Oil Sands Environmental Coalition

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10 January 2014

Canadian Environmental Assessment Agency
Attention: Pierre River Mine Joint Review Panel Secretariat
160 Elgin Street, 22nd Floor,
Ottawa, ON
K1A 0H3

Re: November 7th invitation for public comments on additional information for the Pierre River Mine Project, CEAA reference number: 59539.

Dear Pierre River Mine Review Panel,

I am writing to you on behalf of the Oil Sands Environmental Coalition (OSEC) regarding the proposed Shell Canada Pierre River Oil Sands Mine Project (herein referred to as the Project).

As stated in our Statement of Concern,[1] OSEC has ongoing concerns regarding the Project's impacts to wildlife, greenhouse gas emissions, air emissions, water issues, and terrestrial impacts. However, there are eight broad areas where the information submitted by Shell Canada does not provide sufficient evidence to stakeholders regarding the mitigation of the Project's adverse effects: air exceedances, greenhouse gas emissions, economic viability of the project, tailings management, end pit lakes with mature fine tailings, aquatic health and terrestrial and wildlife impacts. OSEC respectfully asks that the Project proponent address the questions provided below.

Mitigation of air exceedances

Section 3, SIR 5, and Appendix 3.2 Section 5.0
Shell identifies that there are AAAQO exceedances for $PM_{2.5}$ exceedances at five receptor locations in the base case. Shell indicates that "these exceedances are mainly due to existing and approved projects in the region and there are minimal increases" due to the Project. Shell's response also identifies that community 24-hour $PM_{2.5}$ predication was rated as a high environmental consequence at the Cabin J station.

Questions:

1. Given the expectation that $PM_{2.5}$ emissions at five receptor locations are increasing above the AAAQO, please describe the mitigation activities (further to those

[1] OSEC Statement of Concern as filed October 2, 2008. CEAA registry, Pierre River Mine Project, document 15. Retrieved at: http://www.ceaa.gc.ca/050/documents/46966/46966E.pdf

identified in Shell's application that are already considered in these results) that Shell will take to mitigate emission impacts and assist in meeting the AAAQO for $PM_{2.5}$ as development in the region proceeds.

2. What temporary management actions is Shell considering during periods of exceedance due to non-industrial emissions or weather conditions? (i.e. forest fires, temperature inversions, etc.)
3. Please explain why only the result from the community 24-hour $PM_{2.5}$ prediction at the Cabin J station was considered to be a high environmental consequence while results from the Fort McKay, Fort McMurray, Cabin K, and Oil Sands Lodge stations are showing similarly high $PM_{2.5}$ predictions above the AAAQO (Appendix 3.2, Table 5.7-1)?
4. Section 5.7 of appendix 3.2 states that the 98th percentile 24-hour $PM_{2.5}$ concentrations are below the Canada-wide standard for all communities except at the fenceline, however Table 5.7-1 shows that there are five exceedances of the AAAQO in the base case and six exceedances in the planned development case. Why has only the Canadian-wide standard and not the AAAQO been referenced in section 5.7 when the terms of reference indicate to discuss the "predicated air quality concentrations compared with the appropriate air quality guideline"[2] used to infer the Projects impact? Since Alberta Environment and Sustainable Resource Development indicate that "all industrial facilities must be designed and operated such that the ambient air quality remains below Ambient Air Quality Objectives"[3], and Shell has clearly demonstrated that the facility design will not maintain air quality below the AAAQO, how will Shell mitigate these emissions to maintain air quality?

Economic viability of the project

Section 3, SIR 1

Crude oil demand/supply information is referenced as being obtained from the Canadian National Energy Board and the United States Energy Information Administration. This information is provided in Table 1-1 of the response to *SIR 1(a)* and appears to be inconsistent, in places, with the cited sources.[4] It also appears that Shell does not consider alternative scenarios, or risks to the projections of overall Canadian and North American

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[2] Draft Terms of Reference for the Shell Canada Limited Jackpine Expansion & Pierre River Mining Areas. Section 5.4.1, part j on page 15. Available at: http://www.ceaa-acee.gc.ca/050/documents/46920/46920E.pdf

[3] Alberta Environment, Alberta Ambient Air Quality Objectives and Guidelines Summary, August 2013, http://environment.gov.ab.ca/info/library/5726.pdf.

[4] For example, in the response to *SIR 1(a)*, line 1 of Table 1-1, *US Crude Oil Production*, lists the following production numbers: 9.7 millions of barrels crude oil per day (mmbd) in 2010, 13.1 mmbd in 2020 and 11.7 mmbd in 2030. Referring to the appendices of the U.S. Energy Information *Annual Energy Outlook 2013*, Table A11 lists domestic crude oil production in the US as 5.47 mmbd in 2010, 7.47 mmbd in 2020 and 6.30 mmbd in 2030. Source: U.S. Energy Information Administration, *Annual Energy Outlook 2013 with Projections to 2014, Appendix A: Reference case* (2013), Table A11, http://www.eia.gov/forecasts/aeo/pdf/appa.pdf

crude oil supply and demand, which may impact the economic viability of the investment.

The projected primary energy demand data, provided in Table 1-2 of the response to *SIR 1(b)*, is reported to be from Shell's "Signals and Signposts" publication. This information is used to establish the short- and medium-term role of liquid hydrocarbon fuels in relation to the role of alternative energy sources. As noted by Shell in its response to *SIR 1(b)*, ". . . *these forecasts are necessarily based on many assumptions and therefore subject to change and interpretation.*" However, Shell does not elaborate on what these assumptions are and their current relevance, particularly given a growing transition towards clean energy alternatives as countries take action to address climate change.

Questions:

1. Please clarify the exact reference source for all U.S. data in Table 1-1, provided in Shell's response to *SIR 1(a)*, and explain how it relates to the data in Table 1 below, which is obtained from Appendix A: Reference case of the U.S. Energy Information Administration's "Annual Energy Outlook (AEO) 2013 with Projections to 2040."

	2010	***2020***	***2030***
	Millions of barrels crude oil per day		
Domestic Crude Oil Production	5.47	7.47	6.30
Net imports	9.17	6.82	7.36
Consumption	19.17	19.84	19.04
Bitumen	1.65	3.00	3.95

Table 1: U.S. Crude Oil Production, Reference Case Scenario: Net Imports & Consumption, 2010 – 2030[5]

2. The U.S. Energy Information Administration's AEO 2013 reports expected demand and supply statistics for various scenarios. It is assumed that Shell is reporting numbers from the AEO 2013 Reference case scenario, as this is the only scenario reported in the AEO 2013 Early Release, which Shell cites. Please explain the rationale for reporting numbers only from the Reference case, which generally assumes current laws and regulations affecting the energy sector will remain unchanged over the forecast period. How does consideration of other scenarios from the full AEO 2013 report, as encouraged by the AEO authors,[6] impact expected U.S. demand for oil, and the expected economic viability, of the Project?

[5] U.S. Energy Information Administration, *Annual Energy Outlook 2013 with Projections to 2014, Appendix A: Reference case* (2013), Table A11 and Table A21
http://www.eia.gov/forecasts/aeo/pdf/appa.pdf

From the AEO2013 Early Release Overview: "Readers are encouraged to review the full range of cases that will be presented when the complete *AEO2013* is released in early 2013, exploring key

3. Please clarify the exact reference source for the data line *Total Canadian Crude Oil Production* in Table 1-1, and explain how it relates to the data in Table 2 below, which is also obtained from the National Energy Board's 2011 Crude Oil outlook report.

	2010	***2020***	***2030***
	Millions of barrels crude oil per day		
Total Canada Oil Production	2.98	4.51	5.66

Table 2: Canada Oil Production, 2010-2030[7]

4. The National Energy Board identifies the risk of cost inflation and labour shortages as uncertainties around its outlook.[8] How is the economic viability of the Project impacted by these risks?
5. The National Energy Board released an updated energy outlook in November 2013. Please advise whether any of the data reported in Table 1-1 has changed in the new outlook, and if this impacts the economic viability of the Project.
6. Please provide the year of publication for Shell's "Signals and Signposts" report and a current hyperlink to the source for Table 1-2 (Appendix 2 of "Shell Energy Scenarios to 2050: Signals & Signposts"), provided in Shell's response to *SIR 1(b)*.
7. Please summarize and provide a brief justification for the assumptions behind Shell's "Signals and Signposts" forecast and the projected primary energy demand data in Table 1-2.
8. What is Shell's methodology for forecasting primary energy demand by energy type and is it consistent with the methodology used by other organizations? Is there a comparator that supports the numbers forecast by Shell?

Section 3, SIR 2

Shell states that it "has a responsibility to the people of Alberta to develop the PRM resource in a timely and efficient manner," and that "the Pierre River Mine will achieve the purpose of maximizing the value of the resource and providing a supply of bitumen as a source of energy products, for the benefit of Shell's shareholders, Albertans and the broader public." Shell fails to provide evidence supporting the claim that the current production path will maximize the value of the resource. In particular, it does not address the possibility of cost inflation and

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uncertainties in the Reference case." Source: U.S. Energy Information Administration, "AEO2013 Early Release Overview" (2012), 1. http://www2.hmc.edu/~evans/AEOearly2013.pdf

[7] National Energy Board, *Canada's Energy Future: Energy Supply and Demand Projections to 2035* (2011), Source data for Figure 4.6, http://www.neb-one.gc.ca/clf-nsi/rnrgynfmtn/nrgyrprt/nrgyftr/2011/nrgsppldmndprjctn2035-eng.html

National Energy Board, *Canada's Energy Future: Energy Supply and Demand Projections to 2035* (2011), 25. http://www.neb-one.gc.ca/clf-nsi/rnrgynfmtn/nrgyrprt/nrgyftr/2011/nrgsppldmndprjctn2035-eng.pdf

labour shortages. These have been identified as risks for all new oilsands projects given the large number of projects in the construction and planning phase.[9] If realized, these risks will reduce the value of the PRM resource (and other resources in the oilsands region) to Albertans and Shell's stakeholders. Shell also fails to address how the proposed PRM extraction path may impact the value of other resources to Albertans.

Questions:

1. Please describe the criteria and analysis used to conclude that the current proposed development plan for the Project maximizes the value of the resource to Albertans.
2. Please provide analysis on expected royalties to Albertans over the life of the Project when following the currently proposed development path, versus following a development path that delays extraction of the resource for 20 years. For both scenarios please provide an assessment of potential cost over-runs and an estimate of the payback period.
3. What is the projected per barrel supply cost of the Project? How does the per barrel supply cost compare to per barrel price projections for the PRM resource?
4. What are the key inputs required by Shell in the construction and operation phase of the Project? Please describe how Shell plans to secure inputs at minimum cost in increasingly constrained input markets.
5. Please provide a market analysis that considers how Shell's demand for inputs fits into the broader market. For example, what per cent of the oilsands labour force in the Fort McMurray area will the Project employ? What is the forecasted impact of Shell's demand on input market prices in the Fort McMurray area?
6. Please provide an estimate of the number of required overseas foreign workers for the Project during the construction and operation phase. Does this estimate change if the Project is delayed 20 years?
7. Please provide an estimate of reclamation costs for the Project. What steps are being taken to ensure the costs of reclamation do not fall on Albertans?
8. Albertans derive value from a healthy environment, as indicated by clean air, clean water and biodiversity. What is the impact on regional environmental indicators from delaying the Project or staging it more slowly?

Impact to Climate Change

EIA Volume 3, Sections 3.4.8.3 and 3.4.8.4

Shell identifies that one of their greenhouse gas management principles is to include a cost of carbon in the evaluation of all projects[10]. Shell also indicates that the estimated greenhouse

[9] National Energy Board, *Canada's Energy Future*, 25.

[10] Environmental Impact Assessment: Volume 3: Air Quality, Noise and Environmental Health, Section 3.4.8.3, page 3-103.

gas emissions from the Project while operating is 2,252,500 tonnes CO2e annually (without the asphaltene-fired cogeneration unit)[11]. This represents an increase in total Alberta emissions of 0.9 per cent and an increase in mining, oil and gas extraction emissions of 7.7 per cent compared to 2011 emission levels as reported in the Canadian National Inventory Report 1990-2011.

Questions:

1. What was the cost of carbon that was included for evaluation of the Project economics?
2. Please explain how the additional emissions from the Project are consistent with Alberta and Canada's stated climate change objectives, and how Shell intends to mitigate the emissions from the Project to be consistent with Alberta and Canada's climate change objectives.

Tailings management plan

Section 3, SIR 16

In both the initial environmental assessment and subsequent SIR filings, Shell states that the Project will comply with Directive 074 targets and timelines. Shell asserts that the Project will meet the intent of the Directive's fines capture requirements by deploying a thickened tailings (TT) technology and a non-segregating tailings (NST) technology as the primary fines management technology for managing its waste tailings product. These two technologies will be employed in concert with other emerging technologies options, should they prove feasible and economic. Two other options under consideration include Atmospheric Fines Drying (AFD) and centrifugation. Despite continued financial investment in tailings technology sector, there are currently no examples of commercial-scale oilsands facilities complying with Directive 074.[12]

Questions:

1. Please provide commercial evidence to support the claim that TT, NST, and other tailings technologies can be combined to meet the 50 per cent fines capture requirement outlined in Directive 074. Please provide a technical discussion outlining why and how Shell can meet these requirements in the absence of any industry evidence supporting this claim.
2. Please provide specific, commercial-scale evidence to support the claim that DDA trafficability requirements will be met within the Directive's time frame.

Section 3, SIR 16, response d) part i)

Shell states "In 2012, the AFD program exceeded the annual target of 1Mt of fines capture by

[11] Ibid, Section 3.4.8.4, Page 3-107.

[12] For further discussion on industry tailings performance, see: Energy Resource Conservation Board, *2012 Tailings Management Assessment Report: Oil Sands Mining Industry,* June 2013. http://www.aer.ca/documents/oilsands/tailings-plans/TailingsManagementAssessmentReport2011-2012.pdf

utilizing the opportunity areas in front of the mine advance, as well on available beach space on top of the External Tailings Facility (ETF)."

Questions:

1. Given that Shell currently employs AFD at its Muskeg River Mine (MRM) facility, please clarify the above comments in relation to the MRM annual tailings performance report. Specifically, please address the Alberta Energy Regulator's (AER) concerns cited on page 8: "*For the 2010/2011 reporting period, Shell had a lower-than-expected fines capture performance* […]".
2. Please outline why the AER did not credit the company with the fines captured in its ETF and why, despite this, Shell believes that AFD in combination with other technologies should suffice for the Project and guarantee its compliance with Directive 074.
3. The AER outlines three areas of improvement for AFD at MRM. These are, as follows:
    - Add process flexibility to maintain operating schedules
    - Mitigate the impacts of adverse weather conditions by modifying the DDA design to accommodate higher-than-expected rain volumes or by implementing mechanical dewatering and supplemental drying
    - Optimize the project's footprint to take advantage of existing disturbed areas for deposition, and make application for DDAs in time to accommodate tailings deposition needs.

    Please describe, in technical detail, how Shell has addressed these points in the Project tailings management plan.

Section 3, SIR 16 response d) part ii)
Regarding the role centrifugation technology could play in supporting the Project's compliance with Directive 074, Shell indicates that "a trial plant could be commissioned and started up by the end of 2013, with the target date of first fines feed in Q2 of 2014, with full-scale centrifugation planned to be in operation in 2015."

Question

1. Given that full-scale centrifugation is not planned until 2015, and that Shell would require at least one year to collect data on its performance relative to Directive 074 target, please discuss how Shell expect to make an evidence-based investment decision regarding AFD in 2016? Please outline a detailed schedule that confirms the Project could successfully meet the requirements of AER Directive 074 Section 4.4.

Section 3, SIR 17, part b)
Shell's answer to SIR 17 part b is incomplete and was not responsive to the original request for supplemental information. The answer was nonspecific and did not identify defensible changes or actions that would mitigate against current challenges with thickener design and

operation at MRM and Jackpine Mine (JPM) facilities.

Question:

1. Please specify, in technical details, the changes to thickener design and operation under consideration for the Project tailings management plan.

Section SIR 17, part c)
Shell's answer to SIR 17 part b was not responsive to the original request for a contingency plan. As per the CEAA Terms of Reference, Shell is required to submit "contingency plans if major Project components or methods of the Project prove to not be feasible or do not perform as expected."[13]

It its response to the request for a contingency plan, Shell re-stated its commitment to COSIA and its plan to employ TT, NST, AFD and/or centrifugation technologies. This response is not significant different from its response in Section 3, SIR 16, response c), where it states:

> Technologies that are being considered by Shell, besides TT and NST, are:
> i) Atmospheric Fines Drying (AFD) which has been successfully applied at the MRM.
> ii) Centrifugation, which has been proposed at Jackpine Mine for fines capture.
> iii) Many additional technologies are being developed within Canada's Oil Sands Innovation Alliance's (COSIA) Tailings Environmental Priority Area (EPA) that might prove to complement the overall tailings management suite.

Additionally, Shell states in its response "Data evaluation from AFD indicates the material will comply with Directive 074 requirements."

Questions:

1. Please supply a detailed contingency plan in the event the technologies stated above are insufficient to satisfy the requirements of the directive. Please describe the specific management actions that would be pursued in the event these technologies do not perform as anticipated.
2. Please submit the above-referenced data that proves AFD is capable of ensuring the Project is compliant with Directive 074.

End Pit Lakes with Mature Fine Tailings

Section 3, SIR 3 and SIR 20, and Appendix 1
Shell indicates that it plans to create end pit lakes with MFT at PRM. The justification for this

[13] Draft Terms of Reference for the Shell Canada Limited Jackpine Expansion & Pierre River Mining Areas. Section 4.1, part c at page 5. Available at: http://www.ceaa-acee.gc.ca/050/documents/46920/46920E.pdf

decision, provided in JRP SIR 20, Shell states it "believes that pit lakes containing MFT at PRM will be sustainable and have no significant adverse environmental impact. Moreover, Shell states "pit lakes containing MFT will provide for a more economical project, given the substantial cost associated with treating MFT during operations."

Question:

1. Please supply and discuss the evidence on which the claim that pit lakes containing MFT at PRM will be sustainable and have no significant adverse environmental impacts is made.
2. End pit lakes with MFT remain unproven at commercial scale. Given the risk and liability associated with this technology failing, please describe why Shell is unwilling to create a project-specific commitment to eliminate end pit lakes with MFT. Such a commitment would be in line with past JME commitments.

Aquatic health

Section 3, SIR 5
Shell states "PRM pit lakes are expected to be able to support viable aquatic ecosystems, and discharged waters are not anticipated to impair aquatic health in receiving streams."

Question:

1. Please supply and discuss the evidence on which this claim is made. Please discuss all peer-reviewed, scientific evidence that suggests that pit lakes, including those with MFT, can support viable aquatic ecosystems.

Impact to wetlands

Section 3, SIR 5
Shell states "*During construction and operations, PRM is expected to have a negative, high environmental consequence in the LSA for wetlands (including peatlands and patterned fens). At Closure, direct effects of the PRM on wetlands (including peatlands and patterned fens) are expected to have a negative and high environmental consequence at the LSA scale*."

According to the CEAA *Terms of Reference*, the Project proponent must provide "management plans to prevent, minimize or mitigate adverse effects and to monitor and respond to expected or unanticipated conditions, including any follow-up plans to verify the accuracy of predictions or determine the effectiveness of mitigation plans."[14]

[14] Draft Terms of Reference for the Shell Canada Limited Jackpine Expansion &Pierre River Mining Areas. Section 5.1, part c at page 13. Available at: http://www.ceaa-acee.gc.ca/050/documents/46920/46920E.pdf

In September 2013, the Government of Alberta released its final wetlands policy for the Green Area.[15] Shortly after its release, the government confirmed that it would not apply to oilsands projects currently operating, approved or seeking approval.[16]

Given that the Project is already seeking approval, it will not be subject to the final wetlands policy. It is therefore not appropriate for Shell to rely on this policy as a means of mitigating its Project-specific effect on wetlands.

Question:

1. Please supply a detailed plan describing how Shell will prevent, minimize or mitigate the Project-specific effects on wetlands.

Mitigation of terrestrial and wildlife impacts

Section 3, SIR 43
Shell has failed to provide adequate information on how impacts to species at risk and other valued ecosystem components over the life of the project will be mitigated. Section 19 of CEAA (2012) requires the review of the project to include:

(d) mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;

Commitments to monitoring are not mitigation and the commitments of future "adaptive management" in Table 43-3 do not provide adequate information to understand if the mitigation would be adequate.

Given the high impact LSA on many species at risk and uncertain performance of future reclamation, Shell has not described how these impacts will be mitigated. For example, offsets as compensation for habitat impacts have not been assessed or offered as a mitigation measure by Shell.

Questions:

1. Please provide specific information regarding how impacts to species at risk and other valued ecosystem components will be mitigated.
2. Has Shell considered using conservation offsets to offset the significant impacts of the project on species at risk over the life of the Project?

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[15] For further discussion on this policy, please see Alberta Wetlands Policy (2013): http://www.waterforlife.alberta.ca/documents/Alberta_Wetland_Policy.pdf

[16] Thorsten Hebben, Environment and Sustainable Resource Development, confirmed that all currently operating, approved and approval in waiting projects are exempt. See: http://www.edmontonjournal.com/business/Environmental+groups+slam+wetlands+plan/8900939/story.html

3. How does Shell intend to mitigate the effects of the Project without employing conservation offsets?
4. Please provide a technical analysis of potential offsets to quantitatively demonstrate mitigation of impacts on species at risk, wetlands, old growth forests and other valued ecosystem components.
5. Describe what legal mechanisms will be used to maintain the integrity of offset lands in perpetuity.

With respect to the above questions and comments, the Oil Sands Environmental Coalition believes that Shell Canada has not submitted sufficient evidence to stakeholders regarding mitigation of the Project's adverse environmental impacts. At this time, the Oil Sands Environmental Coalition believes the environmental assessment to be incomplete.

We appreciate your prompt reply to the above indicated questions and concerns.

Sincerely,

<original signed by>

Erin Flanagan
Analyst, Alberta and the North
Pembina Institute
On behalf of the Oil Sands Environmental Coalition