



October 16, 2016

Comments on information deficiencies in Teck Resources Ltd.'s Environmental Impact Assessment, reference number 65505, for the proposed Frontier Oil Sands Mine Project from the Keepers of the Athabasca

The Keepers of the Athabasca finds that the information provided in support of Tech Resources comments for the proposed Frontier Oil Sands Project is insufficient to make an informed decision regarding the impacts of the development. Additional information requested is outlined below. In assessing the sufficiency of the information it is central to the Joint Review process to recognize the need to be precautionary in assessing the information provided.

The *Canadian Environmental Assessment Act (CEAA)* and Alberta's *Environmental Protection and Enhancement Act (EPEA)* contain sections that demonstrate the appropriateness of our application regarding the deficiencies of information present in Teck Recourses Ltd.'s current Environmental Impact Assessment, as well as the right of our organization to be involved in these proceedings.

Section 4 of *CEAA* sets out the 'purposes' of the *Act* which includes:

- 4 (1) (a) to protect the components of the environment that are within the legislative authority of Parliament from significant adverse environmental effects caused by a designated project;
- (b) to ensure that designated projects that require the exercise of a power or performance of a duty or function by a federal authority under any Act of Parliament other than this Act to be carried out, are considered in a careful and precautionary manner to avoid significant adverse environmental effects;

Section 4(2) of *CEAA* prescribes that no decision can be made without adequate information – which is currently in question. “The Government of Canada, the Minister, the Agency, federal authorities and responsible authorities, in the administration of this Act, must exercise their powers in a manner that protects the environment and human health and applies the **precautionary principle**”.

With regard to *EPEA*, section 2 sets out the purpose of the *Act*, which is "... to support and promote the protection, enhancement and wise use of the environment..." This includes specific reference to:

“(c) the principle of sustainable development, which ensures that the use of resources and the environment today does not impair prospects for their use by future generations;
(d) the importance of preventing and mitigating the environmental impact of development and of government policies, programs and decisions;
(e) the need for Government leadership in areas of environmental research, technology and protection standards;”

Information Deficiencies

1. Tech Resources Ltd should provide a set of financial estimates of profitability for the proposed Frontier Oil Sands Project, measured to a range of prices of oil; both the ‘business as usual’ estimates, and also estimates for a carbon constrained future.

The Terms of Reference for the Environmental Impact Assessment state:

*[A] The summary report shall provide an overview of the EIA report including: a) the Project components and development activities which have the potential to affect the environment; b) existing conditions in the Study Area, including existing uses of land, resources and other activities which have potential in combination with proposed development activities, to affect the environment; c) the environmental, cultural and **socio-economic impacts** of the Project including the regional, temporal and cumulative effects which are anticipated; d) impact significance in terms of magnitude, extent, duration, frequency and reversibility; e) proposed environmental protection plans, mitigation measures and monitoring; f) residual effects; and g) an overview of modeling techniques used.*

The Terms of Reference for the Joint Review Committee do not directly address financial implications of the project, however, they do state:

As per section 19(1) of CEAA 2012, the assessment shall include a consideration of the following factors:

f) the purpose of the project;

In a letter from Teck Resources Ltd. announcing the Project Update to *EPEA* Application No. 001-247548, *Water Act* File No. 303079, *CEAA* Reference No. 65505 and *ERCB* Application No. 1709793, on June 15, 2015, on page 2, the second last bullet states:

- Royalties, income and taxes – over its lifespan, the Project is estimated to contribute over \$54.2 billion in provincial royalties and taxes, while the federal government is estimated to receive \$11.8 billion by way of corporate income and capital taxes. Annual municipal property taxes are estimated at \$68 million at first oil, increasing to \$94 million at maximum build out.

Considering that making money from oil sands operations is surely the purpose of the project, Keepers of the Athabasca identify these estimated contributions as having potential for an information deficiency. Given today's price of \$34.76 per barrel for WCS, well below the breakeven point for such extreme oil extraction, and the price at the time of the 2015 update and used for calculations was possibly over \$50 per barrel for WCS, it is likely these calculations will have to be revisited.

In a different location in the update document, the lifetime estimate was “\$66 billion (\$2014), of which an estimated 17% will accrue to the federal government, 77% to Alberta in royalties and taxes and 6% to the local municipality” (page 1 – 19 of the June 2015 update, section 1.4 Project Justification). During the year 2014, oil prices fell from over \$110/barrel to under \$60/barrel¹. As we don't know when these calculations were carried out during 2014, again, we identify this as an information deficiency. Considering that other large oil extraction companies have been asking all levels of governments for tax relief in 2016, and even though Teck Resources Ltd. has recently risen above 'junk bond' status, the potential for lesser Royalties, income, and taxes than stated remains. In today's world in which climate change is advancing, while carbon emissions are being carefully constrained by various levels of government, financial effects may well be felt, and should be expressed.

Also, the potential for a huge cost to Canadian society in case of extraordinary financial stress to Teck Resources Inc., and their potential insolvency, needs to be introduced.

2. Teck Resources Ltd. should provide an analysis on various climate mitigation scenarios and the implications for the socio-economic analysis of the project. In addition, Teck Resources Ltd. should provide a plan for full containment of tailings from the beginning of operations.

The Terms of Reference for the Environmental Impact Assessment state:

[A] The summary report shall provide an overview of the EIA report including: a) the Project components and development activities which have the potential to affect the environment; b) existing conditions in the Study Area, including existing uses of land, resources and other

¹ https://ycharts.com/indicators/average_crude_oil_spot_price

*activities which have potential in combination with proposed development activities, to affect the environment; c) the environmental, cultural and socio-economic impacts of the Project including the regional, temporal and **cumulative effects** which are anticipated; d) impact significance in terms of magnitude, extent, duration, frequency and reversibility; e) proposed environmental protection plans, mitigation measures and monitoring; f) residual effects; and g) an overview of modeling techniques used.*

The Terms of Reference for the Joint Review Panel state (page A5):

*The Joint Review Panel will also consider any change to the project that may be caused by the environment. The Joint Review Panel will consider environmental changes and hazards that may occur and may affect the project. The Joint Review Panel should also take into account the potential influence of **climate change scenarios** presented by the Proponent and **other interested parties** on climate parameters (e.g. precipitation, temperature), and physical environmental processes. The Joint Review Panel shall consider the influence that these environmental changes and hazards may have on the project as predicted and described by the Proponent and interested parties.*

Section 6.2 of the June 2015 Frontier Mine Oil Sands Project update states many objectives for the management of tailings, including the following:

- ensuring containment stability, including all dams, throughout construction, operations and closure
- minimizing and eventually eliminating long-term storage of fluid tailings in the reclamation landscape
- ensuring that adequate tailings containment and operational contingency space exists so that operations are not impaired
- timely availability of geotechnically competent structures to contain fluid tailings

These objectives listed in section 6.2 are simply not safely achievable considering today's cumulative effects, as defined in the 'Operational Policy Statement Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012*', as well as the 'Technical Guidance for Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012*. We urge Teck Resources Ltd. to consider full containment of tailings from the proposed start of operations instead of phasing in full containment over time. A description of full containment of tailings in tanks, potentially utilizing renewable energy, and including scrubbers in order to prevent aerial emissions while drying, is not included in the Environmental Impact Assessment, or any of the updates.

Additionally, as extreme storms continue to wash the landscape, any tailings deposited in ponds, dams, pit lakes, or otherwise utilizing at least partially earthen berms, represent a risk to the

environment. When the containment of tailings is purely geotechnical, climate change may provide risks that are not included in the Environmental Impact Assessment.

Keepers of the Athabasca recognizes that cumulative effects on the environment, and on the health of communities upstream from the proposed Project are already severe. The results of new studies showing current aerial particulate emissions between 40 and 110 tonnes per day of oil sands operations², and the fact that these aerial emissions are shown to be emitted from tailings ponds, as well as other components of oil sands operations³. These emissions have not been fully considered in Teck Resources Inc.'s Environmental Impact Assessment. A comprehensive study of known bile duct cancer clusters in communities north of the project has still not been completed (addressed elsewhere in this document).

With the large amount of predominantly hydrocarbon emissions falling on the forest around the oil sands region, a new topic of interest is whether these ongoing and cumulative emissions make the forest even more flammable. We identify forest flammability, as related to climate change and aerial emissions, as another area of deficiency in Teck Resources Inc.'s Environmental Impact Assessment.

3. Tech Resource Ltd should provide an analysis of how climate change can impact water withdrawals, and affect Treaty Rights

The Terms of Reference for the Environmental Impact Assessment state:

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The Terms of Reference for the Joint Review Panel state (page A5):

² <http://thetyee.ca/News/2016/05/30/Oilsands-Smog-Levels/>,
<http://www.metronews.ca/news/canada/2016/05/25/study-traces-organic-aerosol-air-pollution-to-oilsands-production.html>

³ <http://boereport.com/2016/08/19/gassy-ponds-may-hold-key-to-albertas-oil-sands-emissions-battle/>

*The Joint Review Panel will also consider any change to the project that may be caused by the environment. The Joint Review Panel will consider environmental changes and hazards that may occur and may affect the project. The Joint Review Panel should also take into account the potential influence of **climate change scenarios** presented by the Proponent and **other interested parties** on climate parameters (e.g. precipitation, temperature), and physical environmental processes. The Joint Review Panel shall consider the influence that these environmental changes and hazards may have on the project as predicted and described by the Proponent and interested parties.*

And also:

*The Joint Review Panel shall consider: • Evidence presented concerning any likely project effects to asserted or established Aboriginal or treaty rights, such as: o **Any potential effects on current uses of lands and resources by Aboriginal persons for traditional purposes**; o Any effects (including the effects related to increased access, fragmentation of habitat and **displacement of the exercise of traditional activities**) on hunting, fishing, trapping, cultural and other traditional uses of the land (e.g. collection of medicinal plants, use of sacred sites), as well as related effects on lifestyle, culture, health and quality of life of Aboriginal persons; o Any effects of alterations to access into areas used by Aboriginal persons for traditional uses; o Any adverse effects of the project on the ability of future generations to pursue traditional activities or lifestyle; ...*

Regarding water withdrawals from the Athabasca River, section 6.2 of the June 2015 Frontier Mine Oil Sands Project update states as an objective:

- limit total make-up water withdrawals from the Athabasca River and restrict intake during the river low-flow periods in accordance with the Surface Water Quantity Management Framework for the Lower Athabasca River (SWQMF), that was released concurrently with the TMF

Keepers of the Athabasca notes the lack of reference to river flow as impacted by climate change, and by upstream users. Considering that Traditional land users in the north can no longer access many areas they need to be able to hunt and fish, that boats have grounded the past two summers in Lake Claire, and that concerns have been raised about this lack of water flow by ourselves, at least five local First Nations, and by the Treaty 8 Organization of Alberta, we are surprised not to see any mention of the impacts of climate change, or the addition of the many new upstream users of the water in the Athabasca River, in the Environmental Impact Assessment relating to the proposed Frontier Mine Oil Sands Project. The lack of consideration for Traditional land users who have gotten their boats stuck in Lake Claire and Lake Athabasca the past two years (this current generation!) is also a deficiency in Teck Resources Ltd.'s Environmental Impact Assessment. Modeling should be provided to cover seven generations.

4. Teck Resources Ltd should provide an alternative tailings management plan, other than tailings ponds or centrifuges

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The Terms of Reference for the Joint Review Panel state:

*In considering the environmental effects of malfunctions or accidents that may occur in connection with the project, the Joint Review Panel should include potential malfunctions or accidents associated with the following components: • **tailings management**; • waste management and disposal; • use, handling or spills of chemicals and hazardous materials on-site; • the increase in road traffic, and the risk of road accidents; and • **any other project components or systems that have the potential, through accident or malfunction, to adversely affect the natural environment**. The Joint Review Panel should consider the **likelihood of occurrence of a malfunction** or an accident and the sensitive elements of the environment (e.g. communities, homes, natural sites of interest, areas of major use) that may be affected in the event of any such malfunction or accident. **Plans, measures and systems to reduce the potential occurrence of a malfunction or accident should be considered** in the assessment and should indicate how they will reduce the effects or consequences of any such malfunction or accident.*

The Terms of Reference for the Joint Review Panel also state:

The Joint Review Panel shall conduct an assessment of the environmental effects of the project referred to in the Scope of the Project (Part 1) in a manner consistent with the requirements of CEAA 2012, REDA, EPEA, the Oil Sands Conservation Act and these Terms of Reference. As per section 19(1) of CEAA 2012, the assessment shall include a consideration of the following factors:

g) alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;

Although the Tailings management objectives (section 6.2 of the 2015 Frontier Mine Oil Sands Project update) state that tailings will be managed by “adopting proven technologies that will lead to predictable operating outcomes”, section 6.4.1 (Overview of the Tailings Management Plan) states:

- Fine tailings that are not captured in CCT, SFT or FTT deposits will be managed using centrifuges.

Keepers of the Athabasca note that the only ‘commercially viable’ centrifuges are apparently operated by Syncrude at a \$1.9 billion plant with 18 centrifuges, which plant is not mentioned on Syncrude’s website, in fact more information exists on “innovation in co-mixing” as an innovation in tailings management than on centrifuges. Pilot projects for centrifuges have been undertaken by Shell and Newalta with smaller versions of the centrifuge concept. Considering the high cost, both financially, and in terms of energy use, of centrifuge technology, we are not surprised that more centrifuges do not presently exist. Without additional information, we flag the concept of centrifuge use for tailings management as costly, energy intensive, and not necessarily a “proven” technology.

“ evaluations of centrifuge performance to capture water from the clay and silt tailings (mature fine tailings) components demonstrated some success but, at the time, at unacceptable costs ⁴”

Keepers of the Athabasca recommend that Teck Resources Ltd. consider full containment for all tailings, including potentially utilizing renewable energy to dry tailings while they are fully contained. We identify a lack of any description of full containment for tailings to be a deficiency in Teck Resources Ltd.’s Environmental Impact Assessment.

5. Tech Resources Ltd should provide an analysis of contaminants larger than PM2.5, more insight into the proven health impacts on downstream communities, and how they propose not to exacerbate these impacts.

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⁴ 2009R.J. Mikula (Natural Resources Canada, CanmetENERGY) | V.A. Munoz (Natural Resources Canada, CanmetENERGY) | O. Omotoso (Natural Resources Canada, CanmetENERGY)

terms of magnitude, extent, duration, frequency and reversibility; e) proposed environmental protection plans, mitigation measures and monitoring; f) **residual effects**; and g) an overview of modeling techniques used.

The Terms of Reference for the Joint Review Panel state:

*In considering the environmental effects of malfunctions or accidents that may occur in connection with the project, the Joint Review Panel should include potential malfunctions or accidents associated with the following components: • tailings management; • waste management and disposal; • use, handling or spills of chemicals and hazardous materials on-site; • the increase in road traffic, and the risk of road accidents; and • **any other project components or systems that have the potential, through accident or malfunction, to adversely affect** the natural environment. The Joint Review Panel should consider the likelihood of occurrence of a malfunction or an accident and the sensitive elements of the environment (e.g. **communities, homes, natural sites of interest, areas of major use**) that may be affected in the event of any such malfunction or accident. Plans, measures and systems to reduce the potential occurrence of a malfunction or accident should be considered in the assessment and should indicate how they will reduce the effects or consequences of any such malfunction or accident.*

After 55 pages of in dept analysis of health risks, the Environmental Impact Assessment states:

2.9.1 Exposure and Health Effects Studies The Alberta Oil Sands Community Exposure and Health Effects Assessment Program was a joint industry, government and community initiative that was established to investigate possible links between air quality and human health outcomes in the Fort McMurray region (AHW 2000). Results from the AHW (2000) study showed that: • Chemical air concentrations were generally low in the Fort McMurray region, compared to air quality guidelines, regardless of whether they were measured indoors or outdoors. • Air concentrations were not significantly different in Fort McMurray compared to the reference location (Lethbridge, AB), despite the high degree of oil and gas development in the Fort McMurray region. • No significant differences in health status were found between Fort McMurray and Lethbridge regarding physician visits or prevalence of disease.

Keepers of the Athabasca notes that these studies date from 2010, and do not include the most up to date information.

While the Environmental Impact Assessment quotes a further study:

Kindzierski et al. (2010) conducted a trend analysis of air quality data between 1998 and 2007 from WBEA. Through their analysis, Kindzierski et al. (2010) concluded that “there is little or no pattern to the changes in concentrations of various air pollutants across the oil region over the past 10 years.” The authors noted increasing hourly concentrations of nitrogen oxides at the Fort McMurray Patricia McInnes and Fort McKay ambient monitoring stations. In contrast,

decreasing hourly concentrations were observed for PM2.5 at all of the community air monitoring stations (Fort McMurray, Fort McKay and Fort Chipewyan). No trends were apparent for any of the other chemicals.

Keepers of the Athabasca would like to point out that even this study uses out of date information to tell us that nothing has changed, when more recent information show this is not the case⁵.

While PM2.5 is quoted, particulate matter sized over 5 microns has wrongly been left out of any human health impact analysis thus far. Why has particulate matter larger than 5 microns not been considered? Petcoke—coke dust—has been identified as a major airborne pollutant from existing mining operations. These particles—10 microns and larger—contain among the highest concentration of Polycyclic Aromatic Hydrocarbons (PAHs), known to be the most carcinogenic of any of the airborne toxins. Unfortunately, no studies have been undertaken to determine if there has been an impact on humans. The Frontier mine appears to be no different than the others in terms of production of coke dust. We identify this inclusion of data only up to PM2.5 as a data deficiency in Teck Resources Ltd.'s Environmental Impact Assessment.

Teck proposes to continue using the established air monitoring system as per WBEA. This so-called “world class monitoring system” has been revealed to be flawed, its monitors requiring the air intake to be filtered prior to testing. This is in sharp contrast to the monitors utilized by Environment Canada at Fort McKay. The results of air analysis from the Environment Canada monitoring are of great concern, and their methods are more stringent than WBEA. Teck Resources Ltd should provide modeling using the most accurate monitoring techniques possible.

Additionally, the Environmental Impact Assessment states:

In February 2009, the Alberta Cancer Board (ACB) published a study on the incidence of cancer in Fort Chipewyan. The study was completed in response to concerns from a local physician and the community that cancer rates appeared to be higher than expected in Fort Chipewyan. A cluster investigation was conducted based on the guidelines from the U.S. Centre for Disease Control and Prevention. Specifically, the purpose of the study was to determine if there was an elevated rate of cholangiocarcinoma (a rare cancer of the bile duct) and whether there was an elevated rate of cancers overall in Fort Chipewyan, based on data observed in the community from 1995 to 2006.

- overall cancer rate was higher in Fort Chipewyan than expected ...
- cancers of the blood and lymphatic system, biliary tract and soft tissue were higher than expected ...

⁵ <https://www.thestar.com/news/canada/2016/09/21/air-quality-problems-found-around-albertas-first-nation-oilsands-community-study.html>

The Alberta Cancer Board concluded in 2009 that the overall cancer rate in communities north of Fort McMurray was 30% higher than expected⁶. While Health Canada denied this at the time, the Alberta Cancer Board (now dissolved) commented in 2009 that northern communities were wrongly told that the cancer rate was normal.

Since that time, cancer numbers have continued to climb. The Alberta Cancer Board recommended a comprehensive health study be done, based on their findings, and both Alberta and Canada accepted this as a necessity. The Scientific Committee was formed, and after a year of putting terms of reference together, disbanded. The insistence by the Chair of the Scientific Committee that industry representatives be part of a 'Management Oversight Committee' on any health study cause some of the Committee to walk away. This Chair, Dr. Brent Friesen, was simultaneously the Health and Environmental Advisor to the Oilsands Developers' Group (which he did not disclose), and Medical Officer of Health for the region.

In addition to Human Health not being listing explicitly in the Terms of Reference (a cause for concern about the Canadian Environmental Assessment process), it is extremely concerning that Teck Resources Ltd.'s Environmental Impact Assessment for the proposed Frontier Oil Sands Project, which includes a Human Health Risk Assessment, generally concludes that there is no significant risk to human health. This inference is reached despite the many "red flags" raised around scientifically-proven adverse environmental effects, and a lack of any human health studies downstream of the already very large oil sands development infrastructure. Despite repeated promises and commitments, there has still not yet been a comprehensive study of the bile duct cancers at Mikisew Cree Nation, and other noted health effects. This Environmental Impact Assessment represents a dismissal of the tangible known health issues, including the findings of the Alberta Cancer Board on downstream cancer rates in 2009. Keepers of the Athabasca identify known health issues to be an information deficiency in Teck Resources Ltd. Environmental Impact Assessment for the proposed Frontier Mine Oil Sands Project.

⁶ <http://www.cbc.ca/news/canada/edmonton/fort-chip-cancer-rates-higher-than-expected-report-1.796418>