IN THE MATTER OF THE *ENERGY RESOURCES CONSERVATION ACT* R.S.A. 2000, C. E-10

AND THE *OIL SANDS CONSERVATION ACT*, R.S.A. 2000, C. 0-7, Section 10 and 11 and Sections 3, 24, and 26 of the *Oil Sands Conservation Regulation*

AND IN THE MATTER OF THE *CANADIAN ENVIRONMENTAL ASSESSMENT ACT*, S.C. 1992, c.37;

AND IN THE MATTER OF A JOINT PANEL REVIEW BY THE ALBERTA ENERGY AND CONSERVATION BOARD AND THE GOVERNMENT OF CANADA, REGARDING:

JOSLYN NORTH MINE PROJECT
TOTAL E&P JOSLYN LTD.;
CEAR Reference No, 08-05-37519
ERCB Application No. 1445535.

SUBMISSION OF THE OIL SANDS ENVIRONMENTAL COALITION

AUGUST 24TH, 2010

Submitted to:

Joint Review Panel / Joslyn North Mine Project
Energy Resources Conservation Board
9915 Franklin Avenue
Provincial Building 2nd Floor, P.O. Box 15
Fort McMurray, AB T9H 2K4
JoslynReview@ceaa-acee.gc.ca

Submitted by:

ECOJUSTICE
% ACKROYD LLP
1500, 10665 Jasper Avenue
Edmonton, AB T5J 3S9
Tel: (780) 412-204
Fax: (780) 423-8946

Attention: Karin E. Buss
kbuss@ackroydlaw.com

Solicitors for the Oil Sands Environmental Coalition

TABLE OF CONTENTS

1. DESCRIPTION OF INTERVENERS

1) The Oil Sands Environmental Coalition (OSEC) is a coalition of Alberta public interest groups with a longstanding interest in the Athabasca Oil Sands area. OSEC was formed to facilitate more efficient participation in the regulatory approvals process for oil sands applications. Its members include:

   a) **The Fort McMurray Environmental Association,** consisting of residents living in and around Fort McMurray who are concerned about the effects of oil sands development on human health, the ecosystem and the socio-economic quality of life in the municipality of Wood Buffalo and who may be directly and adversely affected by the adverse environmental and socio-economic effects of the Joslyn North Mine.

   b) **The Pembina Institute**, an Alberta-based non-profit environmental research and a policy analysis organization with members across Alberta, including some in the municipality of Wood Buffalo. One of Pembina's objectives is to minimize the environmental impacts associated with fossil fuel development in Alberta. The Institute has monitored the health and environmental implications of oil sands development since the mid 1980's and has been particularly active in the assessment and management of long term, chronic and cumulative impacts. The Institute has an interest in lands near Fort McKay, and in close proximity to the proposed projects. The interest consists of a license to occupy lands on the Muskeg and Athabasca Rivers for recreational purposes, such as camping and boating. The description of the lands subject to the license is attached as **Appendix A**.

   c) **The Toxics Watch Society of Alberta**, an Edmonton-based public interest organization with a primary focus on the toxicity effects of air pollution on human health and the environment. Its goal is to promote and advocate for policies for improved air quality management, pollution prevention, and continuous improvement.

2) OSEC's primary objectives are:

   a) monitoring the environmental implications of oil sands development, and

   b) minimizing the environmental impacts associated with oil sands development in the Athabasca Oil Sands region.

3) OSEC has been engaged in reviewing and assessing oil sands development since the mid 1980's and has been particularly active in the assessment and management of long-term chronic and cumulative impacts. OSEC has provided evidence and/or submissions to the Alberta Energy and Utilities Board at several hearings, including the following:

   (a) The 1993 Syncrude expansion hearing (under the name Syncrude Environmental Assessment Coalition)

   (b) The 1997 Syncrude Aurora Mine (Pembina Institute and Toxics Watch)

   (c) The 1998 Shell Canada Muskeg River Mine Project

   (d) The 1999 Suncor Millennium Project

   (e) The 1999 Syncrude Canada Mildred Lake Upgrader Expansion

   (f) The 1999 PanCanadian Christina Lake Project

   (g) The 2000 Petro-Canada McKay River Project.

(h) The 2002 TrueNorth Fort Hills Project.
(i) The 2003 Joint Panel Review of the CNRL Horizon Project.
(j) The 2003 Joint Panel Review of the Shell Jackpine Mine Phase 1 Project.
(k) The 2006 Suncor Voyageur Expansion Project
(l) The 2006 Shell Albian Muskeg River Mine Expansion Project
(m) The 2006 Imperial Kearl Project

4) Members of OSEC participated actively from 2000 to 2008 with other stakeholders through the Cumulative Environmental Management Association ("CEMA") to develop environmental management systems that are intended to preserve and to protect the long-term ecological integrity of the Athabasca region from industrial development. OSEC members' specific involvement included:
   (a) Member of CEMA Board;
   (b) Officer at large – CEMA Management Committee
   (c) Co-chair of NO_x/SO_2 management working group (NSMWG);
   (d) Member of the Sustainable Ecosystems Working Group (SEWG);
   (e) Member of the Surface Water Working Group (SWWG);

5) OSEC members continue to assist with the planning and management of environmental assessment and monitoring in the region through other regional multi-stakeholder groups.
   (a) Wood Buffalo Environmental Association (WBEA)
      - 3 representatives of OSEC are members
   (b) The Alberta Biodiversity Monitoring Institute (ABMI)
   (c) Terrestrial Environmental Effects Monitoring (TEEM) Group
      - 1 representatives of OSEC are members

6) OSEC has a long-standing practice of working pro-actively with oil sands proponents, in order to resolve issues when possible. OSEC has met with TOTAL E&P Joslyn ("TOTAL") and was unable to reach agreement on appropriate mitigation associated with the Joslyn North Mine Project.

7) The Pembina Institute has published the following research reports about oil sands in Alberta:

   - *Oil Sands Fever: The Environmental Implications of Canada's Oil Sands Rush* (2005)
   - *Oil Sands Fever: The Environmental Implications of Canada's Oil Sands Rush* (2005)
   - *The Climate Implication of Canada's Oil Sands Development* (2005)
   - *Carbon Capture and Storage: an Arrow in the Quiver of a Silver Bullet to Combat Climate Change – A Canadian Primer* (2005)
   - *Troubled Waters, Troubling Trends* (2006)
   - *Down to the Last Drop: The Athabasca River and Oil Sands* (2006)
   - *Death by a Thousand Cuts: The Impacts of In Situ Oil Sands Development on Alberta's Boreal Forest* (2006)

- *Thinking Like an Owner: Overhauling the Royalty and Tax Treatment of Alberta's Oil Sands* (2006)
- *Carbon Neutral by 2020: A Leadership Opportunity in Canada's Oil Sands* (2006)
- *Haste Makes Waste: The Need for a New Oil Sands Tenure Regime* (2007)
- *Royalty Reform Solutions: Options for Delivering a Fair Share of Oil Sands Revenues to Albertans and Resource Developers* (2007)
- *Danger in the Nursery: Impact on Birds on Tar Sands Oil Development in Canada's Boreal Forest* (2008)
- *Catching Up: Conservation and Biodiversity Offsets in Alberta's Boreal Forest* (2008)
- *Taking the Wheel: Correcting the Course of Cumulative Environmental Management in the Athabasca Oil Sands* (2008)
- *Under-Mining the Environment: the Oil Sands Report Card* (2008)
- *Fact or Fiction: Oil Sands Reclamation* (2008)
- *Carbon Copy: Preventing Oil Sands Fever in Saskatchewan* (2009)
- *Upgrader Alley: Oil Sands Fever Strikes Edmonton* (2009)
- *Cleaning the Air on Oil Sands Myths* (2009)
- *Pipelines and Salmon in Northern British Columbia: Potential Impacts* (2009)
- *The Waters That Bind Us: Transboundary Implications of Oil Sands Development* (2009)
- *Heating Up in Alberta: Climate Change, Energy Development and Water* (2009)
- *Carbon Capture and Storage in Canada: CCS and Canada's Climate Strategy* (2009)
- *The Pembina Institute's Perspective on Carbon Capture and Storage* (2009)
- *Climate Leadership, Economic Prosperity: Final Report on an Economic Study of Greenhouse Gas Targets and Policies for Canada* (2009)
- *Tailings Plan Review: An Assessment of Oil Sands Company Submissions for Compliance with ERCB Directive 074* (2009)
- *Drilling Deeper: The In Situ Oil Sands Report Card* (2010)
- *Opening the Door to Oil Sands Expansion: The Hidden Environmental Impacts of the Enbridge Northern Gateway Pipeline* (2010)
- *Northern Lifeblood: Empowering Northern Leaders to Protect the Mackenzie River from Oil Sands Risks* (2010)

2. NATURE AND SCOPE OF INTERVENERS' INTENDED PARTICIPATION

The Oil Sands Environmental Coalition (OSEC) intends to participate in this hearing by:

(a) examining the witness panels of TOTAL Government of Alberta, the Government of Canada and it reserves its right to ask questions of other witnesses as necessary;

(b) presenting an expert witness panel responding to TOTAL's application and the issues described herein (Section IV);

(c) and making final argument.

In the interests of efficiency, OSEC has retained a surface water quality expert, Dr. Donahue, jointly with the Sierra Club of Canada, Prairie Chapter. His report and CV is appended.

Dr. James Hansen will also be called as an expert witness on behalf of OSEC, to speak to matters set out in the greenhouse gas section of this submission. His CV is also appended. The remaining OSEC panel member's CV's will be provided at the hearing.

3. REQUESTED DISPOSITION

A. In order to the environmental effects of Joslyn North Mine project ('the Project"), OSEC submits the following information is required:

1. A cumulative effects assessment of terrestrial impacts that takes into account a) reasonably likely future activities, as required by the terms of reference; b) regional studies of cumulative effects – specifically the Terrestrial Ecosystem Management Framework developed by CEMA;

2. An assessment of impacts to surface water quality that adequately and validly takes into account the toxicity of surface waters and sediments as the result of current cumulative regional development, and the additive effect the Project would have on existing significant cumulative effects;

B. OSEC respectfully requests that the approval of the Project be denied on the basis that it is not in the public interest — environmentally, economically or socially — of the people of Alberta and Canada, and will create significant adverse effects with specific regard to the following grounds:

I. Environmental – Climate Change

- The Project will lead to a significant increase in greenhouse gas emissions that will, in large part, go unmitigated. Greenhouse gas emissions are well proven to be linked to increases in global temperatures which will lead to rising sea levels, impacts on water availability, increased heat waves, and increased severity of storms. These impacts are significant and will be felt globally. Alberta's regulations governing GHG emissions do not require meaningful reductions from the Project and compliance with them will not mitigate the environmental effects of these emissions. TOTAL proposes little in the way of measures beyond regulatory compliance to mitigate its GHG emissions.

II. Environmental – Air

The Project makes insufficiently mitigated contributions to increasing emissions and elevated ambient concentrations of nitrogen oxides (NO_X) and fine particulate matter ($PM_{2.5}$) in the Fort McMurray region.

III. Environmental – Terrestrial

- The Project when combined with existing, approved and planned developments will cause significant adverse effects on wildlife by reducing populations below their normal range of variability and creating unacceptable risks to their viability.
- CEMA has completed its recommended Terrestrial Ecosystem Management Framework (TEMF), which shows that the current oil sands trajectory is not sustainable and that major changes in land management policy are required if proposed CEMA wildlife management objectives and the Regional Sustainable Development Strategy are to be met.
- TOTAL's Application does not meet the Terms of Reference for the environmental assessment or CEAA requirements for assessing cumulative impacts of wildlife and vegetation by failing to account for likely future activities such as future forest fires and

planned industrial forest harvest within the regional study area. This means the Panel does not have valid and reliable information to assess the environmental impacts of the Project on wildlife.

- The Application does not meet the Terms of Reference for the environmental assessment by failing to take into account the work of relevant regional studies conducted by Alberta and Canada and proponents through CEMA, and the Terrestrial Ecosystem Management Framework developed by CEMA. The TEMF presents a more realistic assessment of cumulative impacts in the regional municipality of Wood Buffalo. The TOTAL environmental assessment does not consider these highly relevant impacts or the framework management objectives for wildlife.
- Terrestrial mitigation proposed by the TOTAL is inadequate, and is not consistent with accepted practices in terrestrial mitigation used in the oil sands region around or worldwide.

IV. Environment – Aquatic

The Project when combined with existing, approved and planned developments will cause significant adverse effects to the Lower Athabasca River during low winter flow periods, and declines in regional water quality as the result of atmospheric releases, deposition, and accumulation of organic and heavy metal pollutants, with associated increases in toxicity of surface waters and sediments to aquatic biota.

- A Water Management Framework that provides protection to the Lower Athabasca River Basin has not been completed, despite strong emphasis by government advisors and previous Joint Panels upon the need for Alberta to actively manage development and adopt more restrictive water withdrawal regimes to ensure such protection.

- TOTAL has not properly assessed or demonstrated adequate consideration of toxicity of surface waters and sediments as the result of current cumulative regional development, and has ignored the additive effect the Project would have on existing significant cumulative effects.

- The Application does not meet the Terms of Reference for the environmental assessment of the Project's impacts on surface waters, by failing to adequately describe the existing and anticipated water quality of waterbodies, by failing to adequately describe existing and anticipated sediment toxicity, by failing to adequately predict and describe suitability for aquatic invertebrates of constructed waterbodies like end-pit lakes, and by failing to adequately consider the spatial relations between oil sands operations and deposition or accumulation of heavy metals and other contaminants in designing proposed water quality and sediment quality monitoring programs for contaminants.

V. Environment – Reclamation

- TOTAL has not demonstrated that end pit lakes are technically or economically feasible for oil sands applications. Moreover, TOTAL does not meet the Terms of Reference for environmental assessment by failing to take into account alternatives to the use of an end-pit lake that are technically and economically feasible.

VI. Environmental – Wetlands

- TOTAL will be causing the irreversible loss of peatlands within the project area. There are currently no reclamation practices that are able to re-establish functioning peatlands and therefore TOTAL will not be able to fully mitigate for the impacts to these wetlands. Given the continued delay in implementing a Provincial Wetland Policy that would mitigate these impacts, approval of the project will have significant adverse effects and is not in the public interest.

VII. Environment – Cumulative Effects

- There is no effective management of cumulative effects of oil sands development.

VIII. Environment – Emergency Planning

- TOTAL does not meet the Terms of Reference for demonstrating how they will reduce the effects or consequences of an accident or malfunction, in particular a tailings dam breach (asked in TOR and February 2010 AIR)

IX. Economic

- TOTAL has not demonstrated adequate consideration for the economic liabilities created by the project's projected environmental impact. This oversight potentially places future reclamation costs on Alberta taxpayers, reducing the projected economic benefits created by the Project.

X. Social

- The Project's incremental and insufficiently mitigated contributions to adverse socioeconomic impacts in the Fort McMurray region.

C. While OSEC submits that **approval conditions** and recommendations are insufficient on their own to remedy the negative impacts of the Project given the current development context, should the Panel determine it is able to adequately assess the effects of the Project and determines that the Project has no significant adverse effects and is in the public interest, OSEC requests that any approval include the following conditions and recommendations to minimize and mitigate to the greatest extent possible the adverse impacts of the Project:

I. To address climate change issues:

- TOTAL be required to meet a GHG emissions reduction target for the Project equal to the emissions of a conventional oil and gas operation of similar size at start-up.
- TOTAL be required to install and have operational carbon capture and storage technology at its operation by 2020.
- TOTAL be required to meet a target of carbon neutral for the Project by 2020 through onsite reductions or offsets.

II. To address air quality issues:

- TOTAL be required to identify and implement regional offsets in order to nullify the Joslyn North Mine emissions of SO_2 and NO_x.
- TOTAL be required to employ Selective Catalytic Reduction (SCR) with Low NO_x (LN) burners for any units above 105 GJ/hr (50% + 80% reduction beyond uncontrolled).

- TOTAL be required to comply with the following standard for its cogeneration plant for electrical power and processing demands:

  Non Peaking Standard Formula:
  NO_x (kg/h) = [Net Power Output (MW net) x A] + [Heat Output (GJ/h) x B]

  Where:
  A = Power Output Allowance – the total electricity and shaft power energy production
  B = Heat Recovery Allowance – the total useful thermal energy recovered from the cogeneration / combined cycle facility

  Power Output Allowance ("A")

Net Power Output (per gas turbine train)	**Non Peaking ("A")** (kg NO_x/MWh net)
Greater than 25 MW	0.09
Less than 25 MW	0.60

  Heat Production Allowance ("B"): Natural Gas = 0.01 kg NO_x/GJ

III. To address terrestrial disturbance and wildlife impacts:

- Prior to receiving any federal approvals and commencing construction, TOTAL be required to provide a new and valid assessment of the cumulative impacts on wildlife taking into account all likely future activities including planned forest harvesting and forest fires and the studies on which the TEMF is based.
- Prior to commencing construction, TOTAL be required to develop and submit a biodiversity offset mitigation strategy for terrestrial disturbance that requires the purchase and conservation of ecologically significant private boreal forest lands the restoration of existing (non project related) disturbance footprints in northeastern Alberta, or strategies to retire harvest rights on public lands on a 3 hectare offset per 1 hectare of project disturbance basis, using accepted models for biodiversity offsets used elsewhere in North America and globally.

IV. To address wetland impacts:

- TOTAL be required to replace wetlands at the same ratio that they occurred on the landscape pre-development. For wetland types that the company is unable to replace, develop and submit a biodiversity offset mitigation strategy for wetland disturbance that requires the purchase and conservation of existing wetlands. The Wetland policy for Alberta's white area typically prescribes a 3:1 ratio for replacement wetland area to disturbed wetland area.

V. To address economic concerns:

- TOTAL be required to conduct a full cost analysis on the environmental liabilities created by the Project and calculate a cost to address those liabilities.
- Prior to construction, TOTAL be required to document that sufficient bonding is in place to achieve government certified reclamation.

VI. To address reclamation issues:

- Surface disturbance of 5378 hectares be permitted until 2021 only. Approval for additional disturbance be conditional on TOTAL obtaining a reclamation certificate for 2018 hectares of lands according to the schedule in the application.
- TOTAL meet all portions (including timing) of Tailings Directive 074.
- TOTAL provide an assessment of the technical and economic feasibility of the proposed EPL and alternatives that will be used if the EPL is unsuccessful.
- TOTAL provide evidence on the modeled salinity and contaminant load of recycle water and pore water that will be pumped into an EPL.

VII. To address emergency planning issues:

- TOTAL be required to publicly disclose emergency management plans indicating they are capable of adequately responding to all of the potential accidents and malfunctions listed on Table 1-1 of the July 27th 2010 JRP AIR Responses (Pg 3-4).
- TOTAL be required to conduct contamination modeling for the event of tailing dam breach and incorporate that information into their emergency planning.

Panel Recommendations

I. To address climate change issues:

- A recommendation to Alberta Environment and Environment Canada that they put in place national and provincial greenhouse gas targets that are in line with what the science indicates will be necessary for developed countries to play their part in reducing global greenhouse gas emissions with the aim of keeping global temperatures to within 2 degrees of pre-industrial levels. Specifically commit to reduce emissions to:
    - 25% below 1990 levels by 2020, and
    - 80% below 1990 levels by 2050.
- A recommendation to Alberta Environment and Environment Canada that they put in place regulations to manage the emissions of all large industrial emitters, including new oil sands mines, such that the reductions represent a fair share of the national target.
- A recommendation that Alberta Environment and Environment Canada put in place policies that will ensure wide-spread deployment of carbon capture and storage (CCS) technology by 2020.

II. To address terrestrial disturbance and wildlife impacts:

- A recommendation to Alberta SRD that it promptly fulfill the recommendation of CEMA and set as a key terrestrial environmental management objective for the RM of Wood Buffalo to maintain environmental indicators within 10% below the lower limit of the NRV. (Page 16 of CEMA Terrestrial Ecosystem Management Framework)
- A recommendation to Alberta SRD that it promptly fulfill the recommendation of CEMA and implement the Triad approach as the fundamental regional management strategy to balance social, economic, and ecological values in the RMWB. (Page 19 of CEMA Terrestrial Ecosystem Management Framework)
- A recommendation to Alberta SRD that it promptly fulfill the recommendation of CEMA and Constrain the Intensive Zone to between 5% and 14% of the RMWB at any time. The Intensive Zone is measured by summing the area of all quarter townships that include intensive footprint. (Page 20 of CEMA Terrestrial Ecosystem Management Framework)
- A recommendation to Alberta SRD that it promptly fulfill the recommendation of CEMA and designate an Extensive Zone where ecosystem forestry and other natural disturbance based activities (but not oil sands development) are permitted. This zone should be at least 46% of the RMWB, reflecting the balance of the region that is not an Intensive or Protected Zone. (Page 21 of CEMA Terrestrial Ecosystem Management Framework)
- A recommendation to Alberta SRD that it promptly fulfill the recommendation of CEMA and expand the area of legislatively protected lands to 20-40% of the RMWB; preliminary boundaries should be identified immediately for candidate protected areas to enable their prompt establishment. Candidate protected areas would need to be assessed for economic and social implications to inform the decision. Establishment of new protected areas may mean that some resource tenure could be affected, and in such cases compensation should be provided. (Page 22 of CEMA Terrestrial Ecosystem Management Framework)

- A recommendation to Alberta SRD that is promptly fulfill the recommendation of CEMA and ensure that indicators be managed in reference to their NRV. (Page 23 of CEMA Terrestrial Ecosystem Management Framework)
- A recommendation to Alberta SRD that it promptly fulfill the recommendation of CEMA and implement an aggressive motorized access management program at a level consistent with that modeled (e.g. restriction of OHV access from 50% of the Intensive Zone and 75% of the Extensive Zone, as well as systematic reclamation of existing wide (5 – 8 m) seismic lines). (Page 24 of CEMA Terrestrial Ecosystem Management Framework)
- A recommendation to Alberta SRD that it promptly fulfill the recommendation of CEMA and that Alberta use this Framework to the maximum extent practicable in developing the regional plan under the LUF. That the Framework be accepted by Alberta and implementation proceed immediately.
- A recommendation to Alberta Energy that a moratorium be placed on further allocation of oil sands mineral tenures until regional environmental management frameworks are complete.

III. To address wetland impacts:

- A recommendation to Alberta Environment that it implement the long overdue wetland policy for the Green Area of Alberta, and that the policy be retroactive for all oil sands approvals that have been granted while policy development has been delayed.

IV. To address reclamation:

- A recommendation to Alberta Environment to convene a public consultation process on mine liability security deposits. During the development of Alberta's Environmental Protection and Enhancement Act and the recent Water for Life strategy, the Government of Alberta conducted a thorough public consultation process. A similar review is warranted on the process of calculating, auditing, collecting and managing security deposits. To increase the transparency, sufficiency and political acceptability of a new mine liability policy, it is critical to hear the perspective of not only industry but the public groups and communities affected by mining
- A recommendation to Alberta Environment to provide online access to Annual Conservation and Reclamation Reports. By posting these reports online and by making these reports comparable increases the accountability of companies not only to Alberta Environment but also to the public.
- A recommendation to Alberta Environment to provide online access to mine liability cost calculations. Sharing the methodology behind their estimates will demonstrate transparency and improve trust among shareholders and stakeholders and increase the credibility of the Alberta Environment as the environmental regulator of the oil sands, while respecting proprietary information.
- A recommendation to the ERCB to give additional certainty for what technologies are feasible. This will give more certainty to companies when calculating their Asset Retirement Obligation and result in more accurate reporting.
- A recommendation to the ERCB to require full compliance with Tailings Directive 074, with no flexibility or exceptions to the timing or strength requirements laid out in the original Directive document.

- A recommendation to the ERCB to require mine operators to assign a lifespan to all assets reported as having an indeterminate life. This will give more certainty to companies when calculating their Asset Retirement Obligation and result in more accurate reporting.
- A recommendation to Alberta Environment to require third-party verification of mine liability estimates. Not having this verifications places significant risk on Alberta Environment staff to ensure these estimates are accurate and places considerable risk on the Government of Alberta should there be significant under-estimation of liabilities.
- A recommendation to Alberta Environment to require sign-off on liability estimates by Chief Executive Officer, Chief Financial Officer or Designated Financial Representative. Requiring a sign-off will raise awareness of the magnitude of potential liabilities among senior staff and also demonstrate to shareholders and the public that addressing liabilities is a priority for the company.
- A recommendation to Alberta Environment to expand what is currently considered in a reclamation security estimate. By including additional infrastructure and enlarging operational oversight encompassed in the reclamation security estimate, the accounting methodology becomes more representative of the area needing reclamation and ultimately, the uncertainty facing mine operators, shareholders and the Government of Alberta is reduced.
- A recommendation to Alberta Environment to use the full cost accounting approach to calculate financial liabilities.
- A recommendation to Alberta Environment to use standardized oil sands mine industry liability estimates. This will ensure that all oil sands companies are treated fairly and consistently by the Government of Alberta.
- A recommendation to Alberta Environment to create a staged reclamation certification process. A staged reclamation certificate provides standardized evidence that reclamation is proceeding, assisting industry to maintain their social license and providing justification for returning a portion of the collected security. Transfer of liability to the Government of Alberta would still only occur with a final reclamation certificate and companies would still have access and control of land before final certification.
- A recommendation to Alberta Environment that commercial scale, experimental bog and fen reclamation be demonstrated prior to future oil sands sands mine approvals.

4. FACTS AND REASONS FOR REQUESTED DISPOSITION

4.1 Climate Change

4.1.1 Overview

One of the purposes of the Canadian Environmental Assessment Act is to "to ensure that projects that are to be carried out in Canada … do not cause significant adverse environmental effects outside the jurisdictions in which the projects are carried out"[1]. As a result the consideration of greenhouse gas emissions, which effect the global environment, should be a key determinant of whether this Project should be approved or not.

Greenhouse gases emissions lead to increases in global temperatures which are already and will continue to have global environmental impacts including sea level rise, as well as increases in: the severity of storms, flooding, stresses on the water supply and droughts. These impacts will in turn affect the health status of people around the world, particularly people in those in regions that lack adaptation capacity. Greenhouse gas emissions emitted anywhere in the world contribute to these significant adverse effects.

If the Joslyn North Mine Project is approved it will increase global greenhouse gas emissions (GHGs) by 1.5 million tonnes (Mt) every year. Over the life of the Project these emissions are expected to mount to over 31Mt. This project will increase Alberta's greenhouse gas emissions by 1%[2] and will increase Canada's emissions from oil sands operations by 4%.[3]

This is a significant increase in emissions, equivalent to the sum of all emissions from combustion sources on Prince Edward Island in 2005[4], and equal to the emissions from over 270,000 cars[5].

TOTAL does not commit to meet any emissions reduction targets, or to take any measures that would lead to significant reductions in emissions beyond compliance with federal and provincial regulations. In addition, neither the federal nor the provincial governments have put in place regulations that would require meaningful reductions be undertaken by the Project.

In order to stave off the most significant impacts of climate change, average global temperatures must be kept within 2 degrees Celsius of pre-industrial levels. The Pembina Institute has

---

[1] Canadian Environmental Assessment Act, 1992, c. 37, section 4.1 c.) available at http://laws.justice.gc.ca/eng/C-15.2/FullText.html (accessed August 22nd, 2010)

[2] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 10 Environment, Health, and Safety Management", February 2010, Pg. 10-3.
http://www.ceaa.gc.ca/050/documents_staticpost/cearref_37519/142/AdditionalInformationFeb2010/Section10.pdf

[3] Based on figures from Government of Canada, Environment Canada. 2010. *National Inventory Report 1990-2008 - Part 1 - Greenhouse Gas Sources and Sinks in Canada*, pg. 89 available at http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=492D914C-2EAB-47AB-A045-C62B2CDACC29 (accessed August 22nd, 2010)

[4] National/Provincial/Territorial Tables - Summary tables illustrating GHG emissions by province/territory, sector, and year from 1990 to 2008, as well as a National summary. Taken from Environment Canada. Greenhouse Gas Inventories. http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=83A34A7A-1(accessed August 18, 2010).

[5] Average vehicle emissions taken from U.S. Environmental Protection Agency. Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle. http://www.epa.gov/oms/climate/420f05004.htm (accessed Aug. 22nd, 2010)

recommended that in order for Canada to do its fair share in meeting this goal, reductions in the order of 25% below 1990 levels by 2020 and 80% below 1990 levels by 2050 must be pursued.[6]

However Canada has not committed to targets that are commensurate with the need to keep global temperatures to within 2 degrees Celsius. In 2008 Canada's emissions were 24% above 1990 levels[7]. According to Environment Canada's 2008 reference projections, if unabated Canada's emissions could rise to over 50% above 1990 levels.[8] The national targets that have been announced will result in GHG emissions that are 2% above 1990 levels by 2020[9]

Alberta has also not taken measures to reduce GHG emissions commensurate with its obligation to contribute to meeting the 2 degree Celsius target. Alberta's emissions - in a business as usual scenario - could rise by 30% above 2006 levels by 2020,[10] almost double its 1990 level emissions.[11]Alberta's climate change plan is to reduce emissions to 14% below 2005 levels by 2050[12], which is equivalent to a target of 15% above 1990 levels by 2050[13].

The oil sands will be a large contributor to the increases in emissions expected in Canada and Alberta. Oil sands emissions have more than doubled between 1990 and 2008.[14] According to the federal government's 2008 projection, oil sands emissions could reach 108 Mt by 2020. Over 40% of Canada's emissions increase from 2006 to 2020 would be from oil sands development.[15]

In addition to a lack of clear national targets that are in line with what would be needed to mitigate the serious adverse effects of climate change, Alberta and Canada lack appropriate regulation to manage the emissions of a new oil sands mine like the Joslyn North Mine Project. There are no federal regulations in place to ensure emissions from the oil sands are mitigated.

---

[6] Bramley, Matthew. 2005. *The Case for Deep Reductions, Canada's Role in Preventing Dangerous Climate Change, An Investigation by the David Suzuki Foundation and The Pembina Institute.* Drayton Valley, AB and Vancouver, B.C., The David Suzuki Foundation and the Pembina Institute. pg. 5, available at http://pubs.pembina.org/reports/Case_Deep_R_E.pdf

[7]Supra, note 4

[8] Government of Canada. 2008. *Turning the Corner, March 2008, Canada's Energy and GHG Emissions Projections, Reference Case 2006-2020,* Part 1. National Tables, available at http://www.ec.gc.ca/doc/virage-corner/2008-03/pdf/nat_eng.pdf (accessed August 22, 2010)

9 Canada's emissions reduction target is 17% below 2005 levels by 2020, see Government of Canada. 2010. *Canada Lists Emissions Target under the Copenhagen Accord,* February 1, 2010 available at http://www.climatechange.gc.ca/default.asp?lang=En&XML=D5E39C3A-C958-4876-8222-E3541F7B9C8D (accessed Aug. 22, 2010). According to the 2008 National Inventory report Canada's emissions were 731Mt in 2005 and 718Mt in 2006. Therefore the national target changed from 575Mt (20% below 2006 levels) to 607 Mt (17% below 2005 levels). Canada's 1990 emissions are 595 Mt. Data: Supra, Note 3

[10]Government of Canada. 2008. *Turning the Corner, March 2008, Canada's Energy and GHG Emissions Projections, Reference Case 2006-2020, Provincial and Territorial Tables* pg. 7 http://www.ec.gc.ca/doc/virage-corner/2008-03/pdf/prov-terr_eng.pdf

[11] Based on information in the National Inventory Report, see Supra note 4

[12] Government of Alberta. 2008. *Alberta's 2008 Climate Change Strategy – Responsibility, Leadership, Action*, , Pg. 24, available at http://environment.gov.ab.ca/info/library/7894.pdf (accessed Aug. 22nd, 2010)

[13] Based on information in the National Inventory Report, see Supra, note 4

[14] Based on information in Environment Canada's Reference Case, see Supra note 10

[15]Ibid

Alberta does have regulations in place to limit emissions from large industrial emitters, but these regulations are particularly lenient on new oil sands mines. These facilities face an intensity reduction of 2% starting their fourth year of operation, rising to 12% over 6 years. [16]

The Project will result in a significant increase in greenhouse gas emissions, emissions that are contributing to very serious environmental impacts globally. This increase will largely go unmitigated due to a lack of stringent federal and provincial regulations. The severity of the climate crisis requires urgent action to stabilize greenhouse gas emissions. In the absence of federal and provincial action that could meaningfully mitigate industrial GHGs , no approvals ought to be issued for this Project. If the Project is approved it should have stringent requirements imposed on it to ensure it achieves reductions in GHG emissions that would minimize its emissions.

4.1.2 The Science of Climate Change

The most recent IPCC report (2007), states that "[w]arming of the climate system is unequivocal…"[17] and that "[m]ost of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations."[18] The effects of climate change are also already apparent: "[a]nthropogenic warming over the last three decades has likely had a discernible influence at the global scale on observed changes in many physical and biological systems."[19]

Numerous studies have documented the impacts future warming will likely have on the environment[20]. The recent working group II report of the IPCC fourth assessment found that:

- *Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk.*
- *In the course of the century, water supplies stored in glaciers and snow cover are projected to decline, reducing water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population currently lives.*
- *The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land-use change, pollution, over-exploitation of resources).*

---

[16] Alberta Regulation 139/2007, Climate Change and Emissions Management Act, Specified Gas Emitters Regulation, section 4.1 available at http://www.canlii.org/en/ab/laws/regu/alta-reg-139-2007/latest/alta-reg-139-2007.html

[17] IPCC, 2007: *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, *Climate change 2007, Synthesis Report - Summary for Policymakers* - summary of the key findings and uncertainties contained in the Working Group contributions to the Fourth Assessment Report, pg. 2. Available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf (accessed on Aug. 22nd, 2010)

[18] Ibid, pg. 5

[19] Ibid, pg. 6.

[20] See Hansen et al. 2007. *Dangerous human-made interference with climate: A GISS model* studyAtmos. Chem. Phys., **7**, 2287-2312 available at http://pubs.giss.nasa.gov/abstracts/2007/Hansen_etal_1.html (accessed Aug. 23rd, 2010) and draft Hansen, Ruedy, Sato and Lo. 2010. *Global Surface Temperature Change* available at http://data.giss.nasa.gov/gistemp/paper/gistemp2010_draft0601.pdf. (accessed Aug. 23rd, 2010)

- *Many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. Those densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.*
- *Projected climate change-related exposures are likely to affect the health status of millions of people, particularly those with low adaptive capacity, through:*
  - *increases in malnutrition and consequent disorders, with implications for child growth and development;*
  - *increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts;*
  - *the increased burden of diarrhoeal disease;*
  - *the increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and,*
  - *the altered spatial distribution of some infectious disease vectors.* [21]

North America will also see impacts:

- *Warming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows, exacerbating competition for over-allocated water resources.*
- *Disturbances from pests, diseases and fire are projected to have increasing impacts on forests, with an extended period of high fire risk and large increases in area burned.*
- *Cities that currently experience heatwaves are expected to be further challenged by an increased number, intensity and duration of heatwaves during the course of the century, with potential for adverse health impacts. Elderly populations are most at risk.*
- *Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Population growth and the rising value of infrastructure in coastal areas increase vulnerability to climate variability and future climate change, with losses projected to increase if the intensity of tropical storms increases. Current adaptation is uneven and readiness for increased exposure is low.* [22]

In its chapter on North America, the fourth IPCC assessment report specifically mentions adverse effects of climate change on Alberta's Athabasca river, noting that "*Summer (May to August) flows of the Athabasca River have declined 20% since 1958…".*[23]

---

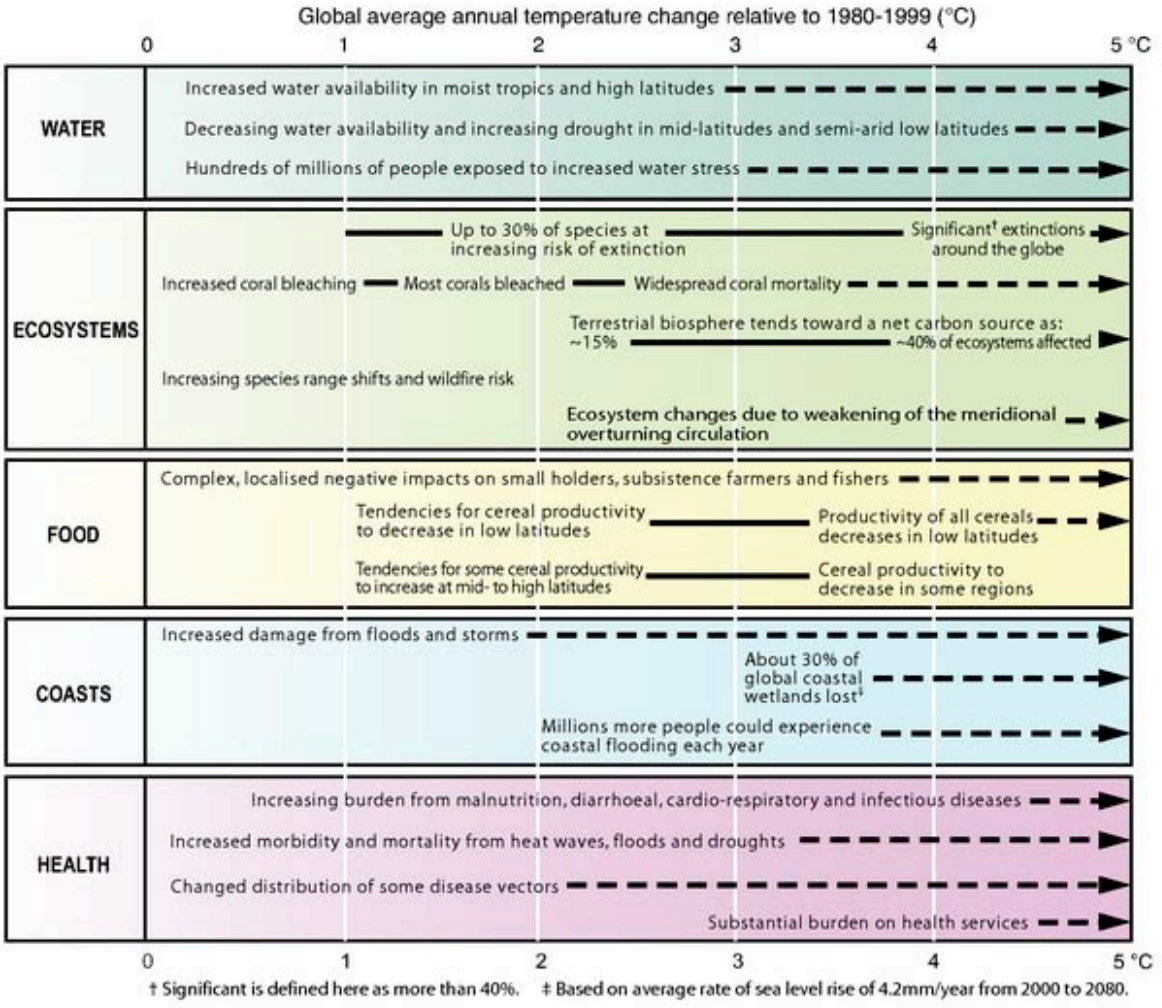
[21] *IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 7-22., pg. 11-12 available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf (accessed Aug. 22, 2010)

[22] Ibid, 14-15.

[23] Field, C.B., L.D. Mortsch,, M. Brklacich, D.L. Forbes, P. Kovacs, J.A. Patz, S.W. Running and M.J. Scott, 2007: North America. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK,. Pg.622available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter14.pdf (accessed on Aug. 22, 2010)

Figure 1 shows examples of impacts associated with different degrees of projected global average surface warming. Clearly, greenhouse gas emissions are causing serious adverse effects on the global environment. Further increases will exacerbate the problem.

Figure 1 - Environmental Impacts Associated with Various Degrees of Temperature Change[24]



4.1.3 GHG Impacts of the Joslyn Mine Project

The total annual average GHGs of the Project are approximately 1.5Mt per year. Over the life of the project the emissions are expected to mount to over 31Mt. The Project will lead to an increase in Alberta's GHG emissions of 1% and Canada's emissions 0.17%.[25] This amounts to a total increase in oil sands emissions of 4% and a 6%.[26]

[24] Supra note 17, pg. 10

[25] Supra note 2, Section 10.6.2, pg. 10-3

[26] Supra note 3

The expected emissions intensity of the mine will be 35.2 kg/ barrel of bitumen.[27] The Project's emissions intensity is at the high end of the 28 to 39 kg/ barrel range of the intensity of other oil sands mining operations tabulated in a recent Pembina report.[28] This intensity level only includes emissions from mining. Upgrading can add up to 79 kg/ barrel to the intensity of oil sands extraction.[29] As a result oil sands extraction is much more emissions intensive than conventional oil extraction, which has an intensity in the region of 28 kg per barrel.[30] A barrel of oil produced from oil sands can have around triple the production emissions of a conventional barrel of oil produced in Canada or the US.

These emissions are expected to go largely unmitigated. There are three main components to TOTAL's plan:

- Enhancing Energy Efficiency – the use of best available technology economically achievable during the design, construction, operation and decommissioning of the plant
- Carbon Capture Ready – The plant has space reserved for carbon capture equipment should this technology be deemed feasible
- GHG Data Management – to serve objectives such as mandatory and voluntary reporting, identifying reduction opportunities and managing risks, participating in GHG markets, and measuring and reporting progress on GHG reductions.[31]

TOTAL's response to OSEC information request 031 clarifies that it plans no GHG mitigation beyond mandatory regulatory requirements. It is developing a corporate climate change policy. Ergo, there are no corporate mitigation planes for the Panel to assess. Without meaningful provincial and federal regulations, this project will cause a significant unmitigated increase in GHG emissions, emissions that are well proven to cause serious environmental impacts beyond the project's regional boundaries and the province of Alberta.

4.1.4 The Need for Deep Greenhouse Gas Emissions Reduction Targets

The Copenhagen Accord, which the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties took note of,[32] states that:

> *We agree that **deep cuts** in global emissions are required according to science, and as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective consistent with science and on the basis of equity.*[33]

---

[27] Supra note 2 Section 9.5, pg.9-16,

[28] McCulloch, Raynolds, Wong. 2006. *Carbon Neutral 2020 –A Leadership Opportunity in Canada's OilSands, Oilsands Issue Paper #2*, Drayton Valley, AB. The Pembina Insitute, pg.11 available at http://pubs.pembina.org/reports/CarbonNeutral2020_Final.pdf (accessed Aug. 22nd, 2010)

[29] Ibid

[30] Woynillowicz D. Raynolds, M., Severson-Baker, C., 2005.*Oil Sands Fever- the Environmental Implications of Canada's Oil Sands Rush*, Drayton Valley, AB, The Pembina Institute, pg.22, available at http://pubs.pembina.org/reports/OilSands72.pdf (accessed Aug. 22nd, 2010)

[31] Supra note 2, section 9.5, pg. 9-16

[32] United Nations Framework Convention on Climate Change, *Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009 Addendum Part Two: Action taken by the Conference of the Parties at its fifteenth session*, FCCC/CP/2009/11/Add.1 30 March 2010, Decision 2/CP.15, 4. http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=4

[33] Ibid., 5.

Figure 2. Scenarios for GHG emissions from 2000 to 2100

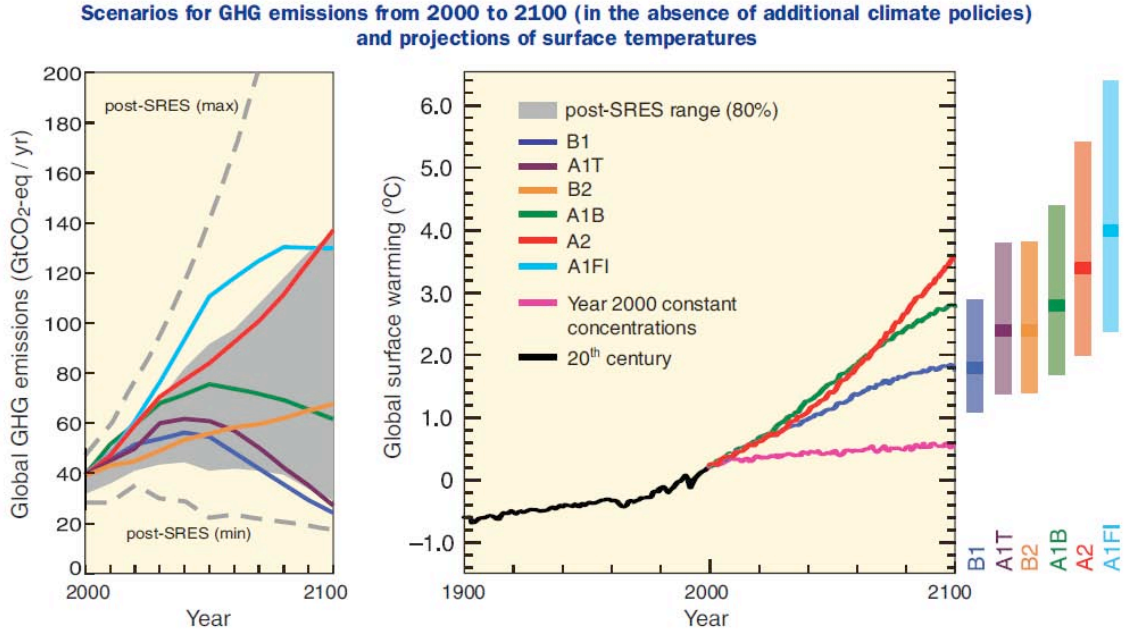


Figure SPM.5. ***Left Panel:*** *Global GHG emissions (in $GtCO_2$-eq) in the absence of climate policies: six illustrative SRES marker scenarios (coloured lines) and the 80th percentile range of recent scenarios published since SRES (post-SRES) (gray shaded area). Dashed lines show the full range of post-SRES scenarios. The emissions include CO_2, CH_4, N_2O and F-gases.* ***Right Panel:*** *Solid lines are multi-model global averages of surface warming for scenarios A2, A1B and B1, shown as continuations of the 20th-century simulations. These projections also take into account emissions of short-lived GHGs and aerosols. The pink line is not a scenario, but is for Atmosphere-Ocean General Circulation Model (AOGCM) simulations where atmospheric concentrations are held constant at year 2000 values. The bars at the right of the figure indicate the best estimate (solid line within each bar) and the* likely *range assessed for the six SRES marker scenarios at 2090-2099. All temperatures are relative to the period 1980-1999. {Figures 3.1 and 3.2}*

Source: IPCC[34]

[34] Pachauri, R.K and Reisinger, A. (eds.), "Summary for Policymakers," 7.

Figure 3. Stabilization scenarios

Table SPM.6. Characteristics of post-TAR stabilisation scenarios and resulting long-term equilibrium global average temperature and the sea level rise component from thermal expansion only.[a] {Table 5.1}

Category	CO_2 concentration at stabilisation (2005 = 379 ppm)[b]	CO_2-equivalent concentration at stabilisation including GHGs and aerosols (2005 = 375 ppm)[b]	Peaking year for CO_2 emissions[a,c]	Change in global CO_2 emissions in 2050 (percent of 2000 emissions)[a,c]	Global average temperature increase above pre-industrial at equilibrium, using 'best estimate' climate sensitivity[d, e]	Global average sea level rise above pre-industrial at equilibrium from thermal expansion only[f]	Number of assessed scenarios
	ppm	ppm	year	percent	°C	metres	
I	350 – 400	445 – 490	2000 – 2015	-85 to -50	2.0 – 2.4	0.4 – 1.4	6
II	400 – 440	490 – 535	2000 – 2020	-60 to -30	2.4 – 2.8	0.5 – 1.7	18
III	440 – 485	535 – 590	2010 – 2030	-30 to +5	2.8 – 3.2	0.6 – 1.9	21
IV	485 – 570	590 – 710	2020 – 2060	+10 to +60	3.2 – 4.0	0.6 – 2.4	118
V	570 – 660	710 – 855	2050 – 2080	+25 to +85	4.0 – 4.9	0.8 – 2.9	9
VI	660 – 790	855 – 1130	2060 – 2090	+90 to +140	4.9 – 6.1	1.0 – 3.7	5

Notes:
a) The emission reductions to meet a particular stabilisation level reported in the mitigation studies assessed here might be underestimated due to missing carbon cycle feedbacks (see also Topic 2.3).
b) Atmospheric CO_2 concentrations were 379ppm in 2005. The best estimate of total CO_2-eq concentration in 2005 for all long-lived GHGs is about 455ppm, while the corresponding value including the net effect of all anthropogenic forcing agents is 375ppm CO_2-eq.
c) Ranges correspond to the 15th to 85th percentile of the post-TAR scenario distribution. CO_2 emissions are shown so multi-gas scenarios can be compared with CO_2-only scenarios (see Figure SPM.3).
d) The best estimate of climate sensitivity is 3°C.
e) Note that global average temperature at equilibrium is different from expected global average temperature at the time of stabilisation of GHG concentrations due to the inertia of the climate system. For the majority of scenarios assessed, stabilisation of GHG concentrations occurs between 2100 and 2150 (see also Footnote 21).
f) Equilibrium sea level rise is for the contribution from ocean thermal expansion only and does not reach equilibrium for at least many centuries. These values have been estimated using relatively simple climate models (one low-resolution AOGCM and several EMICs based on the best estimate of 3°C climate sensitivity) and do not include contributions from melting ice sheets, glaciers and ice caps. Long-term thermal expansion is projected to result in 0.2 to 0.6m per degree Celsius of global average warming above pre-industrial. (AOGCM refers to Atmosphere-Ocean General Circulation Model and EMICs to Earth System Models of Intermediate Complexity.)

Source: IPCC[35]

As Figure 3 depicts, a significant level of effort is required to keep the global climate within 2 degrees Celsius. If Carbon dioxide (CO_2) concentrations are limited to within 445-490 ppm CO_2 equivalent and global emissions peak between the years 2000 and 2015, global temperatures may be stabilized in the range of 2-2.4 degrees above pre-industrial levels. Achieving this will require global reductions on the order of 50-85 percent below 2000 levels by 2050.

Due to their historic responsibility for climate change, developed countries are now accepting they must lead the reduction in GHGs emissions. The North American Leaders Declaration, in part recognizes this. Canada: " …recognize[d] the broad scientific view that the increase in global average temperature above pre-industrial levels ought not to exceed 2 degrees C…" and indicated "… support [for] a global goal of reducing global emissions by at least 50% compared to 1990 or more recent years by 2050, with developed countries reducing emissions by at least 80% compared to 1990 or more recent years by 2050."[36]

To ensure Canada takes on its fair share of the greenhouse gas burden, the Pembina Institute proposes the federal government adopt the following targets:

[35] Pachauri, R.K and Reisinger, A. (eds.), "Summary for Policymakers," 8.

[36] Prime Minister of Canada, "North American Leaders' Declaration on Climate Change and Clean Energy," 10 August 2009, available at http://pm.gc.ca/eng/media.asp?id=2724. (accessed Aug. 22, 2010)

- *a reduction in Canada's GHG emissions to 25% below the 1990 level by 2020*
- *a reduction in Canada's GHG emissions to 80% below the 1990 level by 2050*

The targets are based on the need to stabilize the atmospheric GHG concentration at no more than 400 ppmv CO_2e[37] and our belief that Canada cannot justify making emission reductions by 2050 that are much smaller than those required by industrialized countries as a whole.[38]

The target equates to a reduction of 50% below business as usual emissions by 2020[39] and for these targets to be achieved all sectors and all provinces will have to do their part. These targets represent the minimum of what Canada would need to achieve to help keep global average temperatures to within 2 degrees Celsius of pre-industrial levels.

4.1.5 Lack of Science-based Federal and Provincial Emissions Reduction Targets

Existing Federal and provincial policies and regulations are insufficient to mitigate the green house gas emissions from the Joslyn Mine.

The Canadian government targets are not aligned with what current science indicates will be necessary to stave off significant impacts of climate change. In April 2007 the Canadian government announced its national target to reduce GHG emissions by:

- 20% below 2006 levels by 2020 and
- by 60-70% below 2006 levels by 2050[40].

In January 2010 the federal government revised its 2020 target announcing that it would reduce GHG emissions to 17% below 2005 levels by 2020. This target is intended to be "…aligned with the U.S. target, and is subject to adjustment to remain consistent."[41] The new target will put Canada's emissions at around 2% above 1990 levels in 2020.[42]

Alberta's climate change plan shows even less alignment with climate science than the federal plan. The provincial government has committed itself to a 14% reduction in emissions below 2005 levels by 2050[43] – which is a 15% increase above 1990 levels by 2050.[44]

The science-based targets proposed by Pembina and others, are economically achievable. Recent analysis by the Pembina Institute and the David Suzuki Foundation found that the targets can be achieved while Canada's economy grows by 2.1% per year, and if the government's national GHG target is applied GDP growth would be 2.2% per year. According to this analysis Alberta could meet the 2 degrees Celsius target while its economy grows by 3.3% per year. Under a

---

[37] Note that scientists have indicated that lower concentrations may need to be met, see Hansen et al., 2008. *Target atmospheric CO_2: Where should humanity aim?* Open Atmos. Sci. J., 2, 217-231 available at http://pubs.giss.nasa.gov/abstracts/2008/Hansen_etal.html and Rockstrom et al. 2009. *Planetary boundaries: Exploring the safe operating space for humanity*. Ecol. Soc., 14, no. 2, 32

[38] The David Suzuki Foundation and The Pembina Institute, *The Case for Deep Reductions, Canada's Role in Preventing Dangerous Climate Change* (2005), 5.

[39] Supra note 10

[40] Government of Canada, *Regulatory Framework for Air Emissions* (Canada, 2007) 4. http://www.ec.gc.ca/doc/media/m_124/report_eng.pdf

41 Supra note 9

[42] Supra note 9

[43] Supra note 12

[44] Supra note 4

scenario where the federal government's climate plan is applied instead, economic growth would be 3.7% per year. [45]

4.1.6 Lack of Adequate Industrial Regulations

In addition to its failure to put in place adequate national targets, the federal government has failed to enact appropriate regulations to mitigate the GHG impacts of large industrial emitters. In 2007, it announced a framework for managing industrial emissions. It committed to enacting regulations limiting industrial GHG emissions by January 1, 2010.[46] But these regulations have not been made. Canada has announced the framework will be changed, but has not specified how.

The targets in the April 2007 framework required:

- Existing facilities to reduce emissions intensity by 18% below 2006 levels starting in 2010 with a 2% annual improvement thereafter
- New facilities to reduce emissions by 2% in their fourth year of operation and a 2% annual improvement thereafter.[47]

After the 2009 U.S. presidential, the Canada's position began to shift. It said that it would "… work with the provincial governments and our partners to develop and implement a North America-wide cap and trade system for greenhouse gases."[48] The exact form of this new regulatory agenda has not been made clear.

Alberta's regulation incorporates targets that are not based on science and the requirements to avert major climate change. The *Specified Gas Emitters Regulation*, effective July 1, 2007,[49] requires existing facilities to reduce emissions intensity by 12%[50] below the facilities average intensity over the 2003-2005 period.[51] New facilities are required to reduce their emissions intensity by 2%, starting in the 4th year of operation of the plant, the requirement will increase by 2% every year until it reaches 12%.[52] Compliance options include paying $15/tonne into a technology fund[53].

---

[45] Bramley, M., Sadik, P., Marshall, D., 2009. *Climate Leadership, Economic Prosperity – Final Report on an Economic Study of Greenhouse Gas Targets and Policies for Canada*. Drayton Valley, AB and Vancouver B.C. the Pembina Institute and David Suzuki Foundation, pg. 4-5 available at http://pubs.pembina.org/reports/climate-leadership-report-en.pdf (accessed Aug. 22nd, 2010)

[46] Government of Canada, *Turning the Corner: Regulatory Framework for Industrial Greenhouse Gas Emissions,* March 2008, v available at http://www.ec.gc.ca/doc/virage-corner/2008-03/pdf/COM-541_Framework.pdf (accessed Aug. 22, 2010)

[47] The policy also indicated that new facilities would be required to meet a "cleaner fuel standard". In a subsequent announcement in 2008 the government clarified that the cleaner fuel standard for electricity would be fuel specific, e.g. a new coal-fired plant would be required to meet a standard based on supercritical coal-fired power plant. For the oilsands the cleaner fuel standard would be based on natural gas. See Ibid., 10.

[48] Speech from the Throne, "Protecting Canada's Future," November 19, 2009, http://www.speech.gc.ca/eng/media.asp?id=1364

[49] Alberta Environment, "Greenhouse Gas Reduction Program," http://environment.alberta.ca/01838.html

[50] Alberta Regulation 139/2007, Climate Change and Emissions Management Act, Specified Gas Emitters Regulation, section 4.1. http://www.canlii.org/en/ab/laws/regu/alta-reg-139-2007/latest/alta-reg-139-2007.html

[51] Ibid, section 21.1

[52] Alberta Environment, "Greenhouse Gas Reduction Program," section 4.1.

[53] Alberta Environment, "Greenhouse Gas Reduction Program," section 3.4 and sections 7, 8, and 9.

Neither Alberta's current *Specified Gas Emitters Regulation* nor the federal *Turning the Corner* plan for managing GHG emissions from large industrial facilities require industrial facilities to take on their fair share of the burden towards meeting science based national targets. Specifically, neither policy puts in place either an appropriate price, or deep enough emissions reduction targets.

The Price of Emissions

Under the Alberta requirements the price is set at $15/ tonne and a future increase in price is not contemplated. The 2007 proposed federal rule projected that the industrial GHG emissions price would rise to around $65 per tonne by 2020.[54]

However a recent study by the National Round Table on the Environment and the Economy found that carbon prices of substantial magnitude will be required in order to meet the federal governments 2007 announced targets of: 20% below 2005 levels by 2020 and 65% below 2005 levels in 2050. The report states that:

> *Our research suggests that economy-wide carbon prices will need to rise to $100 per tonne of CO_2e by 2020 and upward of $300 per tonne of CO_2e by 2050 to drive the behavioural change and technology deployment underlying the achievement of deep reductions…*[55]

A recent analysis of the price of meeting a reduction target of 25% below 1990 levels by 2020 (ENGO target) and the price of reducing emissions by 20% below 2005 levels by 2020 (government target), concluded that:

- For the ENGO target the price of emissions begins at $50/tonne CO_2e in 2010 rising to $200/tonne CO_2e in 2020.

For the government target the price of emissions begins at $40/tonne CO_2e starting in 2011 rising to $100/tonne CO_2e in 2020.[56]

Accordingly, not only is the price in the Alberta system and proposed federal system inadequate to meet science-based targets, they are inadequate to meet the federal government's targets as well.

Emissions Target

The targets under both systems are not in line with what will be required by large industrial facilities in order for Canada to meet deep national targets.

Based on recent Environment Canada projection, achieving the governments current target of 17% below 2005 levels emissions will require national reductions of around 35% below business

---

[54] Government of Canada, *Turning the Corner: Detailed Emissions and Economic Modelling,* Section 3.1 Emissions and Energy Price Impacts of the Federal Regulatory Framework for Industrial Greenhouse Gas Emissions, http://www.ec.gc.ca/doc/virage-corner/2008-03/571/p3_eng.htm#3_1

[55] National Round Table on Environment and the Economy, 2009. *Achieving 2050: A Carbon Pricing Policy for Canada,* 2009, 8. Available at http://www.nrtee-trnee.com/eng/publications/carbon-pricing/carbon-pricing-advisory-note/carbon-pricing-advisory-note-eng.pdf (accessed Aug. 22nd, 2010)

[56] M. K. Jaccard and Associates, *Exploration of two Canadian greenhouse gas emissions targets: 25% below 1990 and 20% below 2006 levels by 2020* (2009), prepared for the David Suzuki Foundation and the Pembina Institute , pg. 2 available at http://pubs.pembina.org/reports/mk-jaccard-gov-and-engo-climate-targets-report-oct.pdf (accessed Aug. 22nd, 2010)

as usual emissions. To achieve the ENGO target of 25% below 1990 levels by 2020 reductions on the order of 50% below business as usual would be required for Canada.[57]

Because a new facility that is commissioned in 2011 faces no target in its initial years, and only a 12% emissions reduction obligation by 2020, these facilities are not taking on their fair share of the national obligation.

Compliance of the Project with Current Regulation

TOTAL does not specify how the company intends to comply with the Alberta *Specified Gas Emitters Regulation*, nor does it indicate what it anticipates its expected obligation under that regulation will be.

Cogeneration emissions are expected to make up around 60% of the GHG emissions from the Joslyn mine[58]. Cogeneration is given special treatment under the *Specified Gas Emitters Regulation*. Emissions from cogeneration facilities are deemed equal to emissions from an equivalent stand alone electricity plant and boiler. This provides a benefit to cogeneration facilities that can be realized in the form of emissions reduction credits that can be sold or used to meet emissions reduction requirements in subsequent years.[59] As a result, the cogeneration facility at Joslyn will likely generate credits that can be used to offset emissions reduction requirements from the remainder of the operation. To demonstrate the magnitude of emissions credits that could be generated by a plant such as the Joslyn Mine Project, the emissions credits generated by two example cogeneration units are examined in the next section. The emissions reduction requirement on the remainder of the operation will be a 2% intensity reduction obligation in its 4th year of operation, rising to 12% in its 9th year of operation.[60]

Existing provincial and federal policies will result in limited mitigation measures being employed by the Project. Without appropriate regulation by the federal and provincial governments, this project will result in significant emissions of GHGs to the atmosphere, emissions that will contribute to the GHG problem globally and the significant environmental impacts caused by it. For these reasons, failing appropriate federal and provincial regulation being put in place, OSEC requests that the project not be approved.

4.1.7 Example – An Application of Alberta's Cogeneration Policy

The purpose of this example is to show that Alberta's GHG regulation, the *Specified Gas Emitters Regulation* (*SGER*) is ineffective at applying even its weak emissions reduction targets to oil sands mines. The application of Alberta's cogeneration policy, *Alberta Specified Gas Emitters Regulation - Additional Guidance on Cogeneration Emissions,* to cogeneration facilities can result in those facilities generating emissions credits. In the following example Alberta's current cogeneration policy is applied to two cogeneration facilities that are similar to those facilities described in the Joslyn Mine Project Application. The example endeavors to show the

[57] Supra Note 8.

[58] see Supra note 2, section 9.5, 9-12.
http://www.ceaa.gc.ca/050/documents_staticpost/cearref_37519/142/AdditionalInformationFeb2010/Section9.pdf

[59] Alberta Environment, 2007. *Specified Gas Emitter Regulation – Additional Guidance on Cogeneration Facilities*, Alberta Environment, October 2007, 3. http://environment.gov.ab.ca/info/library/7930.pdf

[60] Specified Gas Emitters Regulation.

effect of Alberta's current cogeneration policy on the emissions credits generated, or reduction obligation applied, to this portion of an oil sands mine.

In this example, take two cogeneration units, assume each unit has the following attributes:

- 85 MW capacity[61]
- Produces 323 tonnes per hour of steam[62]
- Consumes 975, 000 m^3 of natural gas per day[63]

The estimated CO_2 emissions from the two cogeneration units, for the entire unit based on the fuel consumption, will be 1.22 Mt per year.[64] This value estimates what the actual emissions of the cogeneration plants is expected to be.

The *Alberta Specified Gas Emitters Regulation - Additional Guidance on Cogeneration Emissions* sets the baseline emissions intensity for cogeneration plants at a deemed level equal to the emissions that would have been produced by stand-alone alternatives. This baseline emissions intensity is used to determine whether the facility generates credits or faces an emissions reduction obligation. [65]

The guidance indicates the emissions from the electricity portion of the two cogeneration facilities would be deemed to be equal to the emissions of a natural gas combined cycle power plant with an emissions intensity of 0.418 t/MWh.[66] Therefore the deemed emissions from the electricity portion of the two example facilities would be equal to 0.56 Mt per year.[67]

The emissions associated with steam production would be deemed to be equal to the emissions from a stand-alone boiler operating at 80% efficiency. Therefore, the emissions from the steam portion of the two units would be 0.74 Mt per year.[68] As such, the total deemed emissions from the cogeneration units under the *SGER* is 1.3 Mt, a 7% increase in emissions over the estimate of actual emissions of 1.22 Mt.

---

[61] Supra note 2, Pg. 9-2.

[62] Ibid.

[63] Supra note 2, Section 7, pg. 7-2

[64] Emissions of one cogen = (975,000 m^3/ day) x (365 days/year) x (0.9) x (38 MJ/m^3) (50 g / MJ) = 608,546 tonnes. Total emissions from 2 units = 1,217,092 tonnes. Assumes the cogeneration facility is available 90% of the year. Assumes the energy content of natural gas is 38 MJ/m^3 and the emissions factor for natural gas is 50g/MJ. Values are from Government of Canada, Natural Resource Canada. 2006. *Canada's Energy Outlook - The Reference Case 2006* available at http://www.nrcan-rncan.gc.ca/com/resoress/publications/peo/peo2006-eng.pdf?PHPSESSID=69e8c9bf91ec162fd406d15cdd9c56ec (accessed Aug. 26, 2010)

[65] Supra note 59, pg. 3

[66] Supra note 59, pg. 3

[67] Electricity emissions per cogen = 0.418 t/MWh x 85 MW x 24 hrs./day x 365 days/ yr. x 0.9 = 280, 119 tonnes. Emissions of 2 units = 560,238 tonnes Assumes the facility is available 90% of the year.

[68] Energy from the steam = (2.33MJ/kg) (323tph) (24 hours/ day) (365 days/year) (0.9) (1000 kg/tonne) = 5.93 x 10^9 MJ per unit per year. Emissions intensity of steam D_H/H = 50g/MJ / 0.8 = 62.5 g/MJ. Total steam emissions = (62.5g/MJ) (5.93 x 10^9 MJ) = 370, 625 tonnes per unit per year. Total steam emissions (2 units) = 741,250 tonnes per year. Assumes 90% availability. Also assumes the energy content of steam is equal to 2.33 MJ/kg, this value is from Aube, Francois. 2001. *Guide for Computing CO2 emissions related to Energy Use*, CANMET Energy Diversification Research Laboratory, http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/fichier.php/codectec/En/2001-66/2001-66e.pdf (accessed Aug. 26th, 2010). Assumes emissions factor from Natural Resources Canada, 2006 see supra note 64

Under Aberta's cogeneration policy the emissions reduction obligation in the *SGER* is only applied to the steam portion of the emissions.[69] As shown in Table 1, based on the current policy, the two example cogeneration units would generate emissions reduction credits until their ninth year of operation, at which point they would face a small reduction obligation, that would cost on the order of $68,000 per year for the remainder of their operating lives. By the ninth year of operation, the units would have generated credits worth a couple of million dollars.

Table 1 – Emissions Credits / Emissions Reduction Obligations of Two 85 MW Cogeneration Facilities

Year of Operation	Emissions Credits or (Reduction Obligation)[70] under current policy - (tonnes)	Benefit / (Cost) of current policy obligation @ $15 per tonne	Cost of compliance if reduction obligation were levied on total actual emissions @ a rate of $15 per tonne
4	69,570	$ 1,043,550	$ (368,587)
5	54,745	$ 821,175	$ (737,173)
6	39,920	$ 598,800	$ (1,105,760)
7	25,095	$ 376,425	$ (1,474,346)
8	10,270	$ 154,050	$ (1,842,933)
9	(4,555)	$ (68,325)	$ (2,211,520)

Despite the existence of the Alberta *SGER*, in some years the cogeneration facilities on an oil sands mine could see a benefit as a result of the regulation. The current cogenerations policy raises serious questions that go beyond price and target level to the credibility of Alberta's GHG regulation, when, as in this example, large industrial facilities, such as oil sands mines could receive credit for creating significant increases in pollution.

4.1.8 Additional Emissions Reduction Obligations

Should this project be approved, additional project specific GHG emissions reduction obligations should be placed on the Project. Targets have been proposed in the province and federally that go much deeper than the current Alberta regulations and in some cases, these have been imposed by regulation, demonstrating that emissions reduction targets that go further than the current regulatory obligation are possible.

---

[69] Supra note 59, pg. 4

[70] Based on the guidance doc "total allowed greenhouse gas emissions will be = [NEI limit]*[Heat output for the compliance year]", NEI = Net Emissions Intensity Limit = Baseline Emissions Intensity for steam x (1- emissions reduction target). The actual emissions from steam in this calculation is assumed to be the difference between the total actual emissions and the deemed emissions from the electricity portion of the cogeneration facility. Therefore the target or credit is based on the difference between the deemed steam emissions level times the reduction target and the difference between the actual emissions and deemed electricity emissions. Emissions Credit (Obligation) in year x = [(62.5g/MJ) (2 units)(5.93 x 10^3 MJ/unit) (1-%rdxn in year x)] – [1,217,092 tonnes – 560,238 tonnes]

In June 2010 the federal government announced targets for new coal-fired plants that would require significant reductions. The announcement states that:

- New coal fired electricity plants and coal fired power plants that have reached the end of their economic lives (45 years old) would be required to meet a standard equivalent to natural gas combined cycle plant (a reduction in emissions intensity of over 50%).
- These standards will have to be met physically, e.g. no trading, use of offsets etc.
- They will apply to coal plants starting in 2015.[71]

In addition, facility level commitments have been made that show a more serious commitment to mitigating climate change.

- The 2001 Alberta approval of the Genessee 3 coal plant requires the facility to offset its GHG emissions to the level of a natural gas combined cycle facility. [72]
- For the Muskeg River Mine Project, Shell committed to *setting an emissions reduction target or goal for new facilities (on a full cycle basis) that is better than the "most likely commercial supply alternative at start-up".*[73]

Companies like TOTAL can and should be required to meet much deeper targets. A recent Pembina report indicated that the cost of achieving a carbon neutral oil sand could range from US $1.76 to $11.28 per barrel for a mining project;[74] an amount that is likely affordable at current oil prices.

[71] Speaking Notes for the Honourable Jim Prentice, P.C., Q.C., M.P., Minister of the Environment Announcement - *Canada shows leadership on climate change and the environment* At the National Press Theatre, Ottawa, Ontario, June 23, 2010 http://www.ec.gc.ca/default.asp?lang=En&n=6F2DE1CA-1&news=BB5AC3DC-837A-406E-AD28-B92ED80F5A81

[72] Approval for EPCOR Generation Inc. and EPCOR Power for the Construction, Operation and Reclamation of the Genesee thermal electric power plant, Province of Alberta, Environmental Protection and Enhancement Act, Approval no.773-02-00, , Section 4.1.15

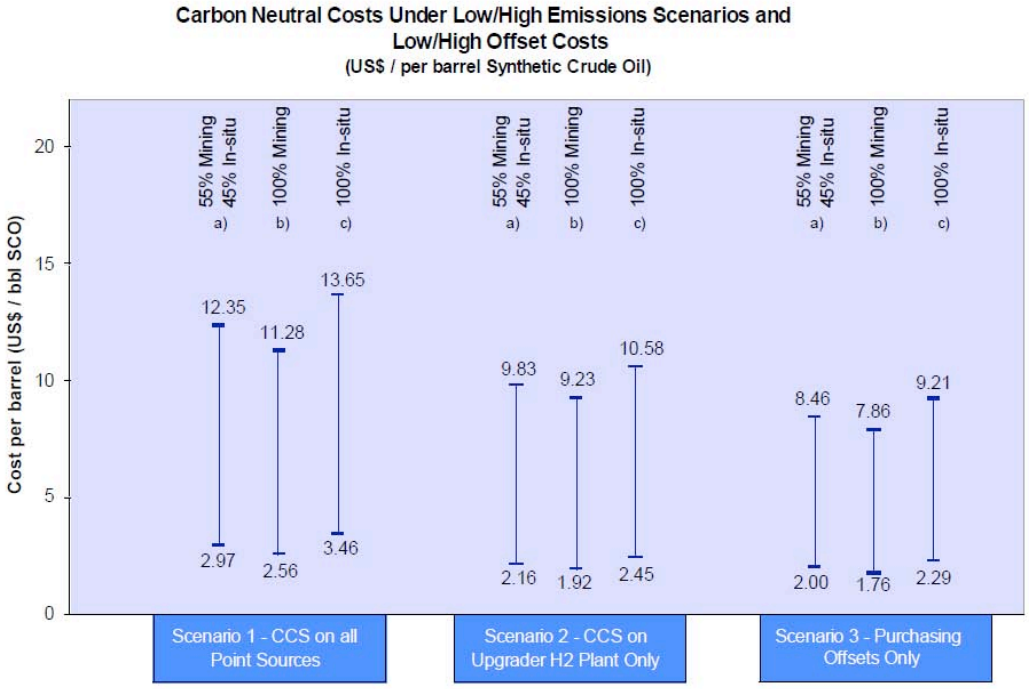
[73] Section 2.3 of Issue Resolution Document for the Proposed Muskeg River Mine Expansion Project.

Prepared By: Albian Energy Inc. (Albian) and the Oil Sands Environmental Coalition (OSEC), August 21,

2006.

[74] Supra note 28

Figure 4 - Costs of Achieving Carbon Neutral Oil Sands Targets



The application does partially demonstrate a recognition by TOTAL that its GHG emissions should be reduced. TOTAL commits to reserve space at the extraction plant for capture equipment, and assess the feasibility of oxy-combustion and post-combustion technologies for the capture of CO_2. In addition the application describes a pilot project in France to capture and store 150 kt CO_2 in a depleted natural gas reservoir. TOTAL says it plans on "incorporating the experience acquired from the Lacq CCS project in the technology options identified for potentially capturing, transporting and storing the CO_2 from its projects in Canada". The application also mentions three other joint projects TOTAL participates in including Integrated CO_2 Network (ICO2N), Alberta Saline Aquifer Project, and the Wabamun Area CO_2 Sequestration Project.[75]

The installation of CCS would be an important part of meeting a carbon neutral target. TOTAL's commitment to to CCS is vague. A commitment to contribute to the development of CCS infrastructure and if the necessary infrastructure is in place, install CCS for this project, would help demonstrate that TOTAL is serious about addressing its impacts on the climate.

OSEC requests that if the Project is approved, Total be required to:

- meet a target emissions intensity that is as clean as conventional oil at start-up
- contribute to the development of CCS infrastructure

[75] Supra note 2

- Assuming the necessary infrastructure is in place, install carbon capture and storage technology by 2020
- ensure the Project is carbon neutral by 2020,

Offset targets should be met through a combination of onsite reductions and offsets.

4.1.9 Summary

Immediate action is required to reduce greenhouse gas emissions and limit the global impacts of climate change. Because of a lack of meaningful federal or provincial regulations limiting the emissions of oilsands facilities; and TOTALs failure to make voluntarily make reductions; the Project creates an undue environmental impact on the global climate.

If the Project is approved, it should be required to live up to the voluntary actions it offers to take with respect to carbon sequestration and storage, to contribute to the development of CCS infrastructure, and provided the necessary infrastructure exists, to have this technology in place by 2020. In addition the Project should have emissions reduction targets imposed on it to minimize its GHG emissions impacts. Specifically, the Project should have an emissions profile that is as clean as the production of conventional crude oil at start-up and should be carbon neutral by 2020.

4.2 Air Emissions

4.2.1 Risk to human health

The Joslyn North Mine Project will be a new source of oxides of nitrogen, sulfur dioxide, carbon monoxide, and particulate matter in the region and will contribute to ground-level concentrations of both these pollutants as well as secondary pollutants such as ground-level ozone and secondary particulate matter. These pollutants are all associated with environmental and human health impacts. Some of these impacts are already occurring and of concern at the baseline levels, even when present in concentrations that are at or within Alberta government guidelines. TOTAL argues repeatedly, and otherwise relies upon, ambient air quality guidelines to claim the acceptability, significance, and the public interest value of the project.

Alberta ambient air quality objectives are intended to provide protection of the environment and human health to an extent deemed technically and economically feasible, as well as socially and politically acceptable.[76] While they may, as claimed by the proponent, be based on health studies, (and only partially so, it can be argued) they are not guideline values determined solely for the protection of human health. Rather, they have been compromised in order to permit the creation of other non-health related, social, economic, and political benefits.

Organizations such as the World Health Organization and its governing body, the World Health Assembly (of which Canada is a member[77]), have produced air quality guidelines whose primary

[76] Alberta Environment, "Ambient Air Quality Objectives." http://environment.alberta.ca/0994.html

[77] World Health Organization, "Composition of the Executive Board." http://www.who.int/governance/eb/eb_composition/en/index.html

aim is to provide a uniform basis for the protection of public health and of ecosystems from adverse effects of air pollution, and to eliminate or reduce to a minimum exposure to those pollutants that are known or are likely to be hazardous.[78] These guidelines, in contrast with the Alberta air quality objectives, prescribe the quality of air that people should have were it not for the perceived need to trade-off air quality for other outcomes.

The table[79] below compares Alberta's, Canada's, and the WHO health value guidelines.

[78] World Health Organization, *Air Quality Guidelines for Europe*, Second Edition, WHO Regional Publications, European Series, No. 91, 2000. www.euro.who.int/__data/assets/pdf_file/0005/74732/E71922.pdf

[79] W.B. Kindzierski et al, *Ambient Air Quality Data Summary And Trend Analysis*, prepared for the Wood Buffalo Environmental Association (2009) 19-20. http://www.wbea.org/component/option,com_docman/task,cat_view/gid,29/Itemid,104/

Figure 5. Health value guidelines in various jurisdictions

Table 2-1 Examples of air quality objectives and standards.

Parameter	Averaging Time	Alberta Ambient Air Quality Objective[1] (AAAQO)	Canada-Wide Standard[2] (CWS)	Canadian Federal Objectives and Guidelines[3] (NAAQOs)	World Health Organization (WHO)[4]	United States Environmental Protection Agency (US EPA)[5]
NO_2	1 hour	400 µg/m^3 (212 ppb)	-	400 µg/m^3 (212 ppb) - MAL 1000 µg/m^3 (532 ppb) - MTL	200 µg/m^3 (106 ppb)	-
	24 hour	200 µg/m^3 (106 ppb)	-	200 µg/m^3 (106 ppb) - MAL 300 µg/m^3 (160 ppb) - MTL	-	-
	annual	60 µg/m^3 (32 ppb)	-	60 µg/m^3 (32 ppb) - MDL 100 µg/m^3 (53 ppb)- MAL	40 µg/m^3 (21 ppb)	100 µg/m^3 (53 ppb)
SO_2	1 hour	450 µg/m^3 (172 ppb)	-	450 µg/m^3 (172 ppb) - MDL 900 µg/m^3 (334 ppb) - MAL	500 µg/m^3 (191 ppb) – 10 min. ave.	-
	24 hour	150 µg/m^3 (57 ppb)	-	150 µg/m^3 (57 ppb) - MDL 301µg/m^3 (115 ppb) - MAL 801µg/m^3 (306 ppb) - MTL	20 µg/m^3 (7.6 ppb)	366 µg/m^3 (140 ppb)
	annual	30 µg/m^3 (11 ppb)	-	30 µg/m^3 (11 ppb) - MDL 60 µg/m^3 (23 ppb) - MAL		30 ppb (79 µg/m^3)
CO	1 hour	15 mg/m^3 (13 ppm)		15 mg/m^3 (13 ppm) - MDL 35 mg/m^3 (31 ppm) - MAL	30 mg/m^3 (26 ppm)	40 mg/m^3 (35 ppm)
	8 hour	6 mg/m^3 (5 ppm)		6 mg/m^3 (5 ppm) - MDL 15 mg/m^3 (13 ppm) - MAL 19.5 mg/m^3 (17 ppm) - MTL	10 mg/m^3 (9 ppm)	10 mg/m^3 (9 ppm)

NOTE: - not applicable

[1] AENV (2008).

[2] CCME (2006).

[3] MDL – maximum desirable level, MAL – maximum acceptable level, MTL – maximum tolerable level (CCME, 2009).

[4] WHO (2000), WHO (2005).

[5] http://www.epa.gov/air/criteria.html, US EPA, Washington, DC (last visited 6 July 2009).

Table 2-1 Examples of air quality objectives and standards (con't).

Parameter	Averaging Time	Alberta Ambient Air Quality Objective[1] (AAAQO)	Canada-Wide Standard[2] (CWS)	Canadian Federal Objectives and Guidelines[3] (NAAQOs)	World Health Organization (WHO)[4]	United States Environmental Protection Agency (US EPA)[5]
$PM_{2.5}$	1 hour	80 µg/m^3		-		
	24-hour average		30 µg/m^3 based on 98th %ile value over 3 years	-	25 µg/m^3 (99th %ile in a year)	35 µg/m^3 (3 year average of 98th %ile of 24-hour concentrations)
	annual	-	-	-	-	15 µg/m^3 (3 year average)
PM_{10}	24 hour	-	-	-	25 µg/m^3 (99th %ile in a year)	150 µg/m^3 (not to be exceeded more than once over 3 years)
O_3	1 hour	160 µg/m^3 (82 ppb)	-	-	-	235 µg/m^3 (120 ppb) (99th %ile in a year)
	8 hour average	-	128 µg/m^3 (65 ppb) based on 4th highest value over 3 years	-	100 µg/m^3 (51 ppb)	147 µg/m^3 (75 ppb) 3 year average of 4th highest value each year
H_2S	1 hour	14 µg/m^3 (10 ppb)	-	-	7 µg/m^3 (5 ppb) as a 30 minute average	-
	24 hour	4 µg/m^3 (3 ppb)	-	-	-	-

NOTE: - not applicable

[1] AENV (2008).
[2] CCME (2006).
[3] MDL – maximum desirable level, MAL – maximum acceptable level, MTL – maximum tolerable level (CCME, 2009).
[4] WHO (2000), WHO (2005).
[5] http://www.epa.gov/air/criteria.html, US EPA, Washington, DC (last visited 6 July 2009).

From an environmental health determinants perspective, determining the public interest is a balance between the health risk decision-makers are prepared to impose on some of its citizens by increasing their exposure to environmental contaminants to levels above what would otherwise be considered safe according to a strict health guideline value, in exchange for some deemed benefits to society as a whole. Generally speaking, increasing the risk to people is

permitted in exchange for the sociopolitical benefits of jobs, provincial wealth, and return to corporate shareholders.

This balancing of imposed risk on certain citizens in exchange for broader social benefits should not occur at a single instant in time (i.e. at the compromising negotiation of an ambient air quality objective), but rather should be regularly assessed whenever environmental quality stands to be degraded, such as during a regulatory approvals process. The social and political trade-offs that were made at the time an ambient air quality objective was established may not hold true due to changes in the technical and economic feasibility of control measures, or under regional or changing social and political circumstances.

> *In practice, there are generally several opportunities within a legal framework to address these economic aspects as well as other issues, such as technical feasibility, structural measures and sociopolitical considerations. These can be taken into account during the standard-setting procedure* ***or at the level of designing appropriate measures to control emissions.***[80]

In every case, TOTAL has assessed the human health and environmental impacts of its Project against the compromise values represented by the Alberta Ambient Air Quality Objectives, rather than the Air Quality Guidelines for Europe developed by the World Health Organization despite these guidelines being available to them[81]. This implies that the benefits of the project cannot be achieved through any other "alternative to the Project" that would not increase the risk to human health. But, if the net benefits of the project to the people of Alberta are low, or could be achieved by alternate means without increasing any appreciable risk, then the project should be held to the higher standard before being deemed "in the public interest".

Under the "Need for the Project", TOTAL proposes the "positive addition" to Alberta's economy consists of:

- The installed capital cost of Phase 1 and 2 will be approximately $2 billion over a seven-year period
- The Joslyn North mine project will pay an estimated 7.5 billion in taxes and royalties to the federal and Alberta the governments
- The site will employ up to 1650 workers for Phase 1 construction, and 604 Phase 2 working an estimated 4.4 million person hours, and about 700 permanent employees for the operation of the mine for 27 years
- Related infrastructure, product bitumen pipeline facilities and a cogeneration plant are also required for the Project
- Contractors may be engaged to perform some of the mining operation
- A mining contractor will be engaged for initial pre-stripping, overburden removal and site clearing activities
- A contractor will be engaged to haul filtered tails to disposal areas

[80] WHO, *Air Quality Guidelines for Europe*.

[81] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Appendix F: Human Health Supporting Information", February 2010, Pg. F1-200.

The people of Alberta should not accept a permanent reduction in the quality of their air, a permanent increase in the risks to their health, in exchange for a few more than 700 permanent jobs. While any increase in employment might be welcomed in the region, given the relatively small permanent benefit, the Project should be required to operate with no increase in risk to human health and should be assessed against the more stringent health-based standard.

4.2.2 Air quality management frameworks

Uncertainty surrounds the development and implementation of air quality management frameworks under the Lower Athabasca Regional Plan

As a part of the Lower Athabasca Regional Plan (LARP), the Government of Alberta is currently in the process of developing a draft framework for air quality in the Lower Athabasca region.

Preliminary descriptions[82] of LARP note that the "Lower Athabasca Regional Plan will identify and set resource and environmental management outcomes for air, land, water and biodiversity, and guide future resource decisions while considering social and economic impacts."

To date there has not yet been an official draft air management framework or outcomes for the LARP, nor have any plans been publically released for consultation. Because it is in an early stage of development, there is a large amount of uncertainty around how the implementation of the LARP will affect air quality requirements, emissions limits, and air emissions management in the oil sands region.

The LARP represents a significant addition to Alberta's air quality management. With a soon to be implemented air management framework, it is in the publics best interest to delay the approval of the TOTAL mine, a significant source of several air emissions, until uncertainty surrounding the implications of LARP have been resolved and the Panel can ensure that this project will be in compliance with the soon to be implemented frameworks.

4.2.3 Areas excluded from assessment

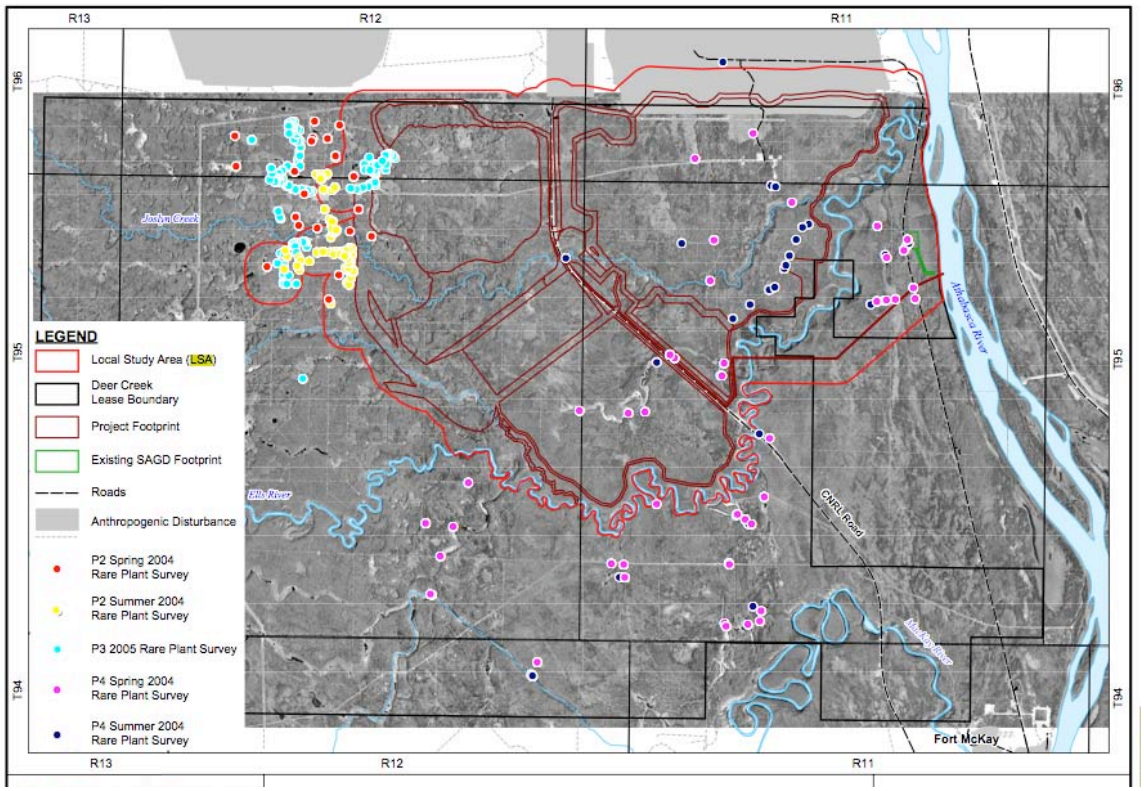
The developed areas are excluded from discussion in the EIA. The region designated as developed increases in size with each and every new development removing more and more land area from reasonable discussion. This limits the capacity to understand the overwhelming impact of these developments on the region. The extrapolation of this practice leads to a completely unacceptable conclusion that any developed areas of Alberta are no longer subject to the requirement to meet standards and guidelines. The developed areas encompass areas that are never developed, areas that are developed in a phased fashion, and areas that are expected to contribute to the reclaimed landscape before air emissions stop. Given that comparisons in emissions with the urban centres are demonstrably of similar magnitude as regional emissions at the present time, it is not reasonable to ignore concentrations in developed areas. We would not do this for downtown Calgary, for example.

Effects of emissions can be due to acute or chronic exposure. Lowering the concentrations level at the MPOI has the potential to affect both exposure regimes. The maxima are reduced and simultaneously the concentrations in the surrounding areas will be lessened on a larger scale.

[82] Government of Alberta, "Land Use Framework: Lower Athabasca Regional Plan." http://www.landuse.alberta.ca/RegionalPlans/LowerAthabasca/Default.aspx

Therefore, there is substantial benefit to acknowledging, understanding and then reducing the MPOI concentrations even if they occur within so called developed regions.

Figure 6. Local Study Area



Source: 2007 SIR[83]

The issue of the exclusion of developed areas results in air emissions modeling that does not adequately describe the potential impact of the emission increases. This situation does not give the community members an opportunity to understand the magnitude of the changes they may expect in their region and greatly understates the impacts of the developments.

4.2.4 SCR on trucks

The project is predicted to increase emissions of regional NOx by 4.1% which will increase acid deposition to lakes in the West of Fort McMurray subregion by almost 7%. Growth in the areas above the monitoring load and critical loads under the CASA acid deposition management framework due to the project are predicted to be 3.8% and 4.7% respectively.

Oil sands mine fleet heavy haulers are a significant source of air emissions, nitrogen oxide emissions in particular. According to the 2010 application update, the mine fleet emissions levels will comply with the U.S. Environmental Protection Agency (U.S. EPA) Tier IV limits.[84] This

[83] LSA source: Deer Creek Energy Limited, "Joslyn North Mine Project, Volume 2: Responses to Alberta Environments SIRs", June 2007, Pg. 75. Note: LSA remains the same as 2007 SIR, source: TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 14: Environmental Assessment", February 2010, Pg. 14-2.

[84] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 9: Emissions Sources", February 2010, Page 9-4.

improvement is a necessary measure that will lessen the magnitude of growth in emissions. However, as noted by the U.S. EPA, the current air emissions limits required by Tier IV could be further reduced. In fact, it was the intention of the U.S. EPA to re-address the NO_x emissions for large mobile engines, such as those found in the mine fleet, and set more stringent air emissions rates. This can be noted by the following two comments found in U.S. EPA Tier IV descriptions:

- "The long-term NOX standard for engines not used in generator sets (mobile machinery) will be addressed in a future action (we are currently considering such an action in the 2007 time frame)."[85]
- "We note that the magnitude of NOX reductions determined in the final rule analysis is somewhat less than what was reported in the proposal's preamble and RIA, especially in the later years when the fleet has mostly turned over to Tier 4 designs. The greater part of this is due to the fact that we have deferred setting a long-term NOX standard for mobile machinery over 750 horsepower to a later action. When this future action is completed, we would expect roughly equivalent reductions between the proposal and the overall final program, though there are some other effects reflected in the differing NOX reductions as well, due to updated modeling assumptions and the adjusted NOX standards levels for engines over 750 horsepower." [86]

As U.S. Tier IV limits are advanced, large equipment manufacturers will be required to produce new equipment that meets the improved air emissions requirements.

In an effort to demonstrate that TOTAL will meet the best available air emissions controls for its mine equipment, it is recommended that TOTAL mining equipment be subject to the continual improvement in accordance with improving emissions guidelines by adopting the latest technologies as they become available. This will ensure that the equipment meets the criteria of 'best available' technologies.

NOx emissions can also be removed directly from the flue gas after the combustion (post-combustion controls). An example of post-combustion control is selective catalytic reduction (SCR).

Post-combustion emissions reductions can be achieved by implementing SCR retrofits on mine fleet equipment. While retrofitting oil sands heavy hauler trucks has yet to be demonstrated, the individual aspects of the required technologies have been well proven and implemented on other vehicle types in other jurisdictions.[87] This is further demonstrated in the following notes made by the Manufacturers of Emission Controls Association:[88]

- "MECA members consider SCR technology a proven NO_x control strategy. SCR has been used to control NO_x emissions from stationary sources for over 15 years. More recently, it has been applied to select mobile sources including trucks, passenger cars, and marine

[85] U.S. Environmental Protection Agency, "Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel; Final Rule," *Federal Register* (2004). vol. 69, no. 124, Rules and Regulations, 38961.

[86] U.S. EPA, "Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel," 38969.

[87] "Heavy Duty Diesel: A Growing Source of PMG Demand," *Platinum Metals Review – Special Feature* (2007): 28-29. http://www.platinum.matthey.com/uploaded_files/Updates/07_special_chapter_hdd.pdf.

[88] Manufacturers of Emission Controls Association. "Written Comments of the Manufacturers of Emission Controls Association on the U.S. Environmental Protection Agency's Draft Certification Procedure for Light-Duty Diesel and Heavy-Duty Diesel Engines Using Selective Catalytic Reduction (SRC) Technologies." Docket ID No. EPA-HQ-OAR-2006-0886 (2006): 1-2.

vessels. SCR using a urea-based reductant has been introduced on a large number of on-road diesel heavy-duty engines to help meet the Euro 4 heavy-duty NO_x emission standards. SCR systems to date have demonstrated emissions reductions of up to 90% for NO_x, 90% or more for HC and CO, and reductions of PM up to 40%. SCR has also been combined with DPF technology to provide simultaneous large reductions in NO_x and PM emissions as well as reductions in CO and hydrocarbon emissions. Typical expected emission reductions of 85% for particulate matter and a 90% reduction in NO_x have been demonstrated"

- "MECA shares EPA's desire to ensure that the SCR technologies that will be available to reduce emissions from heavy-duty diesel engines function properly and are not tampered with or deactivated. This guidance document is an important first step in providing a roadmap to certifying SCR technologies for new vehicles."

The U.S. EPA has also established a methodology for testing and certifying mobile source SCR technologies through their Environmental Technology Verification Program. In fact, one SCR unit has already been tested on a 305 horsepower non-road, heavy-duty diesel engine.[89]

With the current state of development of the SCR technologies for mobile units, it is likely SRC retrofits will soon be available for oil sands mine fleet equipment. For this reason, it is recommended that TOTAL be required to retrofit air emissions reduction technologies, such as SCRs, on their mine fleet equipment as such technologies become commercially available.

4.3 Terrestrial and Wildlife Issues

4.3.1 Forest Fires

TOTAL has not met the terms of reference for the EIA by failing to address the cumulative impacts of future forest fires and planned forest harvest in the regional study area.

The terms of reference for the environmental assessment requires TOTAL to incorporate information about natural processes such as forest fires:

"Basic information requirements for the environmental assessment

Terms of reference:

e) Information about ecological processes and natural forces that are expected to produce changes in environmental conditions. E.g, forest fires"[90]

The proponent has not included impacts of future forest fires on wildlife and vegetation indicators. There is substantial information and modeling software available to incorporate stochastic events such as wildfire into environmental impact modeling. The Cumulative Effects Management Association ("CEMA") has conducted substantial research to determine the impacts of forest fires on environmental indicators in the RMWB, and to assess the cumulative impacts of fire and industrial development on landscapes, while it appears that the proponent did

[89] Southwest Research Institute and RTI International. "Environmental Technology Verification – Test Report of Mobile Source Selective Catalytic Reduction." Under a Cooperative Agreement with the U.S. Environmental Protection Agency (2010). http://www.epa.gov/etv/pubs/600etv10024.pdf.

[90] Deer Creek Energy Limited, "Joslyn North Mine Project, Appendix 1: Terms of Reference", February 2006, Pg. 1-12.

not consider the impacts of future forest fires on habitat quality.[91] This is a major oversight, since forest fires are acknowledged as being the major driver in landscape change in the boreal forest of Alberta.

CEMA research on historic fire cycles in the RMWB estimated a fire cycle of between 35 and 80 years and used a fire cycle of 80 years in its completed modeling of cumulative environmental effects.[92] (A fire cycle of 80 years means that an area equivalent to the entire region would be expected to burn over an 80 year period). Given that the RSA is 400,261 hectares in size, not assessing the impacts of fire using a conservative 80 year fire cycle, means the proponent is ignoring a long term average of 5,000 hectares of disturbance every year. Any projections of future forest condition (and wildlife indicators that rely on older forests) will have extremely limited utility is effects of forest fires are ignored.

Remarkably, the proponent argues that the forest in the RSA will get older and impacts on old forests are "overestimated" due to likely "aggressive fire suppression"[93]. These statements are indefensible given that large fires continue to burn in Alberta's boreal forest, despite attempts at suppression. The Alberta-Pacific Forest Management Plan also projects substantially younger forests in the future.[94]

The proponent has also failed to adequately assess planned development in the RSA. TOTAL does not list future forest harvest areas in the development inclusion list in the project update.[95]

Section 16 of CEAA states that:

> *(1) Every screening or comprehensive study of a project and every mediation or assessment by a review panel shall include a consideration of the following factors:*
>
> *(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project* ***in combination with other projects or activities that have been or will be carried out****;*

Alberta-Pacific Forest Products and Northland Forest Products hold the rights to harvest trees within the RSA, as part of the Forest Management Unit (FMU) A15. There is an approved forest management plan, available online, which includes an approved "spatial harvest sequence" – or all the cutblocks that the companies plan to harvest from 2006 – 2021. Forestry operations have major impacts on vegetation structure and hence wildlife habitat.

---

[91] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Appendix K: Vegetation Supporting Information", February 2010, Pg. K-20. "As forest aging and stochastic processes were not considered as part of the assessment, there is no predicted change in old growth from the Application Case"

[92] Bandaloop Landscape-Ecosystem Services,2005. *Natural Levels of Forest Age-Class Variability on the RSDS Landscape of Alberta*.

[93] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Appendix K: Vegetation Supporting Information", February 2010, Pg. K-20.

[94] Alberta-Pacific Forest Industries Inc., *Alberta-Pacific FMA Area Timber Supply Analysis*, 2007.

[95] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 14: Environmental Assessment", February 2010, Pg. 14-7, Table 14.1-2 is the development inclusion list for the PDC in the Project Update. No forest harvest blocks by forest companies are listed.

The forest management plan for A15 has an approved annual allowable cut of 925,000 m^3 per year[96]. This is expected to drop to around 500,000 m^3 per year after 2031.[97] TOTAL inaccurately presented information on annual allowable cut in its response to supplemental questions. TOTAL has acknowledged that they did not consider any forest harvest after 2016. TOTAL did not present volumes of harvest over the next 25 years, or assess these impacts.[98] This is not credible. Alberta-Pacific operates Canada's newest and North America's largest single line bleached kraft pulp mill[99] The approved annual allowable cut of the forest companies must be met in order to furnish the mills and considering a forest harvest of zero each year after 2016 grossly underestimates planned forestry development. Al-Pac's timber supply analysis shows how 15,000 to 35,000 hectares of forests in A15 can be expected to be harvested each year over the next 200 years.[100] Although the exact spatial harvest sequence has not been confirmed it is possible to assess planned forest harvest to model cumulative environmental impacts. Given that TOTAL did not consider future harvest after 2016, all indicators for performance of wildlife and vegetation should be considered unreliable.

TOTAL did not reference the correct Spatial Harvest Sequence map in its response to supplemental information due to an error on the Government of Alberta website. The approved spatial harvest sequence shows that virtually every merchantable stand in the mineable oil sands area is available for the forest companies to harvest.[101] The forest companies will preferentially salvage known mine sites, but Al-Pac and Northland will cut the AAC in A15 regardless of oil sands activity.

The approved Alberta-Pacific Forest Management Agreement Area Management Plan notes the following guideline[102]:

> *Liquidation of the majority of merchantable growing stock within the TSA's first four periods (20 years) and no growing stock replacement in MOSA within the 200 year horizon of the TSA*

CEMA's cumulative effects assessment, by comparison, did include realistic projections of future forest harvest using Al-Pac information[103], therefore making the CEMA Terrestrial Ecosystem Management Framework assessment, a much more rigorous assessment of cumulative effects. CEMA's work also demonstrate that it is possible for TOTAL to provide a more realistic and valid assessment and one that the Panel can use to assess the effects of the Project.

---

[96] Alberta Sustainable Resource Development, "Forest Management Plans: Alberta-Pacific Forest Products Inc.," http://srd.alberta.ca/ManagingPrograms/ForestManagement/ForestManagementPlanning/ForestManagementPlans/documents/AlbertaPacificForestProducts/ALPAC_amended_allowable_cuts_Nov_2008.pdf

[97] Alberta-Pacific Forest Industries, *FMA Area Timber Supply Analysis*.

[98] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Additional Information," July 2010, Pg. 13. http://www.ceaa.gc.ca/050/documents_staticpost/cearref_37519/44367/ai.pdf

[99] http://www.alpac.ca/index.cfm?id=pulpmill_overview

[100] Alberta-Pacific Forest Industries, *FMA Area Timber Supply Analysis*.

[101] Alberta-Pacific Forest Industries Inc. *A15 Spatial Harvest Strategy- Mineable Oil Sands Area (MOSA). 15 Year Schedule (2006-2021)*. (2007).

[102] Alberta-Pacific Forest Industries, *Alberta Pacific FMA Area Plan*, chapter 3 (2007) 106.

[103] Silvatech Group 2008. Summary of Methodology for the Development of the Terrestrial Ecosystem Management Framework

4.3.2 Terrestrial Ecosystem Management Framework

TOTAL has not met the terms of reference for the EIA by failing to consider the results and implications of the CEMA Terrestrial Ecosystem Management Framework in its assessment.

The Terms of Reference for the Joslyn North Mine project clearly require that the proponent incorporate relevant CEMA predictive tools, methods and information in any environmental assessment.

> *TOR 4.11 Participation in Regional Cooperative Efforts*
>
> *"Describe how Deer Creek intends to use information from CEMA, WBEA, RAMP and Canadian Oil Sands Network for Research and Development (CONRAD) to design mitigation measures for project specific cumulative effects"*
>
> *TOR 5.11 Basic Information Requirements for the Environmental Assessment*
>
> *"the demonstrated use of appropriate predictive tools and methods, consistent with CEMA, WBEA and RAMP and other relevant initiatives, to enable quantitative estimates of future conditions with the highest possible degree of certainty;"*
>
> *"The evaluation system will rank the consequences of the effects measured quantitatively against management objectives or baseline conditions, and described qualitatively with respect to the views of proponents and stakeholders"*

While the TOTAL environmental assessment is not credible given that it does not include impacts of future forest fires and forest harvest, CEMA has completed an extremely rigorous assessment of cumulative effects on wildlife indicators and terrestrial ecosystems.

In the original project application, TOTAL noted the Sustainable Ecosystems Working Group (SEWG) of CEMA, was developing a management framework to address impacts on wildlife.[104] However, the 2010 Update erroneously notes that "SEWG is developing a management framework" [105] despite the fact that SEWG/CEMA completed its assessment and submitted the TEMF to the Government of Alberta in 2008.[106] TOTAL conditionally supported the TEMF recommendations in a letter to the Government of Alberta, stating "TPEJ (TOTAL E&P Joslyn Ltd.) would like to commend SEWG on the immense effort expended on the TEMF".[107] It is, therefore, surprising that the results of this management framework are not presented in the 2010 Project Update or in any of the numerous opportunities that TOTAL has had to refine its explanations of the impacts on wildlife and vegetation.

The complete lack of integration with CEMA's work on terrestrial impacts renders questionable Total's assertions of support for, and reliance on, CEMA and other regional stakeholder groups as a means to manage cumulative effects. Although TOTAL is a member of CEMA, according to

---

[104] Deer Creek Energy Limited, "Joslyn North Mine Project, Section A: Project Introduction", February 2006, Pg. A-52.

[105] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 14: Environmental Assessment", February 2010, Pg. 149-159.

[106] Cumulative Environmental Management Association, letter to Government of Alberta announcing submission of Terrestrial Ecosystem Management Framework, June 5, 2008.

[107] TOTAL E&P Joslyn Ltd., letter to Government of Alberta stating conditional support for the Terrestrial Ecosystem Management Framework.

minutes from the Sustainable Ecosystems Working Group (SEWG), TOTAL is an observer of the work of SEWG, but did not participate in SEWG meetings during the 3 calendar years when the CEMA TEMF was developed. By comparison, an OSEC representative has actively participated in 17 of 23 SEWG/CEMA meetings from January 2005 until OSEC member organizations suspended their involvement in CEMA in August 2008. [108]

CEMA/SEWG's tools and methods have not been effectively integrated into the application which is inconsistent with the Terms of Reference of the environmental assessment, the Terms of Reference of the Panel and the guidance for CEAA. A press release[109] and backgrounder[110] accompanied the Terrestrial Ecosystem Management Framework. Comprehensive background information and data that accompanied the 2 ½ years analysis and workshops that were used to develop the TEMF are available online from www.cemaonline.ca. Detailed assumptions and modeling data, including rigorous sensitivity analyses and modeled results of implementing policy changes are also freely available from CEMA[111]

Current and projected declines in wildlife species in northeastern Alberta were modeled by the CEMA. The conclusions from this modeling are presented in section 4 of the TEMF for the Regional Municipality of Wood Buffalo. Key conclusions, based on assessment of the current status of the region and projected cumulative development under a "Base Case" scenario (pages 12-13) are:

- Rapidly increasing oil sands development is the key driver of landscape change in the RMWB [Regional Municipality of Wood Buffalo] due to the increasing footprint on the land and the long duration of the footprint.
- Both mining and in situ developments must be considered intensive land uses due to their impacts on environmental indicators.
- The landscape has already been substantially altered in the RMWB and will continue to change due to development in the future.
- Most environmental indicators of terrestrial ecosystems will decline outside their natural range of variation (NRV) with continued development in the absence of management intervention.
- Indicators of native fish integrity, fisher, moose and black bear are already below their NRV and will continue to decline.
- Linear feature (footprint) density is a key driver of declines in environmental indicator performance, both through their direct impact on landscape structure and through their use by humans and predators

[108] Margaret Luker, program manager, Sustainable Ecosystems Working Group, Cumulative Environmental Management Association, personal communication.

[109] Cumulative Environmental Management Association, "CEMA announces plan to protect the Ecosystem in the Oil Sands Region. Press Release," 2008.

[110] Cumulative Environmental Management Association, "Backgrounder for the Terrestrial Ecosystem Management Framework," 2008.

[111] Cumulative Environmental Management Association, March 2008, CEMA Data – SEWG Modeling and Facilitation Project Spatial Modeling Results, Disc 1-BC_DP, Disc 2-PA_DP, and Disc 3-BC_SP.

The following table summarizes some of the major differences between the TOTAL assessment on impacts of wildlife and vegetation and the CEMA assessment on impacts on wildlife and vegetation:

Table 2. Differences in assessments of impacts on wildlife and vegetation

TOTAL Application Assessment	CEMA Assessment in TEMF	Difference
Planned Development Case – very short list of current oil sands projects	Future oil sands projected based on bitumen production projections developed by the Alberta Department of Energy	TOTAL assessment underestimates likely cumulative impacts
No consideration of future forest fires	Models impacts of future forest fires based on historic norms	TOTAL assessment underestimates likely cumulative impacts
Does not include forest harvest after 2016	Includes future forest harvests for regional forest companies based on annual allowable cut and approved timber supply analysis	TOTAL assessment underestimates likely cumulative impacts
Regional Study Area (around 400,000 hectares)	Regional Municipality of Wood Buffalo (around 7 million hectares)	TOTAL assessment underestimates likely cumulative impacts
Limited wildlife or landscape objectives. No stakeholder input on significance. Ignores CEMA management framework.	Stakeholder consensus wildlife objectives based on Natural Range of Variability	Limited context to assess significance of TOTAL projections

Given that the TOTAL Application consistently underestimates development impacts, it is unsurprising that the impacts to wildlife indicators are substantially different. Given the limitations of the TOTAL environmental assessment for wildlife, OSEC submits TOTAL's assessment of significance is not valid and the Panel cannot rely upon it.

The proponent also ignores specific supplemental questions by the Panel about wildlife and vegetation objectives that have been developed by CEMA, by incorrectly arguing that these objectives are under development by CEMA, and again completely ignoring the invaluable work of the CEMA Terrestrial Ecosystem Management Framework:

> *Determining significance is best done in the context of accepted resource objectives or ecological thresholds for the resource in question. A project or cumulative effect is considered significant when it exceeds a threshold of what is considered acceptable. Several initiatives in the oil sands region are working to establish goals and thresholds for*

> *biodiversity.* ***At this time however, thresholds for wildlife habitat have not been developed for the region (emphasis added).***[112]

An example of the substantial differences between the projected cumulative impacts of development in northeastern Alberta, below are presented impacts to fisher, moose, black bear and fish integrity assessed by CEMA and by the proponent. It clearly shows how an unreliable cumulative effects assessment that ignores planned forestry development and forest fires and consensus CEMA recommendations on appropriate wildlife thresholds results in spurious conclusions about cumulative impacts on wildlife indicators.

[112]TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Additional Information," July 2010, Pg. 74. http://www.ceaa.gc.ca/050/documents_staticpost/cearref_37519/44367/ai.pdf

Table 3 Differences in assessments of impacts on selected wildlife

Indicator	CEMA projection[113]	TOTAL application projection (Table 13.0-2) 2007 Project Update
Fisher	Indicator is forecast to fall below the NRV over the next 30 years under a base case scenario (base case: projected development without policy change) (p35)	There will be a 3.4% loss in habitat availability at closure compared to baseline. Impact is confined to the local level and regional impacts are not significant. As forests mature, the amount of high quality habitat will increase Residual impacts are insignificant. Approximately 1.3% of the available habitat in the RSA will be affected. These impacts are insignificant on a regional scale.
Moose	Currently moose habitat effectiveness is forecast to be at the lower limit of NRV primarily due to the existence of roads and seismic lines and a high degree of access to them.The general trend under all scenarios is a slow decline to levels below the NRV (p30)	Approximately 1.5% of the available habitat in the RSA will be affected. These impacts are insignificant on a regional scale.
Black Bear	Black bear is determined to be in the yellow condition because modeling predicts it will drop more than 10% below the lower limit of the NRV over the next 30 years. Modelling also suggests it is likely that this indicator could move to a red condition in about 30 years under Base Case Assumptions (p46)	Approximately 1.5% of the available habitat in the RSA will be affected. These impacts are insignificant on a regional scale.
Index of native fish integrity (CEMA)	Indicator is currently more than 20% below lower limit of NRV and requires immediate management intervention. (p18)	In summary, predicted cumulative effects on fish populations in the RSA resulting from the project combined with existing, approved and planned developments remain insignificant, consistent with the conclusion of the fish and fish habitat assessment in 2007 SI Project Update, Section 13.3.3.6 (Section 14.4, Project Update).

The TOTAL 2010 Project Update states:

> *Under a worst-case, full buildout scenario in the RSA for the PDC, at least 89% of the habitat available for these VECs under the Baseline Case is expected to remain in the RSA.*
>
> *In summary, because there will be sufficient habitat in the RSA to sustain black bear, lynx, moose, fisher, snowshoe hare and beaver, predicted cumulative effects on habitat availability resulting from the project combined with other developments will remain insignificant, consistent with the conclusion of the wildlife assessment in the 2007 SI Project Update, Section 13.14.3.1.*

[113] Silvatech Group, *Indicator Synthesis: Selection Rationale, Modelling Results and Monitoring Considerations for Key Indicators of the Terrestrial Ecoysystem Management Framework,* prepared for Sustainable Ecosystem Working Group of the Cumulative Environmental Management Association (2008).

The proponent's assessment is not a worst-case scenario, it is not even a conservative assessment of cumulative effects. The proponent does not provide to the Panel or otherwise take into account the findings of the more rigorous CEMA regional assessment in their project application which present a completely different picture regarding impacts to wildlife: significant adverse impacts

Given the above errors, deficiencies and limitations of the TOTAL environmental assessment for wildlife, OSEC submits it is unreliable. The Panel must have a credible assessment prepared on these important environmental risks of the Project in order to fulfill its mandate to assess the significance of the Project's terrestrial effects and the sustainability of the environment for present and future generations.

The CEMA TEMF indicates significant projected cumulative impacts on wildlife in the Regional Municipality of Wood Buffalo that could potentially be mitigated by the implementation of the very significant recommendations of the TEMF. The TEMF has not been implemented by the Government of Alberta: land-use planning is not complete and there is no other process in place to mitigate these impacts.

In 1999, the Government of Alberta initiated the Regional Sustainable Development Strategy for the Athabasca Oil Sands Region (the Athabasca Oil Sands Region is defined by the outline of the Regional Municipality of Wood Buffalo – it covers Fort McMurray and the surrounding area - the Regional Municipality of Wood Buffalo overlaps significantly, but not completely, with the new Lower Athabasca Planning region).

A key component of the Regional Sustainable Development Strategy was to collect scientific data to identify the environmental thresholds and frameworks that would limit impacts to protect air quality, fresh water, boreal forests and wildlife. These thresholds were supposed to guide decisions about how much oil sands development the environment could withstand before irreversible damage would occur.

For the Regional Municipality of Wood Buffalo, the task of recommending environmental thresholds and management frameworks to protect the environment was delegated to the Cumulative Environmental Management Association ("CEMA") in 2000. CEMA is a "multi-stakeholder", consensus-based process. CEMA does not have any power to implement management frameworks or to give the force of law to environmental thresholds it recommends. If and when its various working groups come to a consensus, these consensus decisions are passed on to CEMA and then to government departments, who then make the final decision about whether and how to implement environmental thresholds and management frameworks. Many of the proposed management frameworks have not come to the point of consensus discussions and or been implemented.

Over the past nine years, CEMA has been overwhelmed by the number of environmental issues it has been assigned to address and has proven unable to meet deadlines. For government, ensuring that this organization fulfills its objectives has been a lower priority than issuing new approvals. CEMA has largely failed to deliver the management frameworks that would ensure that the environment is protected or to define environmental thresholds for the region. In the case of the TEMF, it was delivered in 2008, but has not been implemented by the Government of Alberta. A delay of over 2 years in the implementation of a CEMA management framework that took 8 years to develop is unacceptable.

4.3.3 History of the Terrestrial Ecosystem Management Framework ("TEMF")

In 2008 CEMA submitted the TEMF to the Government of Alberta. The experience with TEMF provides an example both of Alberta's long history of delaying the implementation of plans and recommendations for managing cumulative effects in the northeastern region of the province, and of the inability of planning processes to keep pace with rapid increases in development approvals.

The TEMF makes specific comments on the projected trajectory of development in the Regional Municipality of Wood Buffalo and recommendations for management strategies that are required to ensure the regional environment is protected.

Pembina Institute participated on the CEMA working group that developed the TEMF from 2006 until 2008. SEWG included representatives from the oil sands industry, the forest industry, the governments of Canada and Alberta, aboriginal representatives and environmental organizations. The TEMF was supported or conditionally supported by 19 industry (including TOTAL), ENGO (Environmental Non-Government Organization) and aboriginal members of CEMA. Only two members voted to not to support the Framework; Canadian Natural Resources Limited and the Alberta Fish and Game Association. Government of Alberta and Government of Canada representatives on CEMA abstained from voting on the Framework.

CEMA has made a number of very substantial recommendations for changes in land management that are required in order for terrestrial ecosystems in the RMWB to be protected in the way envisioned by the RSDS. OSEC is not aware of any interim changes in land management policy to address these CEMA framework recommendations over the past 2 years. Therefore it is reasonable for the Panel to conclude that development is currently on the unsustainable trajectory outlined in CEMA's cumulative effects assessment "base case".

The Framework recommendations made by CEMA to ensure sustainable ecosystems include[114]:

- The key environmental management objective for the RMWB is to maintain environmental indicators within 10% below the lower limit of the NRV. (P16)
- The Triad be implemented as the fundamental regional management strategy to balance social, economic, and ecological values in the RMWB. (P19)
- Constraining the Intensive Zone to between 5% and 14% of the RMWB at any time, representing the maximum area in an intensive use condition under base case and double production scenarios respectively. The Intensive Zone is measured by summing the area of all quarter townships that include intensive footprint. (P20)
- Designation of an Extensive Zone where ecosystem forestry and other natural disturbance based activities are permitted. This zone should be at least 46% of the RMWB, reflecting the balance of the region that is not Intensive or Protected Zone. (P21)
- An expansion of protected lands to 20-40% of the RMWB; this range is reflective of the diversity of perspectives among CEMA members. Building on the analysis of environmental criteria completed to date, specific boundaries should be identified immediately for candidate protected areas to enable their prompt establishment. Candidate protected areas would need to be assessed for economic and social implications to inform

[114] Sustainable Ecosystems Working Group of the Cumulative Environmental Management Association 2008. The Terrestrial Ecosystem Management Framework.

the decision. Establishment of new protected areas may mean that some resource tenure could be affected, and in such cases compensation should be provided. (P22)

- Aggressive implementation of access management at a level consistent with that modeled (e.g. restriction of OHV access from 50% of the Intensive Zone and 75% of the Extensive Zone, as well as systematic reclamation of existing wide (5 – 8 m) seismic lines). (P24)
- That Alberta use this Framework to the maximum extent practicable in developing the regional plan under the Land Use Framework. That the Framework be accepted by Alberta and implementation proceed immediately.

Prior to submitting the TEMF to the Government of Alberta, it became clear to CEMA members developing the TEMF that the ability to submit a plan that would effectively balance protection of the environment with development would be hindered by ongoing tenure allocations in some of the few remaining intact areas in the CEMA study area.

In January 2008, CEMA wrote to the Government of Alberta and included supporting documentation from CEMA members requesting that the Government of Alberta stop granting new resource tenures in three remaining intact areas without oil sands tenure until January 1, 2011, in order to allow conservation planning to be completed.[115]

The request to halt lease sales until conservation planning was complete was supported or conditionally supported by the majority of CEMA members that were signatories, including Alberta-Pacific Forest Industries, Albian Sands Energy/Shell Canada, Canadian Parks and Wilderness Society, Conklin Métis Local #193, UTS Energy Corporation, ConocoPhillips Canada, Devon Canada, Environment Canada, Fort Chipewyan Métis Local #125, Fort McKay Métis Local #63, Fort McKay First Nation, Fort McMurray Environmental Association, Fort McMurray Field Naturalists, Fort McMurray Métis Local #2020, Husky Energy Ltd., Imperial Oil Resources, Japan Canada Oil Sands Ltd., Pembina Institute, Petro-Canada Oil and Gas, Suncor Energy Inc, TOTAL E&P Canada, Toxics Watch Society of Alberta and Wood Buffalo National Park. The request to halt new tenure allocations was not supported by only four CEMA members: Encana, Canadian Natural Resources Limited, OPTI/Nexen and UTS Energy Corporation.

On March 7, 2008 the Government of Alberta replied to the CEMA request to halt tenure allocations in remaining intact, unallocated areas[116]. It urged CEMA to complete the TEMF in a timely manner but made no commitment to halt tenure allocations until after planning was complete; tenure and development decisions are continuing to this day in the absence of completed planning.

In August 2008, the three OSEC organizations withdrew their membership from CEMA, joining two First Nations – the Mikisew Cree First Nation and the Athabasca Chipewyan First Nation – who had also left CEMA. Pembina Institute summarized the failings of CEMA and of the current

[115] Cumulative Environmental Management Association, letter to Government of Alberta, requesting temporary halt to tenure allocations in order to support conservation planning, January 2009.

[116] Government of Alberta, letter to CEMA regarding request to halt tenure allocations, March7, 2008.

approach to regional environmental management in *Taking the Wheel: Correcting the Course of Cumulative Environmental Management in the Athabasca Oil Sands*[117]**.**

In *Taking the Wheel* Pembina Institute outlines its reasons for withdrawing from CEMA. One of the key reasons for withdrawing was ongoing skepticism that the governments of Alberta and Canada were on track to deliver a framework for environmental protection in northeastern Alberta. To demonstrate their commitment and good faith, we recommended that Alberta and Canada temporarily suspend issuance of tenures and project-specific approvals until they had developed an effective approach to environmental management in the region (see page 1).

> *To effectively reform their approach to environmental management and re-engage all stakeholders, the [governments of Alberta and Canada] must suspend the regulatory review and approval process and the issuance of oil sands leases. This suspension period is critical to ensure adequate resources to implement environmental management systems based on protective environmental limits and to rebuild trust with and re-engage stakeholders in environmental management. The [governments of Alberta and Canada] must demonstrate a genuine commitment to balancing oil sands development with environmental protection before resuming the review and approval process.*
>
> *This pause would not affect currently operating projects or approved projects, and projects currently in the regulatory "queue" would have the option of maintaining their position in the queue or retracting their application and environmental assessment.*

Neither Canada nor Alberta accepted this recommendation – issuance of tenures and of project-specific approvals continue to this day, in the absence of a completed system for managing cumulative effects in northeastern Alberta in despite evidence that environmental thresholds recommended by CEMA have been exceeded.

In *Taking the Wheel*, we also set out some of the basic problems with the continued rapid expansion of oil sands production, at page 3:

> *Alberta-wide, projected growth in oil sands production is staggering. Between 1999 and 2007, oil sands production increased from approximately 300,000 barrels per day to 1.4 million barrels per day. [As of summer 2008, the government of Canada] estimates that oil sands production will reach 3 million barrels per day by 2015 and 5 million barrels per day by 2030….*

With each additional oil sands project approved and constructed in Alberta's boreal forest the environmental impacts to air quality, forests, wildlife and fresh water resources increase significantly. It is this incremental accumulation of environmental impacts, which might appear insignificant on their own, that is leading to cumulative environmental impacts that could irreversibly damage the ecology of Alberta's boreal forest if they are not properly managed and mitigated. While the boreal forest ecosystem is resilient, it can only withstand so much degradation before it can no longer recover and species are lost and lands and waters radically transformed. This proverbial "tipping point," referred to as an ecological threshold or

[117] Severson-Baker, Chris et al., *Taking the Wheel: Correcting the Course of Cumulative Environmental Management in the Athabasca Oil Sands* (The Pembina Institute, 2008).

environmental limit, represents the extent of change that an ecosystem can endure before this change is irreversible.

4.3.4 Attempts at Land-Use Planning in Northeastern Alberta

Alberta's Land Use Framework was released in December 2008.[118] It acknowledges that Alberta's current approach to managing development does not address the cumulative impacts of multiple development. Below are some important statements from the Alberta Land Use Framework that acknowledge the current project-by-project approach to land management does not address the cumulative effects of multiple developments in areas of intensive development activity :

> *Our watersheds, airsheds and landscapes have a finite carrying capacity.* ***Alberta's system for assessing the environmental impacts of new developments has usually been done on a project-by-project basis. This approach*** *worked at lower levels of development activity. However, it* ***did not address the combined or cumulative effects of multiple developments taking place over time****. (page 3 – emphasis added)*
>
> *Cumulative effects management recognizes that our watersheds, airsheds and landscapes have a finite carrying capacity. Our future well-being will depend on how well we manage our activities so that they do not exceed the carrying capacity of our environment.* ***Alberta's current regulatory system is based on a project-by-project approval and mitigation of the adverse effects of each project. Until now, the approach has been to control the impact of each project. While this may be acceptable for low levels of development, it does not adequately address the cumulative effects of all activities under the current pace of development.*** *Cumulative effects cannot be managed as an "add-on" to existing management approaches; nor is it about shutting down development. It is about anticipating future pressures and establishing limits; not limits on new economic development, but limits on the effects of this development on the air, land, water and biodiversity of the affected region. Within these limits, industry would be encouraged to innovate in order to maximize economic opportunity. (page 31 – emphasis added)*

Regional land use planning for the Lower Athabasca Region is now underway. A Regional Advisory Council (RAC) was selected by the Government of Alberta to provide recommendations to the Government of Alberta on the Lower Athabasca Regional Plan. The plan was initially scheduled to be completed in 2010, but it now appears only a vision statement will be released this fall, and a public consultation process will follow. It remains uncertain when the plan will be completed and implemented, or if the completed plan will be capable of genuinely protecting ecosystem integrity and wildlife populations in the region.

The Terms of Reference for the Regional Advisory Council for the Lower Athabasca Region were released in July 2009.[119] They directed Regional Advisory Council members to explore protection of at least 20% of the planning region and notes that establishing and achieving a new conservation objective will be very challenging in the Lower Athabasca due to the concentration of oil sands resources in the region, and the scope of development activity underway or expected.

---

[118] Government of Alberta, *The Landuse Framework*, 2008. http://www.landuse.alberta.ca/AboutLanduseFramework/LanduseFrameworkProgress/documents/LanduseFramework-FINAL-Dec3-2008.pdf

[119] Government of Alberta, Terms of Reference for Developing the Lower Athabasca Regional Plan, 2009.

Nevertheless, the importance of ecosystem health makes it important to plan conservation areas for the region.

The Terms of Reference document for the Lower Athabasca plan also recognizes (at page 14) that:

> *… in cases where conservation areas conflict with mineral tenure (as regards surface or in situ development), current policies and regulations (i.e., under the auspices of the Mines and Minerals Act) enable the Alberta government to cancel the mineral leases and provide compensation to the leaseholder….*

It also notes:

> ***If cumulative effects thresholds are not set soon, then sustainable environments for water, land, air and biodiversity are compromised….*** *(emphasis added)*

Despite recognizing the need for conservation areas, and while specifically referencing thresholds for air and water, the Terms of Reference for the Regional Advisory Council for the Lower Athabasca Regional Plan make no mention of the need to establish maximum limits on levels of intensive development, land-use thresholds, or strategies to conserve caribou or any of the other specific recommendations for the CEMA TEMF. There is also no plan to pause development while the Regional Plan is developed.

While a new approach to land management planning, if it is implemented, may address some of the current failures to manage cumulative environmental management in Alberta, ongoing processes do not in themselves guarantee that these issues will be addressed. Alberta has a long history of developing plans and recommendations that are never implemented, including the Forest Conservation Strategy, the Regional Sustainable Development Strategy and the recommendations of the CEMA TEMF. The unwillingness to temporarily suspend land management decisions while planning processes are ongoing remains an impediment to developing a comprehensive plan that protects the environment while supporting responsible development.

As set out in *Taking the Wheel* the EUB/ERCB and various federal-provincial Joint Review Panels considering oil sands approvals have expressed ongoing concerns about the ability of the governments of Alberta and Canada to develop and implement timely and effective frameworks for the management of cumulative effects in the oil sands regions. A selection of comments from EUB/ERCB and Joint Review Panel reports is set out at pages 16-18 of *Taking the Wheel*, including the following:

(a) As far back as 1999-2000, the EUB was expressing concerns about the slow pace of CEMA in developing management frameworks. In 2000, the EUB panel considering the Petro-Canada Mackay River SAGD in situ project warned that: "… significant delays in the process or the failure of the process to begin to establish environmental objectives and guidelines for the management of cumulative effects within the oil sands region in a timely manner could eventually force the [EUB] to revisit its previous decisions." (See *Taking the Wheel* at page 16 and at footnote 52.)

(b) In its report on the proposed Albian Sands Muskeg River Mine Expansion, the Joint federal-provincial Panel observed: "… that oil sands development is proceeding, not

waiting for the environmental management frameworks that CEMA is charged with developing." (See p. 18 and footnote 60 of *Taking the Wheel.*)

(c) In its report on Imperial Oil's Kearl oil sands mine project application, the Joint federal-provincial Panel noted that: "[w]ith each additional oil sands project, the growing demands and the *absence of sustainable long-term solutions* weigh more heavily in the determination of the public interest." The Joint Panel stated its belief that ultimate responsibility for regulating the cumulative effects from oil sands development lies with the government [i.e. rather than with project-specific regulators, like the Panel itself]. The Joint Panel also noted Environment Canada's submissions that the rate of industrial development in the Athabasca Oil Sands Area may be exceeding CEMA's capacity to effectively develop frameworks for managing cumulative effects (see p. 18 and footnote 61 of *Taking the Wheel*).

In our opinion, the ongoing problem of individual ERCB project-by-project approvals does not and cannot control the cumulative impacts of development in northeastern Alberta. Until the government establishes and implements the recommendations of the CEMA TEMF, including meaningful cumulative effects thresholds for intensive development, wildlife management objectives, access management controls and a network of conservation areas to protect wildlife and ecosystems in northeastern Alberta each additional individual project approval will further threaten or harm the integrity of wildlife populations and ecosystems in the region.

Given the importance of land management planning through LARP and the ongoing delays, and the failure to identify interim conservation areas, we strongly recommend that decision-making for the Joslyn North Mine project be delayed until a plan for the region is complete.

This system failure is only becoming more apparent and more urgent. As noted by the joint panel in the 2007 Imperial Kearl Mine Project decision report, "[w]ith each additional oil sands project, the growing demands and the *absence of sustainable long-term solutions* weigh more heavily in the determination of the public interest."[120]

Sustainable long term solutions for terrestrial and wildlife issues were proposed as part of the CEMA TEMF in 2008, but have not been implemented.

The panel also noted:

> *The responsibility for developing regional environmental management frameworks has largely been assigned to the Cumulative Environmental Management Association (CEMA), and this work is important to the sustainable development of the mineable oil sands over the long term….. The success of CEMA is viewed by the Joint Panel as critical. The Joint Panel acknowledges that management of environmental effects in the region is ultimately the responsibility of the regulators, and so it encourages the regulators to take a more direct leadership role in all aspects of CEMA.*[121]
>
> *Imperial Decision Report, vii*

[120] Alberta Energy And Utilities Board, Report of the Joint Review Panel, *EUB Decision 2007-013: Imperial Oil Resources Ventures Limited, Application for an Oil Sands Mine and Bitumen Processing Facility (Kearl Oil Sands Project) in the Fort McMurray Area*, 2007, 10.

[121] Ibid., vii

Since the Imperial Decision report, a noteworthy deliverable is the recommended CEMA TEMF.

> *Cumulative management frameworks must be supported by clearly enunciated regional objectives and strategies. The RSDS and the Fort McMurray Subregional Integrated Resource Plan are in urgent need of updating. Underpinning these documents must be a clear vision concerning the nature and pace of oil sands development, and in particular the preferred approach to ensuring that a productive and sustainable landscape follows the completion of resource extraction.*
>
> *Imperial Decision Report, 4 (all paragraphs)*

A clear vision for oil sands management has now been presented by the members of CEMA that in the absence of government objectives for wildlife should be considered by the JRP as the most useful guide to inform decision-making. It includes clearly enunciated regional objectives and strategies and a rigorous cumulative effects assessment.

The CEMA TEMF recommends mitigation strategies that must be implemented by the Government of Alberta to address cumulative effects, not the proponent. This mitigation is not in place.

In its Decision Report on the TrueNorth Fort Hills project, the Board acknowledged *"…it has placed significant reliance on the success of the CEMA process to verify that both existing and future oil sands developments remain in the public interest. The Board believes that CEMA's work is important and that the results will assist the Board in meeting its regulatory mandate to ensure that energy developments are carried out in an orderly and efficient manner that protects the public interest."*

CEMA has verified, from a terrestrial perspective, and without substantial policy changes, future oil sands developments are likely not in the public interest. CEMA's work is now available for the Joint Panel to make an informed decision on the contribution of the Joslyn project to cumulative impacts in northeastern Alberta. Approving another project prior to the government implementing necessary landscape changes is neither orderly nor efficient. As we have noted, the proponent's own assessment for wildlife is not reliable and should carry little weight in the JRP decision.

Clearly, it is not acceptable that strategies to protect the regional environment are continually delayed, first prior to CEMA completing its work, and now in the case of the TEMF prior to it being implemented.

TOTAL should be commended for "Conditionally Supporting" the TEMF being submitted to the Alberta Government[122]. TOTAL noted that the Government of Alberta should lead a detailed assessment of the proposed land management zones, and should consider compensation for oil sands lease and resource rights holders. The TEMF also notes the need to consider compensation if development rights need to be reversed or cancelled in order to establish protected zones free of industrial activity[123]. It is noteworthy that part of the area modeled by CEMA as a

[122] TOTAL E&P Joslyn Ltd., letter to Glen Semenchuk, Executive Director of the Cumulative Environmental Management Association, May 8, 2008.

[123] The Sustainable Ecosystems Working Group of the Cumulative Environmental Management Association, The Terrestrial Ecosystem Management Framework (2008) 25.

representative protected zone free of industrial activity includes a portion of the ESA Nationally Significant Athabasca River Valley that is proposed to be mined as part of the Joslyn project.

Given that CEMA is already raising the issue of the need to "buy back" development rights and lease areas in order to achieve environmental outcomes provides evidence of the ongoing concerns of many stakeholders that the absence of planning and approval decisions informed by thresholds for disturbance is not consistent with orderly development.

In the past the EUB (ERCB) and Joint Review Panels have shown a willingness to approve projects in the absence of management frameworks that protect the environment or meaningful information on cumulative environmental impacts. In the CEMA TEMF, The Joint Panel for the first time have clear scientific evidence of inadequacies in regional management for wildlife and ecosystems, and a host of potential, but as yet, unimplemented solutions.

OSEC concludes that in the absence of the substantial policy changes identified in the CEMA TEMF that development in the Regional Municipality of Wood Buffalo is not on a sustainable trajectory. The Joint Review Panel has the ability to temporarily withhold approval of the project until it can be demonstrated that appropriate policy frameworks have been implemented or reject the project based on the fact these thresholds have been exceeded.

4.3.5 Making an informed decision based on Ecological Thresholds

In discussing the determination of the public interest (Decision 2001-33: EPCOR Power Development Corporation and EPCOR Generation Inc., Rossdale Power Plant Unit 11 (RD 11)) the Board stated:

> *"The existence of regulatory standards is an important element in deciding whether potential adverse impacts are acceptable and whether a proponent has satisfactorily accounted for these externalities, but the Board retains the discretion to find that projects are not in the public interest notwithstanding their compliance with these standards. Such cases are rare. Where no sanctioned thresholds exist, it is especially critical that the Board weigh the impact of potential adverse effects on the public and the efficacy of the mitigative measures designed by a proponent to minimize these impacts to acceptable levels" (emphasis added)."*

This hearing represents an important watershed for the Joint Panel, as for the first time from a terrestrial perspective, CEMA has recommended regional thresholds – and for some species, noted that we have already exceeded those thresholds. Given that the Alberta Government has not yet implemented the ecological thresholds recommended by CEMA, or recommended any interim thresholds we strongly urge Joint Panel to not approve this project.

TOTAL has not proposed adequate terrestrial mitigation to address impacts

TOTAL is not using the full range of mitigation strategies available to them to offset the substantial impacts to biodiversity over the life of the Joslyn North Mine and the long term declines in wildlife indicators predicted by CEMA, nor the substantial local impacts that are predicted by the proponent during mine development.

Mitigation is described as:

> *"The elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means."*
>
> *Canadian Environmental Assessment Agency*

However, despite using this definition, TOTAL has failed to identify adequate mitigation of terrestrial impacts. Appropriate consideration of mitigation must include a focus on *replacement*, *compensation* or *provision of substitute resources* that is not evident in TOTAL's application. Although a focus on rehabilitation of disturbed areas is an essential component of terrestrial mitigation, it is in itself inadequate. Other forms of mitigation proposed by TOTAL are invariably operationally focused and based only on *minimizing* the effects of development activities. This represents only a small component of available mitigation techniques, and will not effectively address the existing and emerging cumulative terrestrial impacts that are facing the RM of Wood Buffalo.

Biodiversity offsets are defined as "conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to aspire to no net loss in biodiversity." They are also known as terrestrial or conservation offsets. No net loss to biodiversity is particularly important in the Regional Municipality of Wood Buffalo, where CEMA has demonstrated that indicators for native fish integrity, fisher, moose and black bear are already outside the range of natural variability and lower than recommended regional objectives.

In June 2008, the Canadian Boreal Initiative, Pembina Institute and Alberta Research Council released a report called "*Catching Up: Conservation and Biodiversity Offsets in Alberta's Boreal Forest*". The report identified that offset mitigation is only being applied in a very limited manner for oil sands development and that project mitigation in Canada lags many other jurisdictions around the world in terms of requirements to mitigate project impacts through compensation. The report included findings from qualitative interviews with thirty-three key informed stakeholders including eleven industry representatives, eight Alberta government professionals, seven environmental non-government organization representatives, (ENGOs), five First Nations representatives, and two academics. Over 90 percent of respondents agreed that current requirements for reclamation in the RMWB are inadequate to manage cumulative effects. Their concerns about the existing regulatory framework included inadequate techniques to ensure ecological viability, rapid development that is outpacing reclamation abilities and activities, and the inability to deal with long reclamation lag times and cumulative effects.[124]

TOTAL is well aware of the value of biodiversity offsets as a strategy to compensate for terrestrial impacts of development projects as identified in its own corporate literature [125]. TOTAL has already committed to fully offset the terrestrial footprint associated with the Joslyn III in-situ expansion project through the conservation of an area of land equal to the disturbance footprint of that project. OSEC withdrew its objection to the Joslyn III in-situ project, due in part to TOTAL's agreement to conserve an equal area of private forestland to offset the footprint associated with their expansion project. This offset commitment was met in 2008 through the

[124] Canadian Boreal Initiative, *Catching Up: Conservation and Biodiversity Offsets in Alberta's Boreal Forest* (2008).

[125] TOTAL. 2007. Biodiversity brochure

purchase of 57 hectares of private land in the boreal forest natural region by the Alberta Conservation Association[126]

In 2006 Albian Sands Energy Inc. committed to invest $4 million in land acquisition and restoration of additional lands to offset impacts associated with the Muskeg River Mine Expansion Project.[127] In 2007, PetroCanada committed to offset impacts associated with the MacKay River In-Situ Expansion project through acquisition and conservation private boreal forest lands equal to 100% of the project development footprint.[128]

Given these levels of commitments, and the terrestrial footprint associated with the Joslyn North Mine of over 7,000 hectares, it is essential that TOTAL be conditioned to adequately mitigate project impacts through establishment of offsets.

4.4 Wetland Issues

4.4.1 Alberta Water for Life Strategy

One of the main goals of the Government of Alberta's Water for Life strategy was to achieve the goal of healthy aquatic ecosystems[129]. The development of a provincial wetland policy and supporting action plan to achieve sustainable wetlands was considered a key action in order to help achieve this goal. The settled portion of the province, or White Area, relies on the concept of no net loss, thereby requiring anyone who disturbs a wetland to get an approval under the *Water Act*, and also must follow up with the appropriate mitigation action decided by the regulator[130]. This can typically mean that someone developing an area will need to compensate for destroying a wetland by restoring a drained or altered wetland in the same watershed at a ratio of 3:1, meaning that three hectares of equivalent wetland would be restored for each hectare lost[131]. This is due to the fact that it has been recognized that it is nearly impossible to replicate the full functionality of a wetland. The scale of wetland loss in the province of Alberta is not fully understood, although estimated to be significant[132].

The Alberta Water Council (AWC) was tasked by the Alberta Government to deliver a set of provincial wetland policy recommendations. This was a three-year process in which the multi-stakeholder AWC Wetland Policy Project Team (WPPT) met with stakeholders to discuss opportunities and challenges around wetlands in the province[133]. Outcomes of the WPPT process included recommendations such as:

---

[126] Todd Zimmerling, Executive Director of Alberta Conservation Association, email communication confirming the purchase of 57 ha of boreal forest land with a legal land description of NE 23-66-2-W5M. July 25, 2008.

[127] Albian Energy Inc and the Oil Sands Environmental Coalition, *Issues Resolution Document for the Muskeg River Mine Expansion Project* (2006).

[128] Petro-Canada, Letter of agreement between Petro-Canada and the Oil Sands Environmental Coalition, 2007.

[129] Government of Alberta, "Water for Life," (2003). http://www.waterforlife.alberta.ca/

[130] Alberta Environment, *Provincial Wetland Restoration/Compensation Guide* (2007) 1. http://www3.gov.ab.ca/env/water/reports/Prov_Wetland_Rest_Comp_Guide.pdf

[131] Ibid., 7.

[132] Alberta Water Council, *Recommendations for a New Alberta Wetland Policy* (2008), i. http://www.albertawatercouncil.ca/Portals/0/pdfs/WPPT%20Policy%20web.pdf

[133] Ibid., 1.

- The Wetland Mitigation Decision Framework is followed where development affects wetlands, ensuring the policy goal is achieved of maintaining wetland area in Alberta[134]
- Appropriate tools including incentives are available to promote wetland protection, conservation and restoration and disincentives are removed[135]

There were many other recommendations put forward by the AWC. These included concepts of no net loss of wetlands in Alberta, mandatory replacement of lost wetlands as well as every wetland having value for the functions it provides over the entire land base.

There is currently no wetland policy for the Green Area, which is the area that includes oil sands development. A provincial wetland policy, which will cover all areas of the province, is over three years overdue from the Government of Alberta. Loss of wetlands in the area of northeastern Alberta are proceeding in this policy vacuum. This uncompensated destruction of wetlands goes against the principles of the Water for Life strategy and also against the policy direction put forward by the AWC.

Furthermore, the area is dominated by peatlands which are difficult to re-create over the short term. Constructed wetlands associated with oil sands operations has been shown to have lower biodiversity then natural wetlands in the area.[136] The continued destruction of peatlands without understanding the long term implications of this habitat loss, is compounded by the fact that it is extremely difficult to recreate these areas.

4.4.2 Importance of Wetlands

Wetlands provide many ecological, social and economic values to all Albertans. They help achieve the *Water for Life* goal of healthy aquatic ecosystems as key components of the watersheds they are a part of[137]. The importance of wetlands is also recognized under the 1971 Ramsar Convention on wetlands, on which Canada is a signatory[138]. This is an intergovernmental treaty in the form of a framework outlining international cooperation for the conservation and wise use of wetlands[139].

The cumulative impacts of disturbances to peatlands remains unknown and as a result, the loss of peatlands continues without sufficient data. Regional scales of study on the effects of loss of peatlands is required[140],[141]. Loss of peatlands may result in changes in the amount of carbon sequestration that can occur on the landscape.

---

[134] Ibid., 16.

[135] Ibid., 17.

[136] Crowe et al. *Effects of an industrial effluent on plant colonization and on the germination and post-germinative growth of seeds of terrestrial and aquatic plant species*. Environmental Pollution 117 (2002). Pages 179-189

[137] Alberta Water Council, *Recommendations for a New Alberta Wetland Policy* (2008), v. http://www.albertawatercouncil.ca/Portals/0/pdfs/WPPT%20Policy%20web.pdf

[138] Ibid., 12.

[139] Alberta Water Council, *Recommendations for a New Alberta Wetland Policy* (2008), 12. http://www.albertawatercouncil.ca/Portals/0/pdfs/WPPT%20Policy%20web.pdf,

[140] Schindler, D.W. and Lee.P.G. *Comprehensive conservation planning to protect biodiversity and ecosystem services in Canadian boreal regions under a warming climate and increasing exploitation*. Biological Conservation 143 (2010). Page1572.

[141] Turetsky et al. *Current disturbance and the diminished peatland carbon sink*. Geophysical Research Letters 29 (2002). Page 21-3.

> **"Wetland areas provide clean water, wildlife viewing opportunities and other outdoor recreation activities. They also conserve soil and control erosion, retain sediments, absorb nutrients, degrade pesticides, store water and moderate impacts of floods and droughts, recharge aquifers and help moderate climate change. These wetlands benefits apply to landowners as well as society as a whole."**
>
> –Provincial Wetland Restoration/Compensation Guide[142]

It was with this recognition of the many important benefits of wetland and peatland ecosystems, from an ecological, social and economic point of view, that the AWC moved forward with the intent of encouraging Albertans to be proactive in increasing the wetland area in the province, where historically we have lost many wetlands in the province[143].

4.4.3 Disturbance of Wetlands by TOTAL

There are a large percentage of wetlands within the TOTAL Joslyn Mine project area. Wetlands and peatlands occupy approximately 33% of the LSA[144] and 38% of the Regional Study Area (RSA)[145].

The TOTAL Joslyn Mine Project application outlines that there will be loss of wetlands and peatlands if the project goes proceeds. It was recognized that there would be complete removal of vegetation and wetlands within the project footprint[146]. While approximately 61% of Alberta Wetland Inventory (AWI) wetland classes within the LSA will be impacted by surface disturbance, it is expected that 68% of AWI wetland classes of restricted distribution will be reduced from baseline levels[147].

Even after reclamation, the wetland classes of restricted distribution are expected to remain reduced by 31% from baseline levels, and the impact from this is considered isolated and irreversible[148]. The proponent goes on to predict that the cumulative effects of the loss of overall wetland loss will be insignificant due to the abundance of wetlands in the RSA, however the confidence in this prediction is rated low since there is a lack of regional information.[149] The mineable area of the Athabasca oil sands is approximately 4,750 square kilometers[150], and

---

[142] Alberta Environment, *Provincial Wetland Restoration/Compensation Guide* (2007) 2. http://www3.gov.ab.ca/env/water/reports/Prov_Wetland_Rest_Comp_Guide.pdf,

[143] Alberta Water Council, *Recommendations for a New Alberta Wetland Policy* (2008), ii. http://www.albertawatercouncil.ca/Portals/0/pdfs/WPPT%20Policy%20web.pdf

[144] Deer Creek Energy Limited, "Joslyn North Mine Project, Section D: Environmental Assessment", February 2006, Pg. D 13-6.

[145] Deer Creek Energy Limited, "Joslyn North Mine Project, Section D: Environmental Assessment", February 2006, Pg. D 13-7.

[146] Deer Creek Energy Limited, "Joslyn North Mine Project, Section D: Environmental Assessment", February 2006, Pg. D 13-16.

[147] Deer Creek Energy Limited, "Joslyn North Mine Project, Section D: Environmental Assessment", February 2006, Pg. D 13-18 to 25.

[148] Deer Creek Energy Limited, "Joslyn North Mine Project, Section D: Environmental Assessment", February 2006, Pg. D 13-25.

[149] Deer Creek Energy Limited, "Joslyn North Mine Project, Section D: Environmental Assessment", February 2006, Pg. D 13-26.

[150] Alberta Energy, Alberta's Leased Oil Sands Area [PDF] (Edmonton, AB: June 24, 2009). This delineation of the surface mineable area is an increase of 1,350 square kilometres from the previous delineation, which put the surface mineable area at

approximately half of this is wetlands. If all mining development, including the Project goes ahead, the loss of approximately 2,400 square kilometers of wetlands will not be insignificant, especially if wetland habitats are converted into upland habitat types in the final reclamation processes of the projects. In previous sections we have also described in detail why the cumulative effects assessment of the proponent is not reliable.

Within the supplemental information provided by the proponent was the recognition that there is a low probability of re-establishing peat-forming wetlands on the landscape, and therefore the impact due to the loss of these peatlands is considered irreversible[151]. This reclamation uncertainty is echoed throughout the application, such as when the proponent indicates that species replacement for plant communities in reclaimed wetlands might parallel those of naturally occurring systems[152], or outlining that strategies for fens and bogs have not been tested in the oil sands region[153]

While the proponent does indicate measures that will be used to minimize or eliminate impacts on wetland resources, these mitigation efforts fall short of available best practices and policy recommendations set forth by AWC recommendations or best practice in wetland mitigation. Failure of government to implement a Wetland Policy should not be used as a rationale for why TOTAL not be required to mitigate wetland loss. Mitigation measures such as dust suppression, using previously disturbed areas where possible or accommodating multiple-use areas,[154] are not consistent with the Wetland Mitigation Decision Framework, or other no net loss policy directions in the province, nor is this approach is also not consistent with the approach taken in the federal policy on wetland conservation or best practices in compensatory mitigation.

Within the current wetland policy for the White Area in Alberta, and also set forward by the AWC in their recommendations for a provincial wetland policy, is the wetland mitigation decision framework that states that when development that affects a wetland is proposed, the Government of Alberta will through the *Water Act* approval process require the proponent to use the following criteria in descending order of preference:

- Avoid loss or degradation of wetlands
- Minimize loss or degradation, where avoidance is not fully achieved
- Compensate for loss of wetland area or for wetland degradation through science-based actions[155]

3,400 square kilometres. See figure 2-4 in ST98-2009: Alberta's Energy Reserves 2008 and Supply/Demand Outlook 2009–2018 [PDF] (Calgary, AB: Energy Resources Conservation Board, June 2009).

[151] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project Additional Information," Submitted to Government of Canada – Energy Resources Conservation Board Joint Review Panel, July 2010, Pg. 61.

[152] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project Additional Information," Submitted to Government of Canada – Energy Resources Conservation Board Joint Review Panel, July 2010, Pg. 41.

[153] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project Additional Information," Submitted to Government of Canada – Energy Resources Conservation Board Joint Review Panel, July 2010, Pg. 45.

[154] Deer Creek Energy Limited, "Joslyn North Mine Project, Section D: Environmental Assessment", February 2006, Pg. D 13-37.

[155] Alberta Water Council, *Recommendations for a New Alberta Wetland Policy* (2008), iv. http://www.albertawatercouncil.ca/Portals/0/pdfs/WPPT%20Policy%20web.pdf,

TOTAL's application is in direct contradiction to the policy recommendations of the Alberta Water Council In the absence of a long overdue wetlands policy that would incorporate the area leased for the Joslyn North Mine Project, OSEC believes that this project is clearly not in the public interest.

4.5 End-Pit Lakes

TOTAL has not demonstrated that end pit lakes (EPLs) are technically or economically feasible. Moreover, TOTAL does not meet the Terms of Reference for environmental assessment by failing to take into account alternatives to the use of an end-pit lake that are technically and economically feasible.

> "The development of EPLs as a natural reclamation tool for process-affected waters raises issues of concerns for regulators and stakeholders. Much of this concern results from the fact that historical data are insufficient to determine a realistic outcome of the final features of EPLs. Modeling and relevant background studies have been the basis of research, but a fully realized EPL has yet to be constructed."[156]

EPLs will be a permanent feature of the reclaimed landscape, but it is not yet known if they will support a sustainable aquatic ecosystem. It may take several decades before water from end-pit lakes will be ready to be released.[157] Based on Table 1 and Figure 18, at least 25 EPLs are planned for the Athabasca Boreal region within the next 60 years.[158] This number includes the planned EPLs for existing and the proposed mines as of 2007. It will likely increase if the current rate of oil sands development continues. These EPLs have been approved in the absence of a single demonstrated EPL by any oil sands operator.

[156] Fay Westcott and Lindsay Watson, *End Pit Lakes Technical Guidance Document,* prepared for the Cumulative Environmental Management Association End Pit Lakes Subgroup Project 2005-61 (2007), 4.

[157] Ibid.

[158] Ibid.

Table 4. End pit lakes for existing and planned mines in the Athabasca Boreal region

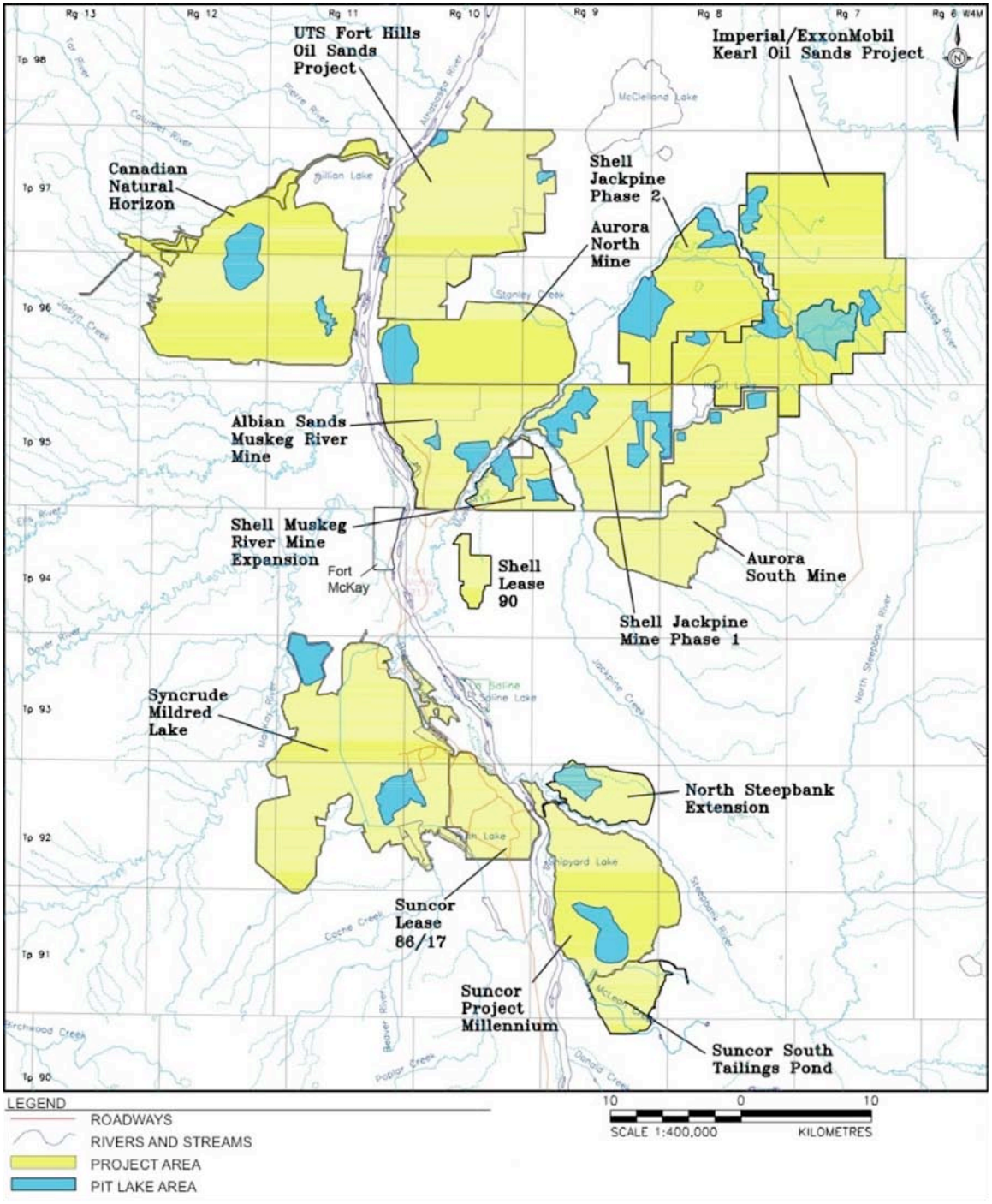
Mine Project	End Pit Lakes	EPL Area (ha)	EPL Volume (million m^3)	EPL Beginning of Release	EPL Water Depth (m)	EPL MFT Depth (m)
Suncor Voyageur South[135]	North lake (VSP11)	1,175	332[136]	2056	15	55
	South lake (VSP12)	398	137[137]	2056	9	66
Suncor Millennium Mine	North and south pit lakes	Unknown	485	2043	Unknown	Unknown
Petro-Canada Fort Hills[138]	South pit lake	5,100	4.7–13[139]	2022	Unknown	Unknown
	East pit lake		8.6–15	2040	Unknown	Unknown
	North pit lake		10.2–33	2044	Unknown	Unknown
Syncrude Mildred Lake Mine	Base Mine lake	Unknown	*40*	*2030*	Unknown	Unknown
	MacKay lake	Unknown	*313*	*2055*	Unknown	Unknown

Oil Sands Environmental Coalition Submissions
TOTAL Joslyn North

Mine Project	End Pit Lakes	EPL Area (ha)	EPL Volume (million m^3)	EPL Beginning of Release	EPL Water Depth (m)	EPL MFT Depth (m)
Syncrude Aurora North Mine	West pit lake	Unknown	*315*	*2049*	Unknown	Unknown
Syncrude Aurora South Mine	South pit lake	Unknown	*750*	*2050*	Unknown	Unknown
Albian Sands Muskeg River Mine[140]	West end pit lake	343	130	2031	20	Unknown
	Sharkbite pit lake	Unknown	*100*	*2061*	Unknown	Unknown
Shell Jackpine Mine Phase 1[141]	East end pit lake	1,615	186.5	2040	11	Unknown
	West end pit lake		186.5	2040	50	0
Shell Jackpine Mine Phase 2[142]	North Central, North Upstream and Down-stream Cell	3,924	477	2044	Unknown	Unknown
Shell Pierre River Mine[143]	North, South and Raw Water Storage Facility	5,739	144	2049	3	Unknown
Imperial Oil Kearl[144]	PL6	1,320	425[145]	2060[146]	41	19
CNRL Horizon Mine[147]	EPL1 (East lake)	70	4.3	2057	6	Unknown
	EPL2 (West lake)	910	427	2057	55	Unknown
Synenco Northern Lights Mine[148]	End pit lake 1	490	68[149]	2044	13	Unknown
	End pit lake 2	520	78	2048	19	Unknown
	End pit lake 3	560	78	2052	21	Unknown
Total Joslyn North Mine Project[150]	End pit lake 1	510	98.3	2034[151]	55	0[152]
Albian Sands Muskeg River Mine Expansion[153]	Cell 7	273.7	158[154]	2046	6.5[155]	Unknown
	Cell 12A	273.7	95[156]	2046	6.5	Unknown
	Cell 16	273.7	95[157]	2046	6.5	Unknown

All information is taken from project EIAs. General EIA references are provided; detailed references are available upon request. Data in italics — Syncrude EPLs and Sharkbite pit lake — is unconfirmed.

Figure 7. Location of planned end pit lakes in the Athabasca Boreal region



Source: Fay Westcott, "Oil Sands End Pit Lakes: A Review to 2007."[159]

[159] Fay Westcott, *Oil Sands End Pit Lakes: A Review to 2007*, prepared for the Cumulative Environmental Management Association End Pit Lakes Subgroup, Project 2006-32 (2007) 2.

A key area of EPL uncertainty, and an area of ongoing research, is the state of meromixis, which is the condition whereby upper water layers do not mix with the lower portions. Meromixis is achieved by increased salinity, which increases water density. It is intended to prevent the mixing of upper lake layers with lower lake layers.[160] The reclaimed landscape will be contoured to drain into the EPL, which in turn will discharge into the Athabasca River watershed. During this process, organic chemicals and salts will accumulate in surface runoff that passes over and through the tailings material and incorporated into the reclaimed landscape. These chemicals and salts will accumulate in the EPL where they are expected to be diluted and biologically degraded over time. The size and volume of an EPL depends upon the pit size and the amount of tailings material that it will contain.

An EPL study released in 2004 revealed the following: meromixis is at best a temporary condition in all of the EPL scenarios modeled in the study because of a lack of a constant salt input. The progression towards non-meromictic lakes for all scenarios modeled in the study was likely due to the declining salt input over time.[161] EPLs are complex systems in terms of hydrology, chemistry and biology, and their design requirements need to be more fully developed.

Uncertainties regarding the construction, maintenance and final success of EPLs remain. An EPL will need to be controlled, managed and monitored throughout much of its initial filling and during discharge to downstream aquatic environments. Alberta Chamber of Resources has noted that "Current practices for long-term storage of 'fluid' fine tailings pose a risk to the oil sands industry." It suggested that the industry "is likely to come under increasing scrutiny from all stakeholders, including regulators, operators, owners, local groups and the regional municipality of Wood Buffalo."[162] Given that tailings materials are proposed to be integrated into the reclaimed landscape (in the case of CT) or disposed of in EPLs, both surface water and groundwater will pass over and through these materials. This situation will potentially affect water quality, which in turn will affect the regional ecosystem and those species that depend on it.

4.5.1 Concerns specific to the Project

OSEC is concerned about the high levels of uncertainty in TOTAL's ability to successfully reclaim in-pit tailings and create a viable, maintenance free and ecologically sustainable end pit lake (EPL).[163] Seeking government approval of plans using untested technology is problematic, especially considering the potential environmental legacy of the mine.

OSEC is concerned that the recycle and pore water will have contaminants and a salinity that will be deleterious to a viable ecologically sustainable EPL.[164] While Total says it does not plan

---

[160] Golder Associates Ltd., "Phase II 2005/2006 Pit Lake Work Plan," (EPL Sub-Group of the Reclamation Working Group, Cumulative Environmental Management Association, 2006)

[161] Golder Associates Ltd., "Modelling Assessment of End Pit Lakes Meromictic Potential," (EPL Sub-Group of the Reclamation Working Group, Cumulative Environmental Management Association, 2004).

[162] Alberta Chamber of Resources, *Oil Sands Technology Roadmap: Unlocking the Potential*, Final Report (Edmonton, AB: 2004).

[163] Deer Creek Energy Limited, "Joslyn North Mine Project, Section B: Project Description", February 2006, Subsection B.11.

[164] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 11: Closure, Conservation, and Reclamation Plan," February 2010, Subsection 11.2.

to transfer fluid fine/mature fine tailings from Pond 2 into the EPL (11.1.4), there will be considerable porewater released from tailings consolidation in DDA2 and Pond 2 and from recycle water inventory at closure until hydraulic head equilibrium is established (15Mm^3 of a total EPL volume of 54 Mm^3) (11.2). DDA2 will be consolidating for 10 years after DDA1. Since DDA2 is adjacent to the EPL, it stands to reason that highly saline and contaminated porewater will flow into the EPL.

Figure 8.2-1 of Section 8: Water Management (pg. 8-4) of the February 2010 Additional Information Project Update presents the project water balance based on expected operating conditions and 100,000 bbl/d production. However, seepage losses to groundwater for plant site ponds, tailings pond and disposal areas and the offstream storage pond are considered negligible with no pond-specific seepage values provided. Other operations such as Imperial Oil Resources (Kearl)[165] and the Fort Hills Corporation (Fort Hills)[166] provided expected seepage rates by year for the each pond and estimated quantities of seepage that will by-pass seepage collection systems.

OSEC questions the assertion that the volume of groundwater that will be entering the EPL at any point in time is negligible. Likewise we question that groundwater outflow is 'small' (11.2.2.8 of the February 2010 Additional Information Project Update). Given the uncertainty on the water quality of the EPL, even a small amount of heavily contaminated groundwater can have significant consequences. Section 11.2.2.4 of the February 2010 Additional Information Project Update states that groundwater in the region flows towards the Ells River and the Athabasca River. However, TOTAL provides no explanations of how groundwater flow in and out of the EPL will be zero to small as well as the potential salinity and contamination load of the groundwater entering and leaving the EPL.

OSEC is concerned that outflows from the EPL into the Ells River will have harmful levels of contamination and salinity. Section 11.2.2.3 8 of the February 2010 Additional Information Project Update states that surface outflow to Ells River will only happen once the lake is filled to 243 masl and that water quality is 'suitable' for release. However, a definition of water quality is notably absent. While TOTAL's response indicates that 3 methods to treat pit lake water may be available by the time 243 masl is reached, insufficient evidence is provided to ensure that these methods would be sufficient. Furthermore, Total does not include a formal contingency plan in the event that the water quality of the EPL proves insufficient by the time 243 masl is reached.

RE alternative means of carrying out the project. See http://www.ceaa-acee.gc.ca/default.asp?lang=En&n=5C072E13-1. This is the recommended procedure:

The Agency recommends the following procedural steps for addressing alternative means:

- Identify the alternative means to carry out the project. The responsible authority should:
    - develop criteria to determine the technical and economic feasibility of the alternative means;
    - describe each alternative means in sufficient detail; and

[165] Source: Imperial Oil Resource Ventures Ltd. "Kearl Oil Sands Project - Mine Development: Regulatory Application." 2005. Volume 2, Section 9, Table 5-4

[166] Fort Hills Energy Corporation. "Fort Hills Oil Sands Amendment Application." 2 (2006). Volume 2, Table 8-5 and 8-6 and text.

- identify those alternative means that are technically and economically feasible.

- Identify the environmental effects of each alternative means. The responsible authority should:
    - identify those elements of each alternative means that could produce environmental effects.
- Identify the preferred means. The responsible authority should:
    - identify the preferred means based on the relative consideration of environmental effects, and of technical and economic feasibility;
    - determine and apply criteria that identify alternative means as unacceptable on the basis of significant adverse environmental effects; and
    - determine criteria to examine the environmental effects of each remaining alternative means to identify a preferred alternative.

4.6 Economic – Mine Liability

TOTAL has not demonstrated any consideration for the economic liabilities created by the project's projected environmental impact. This oversight potentially places future reclamation costs on Alberta taxpayers, reducing the projected economic benefits created by the Project.

4.6.1 Overview

The pace and scale of oil sands mining continues to increase in Alberta, despite a poor understanding of the environmental liabilities associated with oil sands mining and processing. "Environmental liabilities" are the costs associated with the environmental impacts throughout the life of the mine. It is not simply the costs of final reclamation at the mine site but also the costs of reclaiming the initial seismic lines, test pits and road works, damage to airsheds, contamination and disruption of groundwater, costs associated with greenhouse gas emissions and post-reclamation costs. Beyond the typical balance sheet of accountants, these environmental liabilities transect the environmental management of all aspects of oil sands mining. Critics of oil sands development have typically raised concerns over air emissions and greenhouse gases, surface water withdrawals, toxic seepage from tailings lakes into groundwater, habitat fragmentation and impacts on wildlife;[167] increasingly, these traditionally environment issues are being recognized as financial concerns.

Effective reclamation constitutes an essential step in responsible oil sands development and potentially reduces liabilities. In theory, reclamation creates useful post-mining landscapes. The reclamation process involves material placement, regarding, stabilizing, capping, placing cover soils, revegetation and maintenance. Reclamation hastens the re-establishment of functional and healthy ecosystems once mining operations have ceased, as is required by provincial

[167] Woynillowicz D.. Raynolds, M., Severson-Baker, C., 2005.*Oil Sands Fever- the Environmental Implications of Canada's Oil Sands Rush*, Drayton Valley, AB, The Pembina Institute, pg.22, available at http://pubs.pembina.org/reports/OilSands72.pdf (accessed Aug. 22nd, 2010)

legislation.[168] However, government regulations contain vague requirements to reclaim all lands disturbed by mines and processing plants land to 'equivalent land capability.' It is unlikely that regulations, as they are currently defined, address much more challenging areas like peatlands (bogs and fens), end-pit lakes (with and without tailings), dedicated storage areas for dry tailings, overburden dumps and processing plants.[169],[170] A similar conclusion about ambiguous terminology was reached by the 2007 Oil Sands Multi-stakeholder Committee. The Oil Sands Multi-stakeholder Committee was comprised of representatives from government, industry, Aboriginal groups, environmental groups and local communities. The Committee's final report included a consensus recommendation to the Government of Alberta to: "define a reclamation standard that describes final certification requirement where site conditions are clearly self-sustaining, and where natural succession to a typical boreal ecosystem would occur."[171] In 2009, the Reclamation Working Group of the Cumulative Environmental Management Association (CEMA) has subsequently released, *A Framework for Reclamation Certification Criteria and Indicators for Mineable Oil Sands*.[172] While the CEMA report is an important step forward, and provides valuable clarity for future work on reclamation standards, it also highlights the considerable effort needed before the Multi-stakeholder Committee's recommendation for clear reclamation standards will be addressed.

Government of Alberta and industry data suggest the pace and scale of oil sands mining has been increasing much faster than on-the-ground reclamation (Figure XX).[173] This increase in disturbed land can have many explanations, including: new mines coming on-stream, mine expansions, and land not being available for reclamation. This disparity could also be the result of poor mine site planning that does not prioritize progressive reclamation or a lack of financial and regulatory incentives to actively reclaim disturbed land.

---

[168] Section 137(1) of EPEA.

[169] End pit lakes are basins used to permanently store soft tailings or other process-related materials at a mine site, with volumes ranging from 4.3 Mm^3 to 750 Mm^3 of water. Tailings are capped with freshwater and theoretically, the end pit lake is safe for aquatic life and recreational opportunities. While oil sands mines are conditionally approved with end pit lakes in their reclamation and closure plans, end pit lakes have never been tested at the commercial scale. For more information see: Jennifer Grant, Simon Dyer and Dan Woynillowicz, *Fact of Fiction: Oil Sands Reclamation,* (The Pembina Institute, 2008) http://www.oilsandswatch.org/pub/1639 and Fay Westcott and Lindsay Watson, *End Pit Lakes Technical Guidance Document*, prepared for the Cumulative Environmental Management Association End Pit Lakes Subgroup Project 2005-61, (2007), http://cemaonline.ca/component/docman/doc_download/1857-end-pit-lakes-subgroup-2007-annual-report.html

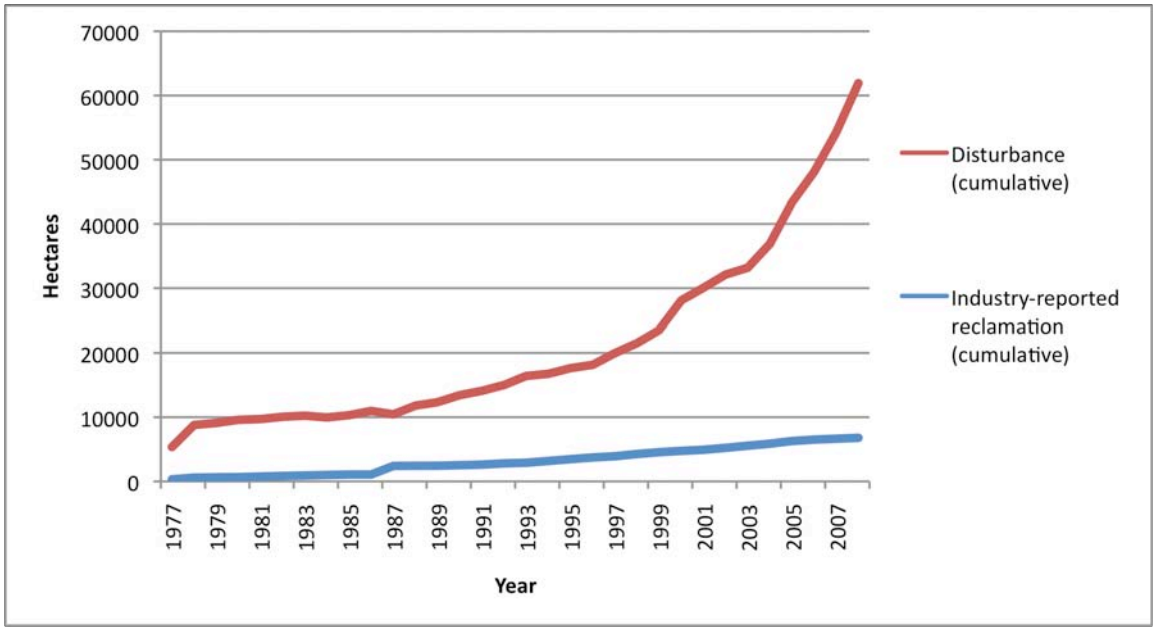
[170] For a detailed analysis on the current limitations of reclamation standards, see Cumulative Environmental Management Association Reclamation Working Group, Appendix A: Criteria and Indicator Gap Analysis" in *A Framework for Reclamation Certification Criteria and Indicators for Mineable Oil Sands,* http://cemaonline.ca/component/docman/doc_download/2367-rwg-criteria-a-indicators-report-final-120910.html

[171] Government of Alberta, 2007, *Oil Sands Consultations Multistakeholder Committee Final Report,* V3.S8. Action 8.4 [C] 22.

[172] Cumulative Environmental Management Association, *A Framework for Reclamation Certification Criteria*.

[173] Data supplied by Alberta Environment, 5 March 2010.

Figure 8. Industry-reported oil sands mine reclamation and cumulative land disturbance by oil sands mines.



Note: the mineable oil sands industry definition of reclamation is unclear and, to our knowledge, has not been verified by Alberta Environment.

Source: Alberta Environment, data supplied upon request

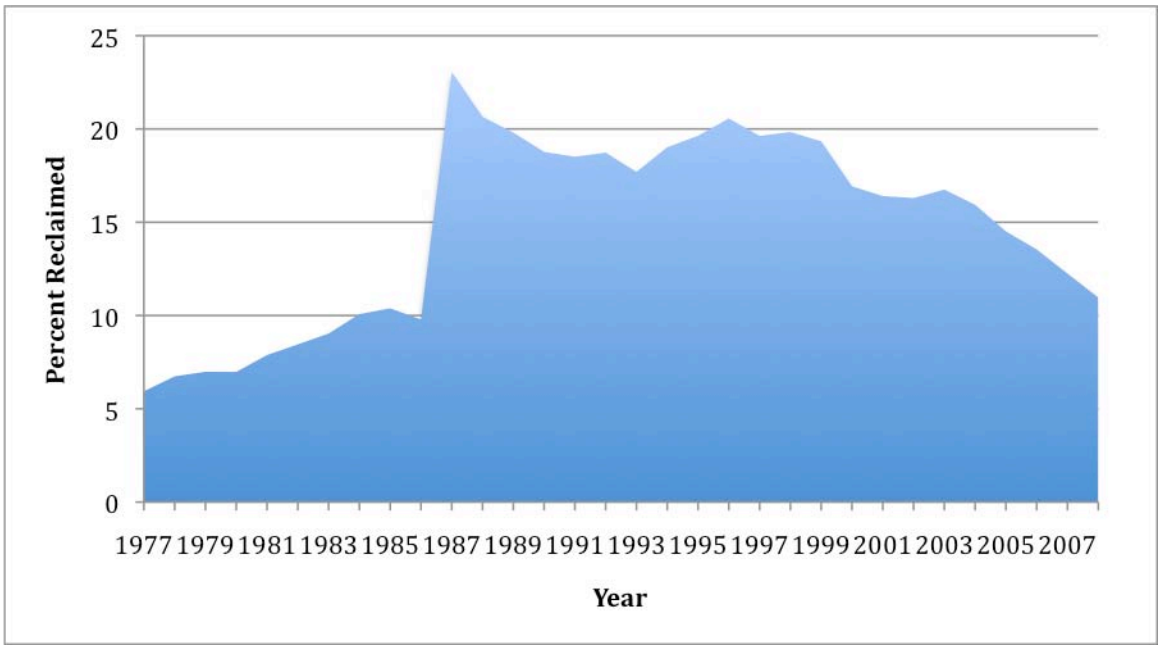
With an increasing reclamation 'deficit', industry is investing significant resources in communicating on their reclamation efforts[174] and is certainly enlarging their reclamation and research and development (R&D) budgets. For example, since 2003 Syncrude has increased annual reclamation spending from $20 million to $140 million in 2010.[175],[176] However, the success of industry's recent investments into reclamation is being overshadowed by the rapid increase in land disturbance from new mines and mine expansions. Indeed, mineable oil sands industry data reveal that the percentage of reclaimed land has been steadily decreasing from a high of 23% of the total footprint of oil sands mines in 1987 to 11% in 2009 (Figure YY). It is important to note that from 1977 to 1997 the amount of reclaimed land was increasing even as the two mines operating at that time, were new and expanding their production levels. This suggests it is possible to improve the percentage of land being reclaimed while increasing production output.

[174] Canadian Association of Petroleum Producers, "Garrett Brown: Faster Forests," 2010. http://www.capp.ca/energySupply/peopleWorkforce/Pages/Garrett-Brown.aspx#g5h71Tonoxnc

[175] "Over the last five years [from 2003-2008], Syncrude has invested about $100 million on oil sands land reclamation. This year, Syncrude will spend more than $50 million on reclamation. As well, over the next two years, Syncrude will invest more than $35 million in groundbreaking wetlands and reclamation research projects. Syncrude is collaborating with 25 researchers - five scientists and 20 graduate students from four universities from across the country on a five-year, $3.8-million project focusing on 16 different wetlands." Syncrude spokesperson Cheryl Robb http://www.canadasoilsands.ca/en/forum/topic.aspx?id=95 Posted 18 June 2009, Accessed 14 May 2010

[176] Henton, D. "Making strides in healing the scars: oilsands giants haul in trees, shrubs and soil to reclaim mines." *Edmonton Journal*, June 22, 2010. http://www.edmontonjournal.com/business/Making+strides+healing+scars/3184736/story.html#ixzz0raXFlg00

Figure 9. Percentage of disturbed land reclaimed compared to the total footprint of all oil sands mines



Note: Percentages as reported by oil sands mines. The mineable oil sands industry definition of reclamation is unclear and, to our knowledge, has not been verified by Alberta Environment.

Source: Alberta Environment (3 March 2010), data supplied upon request

Beyond reclamation requirements, the Government of Alberta requires oil sands mine operators to estimate reclamation costs and submit a security deposit. [177,178] This security deposit acts as a financial backstop or contingency plan to fund "the conservation and reclamation of specified land" if the mine operator is unwilling or unable to pay for the reclamation (e.g. in an insolvency).[179],[180] The security deposit, held in Alberta Environment's Environmental Protection and Security Fund (EPSF), is considered a surety, or guarantee, to prevent the public from bearing the reclamation costs.[181]

Security deposits are un-audited financial estimates by industry and intended to correspond to the total cost of reclamation of the land disturbed to the end of the upcoming year. These confidential estimates are reviewed by Alberta Environment staff and not publicly available.[182] Considering that mining industry estimates for reclamation costs have a long history of

[177] S 135(1) of Alberta's *Environmental Protection and Enhancement Act* R.S.A 2000 C. E-12

[178] Division 2 of Conservation and Reclamation Regulation, Alberta Regulation 115/1993.

[179] S 24(3) of Conservation and Reclamation Regulation, Alberta Regulation 115/1993.

[180] Security deposits are only required by Alberta Environment for oil sands mining operations and not in situ operations. The ERCB Licensee Liability Rating program and the Orphan Fund governs in situ operations' securities. Alberta Energy Resources Conservation Board, personal communication, February 2010

[181] Alberta Environment, *Environmental Protection Security Fund Annual Report, April 1, 2008 to March 31, 2009,* (Government of Alberta, 2009).

[182] Personal communication, Alberta Environment, 4 August 2010.

underestimation,[183], it is uncertain, if not unlikely, that the security collected by Alberta Environment is sufficient to cover the costs of reclamation, let alone the broader environmental liabilities created by oil sands mining that are present but not addressed by current policies.

The risks associated with underestimated environmental liabilities are borne first by investors, then by the government treasury and taxpayers. Investors assume risk when they provide the capital needed for capital and operating costs, including liabilities. Investors' risk range from reduced dividends to outright bankruptcy, if these liabilities are underestimated. The Government of Alberta bears the risk of paying for these liabilities if the mining companies are unable or unwilling to pay and the security deposits prove insufficient to address these liabilities.

Albertans believe mining companies should pay for clean-up costs

Passing on the financial risks associated with cleaning up an oil sands mine to taxpayers is clearly unacceptable to Albertans. A recent public poll found that 96% of Albertans agree that companies operating in the oil sands should be held liable for all environmental damages caused by their operations.[184]

What is the level of risk assumed by provincial and federal taxpayers if an oil sands mining company fails to actually pay for reclamation at the end of a mine's life? How can investors make informed financial decisions if significant liabilities remain undisclosed? If government assumes liabilities, in the event of an insolvent oil sands mine, to what extent should future generations should pay for these environmental liabilities? Unless liabilities are explicitly identified, with current mines projected to last 30-50 years or more, we are passing current liabilities to future generations.

Costly environmental liabilities in Canada are not new. Canada has a long history of mines and industrial sites becoming insolvent, leaving taxpayers with expensive cleaning bills and local populations exposed to considerable pollution. In 2009, there were over 10,000 abandoned or un-reclaimed mines in Canada.[185] Below are three well-known examples of instances where taxpayers have borne the costs of reclamation:

Sydney's Tar Ponds, Nova Scotia

One hundred years of steel and coke production left more than a million tonnes of contaminated soil and sediment in Sydney on the eastern coast of Cape Breton Island, Nova Scotia.[186] This prompted the Government of Canada to "undertake a 10-year, $3.5 billion program to clean up contaminated sites for which the Government is responsible. And the Government of Canada will augment this with a $500 million program of similar duration to do its part in the remediation of certain other sites, notably the Sydney Tar

[183] Martin, T.E. and L.E. Boxill. "Chapter 27. Reclamation and closure cost planning and estimation and the mining life cycle" in *Tailings and Mine Waste '08* (London, UK: Talyor and Francis Group, 2009), 291.

[184] Cambridge Strategies Inc. June 2010. Random conjoint survey of 1032 Albertans. "The companies operating in the oil sands should be held liable for all environmental damages caused by their operations." Completely agree: 57%, Agree: 30%, Slightly agree: 9%, Slightly disagree: 2%, Disagree: 1%, Completely disagree: 1%.

[185] MiningWatch Canada, "Abandoned Mines – Overview," http://www.miningwatch.ca/en/abandoned-mines-overview

[186] Sydney Tar Ponds Agency, "Project," 2010. http://www.tarpondscleanup.ca/index.php?sid=2

Ponds,"[187] as announced in the 2004 Speech from the Throne. For comparison, the Sydney Tar Ponds cover an area of 31 ha. Alberta's current oil sands mine footprint covers an area of 68,574 ha, over 2,200 times larger.

Faro Mine, Yukon Territory

Only 25 years worth of zinc and lead extraction has led to an estimated $450 million in environmental liabilities at the Faro Mine in the Yukon Territory.[188] Of the $450 million, the mining company that operated Faro Mine only declared $93.8 million in liabilities shortly before going bankrupt.[189] Nearby water sources have been contaminated with acid and heavy metals from the mine, requiring continuous treatment. There is also the potential for a tailing dam failure.[190] The estimated cost per hectare is $180,000 but the government had only collected $5,600 per hectare in security. [191] The difference is being paid for by Canadian taxpayers. Clean up is expected to take 40 years.

Giant Mine, Northwest Territories

The legacy of 50 years of gold mining just outside of Yellowknife has created an estimated $400 million in environmental liabilities. Over 237,000 tons of arsenic trioxide dust was stored in underground chambers by Royal Oak Mines before it went bankrupt. Water coming in contact with these chambers has since been contaminated with arsenic and must be pumped to the surface, treated and released.[192] Of the $400 million in liabilities, the Government of Canada held a $400,000 performance bond.[193] The difference is now being paid for by Canadian taxpayers.

Poor reclamation performance of oil sands mines, past taxpayer-funded mine reclamation and the clear desire of Albertans to not assume the financial risks of paying for the clean-up of an oil sands mine clearly demonstrate the need for a rigorous mine liability policy framework. The policy gaps in oil sands mine liability management need to be assessed along with a quantification of the total environmental liabilities for oil sands mines in Alberta. To our knowledge, no study exists that has combined an initial quantification of the total liabilities of oil sands mines and a sober critique of current policies.

---

[187] Privy Council Office, 2004. "Speech from the Throne to Open the Third Session of the 37th Parliament of Canada," http://www.pco-bcp.gc.ca/index.asp?lang=eng&page=information&sub=publications&doc=sft-ddt/2004_1-eng.htm. Accessed 23 June 2010.

[188] Faro Mine Closure, "Reference: Frequently-Asked Questions" (2009) http://faromineclosure.yk.ca/reference/faq.html

[189] Robert Repetto, *Silence is Golden, Leaden and Copper: Financial disclosure of material environmental information in the North American Hard Rock Mining Industry,* prepared for the Commission for Environmental Cooperation (2004). http://www.cec.org/Storage/56/4822_Silence-is-golden_en.pdf

190 Office of the Auditor General of Canada, "2002 Oct Report of the Commissioner of the Environment and Sustainable Development." http://www.oag-bvg.gc.ca/internet/English/att_c20021003xe03_e_12338.html

[191] Based on a 2500 ha mine site.

[192] "2002 Oct Report of the Commissioner of the Environment and Sustainable Development."

[193] Repetto, *Silence is Golden, Leaden and Copper.*

4.6.2 Challenges of Current Bonding Policies

a. Narrow Definition of Financial Liability

Existing Alberta Environment reclamation security policies have a narrow definition of environmental liability. They do *not* consider the liabilities associated with pre-EPEA approval land disturbances, reclamation costs of the processing plants, airshed contamination, greenhouse gas emissions, the treatment of contaminated water in end pit lakes or contaminated soil and post-reclamation care and custody.[194,195,] The potential for groundwater contamination is considered on a case-by-case basis.[196]

The current definition of reclamation liability for oil sands mine does not consider the liabilities accrued over the life of the mine.[197] Environmental liability associated with oil sands mining is not simply the costs associated with reclamation but begins with the initial seismic lines, test pits and road works and extends through the operational life of the plant, through to post-reclamation monitoring and maintenance. It also includes the damage to airsheds, the contamination and disruption of groundwater, and dangerous greenhouse gas emissions.

Alberta Environment only requires mine operators to estimate the liabilities associated with the total disturbed area as projected for the subsequent year. This does not take into account the full costs associated with the entire life of the mine or the mining company's ability to pay for total reclamation.

Both the Government of Alberta and the Government of Canada are directly aware of the shortcomings in current mine liability, including security deposits.[198] The Joint Review Panel for Imperial Oil's Kearl Lake oil sands mine recommended, "a [revised] liability management program should provide a financial mechanism for the funding of total project liabilities, including decommissioning of project facilities, reclamation/remediation of all disturbed lands, and any end-of-project-life monitoring that may be required for a project."[199] Despite these joint federal-provincial panel recommendations in 2006 and 2007, mine liability management policy has not yet changed in Alberta.

The narrow definition of environmental liabilities used by Alberta Environment to estimate reclamation security significantly underestimates the actual liabilities borne by Albertans should an oil sands mine become insolvent. This limitation certainly restricts the amount required in security deposits by oil sands mines. In so doing, the Province fails to account for significant sources of risk and consequently become implicitly responsible for those costs should an oil

---

[194] Alberta Environment, personal communication, January 2010

[195] Albian Sands Decision 2006-128 at page 65

[196] Currently only Suncor's South tailings lake, where "an estimate of the costs associated with the seepage mitigation plan during the operation of the South Tailings Pond, and during the post closure period, until napthenic acid concentrations in the Wood Creek Sand Channel reach levels protective of aquatic life in McLean Creek." S. 5.1.4 (c) of Suncor's 2007 EPEA for their oil sands mining operations.

[197] Martin, T.E. and L.E. Boxill. "Chapter 27. Reclamation and closure cost planning and estimation and the mining life cycle" in *Tailings and Mine Waste '08* (London, UK: Taylor and Francis Group, 2009), 291.

[198] Albian Sands Decision 2006-128 at p. 66

[199] Kearl Lake Decision 2007-013 at p. 52

sands mine be unable to afford to address these risks. This poses an unacceptable amount of risk to Albertans who may ultimately have to pay for these costs.

b. Absence of Transparency

Poor access to government information

The current oil sands mine reclamation security program lacks transparency. Alberta Environment's Annual Report for the Environmental Protection Security Fund (EPSF) is available online, but only shows the amount of security that each mine approval holder (or their joint venture partners) has posted. It does not release any of the data used to calculate this amount; company submissions to Alberta Environment on their reclamation costs are considered proprietary and not shared with the public. Even the government calculation methodology for the EPSF that Alberta Environment uses to assess the accuracy of reclamation costs estimates remains confidential.[200]

Section 16 of the *Freedom of Information and Protection of Privacy Act*, allows oil sands mine operators and the Alberta government to withhold the public release of information that is deemed proprietary.[201]

Public access to what information on mine liability that does exist has been historically difficult to access. Companies were only required to submit digital Conservation and Reclamation reports from 2009.[202] Before this, most oil sands mine operators submitted paper copies, making the sharing of this information more difficult than with digital versions. Conservation and Reclamation reports are not available online. Older paper versions of these reports can only be accessed in hardcopy at the Alberta Government Library in Edmonton,[203] or requested from a mine operator.

Lack of Industry Estimates

Information about reclamation costs is a closely guarded secret in Alberta. All of the oil sands mine companies, industry associations, private reclamation contractors, and academics interviewed for this report were reticent to share any information on how much oil sands mine reclamation actually costs. The most often cited explanations for this reticence include the bidding process and site characteristics. The reclamation bidding process among reclamation contractors is highly competitive; to maintain competitive value, to prevent underbidding and to maximize potential revenue, reclamation costs are kept confidential. Others cite mine-specific factors that prevent the development of any industry averages. They feel the differences among the mines, including the industrial processes used at each mine and hauling distances, prevent any cost comparisons. While this explanation may hold between prairie and mountain coal mines, where topography and access to ore bodies are very different, the variation in reclamation costs among oil sands mines will not be nearly as significant, making basic cost comparisons possible. There is variation in hauling distances, material types and equipment used among oil sands mines but this diversity should not eliminate the possibility of providing publicly available

[200] Albian Sands Decision 2006-128 at p. 65

[201] Government of Alberta, Freedom of Information and Protection of Privacy Act RSA 2000 cF-25 s16(1)

[202] Alberta Environment, personal communication, February 2010.

[203] Alberta Government Library, Great West Life Building, Edmonton, AB.

reclamation cost estimates. Creative solutions exist that can address this diversity without compromising proprietary information.

Lack of Accounting Safeguards

While most oil sands mines use third-party accounting firms to verify their Asset Retirement Obligations as required under Federal law, existing provincial mine liability policy requires neither third party validation of reclamation security estimates nor sign-off by the Chief Executive Officer, the Chief Financial Officer or a designated financial representative. Alberta Environment can request additional information to gain comfort with the estimate but has no formal policy that uses verifiable methods of ensuring the data submitted is accurate.[204]

Growing Public Concern

Compounding the limited transparency are the growing public concerns on the existing mine security policy in Alberta. Attention has been brought upon the need for more transparent inclusion of stakeholder concerns into the development of oil sands reclamation security policy. In 2007, the Oil Sands Multistakeholder Committee, which consisted of representatives from industry, environmental groups, academics, bureaucrats and aboriginal groups reached consensus on the recommendation that the Government of Alberta "develop formal and transparent processes and policies for financial management of reclamation liabilities."[205] The Government of Alberta's own report, *Responsible Actions: a Plan for Alberta's Oil Sands* carried forward the recommendation of "enhanc[ing] existing mining liability management programs to further protect Albertans from financial liabilities related to reclamation."[206] But there has been no evidence of improved transparency – indeed discussions about changes to the Mine Liability program have included only industry and government (See below).

Independent of the Multistakeholder Committee, concerns were also raised by interveners in the regulatory review of proposed oil sands projects. The Mikisew Cree First Nation[207] and the Oil Sands Environmental Coalition (which includes Pembina Institute, Toxics Watch Society and the Fort McMurray Environmental Association)[208] have raised objections over the lack of transparency of the current reclamation liability policy at numerous approval hearings.

c. Underestimated Liabilities

The following analysis suggests that Alberta Environment and oil sands mine operators have significantly underestimated the actual cost to address environmental liabilities. Even with the narrow understanding of mine liability in Alberta Environment's current legislation, the amount collected by Alberta Environment appears wholly insufficient to fully-reclaim an oil sands mine to Provincial standards, should a mine be unable to cover reclamation costs. If the broader life of

---

[204] Through Section Five of EPEA approvals for oil sands mines, Alberta Environment specifically requests for third-party costs of reclamation but give not further guidance on what third-party means

[205] Government of Alberta, 2007, *Oil Sands Consultations Multistakeholder Committee Final Report,* 22

[206] Government of Alberta, 2009, Responsible Actions: a Plan for Alberta's Oil Sands. http://www.treasuryboard.gov.ab.ca/docs/GOA_ResponsibleActions_web.pdf

[207] Albian Sands Decision 2006-128 at page 65; Kearl Lake Decision 2007-013 at 51; Suncor-Steepbank Mine ERCB Decision 2006-112 at 70.

[208] Decision 2007-013 Kearl Lake at 51; Albian Sands Decision 2006-128 at page 66.; True North Energy Company Decision, 2002-089, p 52.; Suncor-Steepbank Mine ERCB Decision 2006-112 at 70.

the mine is considered, from exploration to post-reclamation monitoring, the liabilities are even greater.

The inadequacy of the Alberta Environment's mine financial security program has been known for many years. The provincial government's own watchdog, the Alberta Auditor General has raised concerns four times over the last eleven years. The 1998-1999, 2000-2001, 2005-2006 and 2009 Alberta Auditor General reports all expressed concerns about inconsistencies in the application of the oil sands mine reclamation security program, the failure of oil sands operators to properly estimate reclamation costs and the lack of government response to the Auditor General's concerns.[209,210,211,212]

1998/1998 Annual Report of Auditor General of Alberta, p. 158: My review [of mine liability management policy] suggests that some types of projects are required to provide financial security, while others are not. For those that are required to provide security, differing methods were used to evaluate the need for and actual amount of financial security. In some cases, the security is based on the estimated cost of reclamation; in other cases it is based on an estimate of the value of permanent structural improvements. …The [Mine Financial Security Risk Assessment] Model was forwarded to the Department Executive in June 1998. The Financial Security Risk Assessment Model has not yet been implemented.

2000/2001 Annual Report of Auditor General of Alberta, p. 90: No final solution appears imminent. Progress against the intent of our 1998-1999 recommendation has been unsatisfactory.

2004/2005 Annual Report of Auditor General of Alberta, p. 182: For oilsands and coal mines, for which the Ministry is legislatively responsible to collect reclamation security, there are still many inconsistencies. Some sites posted security under prior legislation and that security has been continued under existing legislation, with the result that some sites have security based on production. Some sites use outdated information to determine their estimated full cost of reclamation. Some estimates do not include all required costs. As a result of these inconsistencies, the sufficiency of security for the completion of reclamation is not ensured.

With the passage of time, the Ministry continues to be exposed to the risk of obtaining inadequate security resulting in additional costs to the province [emphasis added].

October 2009 Report of the Auditor General of Alberta, p 207: We are repeating the recommendation [that Alberta Environment implement a sufficient mine financial security policy] for a third time because the Department could not confirm when a new program for obtaining financial security will be finalized and implemented.

4.6.3 Role of ERCB in Oil Sands Mine Reclamation Security

In addition to the security deposit required under EPEA, the Energy Resources Conservation Board (ERCB) may collect a security deposit. The ERCB may require oil sands operators to, "[d]epending on the specific circumstances before the Board, proponents may be required to post performance bonds, make security deposits, establish internal or external accounts in which funds from revenue are deposited on an ongoing basis for reclamation and decommissioning, and

[209] Auditor General of Alberta, "Annual Report of the Auditor General of Alberta," (Edmonton, AB: 1999), 158.

[210] Auditor General of Alberta, "Annual Report of the Auditor General of Alberta," (Edmonton, AB: 2001), 90

[211] Auditor General of Alberta, "Annual Report of the Auditor General of Alberta," (Edmonton, AB: 2005), 182

[212] Auditor General of Alberta, "Annual Report of the Auditor General of Alberta," (Edmonton, AB: 2009), 207.

obtain both third-party and environmental damage insurance coverage. In some cases, the Board may also ask that security instruments be provided by an applicant's corporate parent or affiliate."[213] However, the ERCB does not enforce this policy and does not presently collect security from oil sands mine operators, as security is already collected by Alberta Environment.[214] The ERCB does collect and manage securities for in-situ oil sands production and conventional oil and gas through the ERCB Licensee Liability Rating program and the Orphan Fund.[215]

4.6.4 Recent Mine Financial Security Policy Developments

The Government of Alberta has been developing a Mine Liability Management Program (MLMP) since 2004.[216],[217] This program is intended to redesign the security process for oil sand mine liabilities. Despite the Government of Alberta's purported intention to make MLMP consultation a transparent initiative,[218,219] the program is being developed by industry and government personnel without input from stakeholders or the public.[220] Since the MLMP is a draft policy, it is neither a public document nor available for scrutiny beyond the industry groups involved in the policy's development. For reasons not publicly disclosed, the Pembina Institute understands that the MLMP has been turned down by cabinet twice over the past four years.

In the past year, the MLMP has apparently been renamed the Mine Financial Security Program (MFSP). Like the MLMP, the MFSP also clearly lacks transparency. Alberta's Auditor General has noted that Alberta Environment has been privately working with Alberta Energy, Alberta Treasury Board, Alberta Finance and Enterprise, the Energy Resources Conservation Board, oil sands mines and industry associations in the development of MFSP.[221] Syncrude subsequently registered their lobbying of Alberta Environment on the MFSP.[222] The Alberta Chamber of Resources has noted they have a "Mine Reclamation Security Committee, led by Ray Hansen of Syncrude, and populated with some of the most well-informed people in the world on the subject, have been working this issue tirelessly for a [sic] several years."[223] Despite their close

---

[213] True North Energy Company Decision, 2002-089, p 52.

[214] Personal communication, Alberta Energy Resources Conservation Board, Feb 2010. The only exception is in the case of pilot or demonstration oil sands upgraders (daily production capacity of 5000m^3 or less), where the ERCB relies on the Licensee Liability Program described in Directives 001, 006 and 011.

[215] Personal communication, Alberta Energy Resources Conservation Board, Feb 2010.

[216] Albian Sands Decision 2006-128 at page 66.

[217] The Alberta Sand and Gravel Association, "Mine Liability Management Program" *The Scoop — Paving the Road to Sustainability and Continued Prosperity* 3, no. 2 (2006).

[218] In 2006, the Government of Alberta "believed there would be consultation with respect to the [MLMP] before implementation to provide for greater transparency." Albian Sands Decision 2006-128 at page 66.

[219] Kearl Lake Decision 2007-013 at page 52.

[220] Brad Anderson, *Resources Guide and Directory 2009*, Alberta Chamber of Resources. 2009. P 12.

[221] Auditor General of Alberta, "Annual Report of the Auditor General of Alberta," (Edmonton, AB: 2009), 209.

[222] Office of the Ethics Commissioner of Alberta. 2010. Registration for Organization Lobbyists: Syncrude Canada, Ltd. http://www.lobbyistsact.ab.ca/LRS/RegistrationPublic.nsf/vwByRegNum/OL0058-20091110181107?OpenDocument Accessed 1 June 2010.

[223] Brad Anderson, *Resources Guide and Directory 2009*, Alberta Chamber of Resources. 2009. P 12.

involvement in the development of the MFSP, Syncrude,[224] Suncor,[225] Shell,[226] CAPP,[227] the Oil Sands Developers Group[228], the Alberta Chamber of Resources,[229] and numerous private sector consultants all turned down the Pembina Institute's request to comment on their contribution to the development of the MFSP.

Even within the Government of Alberta, there is secrecy over the MFSP. Alberta Environment and ERCB employees have noted the policy is confidential. The Pembina Institute's requests to Alberta Environment to provide feedback on the proposed MFSP before cabinet approves the policy were denied. According to one government official because the MFSP does not deal with the environment and is considered financial policy, environmental groups are not consulted.[230] The same official explained that industry is consulted because it is their finances that are directly affected by the policy.[231]

Unfortunately, it is not only industry's finances that are at stake. Shareholders of oil sands mining companies will be the first to pay, as a company's forecasted profits will be eaten up by the increasingly costly reclamation. While increasing a security estimate will also cut into company profits, these costs would be known and incorporated into revenue forecasts instead of ignored.

If a company cannot pay for the reclamation costs and becomes insolvent, Alberta Environment's Environmental Protection Security Fund (EPSF) draws from that particular company's deposit, not the total fund. However, the security deposits held in the fund will likely not cover the reclamation costs.[232] The Government of Canada has spent $3.5 billion to reclaim Nova Scotia's Sydney Tar Ponds, an area significantly smaller (31 ha) than the area disturbed by oil sands mining (68,574 ha). If the EPSF proves insufficient to cover the costs of reclamation then Albertan taxpayers will most likely have to foot the bill.

Reclamation security mechanisms for oil sands mines are an environmental issue and a financial issue to parties other than just oil sands companies, namely Alberta's citizens. If oil sands mine operators or the Province cannot afford or choose not to fully reclaim the mine site, then aboriginal rights holders, local communities and land users will have to bear the consequences of the problematic environmental legacy left behind from the mines. Scientific evidence is quickly accumulating on the problematic environmental legacy of the oil sands.[233] If reclamation is as challenging as some studies are suggesting, then reclamation and remediation costs will be much higher than budgeted.

---

[224] Cheryl Robb, Syncrude, personal communication, 1 April 2010.

[225] Peter MacConnachie, Suncor, personal communication, 1 April 2010.

[226] Fred Kuzmic, Shell Canada, personal communication, 27 April 2010.

[227] Travis Davies, Canadian Association of Petroluem Producers, personal communication, January 2010.

[228] Oil Sands Developers Group, personal communication, January 2010.

[229] Brad Anderson, Alberta Chamber of Resources, personal communication, 18 February 2010.

[230] Government of Alberta employee, personal communication, 1 June 2010.

[231] Government of Alberta employee, personal communication, 1 June 2010.

[232] Per company range is $45-285 million. See Appendix for a company breakdown of EPSF security deposits.

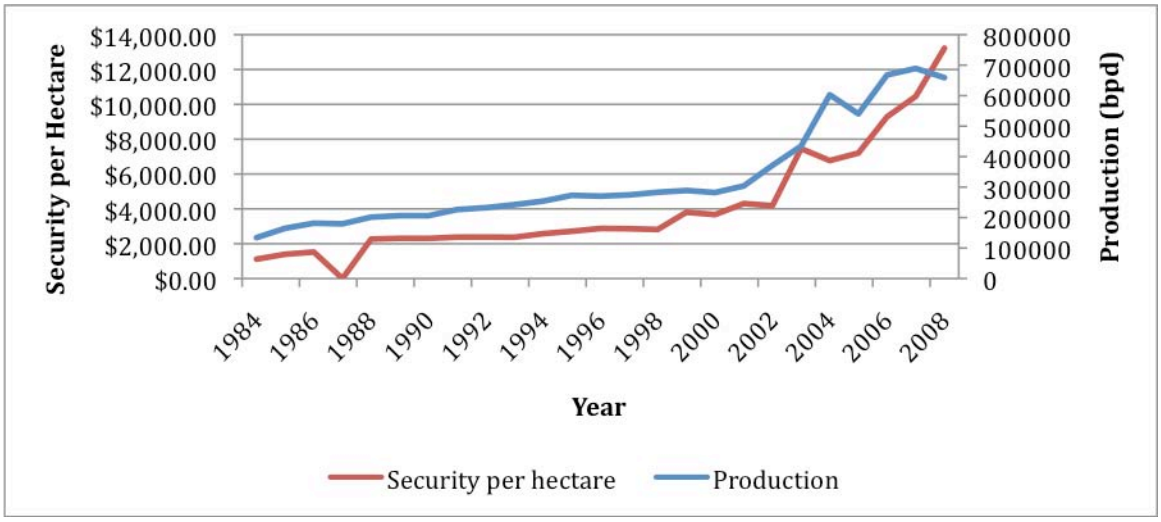
[233] Kevin Timoney and Peter Lee, "Does the Alberta Tar Sands industry pollute? The scientific evidence," *The Open Conservation Biology Journal* 3 (2009): 65-81.

a. Government of Alberta estimates

In 2008 the total oil sands security in the Environmental Protection and Security Fund (EPSF) was $645 million,[234] on a disturbance footprint of 49,647 ha.[235] This represents only $13,221 per hectare.[236] It is important to note that this figure is an approximation of security coverage, given the lack of publicly available data on mine security estimates. This figure adjusts for the year discrepancy between disturbance reporting in the Annual Conservation and Reclamation Reports and the EPSF estimates. The EPSF estimate does not include the plant site, unlike the disturbance footprint. Syncrude and Suncor that were approved under the *Land Surface Conservation and Reclamation Act*, the predecessor to EPEA, have some of their reclamation security calculated based on production.[237] This number, when compared to other publicly available figures on oil sands reclamation costs, appears inadequately low.

Alberta Environment has been far from consistent in its collection of mine security. Figure XX illustrates that financial security collected per hectare of disturbed land has increased over time, even when adjusting for inflation. [238] In 1977, $1,112 were collected per hectare of disturbed land by Alberta Environment (in 2010 dollars). By 2008 this number had increased to $13,221 (in 2010 dollars). Our analysis indicates that while this upward trend of more security collected per hectare of disturbed land (Figure XXY) is positive, the rationale for this increase is unclear.

Figure 10. Security deposits compared to production



The amount of security deposits from oil sands mines held in the Environmental Protection and Security Fund per hectare of disturbance (inflation-adjusted) compared to the production of synthetic crude oil per day produced from oil sands mines over time. Note: Data from 1987 was unavailable.

[234] Alberta Environment, *Environmental Protection Security Fund Annual Report, April 1 2008 - March 31, 2009.*

[235] Data supplied by Alberta Environment upon request

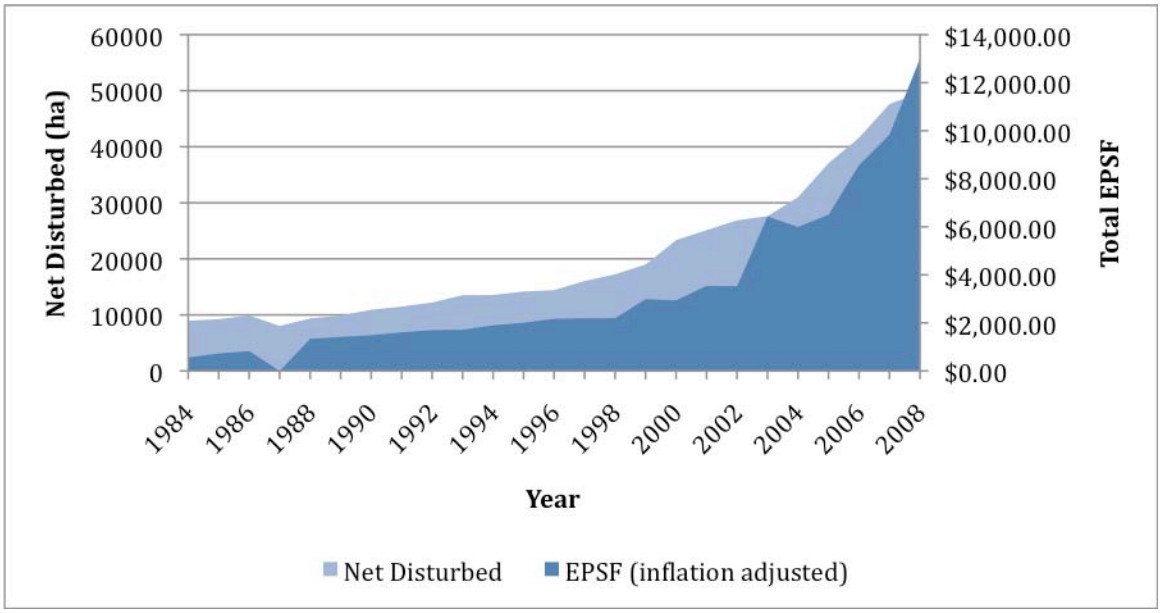
[236] Appendix A indicates the 2009 annual summary of account balances for oil sands mine operators.

[237] This production based liability estimate only applies to Suncor Lease 86/17 and Syncrude Mildred Lake. S. 18(3) Conservation and Reclamation Regulation, Alberta Regulation 115/1993

[238] Calculated from the Bank of Canada website: http://www.bankofcanada.ca/en/rates/inflation_calc.html based on December 31st, 2009 prices.

Source: Annual Environmental Protection and Security Fund Reports and ERCB oil sand mine production data.

Figure 11. Security deposits compared to amount of land disturbed



Total security deposits from oil sands mines in the Environmental Protection and Security Fund (inflation-adjusted) and the net disturbed land from oil sands mines over time. Note: Data from 1987 was unavailable.

Source: Alberta Environment data and Annual Environmental Protection and Security Fund Reports.

There is hardly a level playing field among oil sands mines operators when it comes to collection of reclamation security. Table YY demonstrates the inconsistent application among oil sands mines of Alberta Environment's reclamation costing methodology based on 2008 figures. The amount collected per hectare of disturbed land ranges from $3,841 for CNRL's Horizon Mine to $35,536 for Imperial Oil's Kearl Mine. Both mines are at relatively similar stages in development; the Horizon mine just started producing oil in 2009 and Kearl is scheduled to begin producing in 2012. Legacy producers Suncor and Syncrude also show significant difference in their security collected. This is likely because Syncrude's Mildred Lake Mine is still using a grandfathered flat-rate security estimate methodology.[239] Since Alberta Environment and the oil sands mine operators we contacted were unwilling to share their current calculation methodology for mine liability it is difficult to determine why such significant disparity exists. What ever the reason for the disparity, a particular mine's deposit held by the EPSF can only be used to draw for the reclamation of that mine. In other words, Alberta Environment cannot draw from other mines' security deposits if it proves insufficient to cover reclamation costs.[240]

[239] Suncor's Lease 86/17 also has a grandfathered flat-rate estimate for reclamation, although it is no longer in production. Alberta Environment, personal communication, January 2010.

[240] Personal communication, Environmental Law Centre, 28 July 2010.

Table 5. Security comparison across operators

Company	EPSF contribution ($ CAD)	Net disturbed land (ha)	EPSF / net disturbed ($/ha)
SUNCOR	$271,319,713	16730	$16,218
SYNCRUDE	$165,623,662	17267	$9,592
SHELL	$73,238,264	5269	$13,900
FORT HILLS	$14,243,667	2596	$5,488
CNRL	$27,552,040	7173	$3,841
JACKPINE	$93,450,723	3112	$30,029
KEARL	$98,400,000	2769	$35,536

Total reclamation security held by Alberta Environment in the Environmental Protection Security Fund with net disturbed land and security per hectare of disturbed land.

Source: Alberta Environment 2008 Environmental Protection and Security Fund Report and 2008 Annual Conservation and Reclamation Reports for various oil sand mine operators.

b. Industry Estimates

Oil sands mining industry representatives provided even less information on what mining companies actually spend on reclamation than Alberta Environment. Suncor, Shell and Syncrude were unwilling to provide any data on what they spend on reclamation. Although Shell and Suncor were willing to discuss in general terms how they accounted for reclamation costs. The Oil Sands Developers Group, Canadian Association of Petroleum Producers, Alberta Chamber of Resources, and the Canadian Land Reclamation Association were unable to provide generalized industry standard costs for reclamation. Three academics from the University of Alberta, approached during the course of this study, who work on oil sands mine reclamation research, were unwilling or unable to provide cost estimates as well.

Despite the lack of publicly available data from industry on the costs associated with oil sands mine reclamation, we were able to obtain some financial information from a number of public sources. Some reclamation experts suggest that revegetation alone could cost $200,000 per hectare.[241] In 2006 Syncrude spent a total of $30.5 million on reclamation activities on 267 ha or about $114,000 per hectare.[242] This number is for a relatively straight-forward upland site without significant remediation issues. Low-lying bogs and fens, which once occupied approximately 40% of the oil sands mine-affected landscape, are much more costly to reclaim. Syncrude has spent $50 million experimenting with the reclamation of a 54 hectare fen, this

[241] Dr. David Walker, personal communication, 2007. This estimate is based on the requirement for 10 plants per square metre, at the cost of $2 per plant as cited in Jennifer Grant, Dan Woynillowicz and Simon Dyer, *Fact or Fiction: Oil Sands Reclamation* (The Pembina Institute, 2008) http://www.oilsandswatch.org/pub/1639

[242] Hanneke Brooymans, "Reclaimed Oilsands Site Receives Provincial Blessing — A 'Nice Milestone' Says Syncrude, Which Likely Spent $114,000 per Hectare to Restore Land," *Edmonton Journal*, March 20, 2008.

works out to $925,925 per hectare.[243] While this price per hectare is not representative of the total cost to reclaim the land it does indicate that an oil sands operator cannot, with current technology, find a lower priced, practicable alternative to reclaim a fen. Tailings lakes are also costly to reclaim. Suncor plans to spend billions of dollars in its West Side Lake Closure initiative over the next 10 years.[244] Some of the major issues around soil contamination from naphthenic acids and salt have yet to be addressed.

Often the technology to reclaim a landscape is not yet scalable to an entire landscape. Suncor plans to spend $450 million on commercial implementation of new tailings and reclamation technologies.[245] Though one Suncor reclamation researcher readily admits that, "large scale reclamation of this magnitude has not yet been optimized in terms of costs, it is difficult to assign a dollar value per hectare."[246]

One thing is certain: the amount oil sands mining companies are investing into reclamation is increasing. Since 2003 Syncrude has increased annual reclamation spending from $20 million to $140 million in 2010.[247,248]

An industry representative cited that most oil sands mining companies spend $30,000 – $75,000 per hectare on reclamation; a respected mine reclamation engineer has also quoted $50,000 per hectare.[249] Given that Alberta Environment is expecting to reclaim an oil sands mine for an average of $13,221 per hectare, it is unclear how the provincial government can expect to pay 2-4 times less than industry's ever-inflating reclamation costs.

c. OSEC Estimates

Given the extremely limited publicly-available information on liabilities for oil sands mines, OSEC has attempted to provide its own estimate for the potential liabilities of oil sands mining in Alberta. During the course of the analysis, OSEC researchers endeavoured to use the most accurate data possible. When there was lack of oil sands specific data, proxies from related industries were sought. Comparisons with reclamation costs for mountain and prairie coal mines in the Alberta were not possible due to the unique habitat and operations associated with oil sands mining. Pricing individual products and services involved in oil sands mine reclamation

---

[243] *2009 Canadian Oil Sands Trust Annual Report,* 17.

[244] From comment Posted Friday, May 08, 2009 12:14pm by user Dr F, http://www.canadasoilsands.ca/en/forum/topic.aspx?id=95 May 8 2009 Accessed 14 May 2010

[245] *Suncor 2009 Annual Report,* 4.

[246] Canada's Oil Sands, "Discussion Forum; Topic: Reclamation Estimates," post by Suncor reclamation specialist, 8 May 2009, http://www.canadasoilsands.ca/en/forum/topic.aspx?id=95

[247] "Over the last five years [from 2003-2008], Syncrude has invested about $100 million on oil sands land reclamation. This year, Syncrude will spend more than $50 million on reclamation. As well, over the next two years, Syncrude will invest more than $35 million in groundbreaking wetlands and reclamation research projects. Syncrude is collaborating with 25 researchers - five scientists and 20 graduate students from four universities from across the country on a five-year, $3.8-million project focusing on 16 different wetlands." Canada's Oil Sands, "Discussion Forum; Topic: Reclamation Estimates," post by Syncrude spokesperson Cheryl Robb,18 June 2009 http://www.canadasoilsands.ca/en/forum/topic.aspx?id=95

[248] Henton, D. "Making strides in healing the scars: oilsands giants haul in trees, shrubs and soil to reclaim mines." Edmonton Journal, June 22, 2010. http://www.edmontonjournal.com/business/Making+strides+healing+scars/3184736/story.html#ixzz0raXFlg00

[249] Industry representatives, presenting at Peatnet Symposium: Reclamation and Restoration of Boreal Peatland and Forest Ecosystems, Mar 25-27 2010, Edmonton, AB.

was also treated as confidential for the companies we consulted. Furthermore, many of the liabilities associated with oil sands mining are apparently unknown even to the mine operators, as indicated in their Asset Retirement Obligations filings in their Annual Reports.[250] Given this uncertainty is would appear prudent to ensure reclamation securities accounted for this contingency.

4.6.5 Joslyn North Mine

The Project expects to use a tailings management technology of sand stacking with 100% thickened tailings (Section 12.6.4, Page 12-38 of Feb 2010 Project Update), mine 2857 Mt of ore (Table 3.6-3 (Pg. 3-29) Feb 2010 Project Update) disturb 6980 ha of land (Table 11.3-1 (Pg. 11-13) Feb 2010 Project Update).

Based on the current high and low financial security rates used by Alberta Environment and the Project's projected reclamation and disturbance rates, the greatest liability at any point in time would occur in 2013, when a net of 4687 ha would be disturbed. The liability, extrapolated from Alberta Environment and industry data, could be between $18.0 million and $166.5 million.[251]

Assuming no reclamation occurs, using data derived from Alberta Environment, the overall liability for this project would be between $26.8 million and 248.0 million.[252] However, our analysis suggests this number is significantly lower than the actual financial liabilities created from the Project's environmental disturbance.

Using the project's volume of ore mined, the total disturbed areas and the tailings technology used, it was possible to estimate the total liability created by the Project. The costs of reclaiming disturbed land is based on the potentially underestimated industry average of $30,000 - $75,000 per hectare.[253]

Very limited information exists on the costs to remediate oil sands tailings lakes. The Government of Alberta estimates there are 840 million cubic metres of tailings inventory covering an area of 170 square kilometres.[254] No technology has been proven to remediate a tailings lake to government standards. Those technologies that do exist, such as consolidated tailings and thickeners remain expensive to implement. Tailing technology costs for a tailings thickening process with cyclones and a consolidated tailings were determined from a 2010

---

[250] Unknown liabilities include, but are not limited to: pre-EPEA approval disturbance, processing and upgrader plant site remediation, sulphur and coke stockpiles, suspension, care and custody and post-certification monitoring and remediation. 2009 Canadian Oil Sands Trust Annual Report p32; Suncor 2009 Annual Report p92

[251] The average financial security collected by Alberta Environment per hectare for CNRL's Horizon mine ($3,841/ha). The average financial security collected by Alberta Environment per hectare for Imperial Oil's Kearl mine ($35,536/ha). Alberta Environment 2008 Environmental Protection and Security Fund Report; 2008 CNRL Horizon Mine Annual Conservation and Reclamation Report; 2008 Imperial Oil Kearl Mine Annual Conservation and Reclamation Report

[252] The average financial security collected by Alberta Environment per hectare for CNRL's Horizon mine ($3,841/ha). The average financial security collected by Alberta Environment per hectare for Imperial Oil's Kearl mine ($35,536/ha). Calculations derived from Alberta Environment 2008 Environmental Protection and Security Fund Report; 2008 CNRL Horizon Mine Annual Conservation and Reclamation Report; 2008 Imperial Oil Kearl Mine Annual Conservation and Reclamation Report

[253] Industry representatives, presenting at Peatnet Symposium: Reclamation and Restoration of Boreal Peatland and Forest Ecosystems, Mar 25-27 2010, Edmonton, AB

[254] Government of Alberta. 2010. News Release: ERCB approves Fort Hills and Syncrude pond plans with conditions. 23 April 2010. http://alberta.ca/home/NewsFrame.cfm?ReleaseID=/acn/201004/282012777C01C-9D59-9B31-78BF9F5F4EBE946B.html Accessed 4 July 2010.

Alberta Energy Research Institute report that outlined the costs per cubic metre of ore processed.[255] These costs did not include any earthmoving or revegetation costs. Therefore the $30-75,000 per hectare cost to reclaim land was also applied to tailings lakes. A contingency factor of 20% was added to the upper and lower bound estimates.

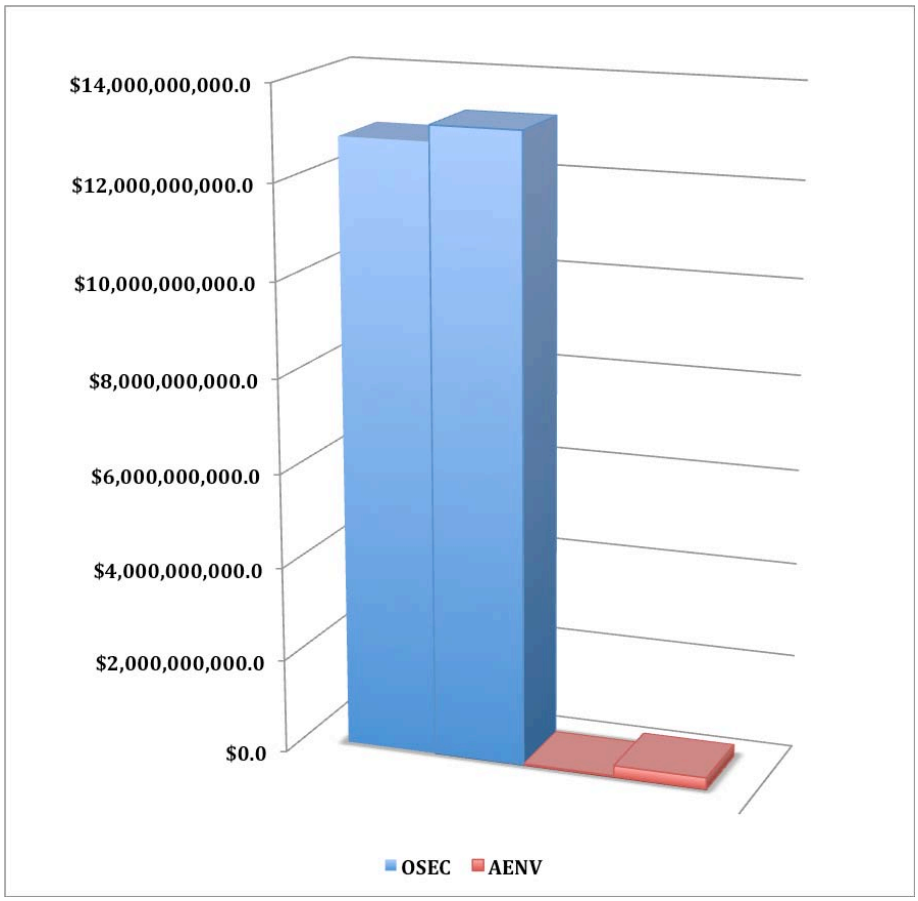
While not totally accepted by the policy community, given the uncertain and conservative estimates this analysis, a contingency factor of 20% was used. This figure is commonly used by the Government of Canada to calculate mine liability in Canada's North.[256]

Once the cost to reclaim land, remediate tailings and the contingency factor was used the estimate of total liability becomes $12.8 billion to $13.1 billion. Liabilities associated with pre-EPEA approval disturbance, processing and upgrader plant site remediation, sulphur and coke stockpiles, groundwater contamination from tailing lakes, post-operation maintenance and monitoring and post-reclamation certification are not included in the total liability estimate. Therefore it is reasonable to assume that these figures are very conservative. Compared to the total liability estimates using relationships derived from Alberta Environment data, there is a considerable discrepancy with the estimates derived from OSEC's analysis (Figure 12).

[255] $3.66 per cubic metre of ore processed. David Devenny, *A Screening Study of Oil Sands Tailings Technologies and Practices*, prepared for Alberta Energy Research Institute (March 2010), 26. http://eipa.alberta.ca/media/40991/part%20a%20final%20text.pdf

[256] Personal communication, Indian and Northern Affairs Canada, Water Resources Division Staff. 8 July 2010

Figure 12. High and low total liability estimates for Joslyn North Mine



Source: OSEC and Alberta Environment data.

From the proponent's application, it is uncertain if they have considered the full cost of treating tailings. The annual operating costs for the Project is estimated at $580 to $620 million (Section 15.3.2 (Page 15-5) Feb 2010 Project Update). However, OSEC has calculated the annual cost for processing tailings using thickening process to be $522 million.[257] Given the non-tailings management costs associated with operating a plant, it is reasonable to assume that the proponent has significantly underestimated the reclamation costs for the Project. This may potentially will cause the mine to a) re-evaluate their operating costs b) reclaim less tailings per year or c) find an lower cost alternative to thickening technology.

Based on the Project production estimates (Table 3.5-1 (Page 3-22) Feb 2010 Project Update), the total estimate royalties and corporate taxes accrued by the Government of Alberta and the Government of Canada by this mine is $10.5 billion (Section 15.3.4 Pg 15-6 Feb 2010 Project Update). If the proponent does not account for the significant financial liabilities of the Project and becomes insolvent, then the economic benefits accrued by the Government of Alberta and the Government of Canada will likely be lessened.

[257] Based on undiscounted costs of $3.66 per cubic metre of processed ore using tailings thickening with cyclones. Devenny, *A Screening Study of Oil Sands Tailings Technologies and Practices.*

4.6.6 Role of ERCB

In addition to the bonding policy with the Environmental Protection and Security Fund, the ERCB may require oil sands operators to, "Depending on the specific circumstances before the Board, proponents may be required to post performance bonds, make security deposits, establish internal or external accounts in which funds from revenue are deposited on an ongoing basis for reclamation and decommissioning, and obtain both third-party and environmental damage insurance coverage. In some cases, the Board may also ask that security instruments be provided by an applicant's corporate parent or affiliate."[258] However, under current policy, the ERCB does not collect security from oil sands mine operators.[259] If a oil sands mine become insolvent and files for bankruptcy, the ERCB draws from the Alberta Environment's EPSF to cover costs associated with the suspension, care and custody of the oil sands mine until a new mine owner can be sought.

4.7 Emergency Planning

TOTAL does not meet the Terms of Reference for demonstrating how they will reduce the effects or consequences of an accident or malfunction, in particular a tailings dam breach (asked in TOR and FEB 2010 AIR)

The Terms of Reference for the Project require "detailed plans, measures and systems to reduce the potential occurrence of an accident or malfunction should be considered in the assessment *and should indicate how they will reduce the effects or consequences of an accident or malfunctions* [emphasis added]."[260] This requirement was not adequately addressed in the February 2006 Integrated Application. The Joint Review Panel requested on Sept 18, 2008 more clarity on how TOTAL will address accidents or malfunctions. In particular, the JRP requested "information on plans, measures and systems to reduce the potential occurrence of an accident or malfunction. Indicate how these plans will reduce the effects or consequences of an accident or malfunction."[261]

In the February 2010 AIR Responses, TOTAL advises that "a catastrophic failure of the external dyke could result in a release of tailings to the surrounding area which, depending on failure location, could include the JCR channel and associated drainage features. However, given the conservative approach to tailings dyke design, the likelihood of a tailings area is remote" (page 24). In other words, the tailing dykes are over-engineered structures and are too well built to fail. TOTAL neglected, in this case, to address the question of how they could reduce the effects or consequences of an accident of a malfunction. They explained the preventative design features but did not explain what they would do if there was a tailing dyke breach.

The JRP found that the February 2010 AIR response was not sufficient and in the June 21st 2010 JRP Additional Information Request asked TOTAL for more detailed information on the

---

[258] True North Energy Company Decision, 2002-089, p 52.

[259] Personal communication, Alberta Energy Resources Conservation Board, Feb 2010. The only exception is in the case of pilot or demonstration oil sands upgraders (daily production capacity of 5000m^3 or less), where the ERCB relies on Licensee Liability Program described in Directives 001, 006 and 011.

[260] Joint Review Panel for Joslyn North Mine Project. Terms of Reference, Agreement to Establish a Joint Panel for the Joslyn North Mine Project. 8 August 2008. http://www.ceaa.gc.ca/050/documents/28321/28321E.pdf

[261] Joint Review Panel for Joslyn North Mine Project. Additional Information Request, 18 September 2008. http://www.ceaa.gc.ca/050/documents/28895/28895E.pdf

"estimated likelihood of each accident or malfunction type, the estimated frequency of occurrence, the duration, magnitude and spatial extent of the effects and whether or not the effects are reversible." TOTAL, in their July 27th, 2010 AIR response produced a table (Table 1-1) that used the following headings, "frequency of occurrence, likelihood of consequence, spatial extent of effects, magnitude of effects, duration of effects and reversibility of effects." Failure of tailing pond dykes was described in the July 27th 2010 response as disastrous in the local area but reversible in the long term. Disastrous is described as being fatal for more than 2 people, a lethal effects threshold above 99% and an irreversible effects zone above 999. There was no explanation given of what long term means beyond the persistence "beyond the life of the project but will diminish with time." Once again, there was no explanation on how TOTAL will mitigate the consequences of a tailing dyke breach after the accident has occurred.

Given the vague explanation of the 'disastrous' consequences and reversibility and the complete absence of how TOTAL will reduce the effects of consequences of a malfunction, despite repeated requests by the JRP for more information, OSEC recommends that the Project be denied unless TOTAL can disclose an emergency management plan that demonstrates they are capable of adequately responding to all of the potential accidents and malfunctions listed on Table 1-1 of the July 27th 2010 JRP AIR Responses (Pg 3-4).

4.8 Socioeconomic Issues

Rapid oil sands development in the Regional Municipality of Wood Buffalo has had and continues to have a direct and negative impact on the quality of life of residents. The shortage of health care professionals, increased traffic volumes, astronomical housing prices, increased crime and alcohol and drug abuse are but a few examples of a degraded fabric of life. Socioeconomic impacts are discussed in industry applications but the cumulative social impacts are not addressed and it is these cumulative impacts that residents have to deal with on a daily basis. The rate of development and the subsequent negative impacts has caused the Municipal government to intervene at hearings. Despite some investments in infrastructure from the Provincial Government from 2006 onwards, significant socio-economic impacts associated with oil sands development remain.

The Joslyn Mine represents the beginning of a third wave of development in the region, to be followed by other proposed new mines and expansions. For example, Shell's Jackpine Mine expansion and Pierre River Mine, UTS's Equinox and Frontier mines, and a several SAGD projects and expansions. TOTAL reports in its 2010 A1 Project Update, the Project will contribute to the following ongoing adverse effects on Fort McMurray:

- Inadequacy of public service systems such as schools and medical services, infrastructure, and housing to meet the needs of the rapidly growing population;
- Inadequacy of roads to handle the volume of traffic;
- Difficult in recruiting personnel and volunteers to provide public services.

TOTAL predicts that the onsite construction workforce is expected to peak at 4,100 workers in 2015, which would place an unacceptable strain on local services. TOTAL acknowledges that camp-based workers will have an effect on certain services in the region including the number of

visits to medical facilities, the demand on policing services, the demand for commercial services and participation in some social support programs.[262]

While Alberta has provided some additional financial support for public services and infrastructure in Fort McMurray, this has not been sufficient to address the accumulated deficit from the last wave of intensive growth. It is not sufficient to accommodate the extra population and traffic from the Project.

Because of the stressors being placed on the regional infrastructure and the hardships being placed on residents of Fort McMurray, OSEC submits any cumulative increase in the infrastructure deficit is not in the public interest. The mitigation measures outlined by TOTAL will not likely prevent a deterioration in socio-economic and quality of life indicators. Some specific examples of unresolved social impacts presented in the application and from regional data are presented below:

a. Housing

Housing continues to be a critical issue for the region. Housing costs continue to be well above provincial averages. The proponent notes the project is expected to result in housing demand of 345 to 410 units.[263] Table 6 and XX present information on housing costs in Fort McMurray

Table 6. Average apartment rental rates in Fort McMurray

	June 2009	June 2010
Bachelor suite	1448	1360
1 bedroom	1853	1666
2 bedrooms	2177	1980
3 bedrooms	2492	2245

Source: Fort McMurray Alberta Labour Market Information

While this shows a slight decrease in costs, the 2010 rates are still extremely high and are causing hardships for people who are working in the retail sector, or for not-for-profit agencies. Based on past experience, when a new project such as TOTAL's are approved and construction commences, housing costs increase.

Table 7. Average housing prices in Fort McMurray

	June 2009	May 2010	June 2010
Single family	626,851	657,532	683,748
Multi family	339,312	445,570	436,306

[262] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 15: Socio-Economic Assessment," February 2010, Subsection 15.5.3.

[263] TOTAL E&P Joslyn Ltd., "Joslyn North Mine Project, Section 15: Socio-Economic Assessment," February 2010, Subsection 15.5.2.

Duplex	464,284	535,396	539,719
Mobile Home	77,333	35,000	
Mobile with land	394,121	443,783	403,029

The average selling price of single family dwelling increased 3.2 % from April 2010 –May 2010 and increased 10.2 % from May 2009 to May 2010. The average selling price for 2006 was $459,140 and has increased to $656,209 in 2010.

b. Homelessness

Homelessness is an issue across the province and is a result of the overheated economy, the rate of population growth to support rapid development and the failure of the provincial government to plan for this growth.

The homeless situation, the underemployed and working poor numbers continue to increase within the RMWB. In 2006 the Housing need count found 441 people without a permanent residence. At this time Fort McMurray's shelter capacity was 188 beds. The homeless count for 2009 was 495 – which again is a one day snapshot of the homeless situation. People are still using tents and makeshift houses in the forest around Fort McMurray as housing.

To try to manage the situation the Wood Buffalo Housing and Development Corporation was formed. Their mandate is to "provide affordable housing and related services to senior citizens and low and middle income families living within the Regional Municipality of Wood Buffalo." The Corporation provides affordable rental units for qualifying working people –with a steady income. The available spaces for the working poor, the unemployed and the homeless are still well below the need. The Housing Corporation. has partnerships programs with the Municipality, the Catholic and Public School Districts, the Northern Lights Regional Health Authority and the RCMP. These organizations are also struggling to provide affordable housing for their employees. An RCMP officer just out of the Academy and posted to Fort McMurray qualifies for subsidized housing. Lower income people will suffer as a result of increased homelessness associated with the TOTAL Joslyn project

c. Crime and Public Safety

Crime statistics continue to rise in this booming economy. Fort McMurray recently saw 21 additional RCMP officers posted to the municipality. "Fort McMurray has certainly become an issue of concern... it's on our priority list" is a quote from Frank Oberle, Alberta's Solicitor General. The new officers represent a 15% increase in police numbers. Superintendent Kirke Hopkins head of the Fort McMurray detachment was quoted in a Globe and Mail article as saying "this is a marked increase. It'll allow us to focus on the organized crime activity that's occurring around Fort McMurray." The majority of the officers will work for the Alberta Law Enforcement Response Team (ALERT). Incremental increases in crime can be expected based on approval of the Project.

d. Transportation

Traffic in the RMWB has increased substantially due to oil sands developments and the increasing population. Highway 63 is the main route to and from Fort McMurray. The increasing volume of traffic due to the oil sands boom has resulted in serious transportation related

problems. Trucks carrying large equipment can delay traffic. Most of Highway 63 is two lane undivided highway with the exception of just a few kilometers south of and through Fort McMurray to roughly 25 km north of the city. The provincial government in 2006 announced it would begin twinning the entire 2 lane portion of the highway to a 4 lane divided standard. As of October 2009 only 16 km has been completed in the twinning process with another 17 km expected to be completed by the fall of 2011. This leaves 207 km without a timeline for completion. Between 2001 -2005, around 1000 crashes occurred on the highway with 25 killed and 257 injured. With the average cost/hospital bed for vehicle crashes at roughly $10,000/bed – the costs are significant. This does not include the emotional costs of the losses or the financial loss of family security.

While TOTAL has presented mitigation strategies to offset the effect of the cumulative traffic increase as a result of their project, such strategies to date have proven to be ineffective and increases in traffic can be anticipated.

e. Health Services

This project will further impact an already stressed health care system. The Health Authority is struggling to provide basic health care services to its expanding population and to the shadow population of workers. The Health Authority flies in emergency doctors on a rotational basis. Family doctors are difficult to find and wait times to a doctor's office can be long. People are using the emergency rooms for regular health care needs which is costly and ineffective.Despite the mitigation proposed by TOTAL increased strain on regional health services can be expected.

5. ATTEMPTS TO ADDRESS ISSUES DIRECTLY WITH THE PROPONENT

OSEC has met and otherwise communicated with TOTAL but was unable to resolve any of its concerns directly with Total. TOTAL was unable to enter into an agreement making its commitments enforceable by OSEC. OSEC has learned from past experience that non legally binding and enforceable commitments made by proponents in connection with obtaining regulatory approvals may not be honoured by proponents or enforced by the ERCB.

6. LIST OF APPENDICES

A. License of occupation

B. CV - Dr. Hansen

C. CV - Dr. Donahue

D. Alberta Environment, *Provincial Wetland Restoration/Compensation Guide* (2007) 2.

E. Alberta Water Council, *Recommendations for a New Alberta Wetland Policy* (2008).

F. Alberta-Pacific Forest Industries Inc. 2007. A15 Spatial Harvest Strategy- Mineable Oil Sands Area (MOSA). 15 Year Schedule (2006-2021).

G. Alberta-Pacific Forest Industries Inc. 2007. Alberta-Pacific FMA Area Timber Supply Analysis

H. Albian Energy Inc and the Oil Sands Environmental Coalition, Issues Resolution Document for the Muskeg River Mine Expansion Project (2006).

I. Bandaloop Landscape-Ecosystem Services,2005. *Natural Levels of Forest Age-Class Variability on the RSDS Landscape of Alberta*.

J. Bramley, M., Sadik, P., Marshall, D., 2009. Climate Leadership, Economic Prosperity – Final Report on an Economic Study of Greenhouse Gas Targets and Policies for Canada. Drayton Valley, AB and Vancouver B.C. the Pembina Institute and David Suzuki Foundation, pg. 4-5.

K. Bramley, Matthew. 2005. The Case for Deep Reductions, Canada's Role in Preventing Dangerous Climate Change, An Investigation by the David Suzuki Foundation and The Pembina Institute. Drayton Valley, AB and Vancouver, B.C., The David Suzuki Foundation and the Pembina Institute.

L. Canadian Boreal Initiative, Catching Up: Conservation and Biodiversity Offsets in Alberta's Boreal Forest (2008).

M. Crowe et al. *Effects of an industrial effluent on plant colonization and on the germination and post-germinative growth of seeds of terrestrial and aquatic plant species*. Environmental Pollution 117 (2002).

N. Cumulative Environmental Management Association, June 5, 2008. Letter to Government of Alberta announcing submission of Terrestrial Ecosystem Management Framework

O. Cumulative Environmental Management Association, March 2008, CEMA Data – SEWG Modeling and Facilitation Project Spatial Modeling Results, Disc 1-BC_DP, Disc 2-PA_DP, and Disc 3-BC_SP.

P. Cumulative Environmental Management Association. 2008. Backgrounder for the Terrestrial Ecosystem Management Framework. Fort McMurray, AB.

Q. Cumulative Environmental Management Association. 2008. CEMA announces plan to protect the Ecosystem in the Oil Sands Region. Press Release. Fort McMurray, AB.

R. Cumulative Environmental Management Association. January 2008. Letter to Government of Alberta, requesting temporary halt to tenure allocations in order to support conservation planning.

S. David Devenny. 2010. *A Screening Study of Oil Sands Tailings Technologies and Practices*. Prepared for Alberta Energy Research Institute, Contract Number 2008 0326.

T. Fay Westcott and Lindsay Watson, 2007. *End Pit Lakes Technical Guidance Document,* Prepared for the Cumulative Environmental Management Association End Pit Lakes Subgroup Project 2005-61.

U. Government of Alberta, "Water for Life," (2003).

V. Government of Alberta, Terms of Reference for Developing the Lower Athabasca Regional Plan, 2009.

W. Government of Alberta. 2008. Web: Managing Programs - Forest Management. Alberta Pacific Forest Products. Amended allowable cuts, Nov 2008.

X. Government of Alberta. 2008. The Landuse Framework. Edmonton, Alberta.

Y. Government of Alberta. March 7, 2008. Letter to CEMA regarding request to halt tenure allocations.

Z. Hansen et al. 2007. Dangerous human-made interference with climate: A GISS model studyAtmos. Chem. Phys., **7**, 2287-2312.

AA. Hansen et al., 2008. Target atmospheric CO_2: Where should humanity aim? Open Atmos. Sci. J., 2, 217-231.

BB. Hansen, Ruedy, Sato and Lo. 2010. (draft) Global Surface Temperature Change.

CC. Jennifer Grant, Simon Dyer and Dan Woynillowicz. 2008. *Fact of Fiction: Oil Sands Reclamation*, Calgary, AB: The Pembina Institute.

DD. McCullough, Raynolds, Wong. 2006. Carbon Neutral 2020 –A Leadership Opportunity in Canada's OilSands, Oilsands Issue Paper #2, Drayton Valley, AB. The Pembina Insitute.

EE. Nathan Lemphers. 2010. Toxic Debt: How Albertans May End Up Paying for Oil Sands Mine Reclamation. Calgary, AB: The Pembina Institute. (Forthcoming).

FF. Petro-Canada, Letter of agreement between Petro-Canada and the Oil Sands Environmental Coalition, 2007.

GG. Schindler, D.W. and Lee.P.G. *Comprehensive conservation planning to protect biodiversity and ecosystem services in Canadian boreal regions under a warming climate and increasing exploitation*. Biological Conservation 143 (2010).

HH. Severson-Baker, Chris et al. 2008. Taking the Wheel: Correcting the Course of Cumulative Environmental Management in the Athabasca Oil Sands Drayton Valley, AB: The Pembina Institute.

II. Silvatech Group 2008. Summary of Methodology for the Development of the Terrestrial Ecosystem Management Framework

JJ. Silvatech Group. 2008. Indicator Synthesis: Selection Rationale, Modelling Results and Monitoring Considerations for Key Indicators of the Terrestrial Ecoysystem Management Framework Prepared for: Sustainable Ecosystem Working Group of the Cumulative Environmental Management Association,

KK. Sustainable Ecosystems Working Group of the Cumulative Environmental Management Association 2008. The Terrestrial Ecosystem Management Framework.

LL. TOTAL E&P Joslyn Ltd. Letter to Government of Alberta stating conditional support for the Terrestrial Ecosystem Management Framework

MM. TOTAL. 2007. Biodiversity brochure.

NN. William Donahue, An Assessment of Water Quality, Sediment Quality, Benthic Invertebrates, and Hydrology of the Joslyn North Mine Project, 2010.

OO. World Health Organization, *Air Quality Guidelines for Europe*, Second Edition, WHO Regional Publications, European Series, No. 91, 2000.