dropped by 4%. SO_x emissions increased by 13% while SO_x intensity dropped by 10%. Major improvements have been made in the flaring of natural gas as flared gas dropped by 54% and intensity dropped by 64% between 2002 and 2006 (Suncor 2007a).

In 2006, Suncor identified a new air quality concern, more frequent incidents of hydrogen sulphide ground level concentration exceedences (Suncor 2007a, 28; Interview #1) Normally there are 30-35 of these exceedances per year, in July 2006 there were 187 (Suncor 2007a, 28). As a result of this issue, they have established an emissions management task force who will identify potential emission sources and create an action plan. Despite this task force and action plan, Suncor currently has a dozen environmental protection orders against them (Interview #2, 14) for infractions from 2006-2008.

Suncor openly shared they recently had an ERCB enforcement order at their Firebag facility because of ground level concentration exceedences. The enforcement order came into effect in September 2007, restricted production to 42,000 barrels per day (Interview #14). The restriction was lifted in July 2008 and the company is currently building a 340 million sulpher plant to reduce their emissions of sulpher dioxide (Suncor 2008a).

Water

Water has been identified by Suncor as one of its environmental focus areas. Gord Lambert, Suncor's VP of Sustainability has said Suncor is, "...flipping the paradigm from the myth of water abundance to the reality of water scarcity" (Nikiforuk 2008, 65). This sentiment is being manifested in Suncor's operations through their efforts to develop less water intensive extraction techniques.

Between 2002-2007, absolute water withdrawals dropped by 40% and water intensity per barrel of oil reduced by 40% (Suncor 2008a, 5; Suncor 2007a, 64). This significant reduction in water withdrawal is even more notable because of the large increase in oil production during that period. A water recycling program which reuses water during the extraction process, up to eighteen times, before it is sent to the tailing ponds, also has helped reduce water demand. Concurrent to the reduced withdrawals there was an 87% increase in the amount of water returned to the Athabasca River and heightened water recycling. In 2006, Suncor withdrew 50.9 million cubic metres of water from the Athabasca River, of a total 60 million cubic metres allowed under their Water Act approval (Suncor 2007a, 35, 36). As a result of this margin and the increasing efficiencies, Suncor's new voyageur application did not seek an increase in their water license (Interview #14). The environmental group, Pembina Institute has criticized Suncor's water license as being much too large to begin with, not taking into account the in-stream flow needs for the Athabasca (Interview #20).

Climate Change

Suncor has not shied away from addressing climate change in their operations and management. The company has had a climate change action plan since 1997 (Suncor 2007, 31). In 2002, they implemented a greenhouse gas management program, using an ISO 14001 framework, to better identify, improve and track greenhouse gas reductions (Suncor 2008c, 16). According to their 2008 Climate Change Report, 61

million metric tonnes of carbon dioxide have been prevented because of this greenhouse gas management program (Suncor 2008c, 2)

Currently their primary method to address climate change is reducing their greenhouse gas emissions through technological solutions. Suncor believes carbon capture and storage and renewable energy (wind, biofuels, geothermal) can deliver permanent reductions in greenhouse gases (Suncor 2007a, 31). Suncor advocates carbon capture and storage through their involvement with the International Carbon Capture Project and the Integrated CO_2 network. In addition, they are investing in gasification technology which converts petroleum coke into synthetic fuel which can then replace natural gas as a source for energy and hydrogen, as well as a mobile mining technology which may replace traditional shovel and bucket extraction (Suncor 2008c, 24). With respect to renewable energy, by 2009, Suncor reported it had invested 250 million CAD in renewables, including four wind farms and Canada's largest ethanol production facility, with plans to spend 500 million more on renewables in the next five years (Suncor 2009f). Suncor's wind power and ethanol projects offset 600,000 metric tonnes of carbon dioxide per year. Suncor produced 9,177,000 metric tonnes of carbon dioxide in 2006 (Suncor 2007a, 64).

Suncor also sees energy efficiency as a way to reduce greenhouse gas emissions through cogeneration of steam and electricity. Energy efficiency per barrel of oil has increased 8% since 2002 (Suncor 2007a, 34).

Besides technological and demand-side solutions, Suncor has also been addressing climate change from a policy perspective. Suncor also introduced CO_2 pricing scenarios to understand how carbon taxes may affect their business planning (Suncor 2008c). Suncor has been involved in initiatives to build and design a carbon offset system for Canada (Suncor 2007a, 32). While purchasing foreign-sourced greenhouse gas credits is an option for the company, they would prefer 'in Canada' solutions. In a surprising move, Suncor,

in their 2005 annual report stated, "we do not currently anticipate that the cost implications of federal and provincial climate change plans will have a material impact on our business or future growth plans" (in Marsden 2007, 167). Suncor calculated that by 2010 adhering to Kyoto Accord Standards will cost it a mere 20-27 cents a barrel (Marsden 2007, 167). Perhaps perceived certainty was in hopes to allay material fear in Suncor shareholders.

In 2007 the lack of confidence returned in the admission that due to the uncertainty with technological approaches to reducing their carbon footprint, particularly with carbon capture and storage, Suncor will not commit to being carbon neutral by a certain time frame (Suncor 2007a, 31). They acknowledge the challenges in reducing total emissions and emissions intensity. Total greenhouse gases increased 14% between 2002-2006, while their greenhouse gas intensity dropped 9 percent (Suncor 2007a, 29, 64). When comparing to 1990 levels, the benchmark year for the Kyoto Protocol, Suncor has reduced greenhouse gas emissions intensity per barrel 44% below 1990 intensity levels, while absolute emissions for their oil sands operations have risen 148% during the same time period (Suncor 2008a, 5; Suncor 2007a, 32). Despite this uncertainty of future climate change regulations Suncor plans to increase production to 550,000 barrels per day in 2012 from 264,000 barrels per day in 2006.

Climate change planning for Suncor does not address the foreseen impacts to water flows in the glacier fed, Athabasca River. No mention in any of their publications link climate change to the need to minimize water withdrawals from the Athabasca River. Similar critiques of poorly integrating climate change science have been raised against Government of Alberta's Lower Athabasca Water Management Framework by university scientists and environmental groups (Schindler et al. 2007, 6; Woynillowicz 2006, 10).

Stakeholder engagement

As one of the two major historical mines in the area, Suncor has had time to develop relationships both good and bad, with stakeholders. A former Alberta Environment employee cited Suncor participated the most in the province's 2006-2007 Multistakeholder Dialogue (Interview #11), while one current Alberta Environment employee singled out Suncor's active participation with the work of NGO's (Interview #11). The same cannot be said for Suncor's work with First Nations, which has seen setbacks because of conflicts over unionized labour (Interview #11). Suncor is unique in its development and publication of a biannual indicator of stakeholder perceptions (Suncor 2007a, 16). Curiously, those indicators do not differentiate between aboriginal communities and non-aboriginal communities and between environmental NGOs and industry NGOs. In any case, from Suncor's own data, positive perceptions about Suncor from government, NGO, and investment community stakeholders have all decreased since 2003 (Suncor 2007a, 16).

While their interactions with stakeholders can be seen in a positive or negative light, none of the interviewees, suggest that Suncor has been reticent to participate in stakeholder forums. Suncor has opened up a consultation office in Fort McMurray in 2005 and has been actively involved in many longstanding stakeholder engagement programs, such as WBEA, RAMP and CEMA. Regarding the many criticisms levied against CEMA, Suncor acknowledges that CEMA's consensus rule results in a slower than ideal progress; however, there is a "need to move forward with care" and caution (Suncor 2007a, 42). They feel that taking time for due process is better than hasty actions. More critically, Suncor benefits from having a slow and relatively predictable forum where they can monitor the perspectives of many of their stakeholders. Suncor's Vice-president of Sustainable Development Gord Lambert: "We don't give up when stakeholders oppose us. In fact, we have a responsibility to keep talking in order to find some common ground. Instead of focusing on our differences, we move forward more gradually by focusing on things

which we agree" (Suncor 2007a, 17). The danger in these situations is to delay discussions on contentious issues precisely because they are difficult, while preventable environmental degradation continues to occur.

By being actively involved in public and private forms of political lobbying, Suncor ensures their needs are met in future government regulations. Suncor's 2008 Annual Report warned investors of future and potential environmental regulations and liabilities that may be of material impact to the company (Suncor 2008a, 20). Suncor wants more effective and transparent consultations with industry when regulations and policies are being developed focusing on involving 'the most appropriate people' (Interview #14). By being active players in the Clean Air Renewable Energy Coalition, the National Roundtable for the Environment and Economy (Suncor 2007a, 32), and carbon capture and storage policy through the Integrated CO2 Network (Suncor 2008c), Suncor publically takes a step forward to lobby government.

Suncor has also demonstrated some leadership within the oil sands industry to help improve their environmental performance. Suncor is a founding member, with ConnocoPhillips, of the Oil Sands Leadership Initiative (OSLI) (Interviews #3, 8, 14). OSLI has been described by an organizational behaviour researcher at the University of Alberta as "not just greenwashing or a media relations exercise" (Interview #13) but a genuine attempt to make improvements in the industry (Interviews #1, 14). It was difficult to find evidence to corroborate that claim because the organization, a group of six companies, is staying behind the scenes, with no publicly available website. Suncor has admitted that beyond compliance issues do not come up at OSLI meetings and that only environmental issues are addressed (Interview #14). While it is laudable to form such a group to encourage stronger environmental performance among oil sands developers, it is curious that this leader's forum is not used as a venue to develop best practices. Perhaps the defense of proprietary knowledge prevents deeper collaboration or perhaps it is too premature to know the results.

Reporting

Suncor takes deep pride in the quality and breadth of their reporting. Suncor, has used GRI indicators in sustainability report since 2003, (Interview #14, Suncor 2009c) and has worked with CERES, a prominent network of investors, labour and environmentalists, to develop its most recent 2007 Sustainability Report (Interview #11). A group of fourteen stakeholders also reviewed the 2007 Sustainability report, providing feedback on a draft of the report (Suncor 2007a). Suncor has also published a Climate Change report in 2008 (Suncor 2008c).

This pride in monitoring, has very effectively been capitalized by their public relations department as an harbinger of their overall environmental performance, as witnessed by their many national and international awards for the quality of their monitoring. In 2006 Suncor was named a Gold Level Reporter by the Canadian Standards Association (Suncor 2007a, 32). Their 2007 Progress Report on Climate Change received an award by CERES and also marked the 10th anniversary of the company's climate change action plan. Stratos Inc., one of Canada's leading sustainability consultancies, ranked Suncor first among seven companies in their Best Practices in Canadian Corporate Sustainability Reporting (Suncor 2008b). In 2008, Suncor tied for first place in the oil and gas category of the Globe & Mail Report on Business Magazine's fourth annual Canadian corporate social responsibility ranking, was named one of the World's Most Ethical Companies by Ethisphere Magazine, and was listed on the Dow Jones Sustainability World Index for the ninth consecutive year (Suncor 2009c).

Many of reports are easily accessible from the company's website. While Suncor's website does not have an archive of past years of sustainability reports to help compare how their performance and goals have changed, upon request a company representative immediately emailed me all of their previous reports. Also, since Suncor is publicly traded company, they are required by law to have a publicly available annual

report. Their annual report also has significant information on their environmental management strategy, performance measures, regulatory and operational risks (Suncor 2009c).

Frankness, clarity and insight are listed as elements Suncor's stakeholders wanted to see in their biennial sustainability report (Suncor 2007a, 1). The 2007 Sustainability report outlines, from 2002-2006, the number of major incidents, regulatory contraventions (air quality, water effluent exceedences, reportable spills, volume of spills, and spills to the Athabasca River) and the value of regulatory fines. While these figures were often left uninterpreted and decontextualized it is extremely significant that an oil sands company would even report these incidents at all. A recent company response to an environmental charge highlights how Suncor frames their approach to environmental management (Suncor 2009e):[19]

> "These charges relate to contraventions a few years back, but they remain a disappointment today. While I'm grateful that there was no harm to the environment or human health, the fact remains that we did not meet the standards set by the province or the expectations we have of ourselves. We have taken the steps necessary to improve our management systems to ensure we remain in compliance."

SYNCRUDE

History

Syncrude, the name for a consortium of Cities Service (Citgo), Imperial Oil, Royalite and Atlantic Richfield (Arco), emerged in 1962, applying to the ERCB for a development permit (Chastko 2004, 127). After much negotiation Syncrude re-applied again in 1968 for an 80,000 barrel per day facility which was approved in 1969 (Syncrude 2006). In 1973 construction began for the Syncrude mine, which was completed and producing oil five years later in 1978 (Syncrude 2006a).

[19] On March 13, 2009, the company openly reported a court date for a charge related to discharging wastewater from a work camp into the Athabasca River. The statement was issued by Rick George, Suncor's President and CEO candidly in a press release posted on the company's website (Suncor 2009e)

Meanwhile, during construction Atlantic Richfield left Syncrude to focus their efforts on the Prudhoe Bay oil fields. The consortium sought public investors to replace Atlantic Richfield's 30% stake. The result in 1975 was Imperial Oil (31.25%), Cities Service (22%), Gulf (16.75%), the Government of Canada (15%), the Province of Alberta (10%) and the Province of Ontario (5%) (Chastko 2004, 160). The increasing public ownership of Syncrude came at a time in Canadian history, after the 1973 OPEC oil embargo, when the federal government was wanting to secure a reliable supply of energy and income for the country. It was also seen as a demonstration project to prove the economic viability of the oil sands and of federal provincial partnerships in resource development (Interview #23).

In the late 1970's when their was much more government involvement, Syncrude had an environmental affairs department of 20-25 people, the majority Masters and PhDs educated scientists specializing in reclamation science, aquatic biology, and forestry (Interview #23). This was considered a very large environmental affairs department, at the time, and was seen to reflect Syncrude's commitment to the environment (Interview #23).

During the 1980's, increased maintenance and upgrading costs in addition to low world crude oil prices prevented Syncrude from posting profits for five consecutive years (Chastko 2004, 211). After a costly fire at Syncrude, the Government of Alberta Edmonton even considered waiving for a period of time the province's take altogether.

In the 1990's Syncrude continued struggling to remain profitable (Nikiforuk 2008, 26). Oil prices remained low and the economy entered a recession in 1993. After a royalty rework, centred on attracting new capital to the oil sands, Syncrude began to post profits.

Currently Syncrude is the world's biggest oil sands producer and the largest single producer of oil in Canada. It has eight oil sands leases totaling 250,000 acres, twice the size of Toronto (Marsden 2007, 146). Their main mining operations take place at the Aurora and Mildred Lake facilities, located 35 - 40 kilometres north of Fort McMurray (Syncrude 2006b). Syncrude has over 4700 employees, an uprgrader on site, a newer power generation facility, a notable research facility in Fort McMurray and in Edmonton (Interview #10).

Corporate Structure

Syncrude is a consortium of companies. Currently it is composed of Imperial Oil Ltd (25%), Canadian Oil Sands Limited (36.74%), Petro-Canada (12%), ConocoPhillips (9.03%), Nexen, Inc (7.23%), Murphy Oil (5%) and Mocal (of Nippon Oil Corp) (5%) (Syncrude 2006b). Each company takes turns operating the mine (Interview #13). Currently ExxonMobil is the mine's project manager, through its ownership of Imperial Oil Ltd.

In 2006, a management services agreement was struck with Imperial Oil. ExxonMobil, the world's largest non-state controlled oil company, owns 69.6% of the shares of Imperial Oil (Imperial Oil 2006). This agreement allows Syncrude to access Imperial Oil / ExxonMobil's technical and managerial expertise and Exxon's energy management systems. An Opportunities Assessment Team was created with representatives from Imperial, ExxonMobil, Syncrude and other owners. In 2007, Syncrude announced a new (Imperial/ExxonMobil) management team and five new operating philosophies: people, safety, reliability, margin and cost. The new organization structure and operating philosophies were "still taking hold" in 2007 (Syncrude 2007a, 3).

Environmental management is handled under the General Manager of Regulatory and External Affairs (Interview #19). Not including those working on environmental issues in the mining, upgrading and extraction areas on Syncrude, forty people report to the GM of Regulatory and External Affairs. One third of the forty are engineers and two thirds are environmental scientists (Interview #19). Regulatory affairs address compliance, reporting, provide guidance to operations and manage land reclamation. External affairs seeks ERCB and EPEA approvals and works with RAMP, WBEA and CEMA. Syncrude mentions that their staff have been bigger in times of rapid growth (Interview #19). Relative to the ratio of environmental staff to oil production then had in the 1970's, there is now comparatively much less environmental staff working for Syncrude.

Reputation

Syncrude's reputation has changed in recent years, as management of the company shifted to Imperial Oil/ ExxonMobil. Lee Raymond, CEO of ExxonMobil for twelve years until 2005, whom Greenpeace calls the "Darth Vader of climate change" (Greenpeace 2002), denied that climate change was anthropogenic or human-caused (Blum 2005). Since his retirement at ExxonMobil, Raymond has become vice-chairman of American Enterprise Institute, an ExxonMobil-funded think tank that has actively lobbied against the UN's Intergovernmental Panel on Climate Change (Sample 2007). A researcher at the University of Alberta studying organizational behaviour revealed that perspective's like those of Raymond can significantly affect the corporate culture of an organization (Interview #13).

Indeed, officials from Alberta Environment, Alberta Justice and Environment Canada have noticed a recent change in how Syncrude engages with government and other stakeholders (Interviews #1, 3, 5, 7, 22, 23). They describe this attitudinal shift as more confrontational, fighting regulations and only following the letter of the law. One interviewee summarized their relationship to regulators as being 'more American' since the

shift in leadership to Imperial Oil/ExxonMobil (Interview #1). An Environment Canada representative noted that Syncrude is "not very cooperative or open and takes a harder-nose approach to the bottom line, which if pervasive can lead to a greater number of actions causing environmental harm. The recent problems with ammonia releases and migratory bird deaths may be an indication of this approach" (Interview #22). "Take a look at the corporate philosophies of their managing partners [ExxonMobil]," states an Alberta Justice employee. "What has Exxon's response been in responding to a variety of environmental issues? [Syncrude says] we will create the jobs here locally and pay royalties but long term environmental costs are a social cost that the company ought not to bear" (Interview #23). Prior to this 2006 management agreement, one Alberta Environment employee considered them 'enlightened', working well with the First Nations, hiring many and favouring contracts with aboriginal-owned companies. This was in part because of the human resources expertise that different owners brought but also because Syncrude was managed as a consortium and consequently took a long time to make decisions (Interview #5).

Syncrude does have the reputation of having good research facilities in Fort McMurray and in Edmonton. In particular their research in reclamation is more advanced than other oil sands developers (Interview #11). In 2006 they were ranked the 35th largest R+D spender in Canada (Syncrude 2007a, 3). They also are known to receive good assistance from parent companies and have a significant bureaucracy, again because of Syncrude's consortium of owners (Interview #10).

Syncrude drew international attention to their operations in June of 2008 and suffered a sizeable blow to their reputation, when a whistle-blower inside the company alerted Alberta Environment to the deaths of a flock of 1606 birds that landed in Syncrude's Aurora tailing pond two months prior. In a precedent setting move, Syncrude was charged under both the federal Migratory Birds Convention Act and Alberta's EPEA (Syncrude 2009a). The Migratory Birds Convention Act charge relates to depositing or permitting the

deposit of a substance harmful to migratory birds in waters or an area frequented by birds (Section 5.1, Department of Justice Canada 1994) and the EPEA charge concerns the improper storage and handling of hazardous substances (Section 155; Government of Alberta 2009b).

Overall Environmental Policies

Syncrude describes its approach to environmental management as "tightly integrated from the design, application, approval and start-up through to operations. This means attaching regulatory people to these different stages so everyone knows what the regulations are" (Interview #19). One ERCB employee verifies this approach sharing that Syncrude puts more effort into their engineering plan and spends more time in the design phase than other oil sands companies (Interview #21). When they design their plants Syncrude tries to anticipate what the regulations are going to be 10-15 years from now when the plant is up and running (Interview #19).

Syncrude feels that as a result of the new agreement with ExxonMobil, their "environmental management is even better because of ExxonMobil's global wherewithal. Syncrude is a northeastern Alberta company, partnering with ExxonMobil pulls us into a whole new world, bringing a global and sharper focus to Syncrude's environmental management" (Interivew #19).

The aggressive, confrontational reputation of Syncrude certainly appeared during an interview with one high-ranking employee. Syncrude believes "there is a dominant mythology that there has been no environmental regulations or management in the oil sands, that is fundamentally, unacceptably wrong" (Interview #19). Government, the media and NGOs "respond to public concerns which come from a complete lack of understanding of the process that has been and is in place" (Interview #19)

Under their five operating philosophies (people, safety, reliability, margin and cost), it is the cost category that speaks to environmental management: "We must direct our expenditures towards items that are required to sustain or grow the business in an environmentally and socially responsible manner" (Suncor 2007a, 3). Environmental management is framed using the rubric of cost and obligation and not benefits, investments or leadership that other companies use in their consumer-facing discourse. Their 2007 Sustainability Report notably places environmental concerns in the last section (Syncrude 2007a).

Land

As mentioned earlier, Syncrude has the reputation of being a leader in reclamation and has stated this as their number one priority in environmental management (Interview #19). This does raise the question of if it is better if their priorities were in areas needing the most work. In their 2007 Sustainability Report, Syncrude states "it is committed to ensuring that the land disturbed by our operation is returned to a stable, safe condition that is capable of supporting biologically self-sustaining communities of plants and animals. Our long-term vision is to create a landscape that sustains an integrated mosaic of land uses that meet stakeholder expectations" (Syncrude 2007a, 52). Jim Carter, CEO of Syncrude, claims that his company is rendering the land "more productive than it was before we got here" (Marsden 2007, 170). In 2007 the company spent 29 million CAD on land reclamation (Syncrude 2007a, 4).

Of 20,572 hectares of disturbed land in 2007, Syncrude says it has reclaimed 4500 hectares of land and planted five million trees and shrubs (Syncrude 2007a, 4). What qualifies as reclaimed for the provincial government and for oil sands company is different. Of those 4500 hectares, Alberta Environment has only certified that 104 hectares have been reclaimed to their standards.[20] Syncrude's current reclamation rate is

[20] In 2008 Syncrude was the first oil sands developer to receive government certification for a 104 hectare parcel of reclaimed land at Gateway Hill (Interview #20).

300 hectares per year but by 2010 when some of the larger pit mines (some three by eight kilometers in size) are expected to have been backfilled and dewatered, the reclamation rate will increase to 500 – 800 hectares per year (Interview #19).

Syncrude has also researched the reclamation of tailing ponds through end pit lakes since the 1980's and 1990's. Using pilot-scale test ponds, Syncrude has conducted experiments showing that end-pit lakes are an effective way to reclaim tailings and support a healthy aquatic ecosystem (Syncrude 2007a, 52). Syncrude, to date, has not claimed that any of its tailings ponds have been reclaimed. In January 2009 it unexpectantly applied to enlarge the capacity of one of its three tailing ponds as an 'interim measure' to store additional mature fine tailings (Cooper 2009a). Syncrude has faced significant international media coverage over the death of 1606 ducks, in the Spring of 2008, that landed in Syncrude's Aurora North Settling Basin (Christian 2009). Originally the company reported only 500 ducks had perished, waiting one year to release the updated numbers.

It is interesting to note that many of the EPEA reclamation requirements are a result of research that Syncrude has done themselves with the provincial government through CEMA (Interview #19). While this shows the initiative and leadership of Syncrude in pioneering new reclamation techniques as well as their efforts to collaborate with other stakeholders, it also presents considerable technical issues. As proven by the recent Directive #74 from the ERCB, those co-created reclamation requirements are proving to be insufficient at reclaiming the tailing ponds at the rate stated in their EPEA approvals. This either suggests that the mines are not investing enough effort into reclamation as they should[21] or the research pioneered by Syncrude was inaccurate.

[21] Investigative journalist Andrew Nikiforuk put Syncrude's 29 million CAD reclamation budget in perspective saying this amounts to one fifth of one percent of their annual budget (Nikiforuk 2008, 96).

Air

Reducing harmful air emissions is Syncrude's second priority (Interview #19). In 2007, Syncrude reports their SO2 emissions were down 10% from 2006 and flaring was reduced by 50% (Syncrude 2007a, 5). The company has invested 1.6 billion CAD to build flue gas dusulpherization units for their base plant cokers at Mildred Lake, which will reduce their SO_x emissions sixty percent from 240 metric tonnes per day to 100 metric tonnes per day by 2011 (Interview #19). Particulate emissions are also projected to decrease by as much as 50% from this project. Currently, Syncrude SO_x emissions intensity is more than all other oil sands projects combined (Dyer et al 2008).

In 2006 Syncrude shutdown Coker 8-3 and the coker's new flue gas desulpherisation system because of odours complaints from the ammonia and a resultant production enforcement order from Alberta Environment (Interview #14, Syncrude 2007a, 18, 48). The 'odour' described in Syncrude's 2007 Sustainability report is left undefined but is most likely sour gas (hydrogran sulphide), which smells like rotten eggs and is toxic and flammable in certain concentrations or methane. Methane and carbon dioxide can be formed when hydrogen sulphide is submerged in water, like in tailing ponds (Thimm 2001). According to a senior Alberta Environment official, Syncrude has had an increase in the number of hydrogen sulphide infractions (Interview #1).

Water

"Water management isn't much of a challenge for us," say a Syncrude spokesperson. "We don't take in that much water. Detractors will claim an amount of water used by the plan but most of this water is recycled" (Interview #19). Syncrude declared in 2007 that because 88% of all water is recycled only 2.03 cubic

metres (12.7 barrels) of freshwater is used per barrel of oil produced, making them the most efficient water user in the oil sands industry (Syncrude 2007a, 58). While water intensity did decrease by 10% between 2006 and 2007, the total volume of water used increased by 6% to 36 million cubic metres (Syncrude 2007a, 58). Under their Water Act Approval, they are authorized to withdraw up to 60,440,610 cubic metres of water from the Athabasca (Alberta Environment 1986). This large amount of 'unused' water, 40 percent of their allowable total withdrawals, perhaps explains why Syncrude does not see additional effort to conserve water a priority as they can nearly double their water intake with their current Water Act approval.

Climate Change

Syncrude feels reducing greenhouse gas emissions is their third priority in environmental management of their operations (Interview #19). Total greenhouse emissions for Syncrude rose 10% in 2007 to 15.01 million metric tonnes (Syncrude 2007, 5). Based upon Environment Canada's National Pollution Release Inventory (2009a), in 2007, Syncrude's operations were the third highest source of CO_2 emissions in the nation and the highest source emitter methane in the country at 669,000 metric tonnes (double second place, oil sands developer Suncor Energy). Methane is twenty times more potent a greenhouse gas than CO_2 (US Environmental Protection Agency 2009). Although Syncrude's 2007 Sustainability Report (2007a, 56) puts these figures in a different perspective: "the oil sands industry accounts for about five percent of Canada's emissions and 0.1 percent of global emissions."

Through Alberta's climate change legislation, the Specified Gas Emitters Regulation, Syncrude, and every other oil sands developer, is required to reduce its per barrel greenhouses gas emissions by 12 percent from the average of its annual per barrel emissions between 2003 and 2005. In 2007, Syncrude met 90 percent of its intensity reduction target. They offset the remainder through the payment of $867,000 to the

Alberta government's technology fund (Syncrude 2007a, 56).

Energy conservation is their primary vehicle to reach 100% of the intensity reduction target. One Syncrude spokesperson said, "thirty years ago all the bitumen was heated up to 80 degrees Celsius now it is only heated to 40 degrees Celsius" (Interview #19). In 2007 Syncrude planned a two percent modest reduction in billions of BTUs consumed. They ended overshooting their goal and increasing the energy used by six percent (Syncrude 2007a, 55).

Since the changeover in leadership in 2007, Syncrude has begun implementing Global Energy Management System, an ExxonMobil Best Practice, that aims to reduce energy use across the company (Syncrude 2007a, 5). In 2008, a major energy audit took place at the Syncrude mine and its results will provide guidance for conservation activities for the next five years. When asked why Syncrude has not publicly set any targets for greenhouse gas reductions, either in their 2007 Sustainability Report or on their website, they cite that they have set the 12% reduction in CO_2 intensity as required by the provincial government (Interview #19).

Syncrude also works on carbon capture and storage. They are an active member of the Integrated CO_2 Network (ICON), their former president Jim Carter chairs ICON's board (Syncrude 2007, 5).

On the policy front, Chairman of Syncrude's board, Marcel Coutu signed in 2007 a Canadian Council of Chief Executives statement calling for aggressive action to tackle climate change. Coutu is also a member of the Council's Task Force on Environmental Leadership, which advocates a national climate policy goal of cutting greenhouse gases emissions while strengthening Canada's competitive advantage and economic

performance. The signed statement envisions the ultimate goal of a substantial absolute reduction in greenhouse gases emissions (Syncrude 2007a, 56).

Stakeholder Engagement

Syncrude has the reputation of being influential in stakeholder driven regional monitoring programs and in their partnerships with local First Nations (Interview #5). Eight percent of the 4700 employees at Syncrude are of self-declared aboriginal descent and 143 million CAD was spent on contracts with local aboriginal firms (Syncrude 2007a, 4). In February 2009, Syncrude achieved for the third time, a gold level accrediation in the national Progressive Aborginal Relations Program (Syncrude 2009b). While Syncrude admits their "relationship with government has changed. Syncrude has always consulted with First Nations and hasn't really changed. What was voluntary 30 years ago has now become required" (Interview #19). Syncrude has a more difficult time engaging environmental groups, as demonstrated by Syncrude's decision to not participate in the Pembina Institute's Oil Sands Report Card (Dyer et al 2008).

Reporting

Syncrude has produced annual Sustainability Reports since 2002; all these reports, which also function as 'annual reports', are available from their website. These are the only public documents available on the Syncrude website. Because Syncrude is a private company they are not required to make any financial statements public or issue any annual reports (Interview #19). Syncrude has not received any recognition for their reporting or follows any third party reporting scheme. When asked if they have considered using the GRI indicators, Syncrude mentioned they have looked at them but feel their current metrics are useful for them (Interview #19).

Their report highlighted many areas that Syncrude is working on but very few visionary goals. No timelines were given for targets more than one year in advance in their 2007 Sustainability Report (Syncrude 2007a). That same report did clearly show the number of air exceedences and odour complaints received, though the interpretation of the data was minimal (Syncrude 2007a, 50). It is doubtful that many of the report's intended audience would be able to interpret the little data that was provided. Moreover, inconsistent categories made it difficult to understand the firm's compliance history. The report also showed there were no Alberta Environment fines and administrative penalties for the five years. However, it did not reveal if there were any Alberta Environment enforcement or environmental protections orders, which are considered more serious infractions. Be that as it may, as demonstrated in Chapter 2, lack of enforcement or environmental protection orders does not necessarily correlate with stronger environmental performance.

SHELL CANADA

History

In 1956, Lease 13, a 121 square kilometre parcel 75 km north of Fort McMurray, was granted to Shell Canada, Ltd by the Province of Alberta (Shell Canada 2009a). Shell estimates that Lease 13 has five billion barrels of recoverable oil (Shell Canada 2009a). In 1962, Shell Canada a proposal to the ERCB with Cities Service (Citgo) but because their mine too large and thought to destablize the booming conventional crude market in Alberta, the proposal was denied (Chastko 2004, 113).

During the 1970's, Shell explored the possibility of being involved in a consortium of investors to limit financial exposure and risk and in 1977 struck an agreement with eight other oil companies and formed the Alsands Project Group (Chastko 2004, 169). However, substantial increases in capital costs, rising inflation and competing federal – provincial government interests stalled development. In 1982, the Alsands group dissolved (Chastko 2004, 192).

In 1998, a pilot project is constructed by Shell on Lease 13. A year later in 1999, Shell announced formation of the Athabasca Oil Sands Project, a joint venture among Shell Canada (60%), Chevron Canada Limited (20%) and Marathon Oil Sands L.P. (20%) (Shell Canada 2009a). This project is the first fully integrated oil sands project in 25 years (Shell Canada 2005, 2). A few months later construction started on the 155,000 barrel per day Muskeg River Mine, which took three years to complete and currently supplies 10% of Canada's oil needs. The Muskeg River Mine is operated by Albian Sands Energy, Inc, a company formed through the joint venture (Shell Canada 2005, 2). Unlike Syncrude and Suncor, the Muskeg River Mine is not located in the Athabasca River Valley but away from the river, has newer technology and does not have an upgrader on site.

The mine does not have their upgrader, which refines the bitumen into synthetic fuels, onsite but rather 450 km away in near Fort Saskatchewan on the eastern edge of Edmonton. The Scotford Upgrader was completed in 2003 and is operated by Shell Canada, the majority shareholder in the Athabasca Oil Sands Project (Shell Canada 2005, 2).

More recently, Shell Canada has been planning to scale up their production. In 2006, Shell Canada receives government approval for a 100,000 barrel per day expansion of the Muskeg River Mine. In 2007, Shell Canada filed application for the Jackpine Mine Expansion and the Pierre River Mine. Also in 2007, Royal Dutch Shell, the world's second largest non-state controlled oil company, bought all the shares of Shell Canada, which was taken off the Toronto Stock Exchange (Shell Canada 2007, Interview #16).

Rising costs and the current economic downturn have affected Shell's oil sands operations. In 2002, Shell Canada estimated capital costs for their Muskeg River Mine expansion at 4 billion CAD, by July 2006, price

for construction had nearly doubled to 7.3 billion CAD, a few months later the price reached 12.8 billion CAD (Marsden 2007, 122). Shell's Carmen Creek Mine has recently been shelved (Interview #20) and Jeroen van den Veer, Royal Dutch Shell's CEO has said, echoing BP Energy's recent announcement, that Shell is planning to drop all new investment in wind, solar, and hydrogen energy (Pagnamenta 2009).

Corporate Structure

Within Shell Canada there is a General Manager for Sustainable Development of their oil sands operations. Sixteen people are under the direct supervision of the GM of Sustainable Development, which functions like a corporate group within Shell Canada (Interview #16). These sixteen people are divided into four discreet groups: mining operations, upgrader operations, greenhouse gas management and stakeholder engagement. Groups typically consist of half environmental engineers and half environmental scientists. Shell stressed that these employees are all professionals, with Masters or PhDs, and have twenty five or more years of experience in the industry (Interview #16). Besides the corporate team there are also environmental groups working on site at the mine (approximately 14) and at the Scotford Upgrader (approximately 6).

Reputation

Within Alberta Environment, Shell Canada's oil sands operations have a good reputation. "Even considering they have a smaller footprint and less complex operations [no onsite upgrader], they are the environmental leaders," says, the Regional Approvals Manager, Northern Region for Alberta Environment (Interview #10).

They also have the reputation of being able to effectively integrate the environment into their operations; they have "enough people with enough experience not to be overwhelmed by the environmental management" (Interview #10). The Head of Governance and Partnerships with the Oil Sands

Environmental Management division of Alberta Environment believes "Shell's organizational structure has led them to be better than other oil sands operators at organizing larger scale change," by drawing from an international network of experts and experiences (Interview #5). The are also known in the industry to have a longer-term view, as demonstrated by being proactive in addressing climate change (Interview #10).

Overall Environmental Policies

Shell Canada has had a sustainable development policy since 1990 (Interview #16). They emphasize this integration by having their sustainable development commitment on the same piece of paper as their Health, Safety and Environment Committment (Interview #16). This policy outlines what Shell Canada wants to achieve for environmental performance, stakeholder engagement, community benefits, using less resources (Shell Canada 2008b).

"One of Shell's business themes is that we are proactively thinking about sustainable development. This has allowed us to be more open with government and other stakeholders. Other operators may not have a policy or commitment...we apply the resources and experienced people to sustainable development issues" (Interview #16).

Shell Canada's overt, integrated and forward thinking vision is captured in their three hard truths, six pathways and two scenarios that Royal Dutch Shell developed in 2003. The three hard truths are: 1) global demand for energy is accelerating 2) 'easy oil' will not keep up with demand and 3) using more energy now means more carbon dioxide (Shell US 2009). Their six pathways are: Increase energy efficiency within the corporation. Create technologies that increase efficiency and reduce emissions. Develop low-carbon fuels. Help customers use less energy. Work with governments on effective regulation. Implement carbon capture and sequestration (Mckenzie-Brown 2008).

From the foreword of Royal Dutch Shell's 40 year energy plan, CEO Jeroen van der Veer describes two scenarios (Royal Dutch Shell 2008):

> Never before has humanity faced such a challenging outlook for energy and the planet. This can be summed up in five words: "more energy, less carbon dioxide".
>
> To help think about the future of energy, we have developed two scenarios that describe alternative ways it may develop. In the first scenario – called Scramble – policymakers pay little attention to more efficient energy use until supplies are tight. Likewise, greenhouse gas emissions are not seriously addressed until there are major climate shocks. In the second scenario – Blueprints – growing local actions begin to address the challenges of economic development, energy security and environmental pollution. A price is applied to a critical mass of emissions giving a huge stimulus to the development of clean energy technologies, such as carbon dioxide capture and storage, and energy efficiency measures. The result is far lower carbon dioxide emissions.
>
> We are determined to provide energy in responsible ways and serve our customers and investors as effectively as we can. Both these scenarios help us do that by testing our strategy against a range of possible developments over the long-term. However, in our view, the Blueprints' outcomes offer the best hope for a sustainable future, whether or not they arise exactly in the way we describe. I am convinced they are possible with the right combination of policy, technology and commitment from governments, industry and society globally. But achieving them will not be easy, and time is short. We urgently need clear thinking, huge investment, and effective leadership. Whatever your role in this, I hope these scenarios will help you understand better the choices you face.

While one Alberta Environment employee conjectured that Royal Dutch Shell's 2007 takeover of Shell Canada might coincide with a decrease in leadership (Interview #3), Royal Dutch Shell appears on paper to be taking a considerable leadership stance. The Muskeg River Mine was rewarded in 2008 with Alberta Environment's EnviroVista Award. To qualify as an EnviroVista Leader, a facility must demonstrate a

minimum five years of approved emissions performance, have an audited environmental management system in place and no Alberta Environment prosecutions in the past five years (Alberta Environment 2009c). Shell is the only oil sands operator to have qualified for this award. Shell Canada's Muskeg River Mine was, in 2004, the first oil sands mine to receive the ISO 14001 environmental management system registration (Shell Canada 2009c)

Land

Shell Canada's goal, as stated on their website, is to "reclaim with self-sustaining ecosystems that are comparable to or better than what was there before our development" (Shell Canada 2009b).

> "We do not wait for mining to finish to start reclaiming the land; we do it as we go along. As mining progresses, mined areas are filled in with sand and covered with the top soil that was saved during the stripping process. This allows reclamation to begin five years after production begins, minimizing effects on wildlife and plants, reducing visual impacts and limiting dust spread" (Shell Canada 2009b).

In 2006, Shell Canada announced it plans to invest 4 million CAD over 10 years in biodiversity offsets to mitigate the terrestrial impacts of their Muskeg River Mine (Interview #20, 22; Canadian Boreal Initiative 2008b). Also in 2006, Shell Canada collaborated with a European Space Agency funded project to obtain recent satellite imagery of their oil sands lease. Shell plans to use this imagery as a way to monitor future reclamation (Shell Canada 2007, 17). Because the Muskeg River Mine is relatively new, their footprint of disturbed land and tailing ponds are considerably less than other oil sands operators.

Air

Shell Canada's oil sands operations have the distinct advantage of being built when the regulations and technologies which reduce NO_x, SO_x, and VOCs are fairly well developed. In 2006, Shell's Muskeg River

Mine emitted 29,000 metric tonnes of sulphur dioxide with an intensity of 0.72 metric tonnes per thousands of cubic metres of bitumen production (Shell Canada 2007, 32). Shell's Muskeg River emits the lowest NO_x intensity of all currently operating oil sands projects (Dyer et al 2008). Despite their advantage in their relatively low rates of air emissions, their Scotford Upgrader which refines Shell's oil sands bitumen had a significant gas release after a fire in November 2007 which caused the evacuation of 3000 workers at the plant (Canadian Press 2007).

Water

In 2006, the Muskeg River mine withdrew 8.4 million cubic metres of water from the Athabasca River. This was a decrease of 61 percent from 2005 although, in part because of operational shutdowns and also increasing resource efficiency through use of on-site storage (Shell Canada 2007, 18). They expect future years to withdraw as much as in 2005, 21.5 million cubic metres. Their current Water Act Approval allows them to withdraw 55 million cubic metres from the Athabasca River (Alberta Environment 2008d).

Like many other oil sands developers, Shell Canada recycles up to eighty percent of is process water and tailings pond water. Indeed, they are known as the best oil sands developers for water re-use (Interview #11). Shell Canada is developing ways to reuse more water from their tailings ponds, use a closed-loop cooling tower and create more on-site water storage to reduce the amount of water they withdraw from the Athabasca River (Shell Canada 2007, 18). Shell developed, in conjunction with Natural Resources Canada scientists, the first commercial application of a new froth treatment technology that will use ten percent less water than conventional low temperature processing (Shell Canada 2007, 15).

Climate Change

According to Royal Dutch Shell's CEO, Jeroen van der Veer, "For us, as a company, the scientific debate about climate change is over. The debate now is about what we can do about it. Businesses, like ours, should turn CO2 management into a business opportunity and lead the search for responsible ways to manage CO_2, use energy more efficiently and provide the extra energy the world needs to grow. But that also requires concerted action by governments to create the long-term, market-based policies needed to make it worthwhile to invest in energy efficiency, CO_2 mitigation and lower carbon fuels. With fossil fuel use and CO_2 levels continuing to grow fast, there is no time to lose" (Brown 2008)

Shell has developed a number of technologies that reduces both upstream and downstream greenhouse emissions. Shell's new patented froth treatment technology will reduce greenhouse gas reductions by ten percent, amounting to a reduction of 40,000 metric tonnes of greenhouse gases (Shell Canada 2007, 15). Shell Canada is also known for its development of ultra-low sulpur diesel fuel, and alternative fuels through their investment in a Canadian-based company researching cellulosic ethanols. Cellulosic ethanol s can reduce greenhouse gas emissions by more than sixty percent. Shell has a patented process that uses amine solvents to scrub H_2S and CO_2 from our gas stream. The CO_2 can then be piped underground using carbon capture and sequestration technology (McKenzie-Brown 2008). Shell Canada is experimenting with ways that the sulphur from the hydrogen sulphide can be used as a carbon offset. Most recently they have been experimenting with incorporating sulphur into asphalt. Studies have shown that for every metric tonne of sulphur embedded in the asphalt, 0.970 metric tonnes of greenhouse gases are offset (Shell Canada 2007, 16). The company has also been experimenting with using excess sulphur as a less greenhouse gas instensive way to produce sulphur enhanced fertilizers and sulphuric acid.

In 2000, Shell Canada set a voluntary, industry-leading target for their oil sands mine to cut greenhouse gases by 50% below startup levels (2003) by 2010 (Shell Canada 2007, 14). That same year the convened

a climate change advisory council which included external international experts and began including the future costs of emitting CO_2 into the company's financial planning (Royal Dutch Shell 2009a). In 2003, a internal carbon dioxide council was formed to develop and implement a climate change strategy (Shell Canada 2007, 15). In the regulatory context, Shell Canada has been advocating for a CO_2 policy for the last five years in Canada (Interview #16). Current no federal legislation exists that requires mandatory reduction of greenhouse gas emission.

Their 2006 Sustainability Report listed their CO_2 emissions, including those produced at the Scotford Upgrader, at 3,190,000 metric tonnes with an intensity of 63.5 metric tonnes of greenhouse gas emissions per thousands of barrels of dry bitumen (Shell Canada 2007, 30). Total greenhouse gas emissions dropped in 2006 and emissions intensity increased. Both the total reduction and intensity increase were due to a major maintenance shutdown and operational upsets. Since Shell Canada's oil sands operations have only been producing since 2003 there were only four years of data to compare, limiting the power of any analysis. Currently Shell Canada is not on track to meet their 50% reduction target by 2010 and require another 45% reduction in greenhouse gas emissions to achieve their voluntary goal.

Stakeholder Engagement

While Shell Canada does participate in the Oil Sands Developer's Group it is not a part of the Oil Sands Leadership Initiative. It feels that some of these industry groups may be redundant (Interview #16). Shell Canada is co-chair of the Reclamation working group of CEMA (Shell Canada 2009b). Shell Canada has signed an environmental agreement with the Fort McKay First Nation to involve them in decisions about reclamation and end land use design (Shell Canada 2009b).

As an example of Shell's openness to engage stakeholders on Shell Canada's website is a video clip their Downstream Executive Director appearing on CNBC Europe's *Questions for the Future*, a series of global debates around energy challenges and the future of energy that is funded in part by Royal Dutch Shell (Shell Canada 2008a). In that episode, the Shell executive openly debates with Andrew Nikiforuk, author of *Tar Sands: dirty oil and the future of a continent*, environmental groups, government officials and investment firms on the sustainability of the Alberta oil sands. This demonstrates not only the willingness for Shell to proactively engage mainstream media but also the sophistication of their public relations deparment.

Reporting

Sustainable development reports going back as far as 1997 can be accessed on their website. However, because Shell Canada is now a privately-owned company, they are not required to produce an annual report. Their 2006 Sustainable Development Report uses GRI G3 reporting and are a B level reporter, meaning their report neither qualifies for the more rigorous A level nor has it been audited by a third party (Shell Canada 2007, 3).

It was sometimes impossible to disentangle the reporting figures from their oil sands mines from Shell Canada's other operations. In particular it was difficult to ascertain what environmental charges, orders and other forms of non-compliance were attributable to the Muskeg River Mine. Before the 2007 takeover of Shell Canada by Royal Dutch Shell, Shell Canada released an oil sands specific sustainable development report. However when asked if Shell Canada intends to produce an oil sands only report they replied that the current company policy is to only produce one sustainable development report for Shell Canada (Interview #16).

Shell Canada invited a panel of stakeholder representatives (Aboriginal, academic, community, employee, investor, local government, supplier and youth) to review a draft of the 2006 Sustainability Report. This panel issued a statement of recommendations that was included in the 2006 Sustainability Report (Shell Canada 2007, 36). From the list of recommendations it was clear that Shell Canada did not follow-up on the majority of the points in the 2006 report. At the time of writing the 2008 Sustainability Report had not yet been made publicly available.

CHAPTER FOUR:

COMPARISON OF OIL SANDS OPERATORS

INTRODUCTION

Before beginning an analysis on the environmental performance of these three companies it is critical to appreciate the challenge in acquiring quantitative and comparable data on these three companies. For example, the most recent Alberta Environment Compliance Assurance Annual Report available online is from 2005/2006 and outlines 47 charges with fines totaling $1,244,357 CAD, as well as 29 administrative penalties, 18 orders and 71 written warnings (Alberta Environment 2006a). Considering the amount of polluting industry in Alberta, it is very dubious to think that these numbers are representative of the actual number of environmental infractions. Since Alberta Environment pursues a strategy that prefers environment education and warnings to fines and penalties, it is very difficult to determine using the number of fines and penalties which operators have been 'better performing' then others. Indeed, Susan McRory, head of environmental prosecution for the province, warned, "you cannot use compliance or the number of prosecutions as a yardstick of environmental management" (Interview #6). The Pembina Institute, a well-respected environmental group in the Province, finds the same difficulty in using the number of prosecutions or compliance levels as a measure for environmental performance, but for different reasons. They feel the difficulty arises from the lack of transparency within the Government of Alberta agencies and because the Province chooses not take action on the majority of environmental incidents (Interview #20).

Further adding to the challenge, some of the most serious environmental infractions are not even prosecuted under statutory environmental legislation, like EPEA, but rather under criminal law using such misdemeanors as public endangerment or gross negligence (Interview #6). One example of this was concerning the Walkerton, Ontario water contamination tragedy, where the two men responsible were charged with public endangerment under criminal law for what lead to the deaths of seven people (Munroe 2007). As a consequence of charges possibly being laid in either statutory or criminal law, it is very difficult

to use the number of times a company has been prosecuted by Alberta Environment as a surrogate for the degree of environmental performance.

Moreover, some offenses are easier to prove in a court of law. Administrative violations, such as failure to report, or approval violations are easier to monitor and prove in a court of law and therefore are some of the most common environmental charges laid against companies (Interview #6; Alberta Environment 2006a). Charging a company who fails to consider, for example, cumulative effects, as permitted in an EPEA approval, is much more rare.

Furthermore, an ERCB official noted that you cannot use the number of questions, information requests or amendments during the ERCB approval process as metrics to quantitatively evaluate which oil sands operator is a stronger environmental performer (Interview #15). Indeed the ERCB feels there is no difference in terms of the application process to receive ERCB approval (Interview #15). The difficulty lies in the constant revisions between applicant and the Province. Even if these revisions were recorded, there is as of yet no system to track what occurs.

So what can be used to differentiate the environmental performance of oil sand operators? The Pembina Institute has attempted to tackle this issue through an oil sands report card called, "Under-Mining the Environment," published in January 2008 (Dyer *et al.* 2008). In it, they created a four-point scale that is applied to five areas: general environmental management, land management, air emissions, water management and climate change. They then overlaid information from obtained from surveys sent out to nine oil sands operators (three operators declined to participate: Canadian Natural Resources Ltd, Syncrude, and Total), the Alberta Environment Library in Edmonton, the Environmental Law Centre, annual reports as well as government and industry representatives. The result, albeit crude, was the most

comprehensive comparison of oil sands operators produced to date; certainly better than any publicly available information from Alberta Environment or industry groups, like the Canadian Association of Petroleum Producers, the Oil Sands Developers Group, the Oil Sands Leadership Initiative. Indeed, "Under-Mining the Environment" has proven to be the Pembina Institute's most downloaded publication in its history (Interview #20) and certainly highlights a problematic area for the provincial government: having easily accessible, comparable data on oil sands operators.

However, there are some aspects of the report that limit its usefulness. The Pembina Institute readily admits the challenge of comparing data. The information in their report is obtained from a variety of sources, which may not necessarily be accredited by a third party, and some of the data is aggregated differently. For instance, Suncor includes its in-situ oil sand operations in many of its statistics and the along with Syncrude, does not separate the environmental effects from their mining and upgrading operations. Shell's Muskeg River Mine on the other hand does not include their Scotford upgrader in their calculations.

Besides data management, there are operational differences among the three operators, which make comparisons problematic. The older plants, Suncor and Syncrude, have older infrastructure than Shell's Muskeg River Mine, causing them to have less efficient production or more 'operational incidents' than a newer plant using state-of-the-art technology (Interview #5). The older plants also have higher demand; their output is significantly higher than the Muskeg River Mine (Interview #5). The quality of the ore deposits also varies between operators. Lower quality ore will have more impurities such as heavy metals and sulphur, resulting in increased emissions. The location for each plant is different. Suncor's location directly adjacent to the Athabasca River results in different environmental demands than Shell's Muskeg River Mine.

As a result of these differences, it is problematic to compare, statistically, the environmental performance of oil sands operators. It is for these reasons, and not to duplicate the efforts made by the Pembina Institute, that this analysis will focus on interview data and the reported environmental management policies in place among oil sands mining operations of Syncrude, Suncor and Shell's Muskeg River Mine. To aid in comparability, the structure of this chapter will follow the same hierarchy as in the previous chapter, which gave in depth descriptions of each operator's environmental management policies.

It was interesting to note even with guaranteed anonymity, the refusal of all energy companies and all those representing the energy regulator or the energy industry, to share any information or opinions comparing oil sands companies. While this solidarity may help unite the industry it does not promote the critical self-reflection and peer evaluation that is needed if environmental management of the oil sands is to substantially improve.

HISTORY

While this analysis is not intended to be a historical comparison of environmental performance, there are a few basic points which must be made before moving the discussion to the present.

Suncor and Syncrude both began in an era (1960's – 1970's) when even the most basic environmental regulations were nascent, when the knowledge of the environmental effects of oil sands mining was comparatively shallow and when the environmental management systems to mitigate those effects were even shallower. That is not to say those early environmental managers were intentionally disregarding the environmental effects, but rather, the systemic uncertainty of the viability of commercial oil sands production, the traditionally myopic focus of energy producers in not considering or acknowledging responsibility for downstream effects, the seemingly endless supply of oil sands and the perceived

vastness and resiliency of the Boreal Forest all lead these two companies to develop in what today would be judged an ill-considered fashion.

Shell Canada's Muskeg River Mine, on the other hand, was birthed in an era (2000's), when environmental sustainability was on the forefront of the minds, or at least mouths, of many energy executives, politicians and local communities. The technological inputs and the regulatory backstops during this time were much more mindful of environmental considerations than during the start-up of Suncor and Syncrude's operations. According to Kem Singh, Approvals Manager with Alberta Environment for the oil sands region, over the last 20-30 years there has been a definite improvement among oil sands operators with respect to environmental management (Interview #10). Best practices are emerging from the mistakes learned in earlier years, however, in the last decade oil sands operations have become increasingly larger in scale and complexity resulting in what Singh calls "neutral environmental improvements" (Interview #10). It is this period of recent surge in scale and complexity that this analysis will focus.

CORPORATE STRUCTURE

The corporate structure among oil sands differed in a number of important ways. Suncor is the only publicly traded company; whereas, Syncrude is privately owned joint venture of energy companies, operated by Imperial Oil, of whom ExxonMobil has majority shares. Albian Sand's Muskeg River Mine is owned by a consortium of companies, and operated by Shell Canada, which in turn is wholly owned by Royal Dutch Shell.

Suncor has thirty-seven environmental health and safety staff on oil sands management who report to a VP of Sustainability who reports directly to the CEO (Suncor 2007a, 66). It was unclear how Suncor organized these thirty-seven staff. Syncrude addressed environmental management under a Regulatory and External

Affairs division of forty staff (Interview #19). The reporting lines for Syncrude's Regulatory and External Affairs division were unclear. Shell Canada has sixteen people operating under the GM of Sustainable Development, who are working in four discrete groups: mining operations, upgrader operations, greenhouse gas management and stakeholder engagement (Interview #16). They also have an additional twenty environmental staff onsite at the mine and upgrader.

It is interesting that Syncrude avoids using the title environment, sustainability or sustainable development to describe the division of the company that works on environmental issues. 'Regulatory and External Affairs' connotes that the main purpose is to meet regulations rather than innovate or have a forward vision. The environment is also not explicitly mentioned in the company's overall corporate strategy.

Besides these structural and semantical differences among these oil sands operators, four main differences in environmental management emerged from examining the corporate structure of Suncor, Syncrude and Shell: expertise, legitimacy, internal policymaking and transparency.

Expertise. The degree to which a company seeks outside expertise may be a function of the nature of their size and ownership structure. Unlike Shell and Syncrude who predominantly rely on the expertise provided internally through their parent companies, Suncor because of its smaller size, has had to hire outside consultants for much of its research that Shell and Syncrude can more readily access with their own internal resources (Interview #21). Shell and Syncrude also have much larger R+D departments than Suncor. This may result from the private owners of Shell and Syncrude are more willing to forego short-term profit than Suncor, who may be seeking a faster rate of return for their shareholders.

Legitimacy. For a publicly owned company, public legitimacy is much more important than for privately-owned companies, as their license to operate is held by a much broader range of stakeholders than simply other energy companies. By associating with different epistemic communities, it can be argued that Suncor has profited from increased legitimacy among oil sands operators. Shell and Syncrude do not need to be as accountable to the public as they are privately-held and can also rely upon the legitimacy created by brand of their parent companies. As a result they have chosen not to partner with as many outside organizations as Suncor who has partnerships with CERES, the Pembina Institute, the Alberta Conservation Association, Boreal Leadership Council, and the Oil Sands Leadership Initiative.

Internal policy. The nature of an oil sand operator's internal environmental policies may be a function of ownership structure. For example, when there was much more government ownership of Syncrude in the 1970's the company was known, unlike today, for its long-term perspective and incorporation of environmental concerns into their internal policies (Interview #23). As government ownership decreased in the 1980's there was a corresponding decrease in concern for environmental management. The government represents a stakeholder group, the public, who has much broader concerns and different conception of liability than an energy company or private investor. The reputation shift noticed after Syncrude's 2007 agreement with Exxon (Interviews #1, 3, 5, 7, 22, 23), also reflects how corporate structure can influence environmental management with respect to their degree of engagement with outside stakeholders. Suncor also saw a shift in their internal policies in the early nineties towards sustainable development and renewable energy concurrent to the company becoming publicly traded (Suncor 2009c).

Transparency. The most transparent company, also happens to be the only publicly traded company, Suncor. This suggests that there may be a relationship, linked to the need for legitimacy, for publicly traded

companies to be more transparent than their privately owned counterparts. This was clearly evident with Suncor's A+ rating with the GRI G3 Reporting System. Shell has a B rating, not audited by a third party, and Syncrude does not use GRI indicators at all.

REPUTATION

Reputation is certainly a difficult metric to enumerate. None of the companies have an outstandingly positive reputation with respect to their environmental management. However, from the twenty-three interviews conducted and the secondary literature surveyed, it is possible to isolate three rather distinct reputations for Suncor, Syncrude and Shell Canada.

Suncor has the reputation of having a sophisticated public relations department that can quickly and very convincingly respond to the environmental management issues that arise from their operations. Their press releases around environmental lapses are often very conciliatory in nature (Suncor 2009e), and reflect the 'frankness, clarity and insight' that they seek to have in their reporting (Suncor 2007a, 1). For many stakeholders, this well-polished persona does not disguise their "most problematic environmental legacy" (Interview #10).

While Suncor may be considered slick, Syncrude was seen by many interviewees as 'bullish' and the most 'American' of oil sands operators (Interview #1). Syncrude's equally frank approach lacks the transparency that Suncor espouses. The 2007 agreement with ExxonMobil, whose climate-change denying and highly litigious behaviour, has begun to sully Syncrude's reputation they have earned over the years as a leader in First Nations relations and reclamation research.

Shell has the reputation of being visionary and integrated. Those interviewed felt Shell was the environmental leader in the oil sands, undoubtedly influenced by the integrated management and long-term vision of Royal Dutch Shell (Interviews #5, 10). Royal Dutch Shell has certainly learned from their experiences in Nigeria and the Brent Spar in the 1990's, and turned their image around in a way that ExxonMobil, with the memory of the Exxon Valdez spill still vivid in the public's mind, has not. Shell also benefits from being a relatively new payer in the oil sands and has not had time to earn a negative reputation in the oil sands.

OVERALL ENVIRONMENTAL POLICIES

While difficult to distill an oil sands operator's individual action into an overall environmental policy, let alone make a comparison across companies, it nevertheless is possible to identify a few overall themes, which emerge from a company's sustainability reports and websites. It is important to note that these themes do not necessarily reflect on the actual environmental performance of the companies that will be discussed following this section but rather showcase how these companies frame their environmental policies.

Suncor has a clear, straight-forward environmental policy compared to the others, focusing on air, water, land, biodiversity and climate change. They use 'triple bottom line' thinking to guide organizational priorities. While simplistic, it clearly outlines their 'journey towards sustainable development'. Suncor is unique among the oil sands companies with their focus on renewable energy as a way to offset their environmental impact.

Syncrude focuses their integration of their environmental policies throughout the life of a project, from design to operation. This tight integration limits their ability to engage with the wider issues associated with the environmental management of the oil sands. Areas outside of the traditional expertise of employees

are less likely to be integrated. They also lack the global focus that Shell brings to their policies. Their policies typically lack targets and any consumer-facing goals. Syncrude certainly strives to meet government regulations but their policies do not indicate ambition to go beyond regulatory limits. This may be a reflection of the risk averse nature that joint ventures may have in managing an oil sands development, not wanting to promise more than the company can deliver. Unlike Suncor, they are seen to follow through on the plans they do have (Interview #21). Their environmental discourse is framed in terms of costs and not benefits (Syncrude 2007a, 3), propagating a negative or burdensome view of environmental management within the company.

Shell's overall environmental policies stand out in their level of sophistication and marketability. Using Royal Dutch Shell's three hard truths, six pathways and two scenarios, clearly and lucidly communicate the overall direction the company wishes to take with respect to environmental issues, in particular climate change. They emphasize responsibility within a global context much more effectively than Alberta-based Syncrude or Suncor. Their 2006 Sustainable Development Report, unlike Syncrude, clearly emphasizes in their sustainable development principles, the need to protect the environment and manage resources wisely for future generations. They are also the only oil sands company with an accredited ISO 14001 environmental management system (Shell Canada 2009c). That said, now that Shell Canada is no longer producing an Athabasca Oil Sands Project Sustainability Report, it is much easier to bury the environmentally problematic Muskeg River Mine within Shell Canada and Royal Dutch Shell's massive global operations.

In summary, Shell's overall environmental policies stand out significantly from the policies advocated by Suncor and Syncrude. Shell's integrated and long-term vision bears witness to their global reach and tenure as one of the oldest oil companies. While they can afford to minimize their oil sands projects within

their global operations, Suncor and Syncrude's primary revenue source is from oil sands development. Suncor's straight-forward, outward-focused environmental policy stands in contrast to Syncrude's mindful, though cloistered, approach to environmental management. All companies minimized the priority placed on goal-setting and thresholds.

LAND

Suncor, compared to the other oil sands companies being studied, has been more involved in conservation offsets and, as mentioned earlier, partnerships with outside environmental initiatives. They also have had a nature trail on reclaimed land open to the public since 2003. This indicates their priority to work with the outside community with respect to their land management and sets them apart from other oil sands developers. Granted, Suncor does have the most problematic management of their tailings ponds that leak significant amounts of tailings in the Athabasca River (Marsden 2007, 170). They also have had their North Steepbank mine approval withheld until they improve their performance of using consolidated tailings.

Syncrude is known among the three oil sands company as being a leader in land reclamation research and is known as their number one environmental priority (Interview #19). Both Syncrude and Suncor use the number of trees planted as a reclamation indicator. While the merit of this metric is questionable, to date Syncrude has planted over 5 million trees, two million more than Suncor, even though Suncor has been operating for 11 additional years. Their leadership position is also evidenced by their historically close partnership with the provincial government in developing reclamation standards and by being the first oil sands developer to receive government certification for a 104 hectare parcel of reclaimed land at Gateway Hill in 2008 (Interview #20). Granted this certificate was issued 30 years since the mine has been operational and only warrants merit vis a vis the reclamation performance of other oil sands companies. The recent Directive 74 from the ERCB, which seeks to improve tailings management (ERCB 2009c),

clearly indicates the industry-wise shortfalls in their reclamation activities. It is telling when a company's number one priority is an activity that requires the least amount of change from current management practices.

Shell's Muskeg River Mine, has only been operational for seven years, since 2002, and therefore does not have the same footprint on the landscape that Suncor or Syncrude has created over the last 30 – 40 years. That said, Shell has no publicly reported the amount of land it has disturbed to date at the Muskeg River Mine, although they appear to be taking a proactive approach, learning from the mismanaged reclamation of other oil sands companies, by using satellite imagery to act as baselines for future reclamation efforts. Shell Canada has said that it will invest 4 million CAD over 10 years on biodiversity offsets to mitigate the terrestrial impacts of their Muskeg River Mine (Interview #20, 22; Canadian Boreal Initiative 2008b). This is four times the amount Suncor has announced it plans to spend on biodiversity offsets. Syncrude does not current have any biodiversity offsets program.

Overall, in terms of self-reported total reclaimed area, Syncrude has reclaimed 23% and Suncor only 7.2%, although it is important to realize these numbers do not meet the government standards for reclamation. With respect to mitigating on site effects, Syncrude is clearly a leader in land reclamation; however, all operators have not reclaimed one hectare of tailings ponds, which remain a significant financial and environmental liability for oil sands companies. Suncor is a leader for offsite stakeholder engagement and mitigation over the impacts of their operations. Shell is taking a proactive stance on stakeholder engagement, on and offsite mitigation and reclamation, although it is much to early to see if these efforts result in "self-sustaining ecosystems' that is their goal (Shell Canada 2009c).

AIR

Air emissions are difficult to compare among oil sands operators because of different ages of infrastructure, production processes and technologies employed at each operations. Nevertheless, some general comparisons can be made.

While the intensity of NO_x and SO_x emissions have decreased for all of the oil sands operators analyzed, Suncor and Syncrude have seen increasing absolute air emissions resulting from increased oil production. Shell Canada's Athabasca Oil Sands Project, which includes their Scotford upgrader, saw SO_x emissions decrease over time. Shell's NO_x intensity is also the lowest of all oil sands operators (Dyer et al 2008). Suncor and Syncrude have seen recent increases in ground level concentration exceedences, mostly attributable to aging infrastructure; whereas Shell has had no environmental enforcements for the last five years. Between the two older operations, Suncor has taken the lead for reducing air emissions, with their first flue gas desulphurization units being installed in 1996, a full ten years before Syncrude, whose SO_x emissions are more than all other oil sands projects combined (Dyer et al. 2008). All oil sands projects have no voluntary targets to reduce or offset NO_x, SO_x or VOCs (Dyer et al 2008).

In general, no oil sands company stands out as leaders in the management of their air emissions. While Shell's Muskeg River Mine, employs much newer technology than Suncor or Syncrude, it is unreasonable to directly compare much of the data. Of all the environmental regulations and monitoring programs in Alberta that relate to air emissions are the most sophisticated of environmental regulations. In a relative sense, given the technology, regulations and monitoring systems in place to reduce air emissions, the environmental concerns surrounding reclamation, water conservation or greenhouse gas reduction technology poses a much greater liability.

WATER

For Suncor, water conservation is an environmental focus area. Suncor has been able to reduce their water withdrawals by 40% and their water intensity by 40% between 2002-2007. Despite this they currently withdraw 85% of their licensed 60 million cubic metres. Suncor feels that this license was large enough to not have to apply for any additional water withdrawal permits for their latest Voyageur application.

Syncrude is the most efficient water user in the oil sands industry, recycling 88% of their water. They believe "water management isn't much of a challenge" (Interview #19). They only are withdrawing 60% of their licensed 60 million cubic metres, compared to Suncor's 85%, despite Syncrude producing more barrels of bitumen per day.

Shell's Muskeg River Mine draws the least amount of water from the Athabasca River and is also known as one of the best water re-users in the industry, only withdrawing 39 % of their allocated 55 million cubic metres, recycling 80% of their withdrawn water. They also have the most on-site capacity for water storage (albeit only for 1.5 days (Dyer et al. 2008)), key for maintaining bitumen production levels when the Athabasca River experiences low flow periods.

Overall, with the exception of Syncrude revealing their one year water conservation targets post-hoc, none of the oil sands operators examined have consumer-facing water intensity and reduction targets (Dyer et al. 2008). Shell is the only operator to have any on-site storage capacity (Dyer et al. 2008). Considering the increasing water pressures that face the Athabasca River and the implications that the Lower Athabasca Water Management Framework may have on oil sands development, it is curious why companies are not taking a more aggressive stance at implanting water reduction targets and aggressively developing on-site storage capabilities.

CLIMATE CHANGE

Suncor has had a climate change action plan since 1997 (Suncor 2007, 31), and a greenhouse gas reduction program since 2002. In 2008 they were the first and only oil sands operator to publish a climate change report. In this climate change report, Suncor's CEO Rick George issues a statement, which is mean to re-assure concerned stakeholders about how the company manages climate change, though it does not link their companies emissions with the impacts that climate change will have on those outside of the company's sphere of influence. Suncor reports 61 million metric tonnes of carbon dioxide have been prevented because of their greenhouse gas management program (Suncor 2008c, 2). They use technology as their primary vehicle to lessen carbon dioxide emissions, while energy efficiency remains a lesser avenue. They are the only company studied that has publicly announced they use CO_2 pricing scenarios to understand how carbon taxes can affect their business planning, pricing out how much it would cost to adhere to Kyoto Accord standards (Suncor 2008c).

For Syncrude, planning for climate change is their third environmental priority after land management and managing non-greenhouse gas air emissions (Interview #19), despite Syncrude being one of Canada's largest emitters of greenhouse gases (Environment Canada 2009a). They seem to place more focus on energy efficiency than Suncor or Shell, despite their failure to reach a modest two percent reduction in energy consumption in 2007, which they ended up overshooting by seven percent (Syncrude 2007a, 55). Shortly after their 2007 management agreement with ExxonMobil, Syncrude announced it's adoption of ExxonMobil's Global Energy Management System, which aims to increase energy efficiency. Like Suncor, Syncrude see energy efficiency, through cooler process water temperatures, and technology, through carbon sequestration, as the best way to manage greenhouse gas emission. Interestingly, Syncrude's website avoids mentioning climate change, but rather opts to use the term greenhouse gas management. In their 2007 Sustainability Report, CEO Tom Katinas' statement does not use the phrase climate change

either. This suggests that Syncrude's leadership is skeptical themselves about the veracity of climate change, trying to decouple their company practices to the issue of climate change or sensitive to raising alarm among Syncrude's stakeholder groups and shareholders.

Shell's framing of climate change is entirely different from the other two oil sands operators. Instead of downplaying climate change, like Syncrude, or maintaining an image of control over the issue, like Suncor, Shell's discourse explicitly conveys a sense of urgency that the other two companies lack. Royal Dutch Shell's CEO Jeroen van der Veer has been quoted as saying, "With fossil fuel use and CO_2 levels continuing to grow fast, there is no time to lose" (Brown 2008). Shell is the only oil sands company that has a voluntary, absolute greenhouse gas emission reduction target that goes beyond provincial emission intensity requirements, 50% below startup levels by 2010 (Shell Canada 2007, 14). It is unclear whether Shell is on track for meeting this target. They adopted a greenhouse gas management program a year after Suncor in 2003. Shell has also been know for their research on creative carbon offsets that can be developed from sulphur.

Neither Suncor, Syncrude nor Shell Canada, linked water demand with the issue of climate change. As the Athabasca is a glacier fed river, its flow is poised to significantly decrease while the amount of companies withdrawing water from the river is planned to increase. Each company addressed water management and greenhouse gas emissions separately but all failed to integrate these issues. With the exception of Shell's Muskeg River Mine having an abnormal year in 2006, every year since 2002 all the companies studied have seen an increase in absolute greenhouse gas emissions. Their common solution is a carbon capture and storage technology, as advocated by the Integrated Carbon Dioxide Network (ICO_2N), of which all three companies are members (ICO_2N 2009). All three companies are involved, to varying degrees, in

policy advocacy for national climate change legislation, arguably in an attempt to create certainty and minimize shareholder risk around the impacts of future climate change policies.

STAKEHOLDER ENGAGEMENT

All oil sands operators are required to be involved and fund three regional environmental monitoring programs, WBEA, CEMA and RAMP. Also, all three operators have consulted with nearby Aboriginal communities on the reclamation standards.

Among the three oil sands operators studied, Suncor has been known as a leader in the recent provincial government-initiated multi-stakeholder dialogues and in having involvement in a wide variety of voluntary conservation initiatives beyond those initiated by the provincial government. Suncor is unique in their efforts to survey stakeholder perceptions over time, despite the decreasing perception from government, NGO and investment community stakeholders since 2003. While Suncor demonstrates their openness for dialogue by highlighting they have a consultation office for stakeholders in Fort McMurray, they appear to avoid certain difficult conversations by "focusing on things on which we can agree" (Suncor 2007a, 17). This position, which emphasizes "moving forward gradually," perhaps because of Suncor's long term tenure in the area, is in contrast to Shell, who advocates dialogue with a greater degree of urgency.

Syncrude, compared to Suncor, is involved in much less voluntary conservation partnerships. However, they are only oil sands company with an award winning Aboriginal relations program. While awards and partnerships do not by themselves reveal the quality of the interaction; they can serve as rudimentary indicators of success. Syncrude prides themselves on being able to access the internal expertise provided by their new partnership with ExxonMobil, especially with respect to their Global Energy Management Program, and does not consult any outside stakeholders for the development of their sustainability report.

Consequently, the inadvertently miss opportunities to consult with stakeholders and enhance the credibility and legitimacy of their environmental management.

Compared to the other operators, Shell is unique in its ability to publicly engage with outside experts and encourage difficult conversations. Their involvement with CNBC's Questions for the Future, where Shell executives openly debated with environmental critics, government officials and investment firms on the sustainability of their oils sands operations, is linked to the company website. Shell, despite their access to internal resources and in contrast to Syncrude, prides themselves on openly seeking outside experts to assist them in their climate change and reporting policy. It was unclear if Shell's relatively new arrival in oil sands mining has been considered an advantage to stakeholder engagement, not having to manage the results of previous mistakes, or a barrier, some local relationships, especially with Aboriginal communities take time to build trust and familiarity.

Stakeholder engagement, in and of itself, does not necessarily lead to an improvement in environmental management. Consideration of the quality and the nature of the interaction and how the resultant gains in social capital are to be managed are essential if stakeholder engagement is to be framed as a benefit to corporate environmental governance. From the paucity of data available, it was difficult to determine the quality and nature of these engagement efforts. However, it was possible to determine how these three oil sands companies approach stakeholder engagement. Suncor is certainly open to engage and develop industry best practices in stakeholder engagement; however, they tend to shy away from highly contentious issues that need more urgent attention. Syncrude highlights activities that have now become industry standard practices, consulting First Nations and their involvement in WBEA, RAMP and CEMA, while missing opportunities to externally legitimize their own activities by pursing policies which exclusively rely on internal resources. Shell, not as embedded in the local context, seeks to follow neither Suncor nor

Syncrude's path, by publicly engaging outside stakeholders, in a very media savvy format, on issues that are first and foremost on the public mind.

REPORTING

With regards to overall reporting initiatives, Suncor has taken a leadership position. They are the only oil sands operator using the third party verified A+ level Global Reporting Initiative G3 Guidelines for their sustainability reports and are the only operator to have several awards for the comprehensiveness of their reporting. As a result of these guidelines, their reports contain much more data. While length is not necessarily an indicator of quality of analysis or comprehensiveness, Suncor's 2007 Report on Sustainability is more than double in length than Shell's 2006 Sustainable Development Report and is thirty percent longer that Syncrude's 2007 Sustainability Report. As mentioned earlier, they are also the only company that has created a climate change report. Their reports, while still lacking in many areas, have a frankness in them, especially in regards to their environmental contraventions that acknowledges their responsibility to mitigate the environmental spillover effects their operations cause.

Syncrude began publishing sustainability reports since 2002, five years after Suncor began reporting on social and environmental indicators. Syncrude, unlike Suncor or Shell does not use or intend to use GRI indicators in their sustainability because they feel their current metrics are 'useful for them' (Interivew #19). Currently, they are the only oil sands operator to release a report on an annual basis. Unlike Suncor or Shell Canada, for whom climate change is a core issue in their reports, climate change is not mentioned in Syncrude's annual sustainability reports. Instead, climate change is framed as greenhouse gas reductions. This subtle, yet profound difference, highlights Syncrude's opaque approach to addressing climate change. It appears they want to avoid taking a stance on climate change by de-linking their operations from global climate change.

Shell Canada's Sustainable Development Reports, go back to 2002, the initial year of the Muskeg River Mine and the same year Syncrude began sustainability reporting. Shell Canada's 2006 Sustainability did not, like Suncor, have a third party certified A+ GRI rating; however, Shell did publicize that it vetted drafts of their 2006 Sustainable Development Report with a group of stakeholders, unlike Syncrude or Suncor. Shell by far produced the most brief report and contained the least amount of information on their oil sands specific information. Their report also had the largest scope further adding to the paucity of data.

As mentioned earlier, comparing data across the reports is difficult as some information includes their in-situ oil sands operations (Suncor), their conventional gas operations (Shell Canada), or does not include environmental outputs from their upgrader (Shell Canada). All of the reports, with the exception of Shell's greenhouse gas emission target and Syncrude's one-year targets, revealed no long-term targets for environmental management.

CONCLUSION

I found that there is significant variation in how these companies have responded to the challenges of reducing the environmental impacts of their operations. Table 2, below, provides a summary of environmental performance of Shell Canada's Muskeg River Mine, Suncor Energy, and Syncrude. While the indicated values are decidedly qualitative in nature, they are meant to give an ordinal sense of how these companies compare to one another. Undoubtedly, these differences are influenced by the quality of bitumen as well as the age, location, size, upgrading and refining capacity of oil sands developers, as they seek to maximize shareholder profit. Arguably, these differences in environmental performance are also influenced by corporate structure, the degree and nature of stakeholder engagement, and the institutional culture, resulting in three distinct ways of framing corporate responses to similar environmental mandates.

Suncor projects a calm disposition, which earnestly explains that they have environmental management of their operations under control. Syncrude, bullish and independent, sees the environment in terms of costs and not benefits, while relying on their own internal resources over collaborating with outside actors. Shell Canada, exudes a sense of urgency about climate change and humility about the future but not without having a well-articulated plan.

Table 2: Summary of differences between three oil sands operators. (*1=strong performance; 5=weak performance*)

	Shell Canada's Muskeg River Mine	Suncor Energy	Syncrude
Corporate Structure	2	2	4
Reputation	2	3	5
Overall Environmental Policies	2	3	4
Land Management	4	4	3
Air Emissions Management	2	3	4
Water Management	2	4	3
Climate Change	2	3	5
Stakeholder Engagement	3	2	3
Reporting Initiatives	3	2	4
Average	**2.4**	**2.9**	**3.9**

All companies are motivated to become stronger environmental performers because of potential cost savings through avoided project delays, fines, and litigation; maintenance or improvement of their social license to operate through stakeholder engagement, political lobbying and glossy publications; and anticipation of future regulations through close relationships with government. Not surprisingly, they all

seek to maximize profit while minimizing risk and uncertainties that are material to their individual operations.

I suggest the variation of environmental performance is an organic response to the innate discretionary nature of environmental policymaking in Alberta, the lack of government leadership and the degree of initiative demonstrated by each company. From my research it is clear that the inconsistent and at times vague government policy and regulations, opaque government agencies, poor monitoring and enforcement, inadequate incentives and penalties does not effectively encourage stronger environmental performance among oil sands developers. At the same time, internal corporate strategy, often in response to the recent pressure from environmental groups, First Nations communities and international media compels some companies to innovate and others to simply follow the regulations. Maintaining their social license, reducing costs, and anticipating future regulations have all been cited as motivation for innovation. Those companies advocating the status quo, like Syncrude, cite the exemplary regulatory framework already in place and the adequacy of existing stakeholder engagement processes. Whereas corporate environmental leaders, like Shell Canada, are frustrated by the uncertainty around environmental policies created by the provincial government and are creating their own venues for collaboration.

CHAPTER FIVE:

POLICY RECOMMENDATIONS

INTRODUCTION

In previous chapters I described the government regulations and policies that currently prescribe how environmental management of Alberta's Oil Sands is supposed to be handled. And, I have compared the environmental policies of three of the major oil sands developers in Alberta. I found that there is significant variation in how these companies have responded to the challenges of reducing the environmental impacts of their operations. Undoubtedly, these differences are influenced by the quality of bitumen as well as the age, location, size, upgrading and refining capacity of oil sands developers, as they seek to maximize shareholder profit. Arguably, these differences in environmental performance are also influenced by corporate structure, the degree and nature of stakeholder engagement, and the institutional culture, resulting in three distinct ways of framing corporate responses to similar environmental mandates. In each case, the company is striving to minimize risk and uncertainty by maintaining close relationships with the provincial government, helping them to better anticipate future environmental regulations.

All companies are motivated to become stronger environmental performers because of potential cost savings,[22] maintenance or improvement of their social license to operate[23] and anticipation of future regulations.[24] Not surprisingly, they seek to maximize profit while minimizing risk and uncertainties that are material to their individual operations. In a landmark empirical study, Klassen and McLaughlin (1996) found significant positive returns for firms with strong environmental management. And while these motivators have caused on-the-ground differences in how these three companies operate,[25] at the current time, they alone are insufficient to encourage oil sands operators to improve their environmental performance to the

[22] Through avoided project delays, fines, and litigation. All companies have reduced the amount they spend on refining by reducing by half the temperature needed to extract the bitumen from the sand.
[23] Facing increasingly harsh criticism on their environmental management, all the companies have become more concerned about the public image of their company.
[24] While no federal greenhouse gas emissions legislation exist, all companies are lobbying Ottawa and Washington, DC for more regulation and less uncertainty in this area.

point where the environmental concerns facing their operations can be addressed in an appropriate and timely fashion.[26]

Realistically, it is highly unlikely that either the federal or provincial government is going to stop oil sands operations from expanding. However, in my view, to minimize the disparity among environmental practices of oil sands operators and to minimize the potential liability facing the Province, the provincial government needs to take an increased role in managing the environmental and social impacts of oil sand development. Both the provincial government and oil sands operators are feeling increasing international pressure to improve their environmental performance.[27] The pressures on government to act, however, are different from those facing energy companies because: A) The Province is constitutionally mandated to protect the ecosystem and human health throughout the entire region. While oil sands companies have environmental requirements stipulated in their ERCB and EPEA approvals, they are not mandated to consider cumulative environmental costs or social costs. B) Unlike oil sands companies, the provincial government is elected. Provincial policies need to reflect public opinion or politicians risk not being re-elected.[28] The Province has accountability to all Albertans, not simply investors in oil sands development. C) Oil sands are geographically and economically linked to Alberta. Many oil sands operators or their parent companies, while having substantial operating capital in Alberta, have other operations outside of the province and other opportunities to demonstrate environmental leadership. Alberta cannot as easily shift its efforts elsewhere to demonstrate that oil sands development is being handled in a sustainable manner. Its

[25] Suncor, Syncrude and Shell Canada have all gone well beyond the regulations for water efficiency, greenhouse gas emission intensity and reporting standards.
[26] In particular, land and tailing pond reclamation, greenhouse gas emission reductions, and environmental monitoring have proven problematic when managed by industry.
[27] International media coverage has undoubtedly increased in the last three years and the Government of Alberta has started sending delegations to international climate treaty negotiations. During the same time the quality of environmental reporting by the three oil sands operators has increased as well.
[28] Granted, at the time of writing, the Progressive Conservative Party has been in power for thirty-eight consecutive years.

reputation has much greater exposure than the oil sands operators themselves. The increased role that the provincial government must take needs to account for these motivations.

Whatever steps are taken must go beyond the current program enacted by the provincial and federal governments, which arguably allowed the environmental liabilities that now exist in the oil sands region to occur. The former Alberta Premier Ralph Klein as once quoted as saying, "to have a long-range plan would be an interventionist kind of policy which says you either allow them [oil sands projects] or you don't allow them to proceed. The last thing we want is to be an interventionist government" (in Nikiforuk 2008, 28). While this mentality may have sufficed for the province until the early 2000's, it is increasingly becoming clear that the 'emperor may have no clothes'.

FUTURE POLICY AND REGULATION

Granted, the provincial government has responded to this exposure by shifting efforts to redress the laissez-faire, distributed governance model of the 1990's (Interviews #1,2). The Lower Athabasca Water Management Framework and the ERCB's Directive 74 illustrate this effort. More recently, regional land use frameworks, cumulative effects legislation and long term oil sands development plans have begun to emerge.

Regional Land Use Planning

The Government of Alberta is developing regional land use planning, a first for the Province.

In December 2008, the provincial government published the Land Use Framework (Government of Alberta 2008b). Although the government has been speaking about integrated land management since the late 1970's. In this document, the government confessed that there is no formalized coordination between

crown land use and municipal lands. From the effects that recent oil sands development has caused on the Municipality of Wood Buffalo/Fort McMurray, this confession does not come as a great surprise.

The Land Use Framework identifies the following policy gaps: managing subsurface and surface activities, reducing the fragmentation and conversion of agricultural land, developing transportation and utility corridors strategy, managing recreational use of public lands, conserving biodiversity, managing flood risk (Government of Alberta 2008b, 45,46). It plans to address many of these policy gaps by creating seven regional land use regions with seven regional advisory councils and seven land use plans along with a coordinating land use secretariat (Government of Alberta 2008b).

One former Alberta Environment employee admitted, "current strategies are disconnected from monitoring and enforcement" (Interview #11). Indeed, the land use framework's scale, Northeast Alberta, may be too large for the issue of how to responsibly develop the oil sands. The current Oil Sands Secretariat, operated out of Alberta Treasury, is responsible for coordinating oil sands development across 16 provincial agencies. There is certainly a need for additional coordination. One Alberta Energy official noted that current communication across agencies is poor and that the Oil Sands Secretariat is helping improve communication. However, this office may already have too wide of a mandate, and too little resources to effectively coordinate such a complex issue.

Malcolm Sparrow of Harvard University's Kennedy School of Government, advocates a 'problem-solving or risk management approach' whereby policymakers are not overwhelmed by the complexity of the region and can instead focus on using the right tools for the problem (Sparrow 2000).

Cumulative Effects Legislation

Historically the Government of Alberta has poorly managed the cumulative effects of oil sands development. Several Alberta Environment employees noted that EPEA and the Water Act are insufficient for addressing cumulative effects (Interview #11). CEMA, the group responsible for managing cumulative effects in the oil sands region, has no regulatory backstop (Interview #5). In the December 2008 Land Use Framework, the province openly admitted that throughout the province they did "not address the combined or cumulative effects of multiple developments taking place over time" (Government of Alberta 2008b, 3). Despite the consideration of cumulative effects being mandated by both EPEA and the Canadian Environmental Assessment Act, the discretionary language in those acts allow the government to merely consider the impacts and then proceed at the discretion of the Act's director.[29] Indeed there is no precedence in Canada for an act focusing specifically on cumulative effects (Interview #6). However, a cumulative effects management act is scheduled for promulgation in 2010/2011 (Interview #1).

Responsible Actions Plan

On February 12th, 2009, the provincial government produced a long-term plan for oil sands development, "Responsible Actions: a plan for Alberta's Oil Sands" (Alberta Treasury Board 2009). This report builds on three reports *Investing in our Future: responding to the rapid growth of oil sands development* (Oil Sands Ministerial Strategy Committee 2007), *Oil sands consultations: multi-stakeholder committee final report* (Government of Alberta 2007a) and *Oil sands consultations: aboriginal consultation final report* (Government of Alberta 2007b).

While this strategy is long due, 6 months past when the Alberta Oil Sand Secretariat had posted on their website, and needed. It fails to live up to many people's expectations. There are no time lines given, no funding sources suggested or agencies explicitly tasked implementing these 'actions.' The report cites past

[29] Cumulative effects management has been mandated by the United States National Environmental Protection Act since 1978.

planning efforts but fails to give sufficient detail for anyone to hold them accountable to the plan. One Environmental Canada official called it, "a disastrous piece of policy, a recycling of vague commitments of the past" (Interview #22). Not all recommendations that were made in the Multistakeholder reports could be addressed in the Responsible Actions report, says on Oil Sands Secretariat official, as some are under the purview of local or federal governments (Interview #9). Other recommendations concretely under the purview of the provincial government failed to make the long-term strategic plan.[30] One Alberta Environment employee shared, "All parties [government, NGOs, industry] get distracted on short-term yearly budgets and quarterly reports but they really need to be managing 100 years into the future" (Interview #10).

Overall, these three policies demonstrate that the Government of Alberta is attempting to super-impose forward-thinking policies and regulations without addressing the weaknesses of existing management practices. In addition to these three new initiatives, the provincial government should focus on policies that will enhance transparency, recover credibility, and demonstrate responsible leadership.

PERCEPTIONS

Many of the Alberta Environment and Environment Canada bureaucrats interviewed, along with the Pembina Institute, acknowledge that the current support structure of policies is no longer sufficient, admitting the need for better cumulative effects management (Interviews #4,5,8,9,20,22). Views of Alberta Environment employees ranged from "the current regulations do as well as they can" (Interview #8) to

[30] For example, review, update and implement new version of IL 96-7 (Memorandum of Understanding between Environmental Protection and Energy and Utilities Board) for application and environmental impact assessment review to improve regulatory and review coordination including consideration of federal/Alberta cooperation agreement on environmental assessment (V3.S1. Action 1.6 [C]), utilize caps as one of the approaches for air emissions in the Oil Sands Areas (V3.S4. Action 4.2 [C]), and implement *interim* precautionary6 based environmental and emission thresholds, guidelines and frameworks based on the best information currently available, to be updated or replaced as new information is obtained and better management tools are developed (V3.S4. Action 4.3 [NC]) are all unanimous recommendations from the Multistakeholder Report that are not mentioned

"absolutely atrocious" (Intervew #11). One Environment Canada employee identified that "there are gaps or weaknesses in existing regulations where either issues are not being regulated or the regulations exist in paper only because we don't have the info available to determine if the companies are in compliance or not" (Interview #22). Ernie Hui, Assistant Deputy Minister for Environmental Assurance and Oil Sands Environmental Management with Alberta Environment admits the "current policies are geared towards 'normal developments' not huge complex problems like the oil sands" (Interview #7).

Industry and ERCB officials were much more confident of the effectiveness of the current regulations to address the environmental effects of oil sands development, although they were unable to provide any examples of such efficacy (Interview #12, 14). One Suncor employee felt that the current EPEA regulations are the most rigorous in North America, with over 4600 regulations (provincial and federal) for an oil sands developer (Interview #14).

There are currently not many incentives within existing policies and regulations to encourage stronger environmental performance (Interview #4). What incentives do exist are often underutilized (e.g. transferring unallocated water rights, Interview #3). While the province does have an awards scheme for strong environmental performers, Alberta Environment's EnviroVista Program (Alberta Environment 2009a), it too is underutilized.

TRANSPARENCY

Limited access to information should be a critical concern for the Government of Alberta. In a controversial article written by UCLA political scientist Michael Ross (2001), three mechanisms were suggested which link oil wealth to authoritarianism: *the modernization effect* which suggests that certain social changes that

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at all in the Responsible Actions Plan.

tend to produce more accountable governments are retarded in oil-rich countries; *the repression effect*, where resources can allow countries to spend more on internal security to block the populations democratic aspirations; and lastly, *the rentier effect* whereby oil revenues can purchase public support through low taxes and high spending, while decreasing the ability for civil society to criticize the government.. In the academic debate and analysis that followed his 2001 article, many scholars challenged Ross' ideas and in 2009 Ross himself revised his assertions, saying there is now little evidence to support the modernization or repression effect. The rentier effect, however, still has evidence to support it.

When applied to the case of Alberta, the rentier effect may help explain some of the government's behaviour. The provincial government has been accused of buying the support of Albertans. Then Premier of Alberta Ralph Klein spent 4 billion CAD on power and natural gas rebates before the 2001 elections and 1.4 billion CAD in prosperity cheques in 2005 (Nikiforuk 2008, 158). Alberta has the lowest taxes in the country, with no sales tax and a flat income tax of 10 percent. Alberta also has poor voter turnout. Only 21% of people in the Regional Municipality of Wood Buffalo voted in the 2008 provincial election, the lowest in the province (Leger Marketing 2008, 5). Provincially, the election also had the lowest turnout in the province's history, 41%, the lowest any Canadian province has seen in 50 years (CBC News 2008). Alberta also has not been known for having transparent public institutions. In 2007, the ERCB (then Energy Utilities Board) spent $100,000 to hire private investigators to spy on citizens concerned about high-voltage transmission lines running over their land. Phones were tapped and moles planted in citizen meetings (Calgary Herald 2007). While the Province responded by introducing a new bill to divide the EUB into two regulators and overhaul their public hearing process (CBC 2007), the spying scandal made national headlines as an example of the energy industry's grip on Alberta's public institutions. The province's high public spending, low taxes, and its poor record for civic engagement have caused some to believe that Alberta has become another case of the rentier effect.

Transparency can be increased and the authoritarian inertia of the rentier effect lessened through better management of information. Indeed, one former Alberta Environment employee suggests that the Government of Alberta needs to "focus on being a broker of information" (Interview #11). This information needs to honestly reflect the environmental impacts of oil sands development on the environment, revealing not just rose-coloured improvements but also observed setbacks, potential liabilities and material risks to the people of Alberta. To begin fulfilling their role as information broker I suggest the Government of Alberta focus on five key actions: digitizing all environmental information, selecting appropriate environmental indicators, standardizing corporate and government reporting requirements, analyzing environmental information collected, and sharing all its analyses with the full range of government agencies, oil sands operators and the public.

Digitize: Currently there is limited information about the environmental performance of oil sands companies available in a digital format. Historic and current environmental performance information should be digitized. This will facilitate improved data management, analysis and distribution. Requiring interested parties to search through paper copies in Alberta Environment's Edmonton library reflects an outmoded approach to data management and indicates the low priority given by the government to transparency.

Select: Selecting appropriate environmental indicators can help demonstrate Alberta Environment's intention to be more transparent by facilitating the ability for the public to interpret digitized data. The stoplight approach in the Lower Athabasca Water Management Framework and the air emission thresholds in the Industrial Heartland are improvements in how the Province approaches indicators. However, there is not a similar framework for monitoring cumulative effects, biodiversity, groundwater pollution or reclamation activity, all identified as areas needing increased attention from the government.

Indicators are typically user driven, developed collaboratively to serve the interests and information needs of a variety of stakeholders, policy relevant and highly aggregated (Hammond *et al.* 1995). Such indicators might include: the ratio of disturbed to reclaimed land, the number of rare cancers downstream of the mines, the quantity and health conditions of local fish stocks, amphibian and caribou population size, or aggregated statistics such as the total air emissions (NO_X, SO_x, CO_2, VOCs) for all oil sands developments or the total number of oil sands environmental infractions. While indicators may not be an appropriate tool for public education or technical assessment, they do serve as excellent measures of environmental performance (Brugmann 1997).

Standardize: The variation I found in the way oil sands operators responding to reporting requirements suggest that current corporate reporting standards are unclear or inadequately enforced. Indeed, I encountered the same difficulty that the Pembina Institute had when trying to compare the environmental performance of oil sands companies. Standardization can aid in the comparison of oil sands companies by ensuring consistency in reporting, which in turn will be vital for a robust analysis. Standards will also dispel the myth within Alberta Energy, the ERCB and oil sands companies that there is no difference in environmental performance among oil sands developers. Moreover, standards will reflect the government's desire to improve transparency while creating the data necessary to encourage competition among the environmental managers of the oil sands operators.

Some third-party environmental standards like the ISO 14001 environmental management system can benefit a firm even if the effort to standardize occurs at their own impetus regardless of local institutional arrangements. Although Delmas (2004) found that the regulatory, normative and cognitive aspects of a country's institutional environment significantly affects their adoption of the voluntary standardized ISO

14001 environmental management system.[31] Regardless of institutional environments, Dowell et al. (2000) analyzed the performance of companies who used global environmental standards have a much higher market value than firms who do not.[32] In other sectors, reform of California's educational standards during the 1980's and 1990's saw improved academic performance and overall positive reactions from parents and policymakers (Cohen 1996, 114). Thus standards can be a method to encourage competition while shifting the operational practice of entire sectors towards a desired policy outcome.

Analyze: Why was the Pembina Institute the first organization to publicly compare the environmental performance of oil sands operators? Is this not a role for government? The 2008 Joint Community Update for WBEA, RAMP and CEMA contained little if no interpretation of the data the organizations are mandated to monitor. Industry officials complained that the public easily misinterprets the technical environmental information they report to the government.

Aside from digitizing the data and selecting appropriate indicators, the Province needs to not only use the information to improve the environmental management of the oil sands but also use data analysis as a tool to improve transparency. For instance Environment Canada maintains a climate database that tracks data across the country. Until scientists David Schindler and William Donahue obtained the data in 2001, the data had not been analyzed (Marsden 2007, 109). They found that the flow in the Athabasca had decreased 30% since 1970. The South Saskatchewan based, subject to heavy withdrawals for irrigation had reduced its flow by 84%. Yet this analysis had ostensibly not been used to inform government decision makers. Data collected on reclamation monitoring by Alberta Environment needs to shape the reclamation policies of the ERCB. Hunting and trapping information collected by Alberta Sustainable Resource

[31] 52% of ISO 14001 certified facilities are in Europe, whereas only 4.5% are in the United States (Delmas 2004).
[32] Indeed, they may be more profitable adhering to global environmental standards than lax local environmental regulations.

Development can be correlated with the rate of oils sands development to better understand how the development has affected wildlife populations.

While Walters and Holling (1990) agree that process management and diligent data analysis alone will not provide answers policy makers can trust, robust data analysis can help to reduce the uncertainty in which policy decisions must get made and facilitate science-informed adaptive management.

Share: The desire by oil sands companies to protect proprietary knowledge has been used as a convenient excuse to silo information among different government agencies and prevent information from reaching the public. Acquiring detailed information from the Government of Alberta on the environmental performance of oil sands companies, unlike the survey technique used by the Pembina Institute to solicit information from oil sands companies, often takes many months and significant expense, because of the need to use the *Freedom of Information and Protection Act* to access the information (Interview #20). This does not reflect the spirit of transparency that is needed to improve the environmental management of the oil sands let alone the image the provincial government wants to portray. One Alberta Environment employee has noted that environmental groups are producing more extensive, better researched reports than the environmental ministry themselves (Interview #5), pressing the need for the provincial government to improve their reporting practices.[33] Post and Altman (1994) identify poor sharing of information as one of the key barriers to improving environmental management.

I propose that information sharing needs to be enhanced between agencies and with industry and the public, particularly those communities most affected by oil sands development. This will minimize the frustration and cost experienced by many stakeholders, help inform better management decisions, address

the paucity of comparable, historical data available and reduce the opportunity for that data to be poorly or inappropriately interpreted by other agencies, industry or civil society groups and promote collaboration among stakeholders. Because the data will be digitized, standardized, indexed and analyzed, the government will demonstrate their due diligence by using and creating best practices in environmental management. This will build capacity across the public, private and non-profit sectors and enable the government to better communicate and enforce their own environmental regulations.

The sharing of information similar to what was contained in the Pembina Institute's Oil Sands Report Card would be a starting point (Dyer et al. 2008). The popularity of Report Card, as the Pembina Institute's most downloaded report, demonstrates the public demand for more comparable information. Sharing digitally may not be appropriate for all groups; public presentations of information should also be made, especially in remote Aboriginal communities. It seems reasonable that the Oil Sands Secretariat, who is responsible for coordinating oil sands planning across eighteen government agencies, also be charged with the mandate to coordinate the sharing of information.

IMPROVE MONITORING AND ENFORCEMENT

Currently, the credibility of the province to mitigate the environmental impacts of the oil sands is suffering from a major decline nationally and internationally. Their extremely effective campaign to develop the oil sands, without properly considering the environmental impacts, has left them not only with significant financial liabilities should an environmental disaster take place, but has also discredited them as advocates for sustainable resource development. As described in previous chapters, the Government of Alberta has responded by increasing political lobbying with Ottawa, Washington, DC and international climate change negotiators to dispel the image of 'dirty oil.' In summary, the Government of Alberta has claimed that oil

[33] The current Alberta Environment platform for viewing EPEA approvals is over 9 years old and is not intuitive to most users.

sands development can be done in a resourceful and responsible manner, for the benefit of all Albertans. They claim that the Province has strict on the ground measures to protect air, land water and wildlife (Alberta Environment 2008a, 1). They also claim that with carbon capture and storage, the oil sands can reduce their carbon emissions by 50 percent, and are confident that tailings ponds can be reclaimed back to its natural habitat.

While this position may indicate resourcefulness in forecasting the development of future technology and in making assumptions on areas in which admittedly the Province knows very little about (e.g. tailings ponds and groundwater, effects of oil sands on wildlife). Recalling the effects that oil sands development has on the environment as outlined in the introductory chapter, it seems highly unlikely that the Province understands the oil sands' full effects. Granted they admit they are on a 'journey towards sustainability', they have never, in my research, admitted the need to exercise caution at the pace or scale of development that is taking place.

It is true the Province has recently created plans and dialogues (Radke Report, Multistakeholder Dialogues, Responsible Actions, etc), new government divisions (Oil Sands Environmental Management and the Oil Sands Secretariat) and new government policies (Lower Athabasca Water Management Framework, Land Use Framework, ERCB Directive 74) to better address the environmental management of the oil sands.

As badly needed as these initiatives have been, the Government of Alberta has not questioned the pace of development. Their newly minted long-term plan, *Responsible Actions*, does broach the subject at all (Alberta Treasury Board 2009). As a result of this unacknowledged taboo area and their reliance on unproven technologies the Government of Alberta is still failing to convince oil sands critics that they can develop the oil sands in an environmentally responsible manner. Indeed during the third phase of

environmental policy (2005 – 2009), when the Government of Alberta has pursued a more systemic policy approach, the number of their detractors has only risen. There is therefore tremendous need to increase the trustworthiness and expertise of the province with respect to the environmental management of the oil sands beyond the current and planned initiatives. Given the current provincial environmental policies described in Chapter 2 and the corporate environmental policies described in Chapters 3 and 4, I recommend the Province focus on improving environmental monitoring and enforcement. These two areas are not adequately addressed by the Province's recent initiatives. By investing significantly resources in these two areas the Government of Alberta could stand to improve their credibility, incentivize companies to adhere to government regulations and ideally decrease the environmental liabilities posed to the people of Alberta by current and planned development.

Improve monitoring

Environmental monitoring of the oil sands region is managed by WBEA and RAMP and contracted out to private environmental consulting firms. As demonstrated in previous chapters, the current monitoring system has significant flaws that undermine the Government of Alberta's credibility to effectively manage oil sands development. Despite the Athabasca Oil Sands region being the most environmentally monitored region in the province, it does not produce enough data of sufficient quality to provide credible information to the public or government decision makers (Interview #10). Indeed environmental lawyers with Alberta Justice find it very challenging to acquire sufficient data to enforce many of Alberta's environmental regulations in the region (Interview #6). Furthermore, it currently is impossible to know if the current monitoring data is sufficient because it is not publicly accessible. Judging from the aforementioned comments given by government employees, it remains doubtful that even if such data were publicly accessible that it would be sufficient to provide more credible information for the public and government managers.

The current system of implementation monitoring through industry self-reporting and effectiveness monitoring through stakeholder driven monitoring programs (CEMA, RAMP, WBEA) is therefore proving insufficient to ensure effective environmental management and effective prosecution. Stadt et al. (2006) explains the need for validation monitoring, which makes cause and effect conclusions on what agents are affecting the local environment, to compliment the implementation and effectiveness monitoring already in place. While there certainly is need for stakeholder driven monitoring schemes, validation monitoring is best managed by scientists who can create a monitoring system that can create cause and effect, legally defensible correlations.

It is true the reasons for why monitoring plans fail is manifold and that government is not immune to these failures (Moir and Block 2001).[34] Yet, industry and these three groups are also prone to monitoring failure as demonstrated in Chapter 2. Moreover they lack credibility outside of Alberta to monitor oil sands development. Considering the majority of the pressure against 'dirty oil' is coming from outside the Province, it stands to reason that their criticisms be accounted for in the monitoring programs. Precisely because they along with future generations of Albertans cannot be represented as a stakeholder, and the need for a legally defensible validation monitoring system, should the Government of Alberta re-affirm their responsibility to directly monitor the effects of oil sands development on the environment.

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[34] From Moir and Block (2001): Seven reasons why monitoring plans fail in public lands in the United States.

1) Management hopes the issues will fade away or that the crisis will wane.
2) Monitoring is too expensive and never achieves adequate funding.
3) The time delay is too long; i.e., management gets no data, stale data, messy data or inappropriate data for timely decisions or actions
4) The system, including field hardware is not maintained, although interest in the issues may be rekindled.
5) Triage: there are too many issues.
6) The issue is too hot to handle, and no action is better than some action in lose-lose situations.
7) There is reluctance to commit future managers to present obligations.

This new monitoring system would integrate the existing implementation monitoring programs (industry managed monitoring stations) and effectiveness monitoring programs (CEMA/WBEA/RAMP) while incorporating additional monitoring stations capable of determining cause and effect relationships. The on-the-ground monitoring for both industry and CEMA/WBEA/RAMP would be taken from consulting companies and given to the provincial government. This new integrated system would be paid by the funds previously awarded to consultant contracts, often originating from oil sands companies and when the necessary by interest from Alberta's Heritage Trust Fund. In so doing, the quality of the monitoring is not dependent on current market fluctuations but rather a more stable form of income. Stakeholder input would remain vital for the success of the revamped monitoring program, although their guidance would be kept to a strategic level, where multistakeholder collaboration would be most effective.

The integrated monitoring program would have the following benefits:

a) **Reduced conflict of interest.** Alberta Environment does not profit from more oil sands development, whereas the consulting companies that monitor the region and are also hired by oil sands companies to create their environmental impact assessments do. These consultancies are better off if there is more development and no major environmental effects. By giving responsibility to monitor the environment back to Alberta Environment, the agency will receive data directly from their own personnel, ideally the Oil Sands Environmental Management Division, and minimize the opportunity for conflict of interest.

b) **Improved public trust.** Albertans do not trust oil sands companies to effectively manage the environmental and social impacts of oil sands development. In a survey, conducted by the Canadian Association of Petroleum Producers in June of 2008, only thirteen percent of respondents believe what oil and gas executives say in the media. Forty six percent believe that oil sands companies have not done a

good job of balancing environmental and economic concerns (Cooper 2009b). Given the public's incredulity with industry environmental initiatives, industry's close association with environmental monitoring programs is likely to erode public trust of monitoring programs themselves. It follows that returning monitoring responsibility to the Province, while retaining collaborative steering groups, will increase the credibility for the data collected, the Province and the oil sands operators.

c) **Increased scientific credibility.** As demonstrated by the Ayles et al (2004) Scientific Peer Review of RAMP, there are considerable shortfalls in the scientific integrity of the environmental monitoring system in place for the Athabasca Oil Sands Region. As discussed in previous chapters, the questionable scientific methodology and domination of industry interests within RAMP/WBEA/CEMA has eroded the scientific credibility of these monitoring programs. Having environmental scientists (e.g. hydrologists, biologists, atmospheric scientists) chiefly responsible for the design, maintenance and analysis of the monitoring data will help improve scientific credibility. Co-designing the monitoring program with industry engineers, local Aboriginal and environmental groups will obviously be key to creating legitimacy, relevance and accuracy of the monitoring program; however, their involvement in operations and analysis should be minimized. Restoring monitoring responsibility to the Province will also address the current 'reverse onus' issue of Alberta Environment having to prove that industry collected the information correctly before laying environmental charges (Interview #6).

d) **Improved effectiveness.** Currently WBEA/RAMP/CEMA have very few full-time employees. Those employees that are full-time are relatively new.[35] Many of the consultancies hired to monitor and analyze the data have high employee turnover. Having increased government staff will increase the institutional

[35] As of March 23rd, 2009, WBEA, even though it has existed since 1996, has no current staff that have been employed before 2006.

memory of the monitoring programs, and reduce the number of half-time positions, thus improving the overall effectiveness of staff time.

e) **Reduced discretionary power.** The rentier effect causes governments to increase their discretionary power, thereby reducing the ability of actors outside their traditional sphere of influence to effect decisions (i.e. scientists, Aboriginal groups, environmental groups). It is in the interest of the Government of Alberta to maintain significant discretionary power. Indeed, Illical and Harrison (2007) demonstrate the proclivity of governments in Canada to have significant room for discretion. By reducing the discretionary power of monitoring programs, the Province can resist the rentier effect and reduce the opportunities for political interference. More clearly delineating roles and responsibilities within these monitoring programs and compelling the Province to incorporate the data and analysis provided by the monitoring programs into their environmental policies will improve the credibility of the monitoring programs, the provincial government and oil sands companies.

Criticism

It is expected that critics of increased government involvement in environmental monitoring may raise three valid issues: cost, the degree of public input and size of government. Cost will undoubtedly increase if monitoring responsibilities are reclaimed by the Province. There will be need to compensate scientific and management staff at rates comparable to industry to address the issue of high staff turnover. This money can be recovered through withdrawing from the Alberta Heritage Trust Fund during times of economic slowdowns and when the price of oil or production levels are high, from a per barrel environmental monitoring tax on every oil sands developer in the region. This will guarantee a funding stream for the monitoring network regardless of the state of the economy. Oil sands companies already enjoy some of

the lowest royalty rates in the world, increasing government rent will not materially impact their bottom line and will demonstrate their commitment to credible scientific monitoring of their activities.

The dominant political ideology of Alberta is one that eschews high taxes and big government. Without a clear explanation of why restoration of monitoring responsibilities should be reassigned to Alberta Environment, it is reasonable to expect considerable public resistance. However, by daylighting[36] many of the criticisms that have been made against these monitoring programs by independent, government initiated reviews, public apprehensions may be addressed and the needed political will generated to implement this change. As in the case of the Government of Alberta creating a provincially owned energy company, following the 1973 energy crisis, Albertans have demonstrated their political ideology can be modified to minimize uncertainty and risk.

There will ostensibly be less opportunity for public input. Data management and analysis should be left for scientists. However, the opportunities for public input that will exist include the development of appropriate indicators, thresholds, reporting standards and goals. These processes will invariably be political in nature and require transparent deliberation and public dialogue. The difference lies in the admission that certain activities do not require or in fact may be ill-advised by public input. Indeed it is arguable the degree of public involvement and consensus-based decision making model for CEMA has reduced the effectiveness and credibility of the organization. By being more strategic in the opportunities for public input,[37] a more scientifically credible and legally defensible monitoring program can be created that helps policy makers and corporate environmental managers make better informed and legitimized decisions.

[36] Indeed a 2008 strategic and program evaluation of CEMA by PriceWaterhouseCoopers was only made publicly available through a *Freedom of Information and Protection of Privacy Act* request.

[37] The current CEMA system of one stakeholder one vote, as described in Chapter 2, is untenable with over fifty stakeholders.

Joint fact-finding has emerged out of the consensus building literature as one method to engage stakeholders (Karl *et al.* 2007). It recognizes different but important roles of experts and "non-experts" in specifying the scientific questions that need to be answered, selecting appropriate methods of inquiry, interpreting findings, and deciding how to handle assumptions and uncertainties inherent in these findings. In this way, joint fact-finding increases the transparency of the collection and use of scientific and technical information in decision-making processes. It also allows for a more comprehensive understanding of the policy implications of scientific and technical input (Susskind *et al.* 2007).

In the re-organization of the environmental monitoring system of the oil sands, it will be helpful to use joint-fact-finding as a process to guide the strategic management. But the limits to stakeholder engagement need to be clearly defined and the discretionary oversight of the government made limited when possible (through legally binding documents) and made explicit when not (through publicly available documents). Giving too much of the wrong responsibility to stakeholder driven monitoring programs have helped to create the current unsustainable situation. By re-evaluating stakeholder roles and re-instating the resources to government to monitor the oil sands, the government can help recover some of it's credibility lost over the last decade of development.

Improve Enforcement

Improving solely monitoring programs will not prove effective in increasing compliance and promoting beyond compliance behavior. Indeed Richard Locke, Professor at MIT's Sloan School of Management, in a study of Nike's labor monitoring programs, found that investments in monitoring alone only produced limited results (Locke 2007). Improving the enforcement of environmental regulations can also help recover the credibility of the Government of Alberta to manage the environmental risks posed by oil sands

development. The efficacy of the current enforcement system for environmental regulations has been impeded by an ineffective monitoring system, overly discretionary regulatory language, and severely under-resourced government agencies. That being said, the recent increase in enforcement and threats of enforcements of environmental legislation (e.g. Syncrude's duck convictions, ERCB's Directive 74) demonstrates a corresponding increase in political will for action. This increase in political will is undoubtedly linked to the tremendous increase in oil sands activity and mounting local, national and international pressure to address the oil sand's environmental liabilities. Given this recent shift, and the proposed new regulations (e.g. land use framework, cumulative effects legislation), there is considerable need and opportunity to improve the enforcement of existing environmental regulations, before drafting new regulations.

Improving the enforcement of regulatory system beyond the current measures will create substantive precedence for the future enforcement of upcoming environmental regulation. It will also better integrate the agenda of responsible development that the Government of Alberta is advocating, helping to restore their credibility as environmental stewards of Alberta's publicly owned resources. There are a number of ways to improve environmental enforcement:

a) Increase fines. While the Province has been strategic in using education and creative sentencing to avoid the confrontational nature of fines and encourage positive behaviour, current fines are so minimal, compared to the revenues of oil sands companies, that they are ineffective as deterrents.[38] Companies have little incentive to modify their practices if the cost of violating a regulation is less than the benefits

[38] Strict liability offences for corporations under EPEA face a maximum fine of 500,000 CAD per offence (Alberta Agriculture 2009).

gained from violating the regulation.[39] Furthermore, the societal benefits accrued from creative sentencing may have perverse incentives of enhancing a violating company's image by associating with an educational program or community good. By increasing fines, the government takes a more assertive leadership position and gives a clear price signal to oil sands operators and their shareholders that violating environmental regulations is unacceptable behaviour.

b) Increase staff retention. The brain drain of qualified professionals from Alberta Environment to oil sands companies and environmental consulting firms limits the Province's ability to investigate environmental violations (Interview #6). Alberta Environment and Alberta Justice have difficulty retaining their top environmental engineers and lawyers in enforcement positions, with staff leaving quickly to upper management or industry. By investing in the compensation and professional development of top staff, the Government of Alberta will be better able to attract and retain the necessary talent to improve the Province's environmental enforcement record.

c) Create performance indicators. Building upon their effort to increase government transparency and stave off accusations of the rentier effect, Alberta Environment, would be well served by having internal and external-facing metrics and indicators. The Pembina Institute's Oil Sands Report Card aptly demonstrated the frustrations of acquiring useful, comparable enforcement data. These proposed measures would help government bureaucrats and the public identify assess and compare the environmental performance of oil sands companies. While the ERCB has recently acknowledged the need for enforcement improvement

[39]The main incentive to improve environmental management, when convicted, is not the fine size but rather the press release and potential erosion of the company's social license.

and has recently increased the rigor of their reporting,[40] Alberta Environment has yet to see a similar change in enforcement policy. Collaborating with public and industry stakeholders would be essential in the development of these metrics (Hammond *et al.* 1995; Brugmann 1997; Susskind *et al.* 2007).

d) Reduce discretionary language. Discretionary language does not necessarily cause environmental mismanagement. On the one hand, the discretionary regulatory and EPEA approval language ostensibly gives industry the room to innovate and expand and gives the Province the room to consider the uniqueness of oil sands applications. On the other hand, this discretion does not reward or encourage improved environmental performance of oil sands operators and it creates considerable opportunity for political influence over the interpretation of EPEA approvals and enforcement policies. Indeed Alberta Environment employees have cited the problematic discretionary language of EPEA approvals which condition approval on the development of technologies which have not even been proven viable in the context of oil sands mining (e.g. end-pit lakes and carbon capture and storage) (Interview #2). Reducing the discretionary language of enforcement policies has the benefit of reducing the uncertainty for oil sands operators and minimizing the potential for environmental liabilities to be borne by the Province.

While Susskind and Secunda (1998), in an examination of the US EPA's Excellence in Leadership (XL) program, argue that more discretion and not less will increase the likelihood of achieving improved environmental performance. They feel the XL program was constrained by outside rigid regulations and inflexible legal interpretations. In the case of Albertan legislation, the regulatory box in which environmental policies are contained is much more malleable or ill-defined than in the US. There are considerably less government agencies to obtain permits from energy companies and fewer overall environmental

[40] In 2005 they launched a Compliance Assurance Initiative (Directive 19) to increase the rigor and transparency of their reporting (ERCB 2008b). Using a risk matrix they have created a Persistent Noncompliance Framework which uses a risk matrix

regulations. Therefore reducing the discretionary language should not restrict the success of policies but rather reduce uncertainty by delineating the box's boundaries. From this better-defined space, policies can be implemented which encourage innovation.

Criticism

Many of the foreseeable criticisms against improving environmental enforcement of oil sands operators are similar to those raised against improving monitoring programs. Certainly, there will be added expense to improve enforcement policies, hire and retain staff. Once again this cost should be borne by oil sands operators in return for the certainty to share and stockholders that they are operating in compliance with provincial regulations. Indeed the difference in cost for a non-compliant oil sands operator between a fine and an eroded social license represents an uncaptured rent by the Province. By considering the larger economic consequences of non-compliance and the polluter pays principle, the Province is justified in collecting the additional fees from oil sands operators to create an enforcement system that reduces risk for industry, the public and the environment. The Province the acts more like a service provider, than a big brother, reducing overall risk and increasing the credibility of both industry and the government.

Some critics may cite the political infeasibility of enlarging the enforcement system and reducing the discretion in current enforcement policies. However, the current policy shift indicates that more enforcement, not less, will be the norm and that increasingly descriptive enforcement policies (e.g. ERCB Directives 19 and 74) will also be more common. Therefore an appeal to historical precedents during this time of change gains less political traction than a few years ago. More and more stakeholders doubt the capacity of the Government of Alberta to enforce their environmental regulations against oil sands

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to identify and monitor non compliant companies.

operators. By addressing some of the above improvements to provincial enforcement policies, the Province can demonstrate their willingness to restore their credibility.

RESPONSIBLE LEADERSHIP

One Alberta Environment employee noted that Alberta has a tradition of being policy leaders, recalling that Alberta was the first province in Canada to have an environmental ministry (1971) and climate change legislation (2007) (Interview #3). Unfortunately, being first in line does not necessarily reflect the responsible leadership the Province needs.[41] Indeed, there are other aspects to leadership that are not captured in that one employee's example. Having the first climate change legislation may be a reactive response; the bill may reflect regressive and short-sighted goals not congruent with most popular conceptions of leadership. There are however, four other rather essential aspects of leadership that the Province would be well-served to develop.

Long-term vision: In the case of environmental management of Alberta's oil sands, leadership requires substantive forward vision and concern for future generations because of the long-term legacy left on local communities and ecosystems well after the mines have closed. Arguably, as demonstrated by the current situation, the Government of Alberta has significantly underestimated the timescale needed to sustainably develop the oil sands.

Immediate action: Because of growing environmental concerns, regardless of their accuracy, immediate action is needed by the Government of Alberta to address these concerns. To be fair, the Province has shifted their approach to environmental management of the oil sands within the last five years. However,

[41] See Alberta Environment (2008a) and Alberta Treasury Board (2009) for examples of the Government of Alberta's attempts to reframe their environmental management as responsible.

even this action has not been effective at improving the government's legitimacy or credibility among the public during this period (Cooper 2009b). Nor does acting quickly connote acting wisely or courageously.[42]

Patience: Aside from discerning what to take action on when, knowing what not to take action on is just as critical leadership tool as the 'first in line' leadership held up by the Alberta Environment employee. Considering the number of oil sands projects that have been approved during the last five years, there has not been sufficient time or funding to allow government bureaucrats to develop and implement appropriate policies nor oil sands companies time to develop and prove technologies they are wanting to use. In the eager rush to develop the oil sands during record oil prices, the Province has undermined their own efforts to improve environmental management.

Facilitative: As defined by Roger Schwarz (2002), facilitative leadership helps groups and individuals build their capacity and improve the way they work. Facilitative leaders, in Schwarz's view, are motivated by the core values and principles of valid information, free and informed choice, internal commitment and compassion. While often meant to describe individuals, these characteristics have the ability to become embodied within an organizations culture. In the case of the Government of Alberta, facilitative leadership could take the form of joint-fact finding among a group of stakeholders to determine strategic policy goals. CEMA and the Multistakeholder Dialogue represent a type of facilitative leadership, although I would advocate that better role definition (free and informed choice) and incentives (internal commitment) could have been instituted to improve the effectiveness of those two collaborative programs. If managed

[42] Several interviewees with Alberta Environment mentioned that the press releases for environmental convictions are more damaging than the financial burden imposed by the fine (Interviews #4, 5). The responsibility to chastise then becomes lopsided, nearly entirely falling on the relatively powerless environmental groups, First Nations and the media; whereas, the Province, who holds the stick, simply gives companies a nominal fine. If a company violates a cherished societal norm and statutory law (protecting the environment), is it not the responsibility of government to take a leadership position and effectively sanction a non-compliant company? Instead the Province relies on the powerless and at times, ill-informed, to criticize the oil sands companies.

intentionally (cognoscente of power differentials among stakeholders, especially those historically–marginalized) and with proper resources, facilitative leadership can build more credibility, transparency than unilateral or bilateral decisions, resulting in less division and negative press over government policies and ideally improved environmental performance.

Responsible or wise leadership flows from these four aspects. Responsible leadership knows when to act, when to abstain from action, how far to look at what and with whom. Far from an exhaustive list, these traits are meant to act as lodestars for the Government of Alberta to guide them towards a more sustainable economy. Given this more robust framework, I outline two facets in which the province of Alberta can become a responsible leader: funding and incentives.[43]

Leadership through funding: Where government allocates funding and how much is a clear indication of the priorities of its leadership. For example, two billion CAD has been allocated by the Province in 2008 to pay private companies to develop carbon capture and storage technology. Because of recent down turn in the economy, this payout period for two billion CAD has been extended over twelve years, making annual payments of 166 million CAD (Cryderman 2009). To put this in comparison, the entire annual budget for Alberta Environment in 2008/2009 was 403 million (Alberta Environment 2008e) and the budget for the Oil Sands Environmental Management Division that same year was only 11.8 million CAD (Alberta Environment 2008f). That same year the Province announced only 7 million dollars in reclamation research.

[43] Regulation is, of course, another way for the Province to demonstrate responsible leadership. However, given the discretionary nature of Canadian environmental regulations, it is doubtful that regulation will bring the levers necessary to enact sufficient change in environmental management practices. Xing and Kolstad (2004) in an empirical analysis, using regulations on national sulfur emissions, found that the laxity of environmental regulations in a foreign host country is a significant determinant of FDI from the US, for heavily polluting industries, such as the oil sands. They found that the more lax the environmental regulations the higher degree of US investment. This phenomenon also diminishes the possibility for significant environmental regulation to take place in Alberta.

This decision to invest two billion CAD in carbon capture and storage research indicates the Province's belief that climate change is an important issue, that technological solutions are required and that government should have a major role in helping industry develop this technology. Finance Minister for Alberta, Iris Evans, says the two billion for carbon capture and storage is, "probably the best way to show that we're serious about energy production in a sustainable way" (Cryderman 2009). Their bold move certainly turned a few heads internationally; however, what wasn't said, what the provincial government has not been acknowledging, that oil sands development in its current incarnation is not sustainable, has been turning more heads, longer than this R+D investment announcement.

The government's announcement also implies that energy efficiency is not nearly as important[44] and supply-side policies (slowing the pace of development) are not viable options. The seemingly endless desire of energy companies to develop the second largest oil field in the world has caused the provincial government, steeped in laissez-faire neoliberal economic principles, to relinquish their constitutional right to control development of the oil sands to the free market. This uncritical trust in the free market is setting the stage, in the eyes of former Alberta Premier Peter Lougheed, an "inevitable" constitutional clash between the province's right to develop their natural resources and the federal right to protect the environment (Nikiforuk 2008, 177).

Critics of the current oil sand development often cite Norway, a fellow oil-exporting nation, as a responsible leader for Alberta to emulate. While Norway remains a global player in the oil industry, 99% of their electricity production comes from renewable energy (European Energy Network 2000). Indeed both

[44] Indeed, very little of the 20 million CAD that was allocated to energy efficiency programs in 2008 was used by Government of Alberta (Cryderman 2009).

countries are advanced, industrialized, unitary states. However the Norway – Alberta comparison quickly breaks apart as one considers the socio-political differences between these two states. Alberta's politics heavily emphasize regionalism, self-sufficiency and the importance of the market to drive the economy; whereas Norway has a strong tradition of nationalism and a consistent mistrust of foreign capital (Phillips 2008). Suggesting that Alberta take such a progressive stance on renewables as Norway or enlarge their 14.5 billion dollar "Heritage Fund" (Alberta Finance 2009) to the size of Norway's 400 billion CAD Government Pension Fund (formerly the Petroleum Fund) (SWF Institute 2009) is not politically feasible. Phillips (2008) found difference in political culture between the two countries to be the key explanatory variable in their royalty regimes. While changing Albertan political culture may be a noble endeavor it will likely prove futile in the near-term. The Norway case draws doubt on the ability to make international comparisons; however the basic premise still stands: like Norway, Alberta invests funding in their priority areas. Norway's priority is renewable energy and investing in the future through their pension fund and Alberta's is increasing oil sands development while offsetting carbon emissions.

I suggest the Government of Alberta fund a broader range of environmental initiatives to better demonstrate their commitment to responsible leadership. Reduce reliance on coal-fired electricity generating plants, which supply 80 percent of the Province's energy needs, develop renewable energy, increase protected areas, and create absolute greenhouse gas emissions targets. These are all policies that demonstrate the kind of leadership many critics want the Province to provide. Which technology gets funded by how much can be determined collaboratively through a public engagement process. An increasingly skeptical public understands that the course the Province has been on is not sustainable. To pursue sustainability in a responsible fashion it follows the Government of Alberta would have to choose a different course than what initially brought them to this place. Deciding that action in a defined area must be taken shows leadership

just as much as letting the people decide on what renewable energy technology this money should be spent.

As they are changing course the Province must be willing to intentionally and patiently slow development in order to create time to test and improve their land use framework, cumulative effects legislation, water management framework, energy efficiency policies, reclamation techniques and carbon capture and storage technology. While not intentional, the current global recession has caused the price of oil to decrease, consequently decreasing the demand oil sands synthetic crude. This slowdown creates a timely opportunity for government and industry to develop the necessary policies and technologies to become more environmentally responsible.

The Province can use this recession to stimulate and diversify the oil-sands fuelled economy by investing in renewable energy technologies. Alberta has some of best environmental conditions in Canada for solar and wind power; yet to date there has been minimal provincial interest in developing a meaningful renewable energy sector. While one Alberta Energy employee noted that "Alberta has a strong incentive to ensure that nothing happens to jeopardize Oil Sand development" (Interview #8), this single-issue focus has come at the cost of developing a renewable energy sector.

Leadership through incentives: Current environmental regulations in Alberta slowly raise the bar of environmental performance but these regulations offer little in the ways of incentives to encourage stronger and quicker environmental performance of oil sands companies. Given the rarity of environmental leadership through funding and the free market proclivities of the Province, it is reasonable to assume that creating incentive programs within existing environmental regulations would be a politically realistic and culturally appropriate method to improve environmental performance. "Oil sands developers could do all

kinds of great things if they took it upon themselves to actually do it," noted an Environment Canada employee. "Problem is there's not much incentives for them to do anything" (Interview #22). The ERCB, according to one interviewee, offers oil sands companies no other incentive other than the threat of "we won't be in you face" (Interview #7). Alongside the development of stricter and more explicit regulations, an incentive program based on free market motivators, competition, cost savings and risk avoidance, could be developed.

Kem Singh, Approvals Manager for Alberta Environment in the Athabasca Oil Sands region, suggests tying incentives to existing environmental regulations (Interview #10). For instance, if you have a greener environmental plan then you can be fast-tracked through environmental permitting. Similar policies are in place in Californian legislation, which reduce the workload of civil servants, decreases the financial costs borne by oil sands operators and ultimately results is less environmentally harmful mining practices.

Several of the Alberta Environment employees interviewed when asked about incentives cited only two examples: the recent Lower Athabasca Water Management Framework and the EnviroVista Award Program. Unfortunately, these examples are insufficient to incentivize the stronger environmental performance that is needed in the oil sands region. While the Lower Athabasca Water Management Framework encourages oil sands operators to share water during low flow (red) periods, it does not encourage them to work together at any other time of the year. Current water licenses are generous in their allocations and none of the oil sands operators studied rated water conservation as a priority. Moreover, this new 'fire-fighting' approach to water management perversely promotes shortsighted planning (developing the oil sands until the red zone occurs year round). The lack of on-site water storage capacity among oil sands operators is one result from this type of strategy. Instead, Alberta Environment should create incentive programs that encourage year round and longer term planning that emphasize

continual improvement in water efficiency and competition among oils sands companies. What would happen if the most water efficient company could have a significant reduction in their royalties? At the moment companies enjoy a 1% royalty rate until all of their capital investment is recovered. Rather than tie royalties to investment, which ironically does not encourage reducing construction costs, link them to environmental best practices.

One Alberta Environment employee admits the EnviroVista Award program is of limited benefit, saying the crux of future policy is to reward overachievers (Interview #3). Just as responsible leadership in enforcement should do more than issue a paltry fine and a press release, responsible leadership in environmental award schemes should give much more than recognition to overachieving companies. Rather than reward only top performers, typically larger companies, award programs should have a progressive incentive scheme that encourages leaders and laggards to improve their environmental management practices.

Besides water, reclamation and tailings management needs additional incentives to raise performance levels. Ernie Hui, ADM of Oil Sands Environmental Management Division of Alberta Environment says, "...especially in tailings there is a real need for change. I want the approval process to be more stringent. The tailings directive is a first step" (Interview #7). While the ERCB is planning more tailings regulation in the future (Interview #21), there is still a need to develop a complementary suite of incentives to encourage beyond compliance behaviour. One incentive suggested by the Pembina Institute suggests the Province return reclamation bonds only when then government considers the land is reclaimed (Interview #20). Currently some of bond is returned when the company, using different metrics, considers the land reclaimed.

Despite internal bureaucratic acknowledgement that incentives are needed, most incentives to improve environmental management are coming from external actors. Be it increasingly effective transnational environmental campaigns, threats of shareholder action, media name and shame or current and impending American environmental legislation,[45] there is no shortage of social incentives for companies to improve. As development of the Athabasca Oil Sands expands, these social pressures, easily fuelled by the 'Land of Mordor' images captured on film, must be complemented by provincial leadership to create regulatory and financial incentives for the companies to improve their environmental practices. These incentives can be created collaboratively, working with environmental groups, local Aboriginal groups, industry and others to determine what incentives would satisfy the most parties and result in the greatest environmental improvement.

CONCLUSION

What, therefore, causes the variation in environmental management among Suncor Energy, Syncrude and Shell Canada?

I suggest the variation of environmental performance is an organic response to the innate discretionary nature of environmental policymaking in Alberta, the lack of government leadership and the degree of initiative demonstrated by each company. From my research it is clear that the inconsistent and at times vague government policy and regulations, opaque government agencies, poor monitoring and enforcement, inadequate incentives and penalties does not effectively encourage stronger environmental performance among oil sands developers. At the same time, internal corporate strategy, often in response to the recent pressure from environmental groups, First Nations communities and international media compels some

[45] E.g.: Section 526 of Energy Independence and Security Act, California's low carbon fuels standards or future federal climate change legislation.

companies to innovate and others to simply follow the regulations. Maintaining their social license, reducing costs, and anticipating future regulations have all been cited as motivation for innovation. Those companies advocating the status quo, like Syncrude, cite the exemplary regulatory framework already in place and the adequacy of existing stakeholder engagement processes. Whereas corporate environmental leaders, like Shell Canada, are frustrated by the uncertainty around environmental policies created by the provincial government and are creating their own venues for collaboration.

Ultimately the responsibility for the environmental management of the oil sands lies with the province. Companies can strive to innovate and compete with other developers, but they are not accountable for the management of cumulative effects in the region. Granted, the province has recently recognized their multi-faceted role in oil sands development. The Lower Athabasca Water Management Framework, Regional Land Use Planning Initiatives and imminent cumulative effects legislation speak to the province's acknowledgement for improved environmental governance. However, if Alberta is going to improve the environmental performance of oil sands developers then a more transparent, credible and strategic environmental planning process must be created. I suggested three areas of policy improvements the province can make to not only improve the environmental performance of the oil sands but also regain public trust in their role as manager of Alberta's natural resources: transparency, monitoring and enforcement, and responsible leadership.

Meanwhile, policy suggestions made by critics of the status quo, while ambitious, often fail to account for the social and political culture of Alberta. Taking a pragmatic but visionary approach, the Province must demonstrate responsible leadership through their funding priorities and through incentives to encourage oil sands companies to surpass government and public expectations in their stewardship of the land.

The limitations of both process and goal oriented theoretical framework, outlined in the introduction, were shown throughout this research. Strictly bottom-up approaches, utilized in the development of multistakeholder monitoring programs, have aptly demonstrated their lack of effectiveness at monitoring the environmental management of the oil sands. Meanwhile, top-down approaches have begun to appear more often, with the recent 2 billion CAD investment in carbon capture and storage, for which the public certainly was not consulted, the ERCB's issuance of Directive 74, which strengthens the government's role in monitoring tailings management, and the increasing rates of environmental enforcement. In this return to more top-down management of the oil sands, it will be essential for the province to strengthen the facilitative programs it began in the 1990's. Responsible leadership need not do away with collaborative initiatives. Rather the Province needs to determine when they are appropriate, clarifying stakeholder roles and equipping them with sufficient financial resources, political capital and regulatory backing to make them effective.

APPENDIX 1:

REFERENCES

Alberta Agriculture. 2007. Alberta Agriculture Statistical Yearbook, 2007. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/All/sdd12270/$FILE/yearinreview.pdf Accessed 11 Mar 2009.

Alberta Agriculture. 2009. Beneficial management practices: environmental manual for Alberta farmsteads. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex11169 Accessed 10 Apr 2009.

Alberta Conservation Association. 2008. The Suncor-Winagami Lake Conservation Project 2003-2004. http://www.ab-conservation.com/go/default/index.cfm/publications/report-series-detail/?reportID=3F1B2BE1-BCD6-BFDD-5D3AFB91433CC662 Accessed 23 Mar 2009.

Alberta Employment Immigration and Industry. 2007. Alberta oil sands industry update, December 2007. http://www.albertacanada.com/documents/AIS-EC_oilSandsUpdate_1207.pdf Accessed 13 Mar 2009.

Alberta Energy. 1990. A discussion paper on the potential for reducing CO2 emissions in Alberta, 1988-2005. www.assembly.ab.ca/lao/library/egovdocs/aleo/1990/67058.pdf Accessed 10 Mar 2009.

Alberta Energy. 2009a. Energy facts. http://www.energy.gov.ab.ca/About_Us/984.asp Accessed 11 Mar 2009.

Alberta Energy. 2009b. Our business: natural gas. http://www.energy.gov.ab.ca/OurBusiness/Gas.asp Accessed 11 Mar 2009.

Alberta Energy and Utilities Board. 1996. EUB / AEP Memorandum of understanding on the regulation of oil sands developments. http://www.ercb.ca/docs/ils/ils/pdf/il96-07.pdf Accessed 20 Mar 2009.

Alberta Energy and Utilities Board. 2007. Development of a memorandum of understanding between Alberta Environment and the Alberta Energy and Utilities Board to enhance collaboration for the protection and management of groundwater. December 20th, 2007. http://www.ercb.ca/docs/documents/bulletins/AENV_EUB_Agreement_Groundwater.pdf Accessed 18 Mar 2009.

Alberta Environment. 1986. Syncrude (Mildred Lake/Processing) Water Resources Act Licence #35216 http://envext02.env.gov.ab.ca/pdf/00035216-00-00.pdf Accessed 26 Mar 2009.

Alberta Environment. 2005a. Enforcement. http://www3.gov.ab.ca/env/protenf/compliance/enforcement/index.html Accessed 22 Mar 2009.

Alberta Environment 2005b. Water Act Fact Sheets. http://www3.gov.ab.ca/env/water/Legislation/FactSheets/Background.html Accessed 29 Mar 2009.

Alberta Environment. 2006a. Compliance assurance annual report 2005/2006. http://www3.gov.ab.ca/env/protenf/compliance/reports/index.html Accessed 14 Mar 2009.

Alberta Environment 2007a. Athabasca water management framework. http://environment.alberta.ca/documents/Athabasca_RWMF_Technical.pdf Accessed 10 Mar 2009.

Alberta Environment. 2007b. Athabasca water management framework: summary. http://environment.alberta.ca/documents/Athabasca_RWMF_Highlights.pdf Accessed 10 Mar 2009.

Alberta Environment. 2007c. Guidelines for wetland establishment on reclaimed oil sands leases: revised 2007 edition. http://environment.gov.ab.ca/info/library/8105.pdf Accessed 12 Mar 2009.

Alberta Environment. 2007d. Trends in oil sands land disturbance (1987-2006). http://www3.gov.ab.ca/env/soe/land_indicators/41_oilsands_reclamation.html Accessed 20 Mar 2009.

Alberta Environment. 2007e. Syncrude Mildred Lake and Aurora North EPEA Approval 26-02-00 http://envext02.env.gov.ab.ca/pdf/00000026-02-00.pdf Accessed 25 Mar 2009.

Alberta Environment. 2008a. Alberta's oil sands. Resourceful. Responsible. http://environment.gov.ab.ca/info/library/7925.pdf Accessed 12 Mar 2009.

Alberta Environment. 2008b. Alberta's 2008 climate change strategy: responsibility, leadership, action. http://environment.gov.ab.ca/info/library/7894.pdf Accessed 13 Mar 2003.

Alberta Environment. 2008c. Alberta ambient air quality objectives and guidelines. http://environment.gov.ab.ca/info/library/5726.pdf Accessed 27 Mar 2009.

Alberta Environment. 2008d. Albian Sands Muskeg River Mine Water Act Licence No 71821-01-00 http://envext02.env.gov.ab.ca/pdf/00071821-01-00.pdf Accessed 2 Apr 2009.

Alberta Environment. 2008e. Budget 2008 fact sheet. http://environment.alberta.ca/documents/Budget08_fact-sheet.pdf Accessed 12 Apr 2009.

Alberta Environment. 2008f. Alberta Environment 2008-2011 Business Plan. http://www.finance.alberta.ca/publications/budget/budget2008/envir.pdf Accessed 12 Apr 2009.

Alberta Environment. 2009a. EnvironVista Program. http://environment.alberta.ca/867.html Accessed 17 Mar 2009.

Alberta Environment. 2009b. Industrial heartland. http://environment.alberta.ca/1933.html Accessed 18 Mar 2009.

Alberta Environment. 2009c. EnviroVista. http://environment.alberta.ca/867.html Accessed 27 Mar 2009.

Alberta Environment. 2009d. Legislative history of water management in Alberta. http://environment.alberta.ca/3355.html Accessed 23 Apr 2009.

Alberta Federation of Labour. 2009. Temporary Foreign Workers Homepage. http://www.afl.org/campaigns-issues/tempworker/default.cfm Accessed 11 Mar 2009.

Alberta Finance. 2009. Alberta Heritage Savings Trust Fund 2008-09 Third Quarter Update. http://www.finance.alberta.ca/business/ahstf/index.html Accessed 13 Apr 2009.

Alberta Forest Products Association. 2009. Forestry. http://albertaforestproducts.ca/industry/forestry.aspx Accessed 11 Mar 2009.

Alberta International and Intergovernmental Relations. 2008. 2007 Alberta International Trade Review. http://www.albertacanada.com/documents/SP-ET_news_ITR2007.pdf Accessed 11 Mar 2009.

Alberta Learning Information Service. 2009. Average wages by industry and economic region, 2007 Alberta wage and salary survey. http://employment.alberta.ca/documents/LMI/LMI-WSI_2007_wss_summary.pdf Accessed 10 Mar 2009.

Alberta Teachers Association. 2009. Ongoing Issues: infrastructure. http://www.teachers.ab.ca/Issues%20In%20Education/Ongoing%20Issues/Pages/Infrastructure.aspx Accessed 11 Mar 2009.

Alberta Treasury Board. 2009. Responsible Actions: a plan for Alberta's Oil Sands. http://treasuryboard.alberta.ca/docs/GOA_ResponsibleActions_web.pdf Accessed 13 Mar 2009.

Austen, I. 2009. The costly compromise of oil from sand. January 6th, 2009. The New York Times. http://www.nytimes.com/2009/01/07/business/07oilsands.html?_r=1 Accessed 27 Mar 2009.

Ayles, G.B., Dube, M. and D. Rosenberg. 2004. Oil Sands Regional Aquatic Monitoring Program: scientific peer review of the five year report (1997-2001). Submitted to RAMP Steering Committee February 13, 2004.

Blakes. 2009. Provincial Environmental Law and Regulation. Blakes Law Firm. http://www.blakes.com/DBIC/guide/html/canada-52.htm Accessed 6 Mar 2009.

Blum, J. 2005. Exxon Mobil Chief to leave. Washington Post. Friday, August 5th, 2005. http://www.washingtonpost.com/wp-dyn/content/article/2005/08/04/AR2005080400994.html Accessed 25 Mar 2009.

Boreal Forest Initiative. 2009. About Canada's Boreal Forest: fast facts. http://www.borealcanada.ca/boreal-did-you-know-e.php Accessed 11 Mar 2009.

Bouchard, L. 2009. A pastoral letter on the integrity of creation and the Athabasca oil sands to the faithful of the diocese of St. Paul on the occasion of the Jubilee Year of St. Paul. http://www.dioceseofstpaul.ca/index.php?option=com_content&task=view&id=135& Accessed 12 Mar 2009.

Bowlby, G. 2005. Provincial drop-out rates – trends and consequences. Education matters Vol. 2(3) http://www.statcan.gc.ca/pub/84f0213x/84f0213x2005000-eng.htm Accessed 11 Mar 2009.

British Broadcasting Corporation. 2008. In the shadow of Canada's oil boom. http://news.bbc.co.uk/2/hi/americas/7776775.stm Accessed 12 Mar 2009.

Brooymans, H. 2009a. Cancer downstream from oilsands merits further study. February 26th, 2009. Edmonton Journal. http://www.edmontonjournal.com/Business/Cancer%20downstream%20from%20oilsands%20merits%20further%20study%20Alta/1332907/story.html Accessed 17 Mar 2009.

Brooymans, H. 2009b. Three companies dinged for Alberta Act violations. February 20th, 2009. Edmonton Journal. http://www.edmontonjournal.com/Business/Three+companies+dinged+Alberta+Water+violations/1311760/story.html Accessed 29 Mar 2009.

Bruce, C., Kneebone, R. and K. McKenzie. 1997. A government reinvented: a study of Alberta's deficit elimination program. Oxford: Oxford University Press. 518pp.

Brugmann, J. 1997. Is there a method in our measurement?: the use of indicators in local sustainable development planning. Local Environment 2: 59-72.

Calgary Herald. 2007. Tories urged to fix spy scandal. September 14th, 2007. http://www.canada.com/calgaryherald/story.html?id=34baf518-0745-4ac3-91c7-6909e74af67a&k=19812 Accessed 12 Mar 2009.

Canadian Association of Petroleum Producers. 2009a. Canada's industry: Alberta. http://www.capp.ca/canadaIndustry/industryAcrossCanada/Pages/Alberta.aspx Accessed 11 Mar 2009.

Canadian Boreal Initiative. 2008a. Canadian Boreal Initiative, Boreal forest conservation framework, Suncor Energy Inc. 2009 Annual action plan. http://www.borealcanada.ca/documents/Suncor2009BorealForestBiodiversityActionPlan-final.pdf Accessed 2 Apr 2009.

Canadian Boreal Initiative. 2008b. Catching up: conservation and biodiversity offsets in Alberta's Boreal forest. http://www.borealcanada.ca/documents/Boreal_offset_E.pdf Accessed 2 Apr 2009.

Canadian Boreal Initiative. 2009. Boreal conservation framework. http://www.borealcanada.ca/framework-e.php Accessed 31 Mar 2009.

Canadian Broadcasting Corporation. 2007. Top EUB officials retire in wake of spying controversy. November 21st, 2007. http://www.cbc.ca/canada/edmonton/story/2007/11/21/eub-directors.html Accessed 12 Mar 2009.

Canadian Broadcasting Corporation. 2008a. Low voter turnout in Alberta being questioned. March 5th, 2008. http://www.cbc.ca/canada/albertavotes2008/story/2008/03/05/edm-turnout.html Accessed 12 Mar 2008.

Canadian Broadcasting Corporation. 2008b. Imperial Oil gets green light to break ground on Kearl project. http://www.cbc.ca/canada/calgary/story/2008/06/06/kearl-approved.html Accessed Mar 29 2009.

Canadian Broadcasting Corporation. 2009a. Ottawa, Alberta charge Syncrude in oilsands pond duck deaths. http://www.cbc.ca/technology/story/2009/02/09/edm-syncrude-charges.html Accessed 19 Mar 2009.

Canadian Broadcasting Corporation. 2009b. Becoming No. 1: Suncor's story. March 23, 2009. http://www.cbc.ca/money/story/2009/03/23/f-suncor-faq.html Accessed 24 Mar 2009.

Canadian Centre for Energy Information. 2006. Canada's oilsands. http://www.centreforenergy.com/Shopping/browsecategory.asp?CategoryKey=11&ProductIDClicked=166 Accessed 26 Mar 2009.

Canadian Environmental Assessment Agency. 2005. Canada-Alberta agreement on environmental assessment cooperation. http://www.ceaa.gc.ca/010/0001/0003/0001/0001/qa050722_e.htm Accessed 18 Mar 2009.

Canadian Environmental Assessment Agency. 2009. Introduction and Features: Canadian Environmental Assessment Act. http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=5BDC800F#2 Accessed 13 Mar 2009.

Canadian Parks and Wilderness Society. 2005. A response to the mineable oil sands strategy. Dec 14th, 2005. http://cpaws.org/files/report_response-to-moss.pdf Accessed 18 Mar 2009.

Canadian Press. 2007. Shell Canada says leak at Scotford Upgrader under control, units shut down. http://www.redorbit.com/news/business/1151873/shell_canada_says_leak_at_scotford_upgrader_under_control_units/index.html Accessed 27 Mar 2009.

CBS. 2006. The oil sands of Alberta. http://www.cbsnews.com/stories/2006/01/20/60minutes/main1225184.shtml Accessed 27 Mar 2009.

CERES. 2009. Chevron and Canadian Natural Resources named to investor 'climate watch list' for major involvement with Canadian oil sands. http://www.ceres.org/Page.aspx?pid=1035 Accessed 12 Mar 2009.

Chastko, P. 2004. *Developing Alberta's oil sands: from Karl Clark to Kyoto.* Calgary: University of Calgary Press. 320pp.

Christian, C. 2009. Syncrude admits 1,606 dead ducks. April 2nd, 2009. Fort McMurray Today. http://fortmcmurraytoday.com/ArticleDisplay.aspx?e=1506082 Accessed 2 Apr 2009.

Cohen, D. 1996. Chapter four: standards-based reform: policy practice and performance. In *Holding Schools Accountable: Performance-based reform in education* by H. Ladd. Washington, D.C.: Brookings Institution Press. 382pp.

Cooper, D. 2009a. Syncrude seeks OK to deepen tailings pond. January 15th, 2009. Edmonton Journal. http://www.edmontonjournal.com/Travel/Syncrude+seeks+deepen+tailings+pond/1179654/story.html Accessed 2 Apr 2009.

Cooper, D. 2009b. Distrust of oilsands rampant, poll finds: companies not green enough, 46 percent say. January 9th, 2009. Edmonton Journal. http://www.edmontonjournal.com/Technology/Distrust+oilsands+rampant+poll+finds/1158557/story.html Accessed 10 Apr 2009.

Cross, P. and G. Bowlby. 2006. The Alberta economic juggernaut: the boom on the rose. Canadian Economic Observer 19: 3.1-3.12

Cryderman, K. 2009. Environmental programs face $12 million in cuts in proposed budget. http://www.calgaryherald.com/Technology/Environmental+programs+face+cuts+proposed+budget/1474490/story.html April 7th, 2009. Calgary Herald. Accessed 10 Apr 2009.

Cumming, J. and R. Froehlich. 2007. NAFTA Chapter XI and Canada's Environmental Sovereignty: Investment flows, Article 1110 and Alberta's Water Act. University of Toronto Faculty of Law Review 65: 107-135.

Davidson, D. and N. MacKendrick. 2004. All dressed up with nowhere to go: the discourse of ecological modernization in Alberta, Canada. The Canadian Review of Sociology and Anthropology. 41: 47- 65.

Delmas, M. 2002. The diffusion of environmental management standards in Europe and in the United States: an institutional perspective. Policy Sciences 35: 91-

Department of Justice Canada. 1994. Migratory Birds Convention Act, 1994. http://laws.justice.gc.ca/en/showdoc/cs/M-7.01///en?page=1 Accessed 25 Mar 2009.

Department of Justice Canada. 2009a. Canadian Environmental Assessment Act. http://laws.justice.gc.ca/en/ShowFullDoc/cs/C-15.2///en. Accessed 14 Mar 2009.

Department of Justice Canada. 2009b. Species at Risk Act. http://laws.justice.gc.ca/en/s-15.3/text.html Accessed 14 Mar 2009.

Dowell, G., Hart, S., and B. Yeung. 2000. Do corporate global environmental standards create or destroy market value? Management Science 46: 1059-1074.

Dunbar, R. 2009. Existing and proposed Canadian Commercial oil sands projects. February 2009. http://www.strategywest.com/downloads/StratWest_OSProjects.pdf Accessed 28 Mar 2009.

Dyer, S., Moorhouse, J., Laufenberg, K. and R. Powell. 2008. Under-mining the environment: the oil sands report card. The Pembina Institute. http://pubs.pembina.org/reports/OS-Undermining-Final.pdf Accessed Mar 31 2009.

Egglington, P. and M. Uffelmann. 1984. An economic analysis of oil sands policy in Canada: the case of Alsands and Wolf Lake. Economic Council of Canada Paper #259. Ottawa: Science Council of Canada.

Elder, P. 1973. Environmental protection through common law. University of Western Ontario Law Review 12: 107-171.

Energy Information Administration. 2007. World crude and natural gas reserves, January 1, 2007. http://www.eia.doe.gov/emeu/aer/txt/ptb1104.html Accessed 11 Mar 2009.

Energy Information Administration. 2009. Crude oil and total petroleum imports top 15 countries. http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/company_level_imports/current/import.html Accessed 11 Mar 2009.

Energy Resources Conservation Board. 2006. Bulletin 2006-29 New edition of Directive 065 issued. http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_0_323_253_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/industry_zone/rules__regulations__requirements/bulletins/archive_bulletins_and_general_bulletins/bulletin_2006_29.aspx Accessed 19 Mar 2009.

Energy Resources Conservation Board. 2008a. ERCB Draft Tailings Directive Public Review, Sept 24, 2008. http://www.ercb.ca/docs/documents/directives/Directive074_Public_Workshop_Notes.pdf Accessed 28 Mar 2009.

Energy Resources Conservation Board. 2009a. About the ERCB. http://www.ercb.ca/portal/server.pt?open=512&objID=260&PageID=0&cached=true&mode=2 Accessed 11 Mar 2009.

Energy Resources Conservation Board. 2009b. Compliance information. http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_0_318_255_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/industry_zone/compliance_and_enforcement/compliance_information/ Accessed 15 Mar 2009.

Energy Resources Conservation Board. 2009c. Directive 074: Tailings Performance Criteria and Requirements for Oil Sands Mining Schemes.

http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_0_322_252_0_43/http%3B/ercbContent/publishedcontent/publish/ercb_home/industry_zone/rules__regulations__requirements/directives/directive074.aspx Accessed 18 Mar 2009.

Energy Resources Conservation Board. 2009d. News Release 2009-02-03: ERCB releases major directive on oil sands tailings management and enforcement criteria. http://www.ercb.ca/docs/new/newsrel/2009/nr2009-04.pdf Accessed 20 Mar 2009.

Environment Canada. 2007. Overview of CEPA 1999. http://www.ec.gc.ca/CEPARegistry/gene_info/overview.cfm Accessed 2 May 2009.

Environment Canada. 2009a. Information on greenhouse gases sources and sinks – 2007. http://www.ec.gc.ca/pdb/ghg/onlinedata/table_e.cfm?sortC=total_emission_eq&sortD=DESC&year=2007&gasorcas=gas&gas=A&cas=A&fac_name=&npri_id=&c_local=P&prov=A&city=169&postal=&naics=A Accessed 26 Mar 2009.

Environmental Defence. 2008. 11 million litres a day: the tar sands leaking legacy. http://www.environmentaldefence.ca/reports/pdf/TailingsReport_FinalDec8.pdf Accessed 11 Mar 2009.

Environmental Law Centre. 2009. Fact Sheet: Environmental Assessments. http://www.elc.ab.ca/Content_Files/Files/EnvironmentalAssessments.pdf Accessed 6 Mar 2009.

Ethical Funds Company. 2008. Unconventional risks: an investor response to Canada's oil sands. https://www.ethicalfunds.com/SiteCollectionDocuments/docs/Albertaoilsands_whitepaper.pdf Accessed 2 Apr 2009.

European Energy Network. 2000. Norwegian Renewable Energy Policy, Institute for Energiteknikk. http://www.agores.org/Publications/EnR/Norway-2000.pdf Accessed 13 Apr 2009.

Fisheries and Oceans Canada. 2007a. Alberta Environment / Department of Fisheries and Oceans Canada Water management framework: instream flow needs and water management system for the Lower Athabasca River. http://www.dfo-mpo.gc.ca/regions/central/pub/water-eau/section1-eng.htm Accessed 10 Mar 2009.

Fisheries and Oceans Canada. 2007b. The *Fisheries Act.* http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/policies-politique/act-acte_e.asp Accessed 2 May 2009.

Fort McKay First Nation. 2009. About Chief Boucher. http://www.fortmckay.com/Chief%20Boucher.html Accessed 27 Mar 2009.

Foster, P. 1982. Sorcerer's Apprentices: Canada's super bureaucrats and the energy mess. Toronto: Harper-Collins.

Gentes, M.-L., A. McNabb, C. Waldner, and J. Smits. 2007. Increased Thyroid Hormone Levels in Tree Swallows (*Tachycineta bicolor*) on Reclaimed Wetlands of the Athabasca Oil Sands. Archives of Environmental Contamination and Toxicology 53:287-292.

Gillies, R. 2008. Environmentalists weigh costs of Alberta oil sands. International Herald Tribune. August 25th, 2008. http://www.iht.com/articles/2008/08/25/business/sand.php?page=1 Accessed 10 Mar 2009.

Government of Alberta. 1983. Oil sands conservation act. http://www.ercb.ca/docs/requirements/actsregs/osc_act.pdf Accessed 20 Mar 2009.

Government of Alberta. 2003. AR 76/88 Oil sands conservation regulation (consolidated AR 191/2003). http://www.ercb.ca/docs/requirements/actsregs/osc_reg_076_88_oil_sands.pdf Accessed 20 Mar 2009.

Government of Alberta. 2004. Alberta Water Acts: facts at your fingertips. http://www3.gov.ab.ca/env/protenf/compliance/pubs/FactSheet_WaterAct.pdf Accessed 29 Mar 2009.

Government of Alberta. 2005a. Mineable oil sands strategy. http://www.oilsandsconsultations.gov.ab.ca/docs/MOSS_Policy2005.pdf Accessed 18 Mar 2009.

Government of Alberta. 2007a. Oil sands consultations: multi-stakeholder committee final report. http://www.oilsandsconsultations.gov.ab.ca/docs/FinalReport_MSCReport-lowres-july24.pdf Accessed 13 Mar 2009.

Government of Alberta. 2007b. Oil sands consultations: aboriginal consultation final report. http://www.oilsandsconsultations.gov.ab.ca/docs/FinalReport_AboriginalReport-lowres-july4.pdf Accessed 14 Mar 2009.

Government of Alberta. 2008a. Information and communication technologies. http://www.albertacanada.com/industries/866.html Accessed 11 Mar 2009.

Government of Alberta. 2008b. Land-use framework final report. http://www.landuse.alberta.ca/documents/Final_Land_use_Framework.pdf Accessed 17 Mar 2009.

Government of Alberta. 2008c. Facts about Alberta's oil sands: tailings management. http://oilsands.alberta.ca/documents/Tailings_management.pdf Accessed 20 Mar 2009.

Government of Alberta. 2009a. History. http://alberta.ca/home/182.cfm Accessed 11 Mar 2009.

Government of Alberta. 2009b. Environmental Protection and Enhancement Act. http://www.qp.gov.ab.ca/documents/acts/E12.cfm Accessed 6 Mar 2009.

Government of Alberta. 2009c. About Alberta: industry and economy. http://alberta.ca/home/181.cfm Accessed 11 Mar 2009.

Government of Alberta. 2009d. Alberta Advantage. http://alberta.ca/home/43.cfm Accessed 24 Mar 2009.

GreenOntario. 2002. Green On – November 2002 Newsletter of the Conservation Council of Ontario. http://www.greenontario.org/news/0211.html Accessed 10 Mar 2009.

Greenpeace. 2002. Blair meets "Darth Vader: of global warming. http://www.greenpeace.org.uk/tags/lee-raymond Accessed 25 Mar 2009.

Greenpeace. 2009. Stop the tar sands. http://www.greenpeace.org/canada/en/campaigns/tarsands Accessed 14 Mar 2009.

Hammond, A., Adriaanse, A., Rodenburg, E., Bryant, D., and R. Woodward. 1995. Environmental indicators: a systemic approach to measuring and reporting on environmental policy performance in the context of sustainable development. World Resources Institute. http://pdf.wri.org/environmentalindicators_bw.pdf Accessed 30 Apr 2009.

Harrison, K. 1996. Passing the buck: federalism and Canadian environmental policy. Vancouver: UBC Press. 238pp.

Harrison, L. 2009. Oilsands miners assessing new tailings rules, technology solutions. March 10th, 2009. New Technology Magazine. http://www.nickles.com/ntm/extra.asp?article=NTM2009_MA0002.html Accessed 20 Mar 2009.

Healing, D. 2009. Alberta gives 'teeth' to tailings pond rules: oilpatch bound to file compliance reports annually. http://www.calgaryherald.com/business/Alberta+gives+teeth+tailings+pond+rules/1246894/story.html Calgary Herald. February 3rd, 2009. Accessed 20 Mar 2009.

Hoberg, G. 1991. Sleeping with an elephant: the American influence on Canadian environmental regulation. Journal of Public Policy 11: 107-132.

ICO2N. 2009. Integrated carbon dioxide network. http://www.ico2n.com/index.php Accessed 2 Apr 2009.

Illical, M. and K. Harrison. 2007. Protecting endangered species in the US and Canada: the roles of negative lesson drawing. Canadian Journal of Political Science 40: 367-394.

Imperial Oil. 2005. Imperial Kearl Oil Sands Mine Application, (no. 1408771 & 1414891, volume 4), Calgary, Alberta: Imperial Oil Ltd. pp. 3- 31.

Imperial Oil. 2006. Corporate profile. http://www.imperialoil.ca/Canada-English/ThisIs/Profile/TI_P_CorporateProfile.asp Accessed 26 Mar 2009.

InfoMine. 2008. Suncor Minesite. http://www.infomine.com/minesite/minesite.asp?site=suncor Accessed 1 May 2009.

Kairos. 2009. A Christian response to the tar sands: add your voice! http://www.kairoscanada.org/en/ecojustice/climate-change/tarsandsresponse/ Accessed 12 Mar 2009.

Karabegovic and McMahon. 2008. Economic freedom of North America: 2008 Annual Report. Fraser Institute. http://www.fraserinstitute.org/researchandpublications/publications/5729.aspx Accessed 11 Mar 2009.

Karl, H.A., Susskind, L.E., and Wallace, K.H, 2007, A dialogue, not a diatribe—effective integration of science and policy through joint fact finding. Environment 49: 20-34.

Kennett, S. 2002. Integrated resource management in Alberta: past, present and benchmarks for the future. CIRL Occasional Paper No. 11. Calgary: Canadian Institute of Resources Law.

Klassen, R. and C. McLaughlin. 1996. The impact of environmental management on firm performance. Management Science 42: 1199-1214.

Kolbert, E. 2007. Unconventional crude: Canada's synthetic-fuels boom. New Yorker: November 12, 2007. http://www.newyorker.com/reporting/2007/11/12/071112fa_fact_kolbert Accessed 11 Mar 2009.

Kunzig, R. 2009. Scraping bottom. National Geographic Magazine: March 2009. Pp36-59 http://ngm.nationalgeographic.com/2009/03/canadian-oil-sands/kunzig-text Accessed 11 Mar 2009.

Layzer, J. 2008. Natural experiments: ecosystem based management and the environment. Cambridge, MA: MIT Press. 365pp.

Leger Marketing. 2008. Variation in turnout by Alberta Electoral Region. http://www.elections.ab.ca/Public%20Website/1012.htm Accessed 12 Mar 2009.

Leung, S., MacKinnon, M., and R. Smith. 2003. The ecological effects of naphthenic acids and salts on phytoplankton from the Athabasca oil sands region. Aquatic Toxicology 62:11-26.

Locke, R., Qin, F. and A. Brause. 2007. Does monitoring improve labor standards?: Lessons from Nike. Industrial and Labor Relations Review 61: 3-31.

Marsden, W. 2007. Stupid to the last drop: how Alberta is bringing environmental Armageddon to Canada (and doesn't seem to care). Toronto: Knopff Canada. 248pp.

MacDonald, J. 2006. Klein slams Al Gore interview on oil sands. Globe and Mail. July 5, 2006. http://www.theglobeandmail.com/servlet/story/RTGAM.20060705.waltagore0705/BNStory/National/?page=rss&id=RTGAM.20060705.waltagore0705 Accessed 10 Mar 2009

Markusoff, Jo. 2007. Head rolls in EUB spying scandal. October 15th, 2007. Edmonton Journal. http://www2.canada.com/edmontonjournal/news/story.html?id=a6400ade-683a-485a-b7b0-0c8479669ab0&k=44895 Accessed 28 Mar 2009.

McKenzie-Brown, P. 2008. Shell's take on carbon sequestration. http://www.newfuelnow.com/commentary/november2008/mckenziebrown110408/ Accessed 27 Mar 2009.

Mikisew Cree First Nation. 2007. Response to the Multi-stakeholder committee phase II proposed option for strategies and actions and Submission to the Government of Alberta for the oil sands strategy. Fort Chipewyan, AB: Mikisew Cree First Nation.

Moir, W. and W. Block. 2001. Adaptive management on public lands in the United States: commitment or rhetoric? Environmental Management 28:141-148

Munroe, S. 2003. Charges laid in Walkerton water contamination. About.com. http://canadaonline.about.com/cs/walkerton/a/walkertoncharge.htm Accessed 14 Mar 2009.

New York Times (2009). Oil sands news. http://topics.nytimes.com/top/reference/timestopics/subjects/o/oil_petroleum_and_gasoline/oil_sands/index.html Accessed 11 Mar 2009.

Nikiforuk, A. 2008. Tar sands: dirty oil and the future of a continent. Toronto: Greystone Books 214pp.

Office of the Auditor General of Canada. Water and sediment contamination of the Athabasca River due to oilsands production. http://www.oag-bvg.gc.ca/internet/English/pet_238_e_30190.html Accessed 10 Mar 2009.

Oil Sands Developers Group. 2008. The facts on reclamation. http://www.oilsands.cc/pdfs/The%20Facts%20on%20Oil%20Sands%20Reclamation-Jul%2031-08.pdf Accessed 20 Mar 2009.

Oil Sands Ministerial Strategy Committee. 2007. Investing in our future: responding to the rapid growth of oil sands development – final report. http://alberta.ca/home/395.cfm? Accessed 11 Mar 2009.

Pagnamenta, R. 2009. Anger as Shell reduces renewables investment. March 18, 2009. The Times of London. http://business.timesonline.co.uk/tol/business/industry_sectors/natural_resources/article5927869.ece Accessed 27 Mar 2009.

Pembina Institute. 2009a. Oil sands watch: minimizing the impacts of oil sands development in Canada. http://www.oilsandswatch.org/ Accessed 14 Mar 2009.

Phillips, J. 2008. Collecting Rent: A Comparative Analysis of Oil and Gas Fiscal Policy Regimes in Alberta, Canada and Norway. Social Science Research Network Working Paper. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1140306 Accessed 13 Apr 2009.

Pollet, I., and L. Bendell-Young. 2000. Amphibians as indicators of wetland quality in wetlands formed from oil sands effluent. Environmental Toxicology and Chemistry 19: 2589-2597.

Post, J. and B. Altman. 1994. Managing the environmental change process: barriers and opportunities. Journal of Organizational Change Management 7: 64-81

RAMP/WBEA/CEMA 2008. Joint community update 2008: reporting our environmental activities to the community. http://www.ramp-alberta.org/UserFiles/File/CommunityReports/2008/Joint_commreport_08.pdf Accessed 11 Mar 2009.

Regional Municipality of Wood Buffalo. 2007. 2007 Municipal Census. http://www.woodbuffalo.ab.ca/business/demographics/demographics.asp Accessed 10 Mar 2009.

Ross, M. 2001. Does oil hinder democracy? World Politics 53: 325-361.

Ross, M. 2009. Oil and democracy revisited. Working Paper. http://www.sscnet.ucla.edu/polisci/faculty/ross/Oil%20and%20Democracy%20Revisited.pdf Accessed 12 Mar 2009.

Royal Dutch Shell. 2008. Shell energy scenarios to 2050. http://www-static.shell.com/static/public/downloads/brochures/corporate_pkg/scenarios/shell_energy_scenarios_2050.pdf Accessed 27 Mar 2009.

Royal Dutch Shell. 2009a. Managing our emissions. http://www.shell.com/home/content/responsible_energy/environment/climate_change/managing_emissions/managing_emissions.html#building_our_capability_in_co2_capture_and_storage_4 Accessed 27 Mar 2009.

Sample, I. 2007. Scientists offered cash to dispute climate science. The Guardian. http://www.guardian.co.uk/environment/2007/feb/02/frontpagenews.climatechange Accessed 25 Mar 2009.

Schindler, D., Donahue, W., and J. Thompson. 2007. Section 1: Future water flows and human withdrawals in the Athabasca River. In *Running out of steam?: oil sands development and water use in the Athabasca River watershed: science and market based solution.* Munk Centre for International Studies, University of Toronto and Environmental Research and Studies Centre, University of Alberta. http://www.ualberta.ca/ERSC/water.pdf Accessed 24 Mar 2009.

Schwarz, R. 2002. *The skilled facilitator: A comprehensive resource for consultants, facilitators, managers, trainers, and coaches.* San Francisco: Jossey-Bass.

Scott, N. 2008. Oil sands projects slashed as credit crisis hits Alberta. October 23, 2008. The Globe and Mail. http://www.theglobeandmail.com/servlet/story/RTGAM.20081023.wroilpatch24/BNStory/energy/?cid=al_gam_nletter_maropen Accessed 28 Mar 2009.

Shell Canada. 2005. 2004 Athabasca Oil Sands Project Sustainable Development Report. http://www.shell.ca/static/ca-en/downloads/about_shell/what_we_do/aosp_sd_report.pdf Accessed 27 Mar 2009.

Shell Canada. 2007. 2006 Sustainable development report. http://www.shell.ca/static/ca-en/downloads/society_environment/sd06.pdf Accessed 27 Mar 2009.

Shell Canada. 2008a. CNBC's *Questions for the Future* with Rob Routs now online. http://www.shell.ca/home/content/ca-en/news_and_library/features/feature_cnbc.html?LN=/news_and_library/features Accessed 27 Mar 2009.

Shell Canada. 2008b. Commitment to sustainable development. http://www.shell.ca/static/ca-en/downloads/society_environment/hssdpolicy.pdf Accessed 27 Mar 2009.

Shell Canada. 2009a. Shell Canada – Muskeg River Mine. http://www.shell.ca/home/content/ca-en/about_shell/what_we_do/oil_sands/aosp/muskegriver.html Accessed 27 Mar 2009.

Shell Canada. 2009b. Reclamation at the Muskeg River Mine. http://www.shell.ca/reclamation Accessed 27 Mar 2009.

Shell Canada. 2009c. ISO 14001 Registration in Shell Canada. http://www.shell.ca/home/content/ca-en/about_shell/how_we_work/iso/iso_notice.html Accessed 27 Mar 2009.

Shell US. 2009. The three hard truths. http://www.shell.us/home/content/usa/aboutshell/energy_challenge/hard_truths/three_hard_truths.html Accessed 27 Mar 2009.

Sierra Club of Canada. 2009. Tar sands. http://www.sierraclub.ca/prairie/tarnation.htm Accessed 14 Mar 2009.

Sparrow, M. 2000. The regulatory craft: controlling risks, solving problems and managing compliance. Washington, D.C.: Brookings Institution Press. pp 346.

Stadt, J., Schieck, J., and H. Stelfox. 2006. Alberta Biodiversity Monitoring Program – monitoring effectiveness of sustainable forest management planning. Environmental Monitoring and Assessment 121: 33-46.

Statistics Canada. 2005. Divorces in Canada, 2005. http://www.statcan.gc.ca/pub/84f0213x/84f0213x2005000-eng.htm Accessed 11 Mar 2009.

Statistics Canada. 2008. Family violence in Canada: a statistical profile 2008. Canadian Centre for Justice Statistics. http://www.statcan.gc.ca/pub/85-224-x/85-224-x2008000-eng.pdf Accessed 11 Mar 2009.

Statistics Canada. 2009a. Population by year, by province and territory. http://www40.statcan.gc.ca/l01/cst01/demo02a-eng.htm Accessed 11 Mar 2009.

Statistics Canada. 2009b. Selected ethnic origins for Canada, Province and Territories – 20% sample data. http://www12.statcan.ca/english/census01/products/highlight/ETO/Table1.cfm?T=501&Lang=E&GV=1&GID=48&S=1&O=D Accessed 11 Mar 2009.

Stevenson, R. 1982. Explorations: the Athabasca Environment. Environmental Geochemistry and Health 4: 114.

Suncor Energy. 2008a. 2008 Annual Report. http://www.suncor.com/doc.aspx?id=105 Accessed 23 Mar 2009.

Suncor Energy. 2008b. Suncor Energy recognized for excellence in reporting. http://www.suncor.com/default.aspx?cid=714&lang=1 Accessed 23 Mar 2009.

Suncor Energy. 2008c. 2008 Progress report on climate change. http://www.suncor.com/doc.aspx?id=118 Accessed 24 Mar 2009.

Suncor Energy. 2009a. The early years: 1917-1960. http://www.suncor.com/popup.aspx?cid=331 Accessed 23 Mar 2009.

Suncor Energy. 2009b. The oil sands story (1960's, 1970's, 1980's). http://www.suncor.com/popup.aspx?cid=332 Accessed 23 Mar 2009.

Suncor Energy. 2009c. Energy for the future (1990's and 2000's). http://www.suncor.com/popup.aspx?cid=333 Accessed 23 Mar 2009.

Suncor Energy. 2009d. Suncor Energy and Petro-Canada join forces to create the premier Canadian energy company. http://www.suncor.com/default.aspx?cid=988&pre=view Accessed 23 March 2009.

Suncor Energy. 2009e. Suncor Energy reports court date for environmental charges. http://www.suncor.com/default.aspx?cid=970 Accessed 23 Mar 2009.

Suncor Energy. 2009f. Climate change. http://www.suncor.com/default.aspx?cid=84&lang=1 Accessed 23 Mar 2009.

Suncor Energy. 2009g. Suncor Energy please guilty to three environmental charges. April 2nd 2009 Press Release. http://www.suncor.com/Default.aspx?cid=995&lang=1 Accessed Apr 3 2009.

Susskind, L. and J. Secunda. 1998. The risks and advantages of agency discretion: evidence from EPA's Project XL. UCLA Journal of Environmental Law and Policy 17:67-103.

Susskind, L., McKearnan, S. and J. Thomas-Larner. 1999. The consensus building handbook: a comprehensive guide to reaching agreement. Thousand Oaks, CA: Sage Publications. 1147pp.

Susskind, L., Field, P., van der Wansen, M., and J. Peyser. 2007. Integrating scientific information stakeholder interests and political concerns. MIT-USGS Science Impact Collaborative Working Paper. http://web.mit.edu/dusp/epp/music/pdf/LES_PF_MvdW_JP_Oxford.pdf Accessed 1 May 2009.

SWF Institute. 2009. Government Pension Fund – Norway. http://www.swfinstitute.org/fund/norway.php Accessed 13 Apr 2009.

Syncrude. 2006a. Oil sands history. http://www.syncrude.ca/users/folder.asp?FolderID=5657 Accessed 25 Mar 2009.

Syncrude. 2006b. Syncrude owners. http://www.syncrude.ca/users/folder.asp?FolderID=7101 Accessed 25 Mar 2009.

Syncrude. 2007a. 2007 Sustainability report. http://sustainability.syncrude.ca/sustainability2007/ Accessed 19 Mar 2009.

Syncrude. 2009a. Charges related to Aurora waterfowl incident confirmed. http://www.syncrude.ca/users/news_view.asp?FolderID=5690&NewsID=142 Accessed 25 Mar 2009.

Syncrude. 2009b. Syncrude earns gold-level accreditation. http://www.syncrude.ca/users/news_view.asp?FolderID=5690&NewsID=143 Accessed 26 Mar 2009.

Thimm, H. 2001. Hydrogen sulphide measurements in SAGD operations. Journal of Canadian Petroleum Technology 40: 51-53.

Thompson, D. 2009. Bison now roam on rehabilitated oil sands. February 28, 2009. Letter to the Editor. The National Post. http://www.nationalpost.com/news/story.html?id=1338545 Accessed 28 Mar 2009.

US Environmental Protection Agency. 2009. Methane. http://epa.gov/methane/ Accessed 26 Mar 2009.

van den Heuvel, M., Power, M., Richards, J., MacKinnon, M. and D. Dixon. 2000. Disease and Gill Lesions in Yellow Perch (*Perca flavescens*) Exposed to Oil Sands Mining-Associated Waters. Ecotoxicology and Environmental Safety 46:334-341.

Valiant, M. 2003. Legal foundations of Canadian environmental policy: underlining our values in a shifting landscape. pp 3-24 in *Canadian environmental policy: context and cases.* Eds. D.Van Nijnatten and R. Boardman. Toronto: Oxford University Press. 372pp.

Walters, C. and C. Holling. 1990. Large-scale management experiments and learning by doing. Ecology 71: 2060-2068.

Weber, B. 2006. Official grilled on oil sands impact on Athabasca River in Alberta. http://finance.sympatico.msn.ca/investing/insight/article.aspx?cp-documentid=1318039 Accessed 28 Mar 2009.

Wells, J., Case-Lefkowitz, S., Chavarria, G. and S. Dyer. 2008. Impact on birds of tar sands oil development in Canada's boreal forest. http://pubs.pembina.org/reports/borealbirdsreport.pdf Accessed 15 Mar 2009.

WoodBuffalo.net 2009. Labour market information, Fort McMurray, Alberta. http://www.woodbuffalo.net/AboutCostHouse.html Accessed 10 Mar 2009.

Woynillowicz, D., Severson-Baker, C. and M. Raynolds. 2005. Oil sands fever: the environmental implications of Canada's oil sands rush. http://www.oilsandswatch.org/pub/203 Accessed 26 Mar 2009.

Woynillowicz, D. and C. Severson-Baker. 2006. Down to the last drop: the Athabasca River and oil sands. Pembina Institute: Oil Sands Issue Paper No. 1. http://pubs.pembina.org/reports/LastDrop_Mar1606c.pdf Accessed 24 Mar 2009.

Xing, Y. and C. Kolstad. 2004. Do lax environmental regulations attract foreign investment. Environmental and Resource Economics. 21: 1-22.

Yergin, D. 2003. "Gulf Oil – how important is it anyway?" The Financial Times (London). March 22, 2003. p.1

APPENDIX 2:

INTERVIEW LIST

1. Senior official, Oil Sands Strategic Policy and Innovation, Oil Sands Environmental Management, Alberta Environment. Jan 28th, 2009.
2. Preston McEachern – Section Head, Science, Research and Innovation, Oil Sands Strategic Policy and Innovation, Oil Sands Environmental Management, Alberta Environment. Jan 28th, 2009.
3. Kathleen Rich – Section Head, Policy and Systems, Oil Sands Strategic Policy and Innovation, Oil Sands Environmental Management, Alberta Environment. Jan 28th, 2009.
4. Nicole Spears – Section Head, Education and Information, Oil Sands Strategic Policy and Innovation, Oil Sands Environmental Management, Alberta Environment. Jan 28th, 2009.
5. Randall Barrett – Section Head, Governance and Partnerships, Oil Sands Strategic Policy and Innovation, Oil Sands Environmental Management, Alberta Environment. Jan 28th, 2009.
6. Susan McRory – Environmental Coordinator, Regulatory Prosecutions, Criminal Justice Division, Alberta Justice. Feb 2nd, 2009.
7. Ernie Hui – Assistant Deputy Minister, Environmental Assurance and Oil Sands Environmental Management, Alberta Environment. Feb 3rd, 2009.
8. Senior official, Oil Sands Operations, Alberta Energy. Feb 3rd, 2009.
9. Senior official, Strategic Policy and Planning, Oil Sands Secretariat, Alberta Treasury Board. Feb 6th, 2009.
10. Kem Singh, Regional Approvals Manager, Northern Region, Alberta Environment. Feb 6th, 2009.
11. Sara Ehrhardt –Former Policy Manager, Oil Sands Strategic Policy and Innovation, Oil Sands Environmental Management, Alberta Environment. Feb 9th, 2009.
12. Senior official, Energy Future and Strategic Relations. Former ADM for Oil Division, Alberta Energy. Feb 10th, 2009.
13. PhD. Student Organizational Management – Strategic Management and Organization. University of Alberta School of Business. Feb 10th, 2009
14. Senior Environmental Management Spokesperson, Suncor. Feb 10th, 2009.
15. Senior official, Applications Branch – Alberta Energy Resource Conservation Board. Feb 10th, 2009.
16. Senior Environmental Management Spokesperson, Shell Canada. Feb 11th, 2009
17. Senior spokesperson, Ottawa, Department of Fisheries and Oceans, Government of Canada. Feb 12th, 2009.
18. Spokesperson, Canadian Association of Petroleum Producers. Feb 13th, 2009.
19. Senior Environmental Management Spokesperson, Syncrude. Feb 17th, 2009.
20. Oil Sands Policy Analyst, Pembina Institute for Sustainable Development. Feb 17th, 2009.
21. Engineer, Fort McMurray Office, Alberta Energy Resources Conservation Board. Feb 19th, 2009.
22. Senior spokesperson, Edmonton, Environment Canada. Feb 20th, 2009.
23. Howard Samoil – Barrister and Solicitor, Environmental Law Section, Alberta Justice. Feb 22nd 2009.