



Department of Justice Canada

Ministère de la Justice Canada

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Security
Classification : **Protected B**

Telephone:
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Our File: 2-143281
Notre dossier:

Your file: CEAR Reference Number 59539
Votre dossier: ERCB Application No. 1554396

January 17, 2014

BY EMAIL (Shell.Reviews@ceaa-acee.gc.ca)

Pierre River Mine Project
Joint Review Panel Secretariat
160 Elgin Street, 22nd Floor
Place Bell Canada
Ottawa, ON K1A 0H3

Attention: Jill Adams, Panel Manager

Dear Madam:

Re: Pierre River Mine Project – Joint Review Panel

Attached please find comments from Fisheries and Oceans Canada, Environment Canada, Health Canada, Natural Resources Canada and Transport Canada with respect to the adequacy of the additional information provided by Shell Canada.

Please do not hesitate to contact me <personal information removed>
<personal information removed> , should you require anything further.

Yours truly,

<original signed by>

Dayna S. Anderson
Counsel
Prairie Region
Justice Canada

Encl.

/gs

Canada



Fisheries and Oceans Canada Pêches et Océans Canada

1028 Parsons Road
Edmonton, Alberta
T6X 0J4

January 16, 2014

Pierre River Mine
Joint Review Panel Secretariat
160 Elgin Street, 22nd Floor, Place Bell Canada,
Ottawa, ON, K1A 0H3
Via email Shell.Reviews@ceaa-acee.gc.ca

Attention: Jill Adams, Panel Manager

Subject: Fisheries and Oceans Canada's reply to the Joint Review Panel's November 7, 2013, request for public comments on Additional Information Provided for Shell Canada's proposed Pierre River Mine Project

Thank you for the opportunity to respond to the invitation for public comment dated November 7, 2013, requesting Fisheries and Oceans Canada's (DFO) views on the adequacy of the additional information provided by Shell Canada on the proposed Pierre River Mine project (PRM).

DFO has reviewed the additional information provided by Shell Canada on October 31, 2013. DFO has determined that the information available for the Pierre River Mine is sufficient for this stage of the review to assess impacts under DFO's mandate, and proceed to a public hearing.

This determination was made with the understanding that the potential impacts to fisheries resulting from the proposed PRM would be mitigated through the construction of the proposed offsetting plan, specifically South Redclay Compensation Lake. As the panel may be aware, South Redclay Compensation Lake has been proposed as mitigation for impacts to fisheries for both the proposed PRM and the Jackpine Mine Expansion Project (JPME), and remains the viable offsetting strategy provided to DFO to date.

Should you have any questions in relation to this notice, please contact Marek Janowicz via email at j <personal information removed>

Sincerely,

<original signed by>

Marek Janowicz
Manager, Mining, Oil and Gas
Ecosystems Management
Fisheries and Oceans Canada

Cc:
Court Berryman, DFO
Michael Hunka, DFO

ATTACHMENT 2: ENVIRONMENT CANADA'S LEGISLATION

I. INTRODUCTION

The mandate of Environment Canada (EC) has its source, in particular, in the statutes and regulations assigned to the federal Minister of Environment by Parliament or the Government. Delivering this mandate requires EC, among other things, to develop and implement policies, guidelines, codes of practice, inter-jurisdictional and international agreements and related programs. The following lists specific legislation and national environmental policies and programs administered by EC that influenced the content of this submission.

II. SUMMARY OF LEGISLATION

- A. *Department of the Environment Act*
- B. *Canadian Environmental Protection Act, 1999*
- C. *Fisheries Act – Pollution Prevention Provisions*
- D. *Migratory Birds Convention Act, 1994*
- E. *Species at Risk Act*
- F. *Canada Water Act*

A. Department of the Environment Act

, General responsibility for environmental management and protection is attributed to EC, through the Minister, under the *Department of the Environment Act* (DOE Act). This responsibility extends to and includes all matters over which Parliament has jurisdiction, which matters have not, by law, been assigned to any other department, board, or agency of the Government of Canada relating to:

- Preservation and enhancement of the quality of the natural environment (e.g. water, air, and soil);
- Renewable resources including migratory birds and other non-domestic flora and fauna;
- Water;
- Meteorology; and
- Coordination of policies and programs respecting preservation and enhancement of the quality of the natural environment.

The DOE Act requires EC / the Minister to advise heads of federal departments, boards and agencies on matters pertaining to the preservation and enhancement of the quality of the natural environment.

B. Canadian Environmental Protection Act, 1999

Proclaimed on March 31, 2000, the *Canadian Environmental Protection Act, 1999* (CEPA) is an Act regarding pollution prevention and the protection of the environment and human health in order to contribute to sustainable development. CEPA shifts the focus away from managing pollution (after it has been created) to preventing pollution. CEPA provides the federal government with new tools to protect the environment and human health, establishes strict deadlines for controlling certain toxic substances, and requires the virtual elimination of toxic substances which are bioaccumulative, persistent and result primarily from human activity.

Under CEPA, in particular, when a substance is declared “toxic” under CEPA and is added to the List of (toxic) Substances set out in Schedule 1 of CEPA, instruments are proposed to establish preventive or control actions for managing the substance and to thereby reduce or eliminate its release into the environment. These tools may be used to control any aspect of the substance’s life cycle, from the design and development stage to its manufacture, use, storage, transport and ultimate disposal.

Examples of preventive and control instruments include:

- Regulations;
- Pollution prevention plans;
- Environmental emergency plans;
- Environmental codes of practice;
- Environmental release guidelines; and
- Pre-notification and assessment of new substances (chemicals, biochemicals, polymers, biopolymers, and animate products of biotechnology).

C. Fisheries Act – Pollution Prevention Provisions

The Department of Fisheries and Oceans administers section 35 of the *Fisheries Act*, which is a key habitat protection provision, prohibiting any work, undertaking or activity that would result in the harmful alteration, disruption or destruction of fish habitat, except in circumstances specified in the *Fisheries Act*.

Environment Canada administers section 36, the key pollution prevention provision of the *Fisheries Act*, prohibiting, in particular, the deposit of a deleterious substance into water frequented by fish, unless authorized by, and deposited in accordance with, regulations under the *Fisheries Act* or other federal legislation” (Government of Canada, 2012). In this context, EC:

- Works to advance pollution prevention technologies;
- Promotes the development of preventative solutions; and
- Works with the provinces, territories, industry, other government departments and the public on issues relating to the pollution provisions of the *Fisheries Act*.

The main pollution prevention provision is found in subsection 36(3) of the *Fisheries Act* and is commonly referred to as the “general prohibition”. This subsection states, in particular, that no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish. In addition, paragraph 78.6(a) of the *Fisheries Act* states that no person shall be convicted of an offense under the *Fisheries Act* if the person establishes that they exercised all due diligence to prevent the commission of the offence. As outlined in subsection 34(1) of the *Fisheries Act*, the expression “deleterious substance” encompasses, in particular, any substance that, if it is added to water, would change the quality of that water so that the water becomes or is likely to become deleterious to fish, fish habitat or to the use by man of fish that frequent that water. One measure of a deleterious substance (such as a liquid discharge) is acute lethality as measured by the standard 96-hour fish bioassay test.

References:

Fisheries and Oceans Canada. (2006, 05 26). *The Fish Act* . Retrieved 01 14, 2014, from http://www-heb.pac.dfo-mpo.gc.ca/water_quality/fish_and_pollution/fish_act_e.htm

Government of Canada. (2012, 08 24). *Fisheries Act* . Retrieved 01 14, 2014, from <https://www.ec.gc.ca/pollution/default.asp?lang=En&n=072416B9-1>

D. Migratory Birds Convention Act, 1994

The purpose of the *Migratory Birds Convention Act 1994* is to implement the Migratory Birds Convention of 1916, between Canada (through Her Majesty) and the United States, by protecting and conserving migratory birds, as populations and individual birds, their nests and eggs. The *Migratory Birds Regulations* provide for the conservation of migratory birds and for the protection of their nests and eggs. Section 5.1 of the *Migratory Birds Convention Act 1994* prohibits the deposit of a substance that is harmful to migratory birds in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. A prohibition against, in particular, the disturbance, destruction, or taking of a nest, egg or nest shelter of a migratory bird is set out in paragraph 6(a) of the *Migratory Birds Regulations*. The *Migratory Birds Convention Act, 1994* also prohibits the possession of a migratory bird, nest or egg without lawful excuse.

E. Species at Risk Act

The Species at Risk Act (SARA) is intended to prevent wildlife species from being extirpated or becoming extinct; to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity; and to manage species of special concern to prevent them from becoming endangered or threatened. In terms of wildlife species, SARA applies to all that are listed in Schedule 1 of SARA as being at risk, their residences and their critical habitat. Geographically, SARA generally applies to individuals of such species and their eggs and nests located

anywhere in Canada. Specific elements of SARA, such as, in particular, prohibitions set out in that Act, may not apply in respect of certain species within certain geographic areas in Canada, as specified in SARA. For example, the prohibitions set out in sections 32 and 33 (to kill, harm, harass, capture or take an individual or damage or destroy its residence [as specified]) do not apply, in lands in a province that are not federal lands, with respect to individuals of a listed wildlife species that is not an aquatic species or a species birds protected by the Migratory Birds Convention Act, 1994 – unless the Governor in Council makes an order under subsection 34(2) of SARA.

With respect to species at risk, SARA provides for:

- Status assessment and legal listing (Schedule 1);
- Preparation of recovery strategies and action plans;
- Protection of critical habitat; and
- Management plans to prevent further endangerment.

Risk Categories: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent, expert committee that assesses the level of risk to wildlife species. Assessments are based on the best available science, Aboriginal traditional knowledge, and community knowledge.

SARA Listing: In 1999, COSEWIC adopted new assessment criteria based on World Conservation Union criteria. The relevant Minister (the Minister of the Environment and/or the Minister of Fisheries and Oceans, depending on the species), after receiving the COSEWIC assessment, consults the affected parties with respect to the proposed listing (as appropriate). After consultation, the Minister can either: accept the assessment and recommend that the species be added to Schedule 1; decide not to list the species; or refer the matter back to COSEWIC for more information. In cases where the species was already listed, the Minister of the Environment can also recommend that the species be reclassified or removed from Schedule 1.

Recovery Actions: Recovery strategies are planning documents that identify actions that need to be taken to conserve the species such as stopping or reversing the decline of a species. Action plans outline the specific projects or activities required to meet the goals and objectives outlined in the recovery strategy. Management plans set goals and objectives for maintaining sustainable population levels of species that are particularly sensitive to environmental factors, but not in danger of becoming extinct.

Environmental Assessment and Species at Risk: Where, in relation to a proposed project, the *Canadian Environmental Assessment Act, 2012* requires:

- The carrying out of an environmental assessment; or

- if the project is proposed to be carried out on federal lands, the making of a determination (pursuant to section 67 of the *Canadian Environmental Assessment Act, 2012*) in respect of whether the project is likely to cause significant adverse environmental effects;
- ***If the project is likely to affect a SARA-listed wildlife species or its critical habitat, then SARA requires that certain considerations be addressed. In particular, it requires the person who is required to carry out the environmental assessment – or who is required to make the determination pursuant to section 67 – to:*** notify the competent minister(s) of the project, without delay;
- Identify the adverse effects of the project on the listed wildlife species and its critical habitat;
- Ensure that measures are taken to avoid or lessen those adverse effects in a way that is consistent with any applicable recovery strategy or action plan; and
- Ensure that measures are taken to monitor those adverse effects.

F. Canada Water Act

EC is the lead federal agency for establishing and operating federal-provincial/territorial water monitoring networks as legislated under the *Canada Water Act*, and aquatic data and information management, protocols, and bio-monitoring networks.



Prairie and Northern Region
9250-49 Street NW
Edmonton, Alberta T6B 1K5

January 17, 2014

EC file no.: 4194-10-3/6037
CEAA reference no.: 10-05-59539

Alex Bolton
Chair, Joint Review Panel
Established to review the Pierre River Mine Project

Canadian Environmental Assessment Agency
160 Elgin Street, 22nd Floor, Place Bell Canada
Ottawa, Ontario K1A 0H3

Alberta Energy Regulator
9915 Franklin Avenue, Provincial Building, 2nd Floor
Fort McMurray, Alberta, T9H 2K4

RE: Shell Canada's Pierre River Mine Project (the Project)
Round Two Adequacy Review of Shell Canada's Environmental Impact Statement (EIS) and Supplemental Information

On November 7, 2013, the Joint Review Panel (the Panel) reviewing the proposed Pierre River Mine Project (the Project) invited comments from Aboriginal groups, governments and the public on the additional information provided by Shell Canada (the Proponent) on October 31, 2013. Although a specific request was not made of federal departments to review the additional information, the expectation is that federal departments participating in the process will continue to provide their expertise for reviewing any additional information submitted by the Proponent during the review process.

Environment Canada (EC) has reviewed the additional information provided by Shell Canada as well as the initial environmental impact statement (EIS). EC appreciates the work the Proponent has undertaken to respond to the supplemental information requests (SIRs) and to address many of the issues raised previously by EC. Attachment 1 summarizes EC's outstanding concerns resulting from our review of the additional information provided by Shell Canada. Our review and response is focused on issues that relate to our mandate: that is, to conserve and enhance the quality of the natural environment including water, air, soils, sediments and biota. A summary of EC's legislation is included as Attachment 2.

As outlined in Attachment 1, EC has identified a number of gaps and deficiencies in Shell Canada's EIS and additional information regarding the following topics:

- **Air Quality:** greenhouse gas emissions, mine fleet, and fugitive emissions;

- **Water Quality:** water quality models, baseline surface water quality dataset and chronic effect benchmarks;
- **Wildlife and Biodiversity:** effects prior to reclamation, evaluation of significance, regional habitat mapping, wildlife movement, The Ronald Lake wood bison herd and peatland and patterned fens;
- **Ecotoxicology and Wildlife Health:** inconsistencies in the Wildlife Risk Assessments; and
- **Emergencies:** accidents and malfunctions.

EC recommends that these gaps and deficiencies be addressed, to the extent possible, prior to the hearings to allow the Panel to make an informed decision on the significance of adverse effects. Although EC has identified a number of issues, we are particularly concerned with Shell Canada's assessment of potential Project and cumulative effects on the Ronald Lake wood bison herd (SIR response #41). EC considers Shell Canada's analysis of effects on the herd incomplete and, thus, has very low confidence in the accuracy of their predictions. EC has provided a number of recommendations to address the deficiencies in Shell Canada's analysis, including the analysis of new telemetry data being collected on the Ronald Lake herd and additional engagement by Shell Canada with affected Aboriginal groups to ensure that Aboriginal concerns, knowledge and views on the Ronald Lake herd are adequately incorporated in the assessment.

Please contact Susanne Forbrich at <personal information removed> if you have any questions or concerns regarding EC's assessment of adequacy of the additional information provided by Shell Canada. EC can provide additional technical information to the Panel, if required, to help address the concerns raised in our sufficiency review, including those regarding the Ronald Lake wood bison herd. We appreciate the opportunity to provide our assessment and look forward to the next steps in the process.

Sincerely,

<original signed by>

Margaret Fairbairn
A/Regional Director, Prairie and Northern Region
Environmental Protection Operations Directorate

Attachments:

Attachment 1: EC's second review of Shell Canada's EIS and supplemental information for the Pierre River Mine Project

Attachment 2: EC's Legislation

cc: Amanda Lwanga-Thomson, Environment Canada
Susanne Forbrich, Environment Canada
Mai-Linh Huynh, Canadian Environmental Assessment Agency

ATTACHEMENT 1: ENVIRONMENT CANADA'S SECOND REVIEW OF SHELL CANADA'S ENVIRONMENTAL IMPACT STATEMENT AND SUPPLEMENTAL INFORMATION FOR THE PIERRE RIVER MINE PROJECT

SUMMARY OF TOPICS

- I. Air Quality
 - A. Green House Gas Emissions
 - B. Mine Fleet
 - C. Fugitive Emissions

- II. Water Quality
 - A. Water Quality Models and Baseline Surface Water Quality Dataset
 - B. Chronic Effect Benchmarks

- III. Wildlife and Biodiversity
 - A. Effects Prior to Reclamation
 - B. Evaluation of Significance
 - C. Regional Habitat Mapping
 - D. Wildlife Movement;
 - E. The Ronald Lake Wood Bison Herd
 - F. Peatland & Patterned Fens

- IV. Ecotoxicology and Wildlife Health
 - A. 2007 Wildlife Health Risk Assessment vs. 2013 Screening Wildlife Risk Assessment

- V. Emergencies
 - A. Accidents and Malfunctions

I. AIR QUALITY

The following Supplemental Information Request (SIR) topics were submitted to the Panel by Environment Canada (EC) on September 12, 2012 but were not forwarded to Shell Canada as part of the Joint Review Panel's (JRP) first round of adequacy SIRs. It is EC's view that further information regarding Greenhouse Gas Emissions (GHGs), mine fleet, and fugitive emissions are of importance in fulfilling the JRP Terms of Reference (TOR). Thus EC requests that the Panel reconsider the following SIRs in this second round of reviews.

A. Greenhouse Gas Emissions

The JRP TOR (Appendix, Part III) requested that the Proponent's "*cumulative effects assessment should consider key valued components, without limiting itself thereto, the following components should be considered:*

- *Air quality and greenhouse gas emissions”*

In addition, Sections 4.7.1 d) and e) of the Provincial TOR on GHG Emissions and Management requires that the Proponent provide:

- d) *“How the Project design and GHG management plans have taken into account the need for continuous improvement with respect to GHG emissions; and*
- e) *Overall GHG management plans, any plans for the use of offsets (nationally or internationally) and the expected results of implementing the plans.”*

EC’s Position:

GHG emissions from Canada’s oil and gas sector are projected to increase substantially over the coming decades. The Government of Canada is moving forward to develop a regulatory approach to reducing GHG emissions from the oil and gas sector, in order to help contribute to meeting its commitment to reduce emissions by 17% below 2005 levels by 2020.

Having examined the relevant sections of Shell Canada’s Environmental Impact Statement (EIS) (2007) for this project, as well as subsequent supplementary information requests, EC is of the view that Shell Canada has not met the JRP TOR as they have not provided an analysis of GHG emissions in the cumulative effects assessment. In addition, EC could not find sufficient information corresponding to sections 4.7.1 d) and e) of the Provincial requirements (cited above). First Nations have also raised concerns with the lack of detailed information on GHG management plans.

Outstanding Information:

In order for Shell Canada to meet the JRP TOR and Provincial TOR, EC requests the following information:

1. Planned measures for the Project that will contribute to minimizing or reducing GHG emissions and the avoided GHG emissions associated with these measures; and
2. Estimates of GHG emissions for the Planned Development Case.

B. Mine Fleet

As reflected in the Decision Statement for the Shell Jack Pine Mine Expansion (JPME), the government of Canada considers the management of emissions from the mine fleet important to protect Aboriginal health. The operation of off-road mine fleet equipment, for extraction of bitumen, will contribute significantly to air emissions at the proposed Pierre River Mine. First Nations have identified concerns with the predicted increase in

NOx emissions and NO₂ levels in their communities and the potential resulting health and environmental effects (acid deposition).

EC's Position:

To model NOx and potential acid input (PAI) predictions, Shell Canada has developed a mine fleet profile. It is EC's view that the Proponent has not met the JRP Terms of Reference because Shell Canada has not provided the following:

- Sufficient information on possible mine fleet profiles (and therefore air emissions profiles) for the Project; and
- Adequate modeling of NOx and PAI for these profiles.

In their October 2013 response to the JRP, Shell Canada had assumed that all mine operators' mine fleets will meet Tier-4 emission standards by the end of 2025. However, Shell Canada provided verbal testimony at the Shell JPME hearing, stating that they do not commit to having Tier-4 trucks by 2025, and that their supplier is having continued challenges with Tier-4. Shell Canada also assumed a 10-year design life which is not conservative because mine operators currently quote a 12-15 year operating life. Underestimating these emissions may lead to under estimation of ambient concentrations of NO₂ and PM_{2.5}, and the predicted PAI in the region, including in First Nations communities. At the Shell JPME hearing, Shell Canada also testified that they have considered how the mine fleet emissions and resulting ground-level concentrations will be higher if Tier-4 trucks are not available when they have assumed they would be available. However, in the Pierre River Mine submission, Shell Canada has assumed the Tier-4 trucks would be available. Shell Canada has not applied, nor have they included, this information on mine fleet profiles or their effects on predictions of NOx and PAI in their October 2013 response to the JRP.

Outstanding Information:

Additional information from Shell Canada is requested to complete the assessment of air quality and PAI predictions for the two scenarios as quoted from Shell's JPME testimony (pg. 1275):

- *"mov[ing] the trucks up to 2015 with a 15-year life"; and*
- *"mov[ing] the availability of Tier-4 trucks out to 2021 with a 15-year truck life"*

In its testimony, Shell Canada stated that in these scenarios the mine fleet "emissions increase in the 20 to 30 percent range", resulting in a "10 to 15 percent increase in ground-level concentrations near the site".

EC requests that Shell Canada provide the following information related to the two scenarios above:

1. The assumptions used to create the mine fleet profiles;

2. The quantity, size and engine Tier level of the off-road vehicles planned to be operated at the project;
3. Details of how Shell Canada determined that the mine fleet emissions increase by 20-30%, and that the ground-level concentrations change by 10-15% near the site;
4. Using these mine fleet scenarios, the predicted NOx and PM emissions and ambient concentrations and PAI for the base case and application case for the Pierre River Mine.

References:

Joint Review Panel Session in Fort McMurray, Alberta – Hearing Transcript – Volume 7 – November 5, 2012 pages 1272 to 1277 <http://www.ceaa-acee.gc.ca/050/documents/p59540/83341E.pdf>

C. Fugitive Emissions

The JRP TOR requested that the Proponent include “a consideration of the factors” such as “the environmental effects of 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”; and the significance of those effects.

Additional details are required on the calculations and methodologies used by Shell Canada to estimate fugitive emissions (i.e., tailings ponds, mine face, land disturbance and other fugitives). The range of possible error or uncertainty for these estimates is also required. Without this information EC cannot complete its assessment of this aspect of the project’s environmental impacts.

EC’s Position:

It is EC’s view that Shell Canada has not met the JRP TOR. EC is of the view that Shell Canada has not provided sufficient information on the methodology and calculations used to estimate fugitive greenhouse gas emissions and air pollutants. As a result, EC has no way to determine whether the estimated fugitive emissions from this project are appropriate. Fort McKay acknowledges in the Fort McKay Site Specific Assessment (March 2010) that there are uncertainties in predicting fugitive emissions compounds from area sources such as ponds and facility upsets. EC shares these concerns pursuant to our mandate, and requires additional information to determine the appropriateness of Shell Canada’s estimated fugitive emissions from this project.

Outstanding Information:

In order for Shell Canada to meet the JRP TOR and in order to adequately assess Shell Canada’s emissions analysis, EC requests the following:

1. Information on the methodology and calculations used to calculate fugitive emissions. Specifically:
 - EC requires the upper and lower bounds for each category of sources within the fugitive category; and
 - EC also requires copies of the studies performed by the proponent or consultants related to estimating or measuring air emissions from tailing ponds and/or mine faces.

II. WATER QUALITY

The following SIR topics were submitted to the Panel by EC on September 12th, 2012 but were not forwarded to Shell Canada as part of the JRP first round of adequacy SIRs. It is EC's view that further information regarding improving baseline water quality data and addressing toxicity of Naphthenic Acids (NAs) is of importance in fulfilling the JRP TOR. Thus EC requests that the Panel reconsider the following SIRs in this second round of reviews.

Both the JRP and Provincial Terms of Reference (TOR) call for an analysis of impacts to water quality.

The JRP TOR (Appendix, Part III) requested that Shell Canada include a Cumulative Effects Assessment, noting:

"The JRP should focus its consideration of cumulative effects on key valued components, without limiting itself thereto, the following components should be considered:

- *water quality and quantity"*

In addition, the provincial TOR (Section 5.6.6 Surface Water as detailed in Sections h) through p) requires Shell Canada to describe: *"the existing and anticipated water quality of waterbodies."*

A. Water Quality Models and Baseline Surface Water Quality Dataset

Water quality modeling is an important tool in predicting the potential short- and long-term effects of a project on downstream water quality. Such predictions form the basis for impact assessment for project effects on water quality and aquatic and fish species. To accurately model water quality there must be a foundation of baseline data that accurately characterises the pre-project conditions both up-stream and down-stream. This baseline dataset will also provide the basis for comparisons of project monitoring data collected throughout the life of project.

The original modeling work was based on sampling done by Golder and reported in the 2007 EIS. In the JRP SIRs Appendix 1 (SIR 5, section 3.3) modeling was updated for the Pre-Industrial Case and the 2013 Pierre River Mine (PRM) Application Case. Predictions for water quality results are presented in Appendix 2 (Section 3.3.1, Water Quality Assessment). It appears that Shell Canada has increased the sample sizes (n) for various sites with data taken from the Regional Aquatics Monitoring Program (RAMP) and from the Government of Alberta water quality database (cited as AENV 2010 in Appendix 1, and ESRD 2012 in Appendix 2). While the sample sizes associated with the RAMP data represent an improvement, it has not been demonstrated that these data adequately characterizes the range of natural seasonal variability in the project area (as required by the TOR Section 5.6.6, h), Surface Water). Further, the monitoring data referenced, as drawn from the Alberta Environment water quality database, is extremely unlikely to be comparable, as it was not collected at the same sampling locations (rather, approximated from the Ells sub basin), and dates back to the 1970s. This approach raises concerns regarding Shell Canada's methodology and detection limits.

Background (or baseline) water quality data presented by Shell Canada is very limited and does not appear to fully characterize seasonal variation in surface water quality. This sparse water quality data limits the ability of the water quality models to accurately predict long-term changes, and may limit future monitoring comparisons. In the absence of sufficient baseline data, the conclusion reached by Shell Canada that there will be negligible changes to water quality concentrations in the Athabasca River is not well supported.

In addition to impact assessments, water quality modeling also provides the basis for long-term water quality predictions. Minimizing the risk of adverse impacts to future water quality requires, in part, a modelling process that is responsive to new information and changing trends. In order to reduce the inherent uncertainty in the use of modeling for long-term predictions, the water quality modeling process must combine timely incorporation of monitoring data with on-going model calibration and validation. Ensuring that the model is responsive to data inputs is essential to improving confidence in long-term predictions. Because water quality predictions are a key element in estimating the potential for adverse impacts to aquatic and fish species, it is essential that Shell Canada ensures the model accurately reflects current conditions and trends over the life of the project.

Outstanding Information:

EC requests that Shell Canada:

1. Update and validate pre-development water quality data, to ensure that seasonal variability has been captured to properly establish pre-development reference levels;
2. Describe how Shell will update, calibrate and validate the water quality model over the construction and operational stages of the project; and

3. Explain how updated information on water quality will drive adaptive management.

B. Chronic Effect Benchmarks

Chronic Effects Benchmarks (CEBs) were developed to establish acceptable concentrations of contaminants on downstream aquatic communities. Appendix 3.6, *Chronic Effects Benchmarks (Oct 2013)* details further work on the assessment methods and results of CEB derivations applied to the aquatic health assessment. The CEBs developed for the PRM build on previous versions developed by Golder for other mines and are summarized in Table 2.9-1 (p. 87). They comprise a set of benchmarks derived by assessing single chemicals or groups of similar chemicals (including naphthenic acids (NAs), polynuclear aromatic hydrocarbons (PAHs) and total dissolved solids (TDS)). These single-chemical and grouped CEBs were used in the development of Shell Canada's predictions for adverse impacts to aquatic and fish species. EC notes there are limitations to the use of thresholds for individual contaminants, as this approach does not address the potential for additive, antagonistic or synergistic interactions between parameters in the complex mixtures. Given the limitations of using individual CEBs, it is important to understand the toxicity of the whole mixture when evaluating surface water and pit water quality. EC notes that concerns raised by Aboriginal groups echo EC's concerns related to the uncertainty associated with long-term water quality and effects using single-chemical CEBs.

EC notes that Shell Canada's attempts to follow the Canadian Council of Ministers of the Environment's (CCME) protocols (as described above) had the following deficiencies:

- Minimum data sets were often not met;
- Lethal effects were not included;
- No-effect data was not used for CEBs developed with the species sensitivity distribution;
- The CCME data hierarchy was not followed when there were multiple endpoints for one species; and
- A safety factor was not applied when using the lowest endpoint approach.

Specifically EC has concerns with the benchmarks proposed for NAs. Separate thresholds have been proposed for the labile (1 mg/L) and refractory (19 mg/L) forms. The chronic threshold of 1 mg/L for the labile form is based on a single chronic study of yellow perch, with the endpoint of gill anomalies. Shell Canada states that this is the lowest threshold concentration identified in the literature for total NA mixtures containing a high proportion of labile NAs. As stated above, a safety factor should have been incorporated where data was insufficient to develop a Species Sensitivity Distribution (SSD) curve, rather than using the lowest value directly.

The threshold of 19 mg/L for refractory NAs was approximated from the no-effect level from Kavanagh et al (2011) and assessed to be below the effects level of 24 mg/L for

fathead minnows reproductive endpoint. Again, no safety factor was used, and the data did not incorporate a range of species and endpoints. EC requests further development of CEBs for naphthenic acids.

EC's Position:

EC suggests that Shell Canada has not fully met the JRP and Provincial TOR with respect to assessing the effects of the project on surface and pit lake water quality.

Outstanding Information:

EC requests that Shell Canada:

1. Provide further information showing how Shell will address the uncertainties related to the toxicity of naphthenic acids, and to establish appropriate chronic effects benchmarks in accordance with CCME protocols.
2. Provide a description of how whole effluent toxicity testing (both acute and chronic) will be incorporated into ongoing monitoring protocols.

References:

CCME. 2007. A protocol for the derivation of water quality guidelines for the protection of aquatic life 2007. Canadian Council of Ministers of the Environment. Winnipeg, MB Canada. Available at <http://cegg-rcqe.ccme.ca/download/en/220/>

Kavanagh, R.J., R.A. Frank, K.D. Oakes, M.R.Servos, R.F. Young, P.M.Fedorak, M.D. MacKinnon, K.R. Solomon, D.G. Dixon and G. Van Der Kraak. 2011. Fathead minnow (*Pimephales promelas*) reproduction is impaired in aged oil sands process-affected waters. *Aquat Toxicol* 101:214-220.

III. WILDLIFE AND BIODIVERSITY

A. Effects Prior to Reclamation

In the JRP SIR 7 (pg. 6), the Panel requests information on the environmental consequences of effects prior to reclamation. In its response, Shell Canada provides information on project and cumulative environmental effects during construction and operations. Although this time period is prior to reclamation, Shell Canada's evaluation of environmental consequence during construction and operations incorporates a measurement of reversibility (reversible/irreversible) and thus includes implementation of future mitigation measures (e.g., reclamation). As a result, the environmental consequence values presented by Shell Canada in response to the JRP SIR 7 (Section 3, pg. 3-28) are for residual effects after reclamation (and other mitigation) is applied. For example, although Shell Canada predicts high magnitude (rating = +15) and long-term (rating = +2) loss of terrestrial vegetation (uplands) for the 2013 PRM Application

Case during construction and operations (Table 7-1), environmental consequence is only moderate (rating = +14) because effects are considered reversible (-3 rating) following reclamation. However, prior to reclamation (no consideration of reversibility), environmental consequence would be high (rating = +17).

EC's Position:

The information presented by Shell Canada does not represent environmental consequence before implementation of (or prior to) reclamation, but residual effects after reversibility (reclamation) is incorporated into the environmental consequence rating. Therefore, Shell Canada has not adequately responded to the Panel's SIR.

Evaluating effects prior to reclamation (without assuming reversibility) will alter the environmental consequence ratings for several key indicator resources (KIRs). EC considers it important to understand effects prior to reclamation because the success of reclamation in developing functional, healthy, diverse and representative boreal forest habitats and ecosystems in the oil sands region is still uncertain. Therefore, Shell Canada's assessment (which assumes that most reclamation, with the exception of peatland reclamation, will be successful) may underestimate actual project and cumulative effects.

Outstanding Information:

EC requests that Shell Canada:

1. Re-evaluate environmental consequence of project and cumulative effects without considering reversibility (prior to accounting for reclamation); and
2. Provide any new scientific evidence, from long-term monitoring or research programs, that reclamation will create functional, healthy, diverse and representative boreal forest habitats and ecosystems (both terrestrial and non-peat wetland) in the oil sands region.

B. Evaluation of Significance

Shell Canada used broad regional land cover classification to determine habitat availability for wildlife KIRs when assessing cumulative effects in the regional study area (RSA). In the analyses presented in Appendix 2 of their response to the JRP SIRs, Shell Canada indicates that classification errors for high suitability habitat for several wildlife KIRs were very high (e.g., yellow rail habitat classification error = 75%, western toad = 67%, horned grebe = 67%, Canada warbler = 47%, rusty blackbird = 40%). This error compounds other error caused by using broad regional land cover types to define species habitat use. For example using these broad classes can be problematic because they often lump distinctly different ecosite phases having different habitat suitability for wildlife (low and high quality habitat), and also do not differentiate between stand age classes. Therefore, as Shell Canada points out, the amount of high quality habitat in the RSA may be greatly over-estimated for several species. This

could result in underestimating cumulative effects in the RSA and the significance of effects on these species.

Despite these large classification errors, Shell Canada uses the output of habitat modeling to determine significance of cumulative effects. For example, Shell Canada states that, because of the extent of remaining high suitability habitat in the RSA for yellow rail (196,575 ha in the 2013 PDC), as well as limiting factors on the wintering grounds, the cumulative effects of development have likely not compromised the population of yellow rail in the RSA to a point it is no longer self-sustaining or ecologically effective (Appendix 2, Section 5.3.3.2.24.2.1, pg. 416). However, Shell Canada does not incorporate the classification error for high suitability habitat into its determination of significance. A classification error of 75% for yellow rail indicates that availability of high suitability habitat could range from 49,144 ha to 196,575 ha, depending on model accuracy. Therefore, the determination of significance could vary greatly depending on the actual amount of high quality habitat available in the PDC.

EC's Position:

The variability of available high quality habitat in the PDC has not been adequately considered by Shell Canada. As a result, EC considers Shell Canada's assessment incomplete and potentially inaccurate.

Outstanding Information:

1. EC requests that Shell Canada re-evaluate the significance of cumulative effects on wildlife KIRs, taking into account classification error of high suitability habitat and the potential range in availability of high quality habitat in the RSA for all wildlife KIRs.

C. Regional Habitat Mapping

In its response to the JRP SIR 8, Shell Canada provides an evaluation of the significance of cumulative effects on wildlife KIRs. As outlined in their response to the JRP SIR 6 and Appendix 3.1 (Assessment Methods), Shell Canada defines a significant cumulative effect using both ecological threshold and resource management criteria. Shell Canada indicates that ecological thresholds are exceeded when an animal population is no longer viable, and defines an ecological threshold as *"the point at which a wildlife population is no longer self-sustaining or ecologically effective"* (Section 3, SIR 6, pg. 3-24). Overall, Shell Canada favors the use of ecological thresholds and indicates they *"produce a more appropriate and meaningful assessment of significance for conservation of terrestrial resources"* (Section 3, SIR 8, pg. 3-58).

EC's Position:

It is unclear from Shell Canada's response to JRP SIR 8 and supporting documents what specific ecological thresholds of habitat loss were applied for each wildlife KIR within the RSA, including species at risk, and how these ecological thresholds were determined. Shell Canada concludes in its assessment that certain species (e.g., yellow rail) are unlikely to be compromised by cumulative effects and are likely still self-

sustaining or ecologically effective, based on extent of regional habitat loss and other potential limiting factors (Appendix 2, JRP SIR 8, Section 5.3.3.2.24.2.1, pg. 416), but provides no data or evidence on actual thresholds to support these claims. This creates uncertainty in Shell Canada's approach and conclusions.

Outstanding Information:

EC requests that Shell Canada provide the following information:

1. Specific ecological threshold of habitat loss where each wildlife KIR would no longer be considered viable, self-sustaining or ecologically effective within the RSA, with supporting scientific rationale and references, to support its conclusions; and
2. An explanation of how their criteria can be used reliably to determine significance of effects (if ecological thresholds are not available or do not exist for some species).

D. Wildlife Movement

In its response to the JRP SIR 5, Shell Canada predicts that the environmental consequence of the PRM on movement of terrestrial mammals is low because north-south movement along the Athabasca River will be maintained under the Athabasca River bridge, and because "*wildlife movements across the [regional study area] RSA outside of the [local study area] LSA have not been blocked*" (Appendix 1, JRP SIR 5, Section 4.4.1.3, pg. 151). Similarly, in its response to SIR 8, Shell Canada predicts that the environmental consequence of the 2013 Planned Development Case (PDC) on movement of terrestrial mammals is also low because riparian buffers will be maintained along the Athabasca River (thus allowing north-south movement) and along other large rivers in the RSA (Appendix 2, JRP SIR 8, Section 3.4.3.1.3, pg. 131).

In its responses (Appendix 1, JRP, SIR 5, Section 4.4.1.3) and 2013 PDC (Appendix 2, JRP SIR 8, Section 3.4.3.1.3), Shell Canada does not assess effects on movements of boreal woodland caribou because they are absent from LSA. Shell Canada also does not discuss the potential effects of the project and 2013 PDC on east-west movements of terrestrial mammals (e.g., wood bison and moose) through the mine site, or across the Athabasca River, and instead focuses on north-south movements. East-west movements, which may be critical for some wildlife species, may be blocked or greatly limited by the PRM and other developments along the Athabasca River (e.g., Teck Frontier, Shell Pierre River, Total Joslyn and Canadian Natural Recourses Limited (CNRL) Horizon oil sands mines).

EC's Position:

Because of these information gaps, EC considers Shell Canada's analysis incomplete. EC is in particular concerned about effects on boreal woodland caribou and wood bison, as discussed below. In addition, EC notes potential project and cumulative (2013 PDC) effects on movements of moose that have also not been addressed by Shell Canada. Although moose are a provincially managed species and not within

EC's core mandate, effects on moose may impact traditional Aboriginal resource use and thus are subject to review under CEAA 2012.

Boreal Woodland Caribou: The PRM and cumulative developments may, individually or collectively, block east-west movement of caribou and connectivity between the Red Earth and Richardson caribou ranges. Although extent of current and historical movement between ranges is not known, provincial telemetry data show that some Red Earth caribou can occur close to the Athabasca River (outside of provincially designated range) in close proximity to the Richardson range, indicating the potential for movement of individuals between ranges (Teck Resources Limited 2013). This issue is considered important, as maintaining connectivity between caribou ranges is an important consideration of landscape level management planning under the federal boreal caribou recovery strategy (Environment Canada 2012). The effects of the project and 2013 PDC on movement of caribou between ranges have not been addressed by Shell Canada.

Wood Bison: Aboriginal traditional knowledge indicates that core range of the Ronald Lake wood bison herd occurs on the east and west sides of the Athabasca River (e.g., Candler et al. 2011). Therefore, development of the PRM and other projects along the Athabasca River may fragment core bison range and affect movement between the east and west sides of the Athabasca River. This could affect Aboriginal traditional use of bison. The effects of the project and 2013 PDC on the movements of the Ronald Lake herd have not been adequately addressed by Shell Canada.

Moose: Hauge and Keith (1981) reported seasonal movements of moose between high elevation summer habitats in the Birch Mountains and low elevation winter habitats in the Athabasca River valley. The Athabasca River valley is known as an important wintering area for moose (D.A. Westworth and Associates Ltd. 1990); therefore, blocking or greatly limiting east-west movement of moose and subsequent access to the Athabasca River valley by the project and the 2013 PDC may have substantial adverse effects on the local moose population, and Aboriginal traditional use of moose. These effects on moose movements have not been adequately addressed by Shell Canada.

Overall, Shell Canada's analysis of the effects of the PRM (Appendix 1, JRP, SIR 5, Section 4.4.1.3) and 2013 PDC (Appendix 2, JRP SIR 8, Section 3.4.3.1.3) on the movement of boreal caribou, wood bison and moose is incomplete.

Outstanding Information:

EC requests that Shell Canada:

1. Summarize known scientific information and Aboriginal traditional knowledge on, and likely importance of, east-west movements of boreal woodland caribou, wood bison and moose in the northwestern portion of the RSA, in the vicinity of the Athabasca River and the LSA;

2. Identify and discuss any provincial management actions to maintain regional habitat connectivity for woodland caribou, wood bison and moose in the oil sands region, and in the vicinity of the LSA;
3. Evaluate the effects and environmental consequence of construction and operations of the PRM and the 2013 PDC on the east-west movements of boreal woodland caribou, wood bison and moose in the LSA and across the Athabasca River valley. Provide data to support predictions regarding the likely effectiveness of any east-west corridors retained within the PRM lease (or elsewhere) during construction and operations to maintain unimpeded east-west movements of terrestrial mammals, and likely effects of sensory and visual disturbance on use of these corridors by caribou, bison and moose;
4. Provide data to support selection of appropriate movement corridor widths to maintain unimpeded movements of wildlife including caribou, bison and moose;
5. Discuss the potential consequences of blocked or altered movement patterns to local populations of caribou, bison and moose in the northwestern portion of the RSA, and effects on traditional land use in this region; and
6. Provide maps demonstrating potential east-west movement patterns of caribou, bison and moose and available or proposed movement corridors to support predictions and conclusions of residual environmental effects.

References:

Candler, C., the Firelight Group Research Cooperative and the Athabasca Chipewyan First Nation. 2011. Integrated Knowledge and Land Use Report and Assessment for Shell Canada's Proposed Jackpine Mine Expansion and Pierre River Mine. Submitted to the Athabasca Chipewyan First Nation Industry Relations Corporation.

D.A. Westworth and Associates Ltd. 1990. Significant Natural Features of the Eastern Boreal forest Region of Alberta. Technical Report. Prepared for Alberta Forestry, Lands and Wildlife. Edmonton Alberta.

Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa.

Hauge, T.M. and L.B. Keith. 1981. Dynamics of Moose Populations in Northeastern Alberta. J. Wildl. Manage. 45:573-597.

Teck Resources Limited. 2013. Frontier Oil Sands Mine Project, Integrated Application, Supplemental Information Request, Round 2, ESRD and CEAA Responses, Terrestrial.

E. The Ronald Lake Wood Bison Herd

In its response to the JRP SIR 41, Shell Canada provides an assessment of project and cumulative effects on the Ronald Lake wood bison herd within their “*known*” and “*observed*” core ranges, as determined by TEK, and on wood bison habitat within the regional study area (RSA). Although Shell Canada discusses the environmental consequence of habitat change within the core ranges, Shell Canada bases its determination of significance on effects within the RSA (Section 3, SIR 41, pg. 3-153). Shell Canada indicates that much of the high suitability habitat within the RSA is currently not utilized by the Ronald Lake herd (Section 3, SIR 41, pg. 3-150) and concludes that the Ronald Lake herd is unlikely to be limited by habitat availability (Section 3, SIR 41, pg. 3-151). EC considers this approach problematic, as the Ronald Lake herd has a restricted range within the RSA (based on TEK, provincial surveys and telemetry data), and it is likely that most habitat in the RSA is not accessible or available to the herd (e.g., movement south is restricted by existing mine developments). Therefore, the determination of significance should be based on environmental effects within the herd’s current core range (as determined by TEK, field surveys and recent telemetry data), rather than the RSA. Shell Canada has identified a very high loss (-59%) of high quality habitat within the herd’s “*known*” core range in the Planned Development Case relative to the Pre-industrial Case (Section 3, SIR 41, Table 41-1, pg. 3-152), but does not discuss the significance of this effect on bison within the range. Shell Canada’s approach, based on the RSA, is inappropriate.

In addition to the above concern, EC noted a number of unsupported assumptions and conclusions in Shell Canada’s response, as well as gaps in analyses, which further raise concerns regarding the accuracy of Shell Canada’s assessment. As indicated above, Shell Canada indicates that the Ronald Lake herd is unlikely to be limited by habitat based on habitat availability within the RSA. However, Shell Canada has not determined or provided evidence that habitat within the current range is not limiting (e.g., based on range carrying capacity). As a result, it is unclear whether animals displaced by the project and cumulative developments will remain in their current range, depart the current range (e.g., move further into Wood Buffalo National Park [WBNP]) or experience higher mortality as a result of decreased resource availability. Shell Canada assumes that animals will be displaced to alternate suitable habitat outside of the PRM footprint (Section 3, SIR 41, pg. 3-151), but provides no data (e.g., range carrying capacity, response of bison to winter exploration activities) to support this prediction. Also, Shell Canada does not discuss how multiple mine developments (Shell Pierre River and Teck Frontier) will affect distribution and range use of the Ronald Lake herd. The potential displacement of bison further into the WBNP as a result of project and cumulative developments is not discussed by Shell Canada, but is a high concern if Ronald Lake bison are disease free, or have low prevalence of disease (as evidence suggests; Government of Alberta 2013). Displacement further into the park may increase the risk of contact with diseased bison, which may negatively affect the Ronald Lake herd. Displacement of animals into WBNP would also negatively affect traditional resource use, as hunting is prohibited in the park.

Despite having no evidence that habitat is not limiting for the herd in their core range, Shell Canada indicates that the herd is instead likely limited by the effects of unregulated hunting, predation and disease (Section 3, SIR 41, pg. 3-151). However, as acknowledged by Shell Canada (Section 3, SIR 41, pg. 3-150), the prevalence of disease in the herd is low (and may be absent), thus the influence of disease on the herd may also be low (or absent), contrary to Shell Canada's statement. Shell Canada also does not provide any information to support its assertion that unregulated hunting and predation limit the Ronald Lake population (rather than habitat), or the relative importance of each factor. If unregulated hunting is high, then any additional unregulated hunting (e.g., through increased non-Aboriginal hunts) may be detrimental to the herd. Also, displacement of bison and wolves into a smaller range may increase predation rates, thus negatively affecting the herd. The effects of all potential limiting factors (habitat, unregulated hunting, predation and disease) on herd viability within their core range and how these factors may be altered as a result of project and cumulative developments within the herd's range, are not adequately assessed by Shell Canada.

Finally, Shell Canada assumes in its analysis that, because the home range of the Ronald Lake herd overlaps with a small portion of southern WBNP (based on recent telemetry data), Ronald Lake bison are likely to interact with diseased bison that occur in the park (Section 3, SIR 41, pg. 3-150). This contrasts with the views of some Aboriginal groups, who suggest that the herd may be genetically distinct from bison in WBNP and disease free. Although Shell Canada assumes that contact occurs, it provides no information on the current and historical distribution of bison in southern WBNP (e.g., count data, track data, incidental sightings) and degree of overlap of sightings with the known Ronald Lake bison range, to support this claim. Shell Canada does not indicate whether it has consulted Parks Canada to obtain information on bison distribution in southern WBNP.

EC's Position:

Overall, EC finds Shell Canada's assessment of effects on the Ronald Lake wood bison herd incomplete, as described above. As a result, there is high uncertainty in Shell Canada's predictions.

EC requests that the gaps and deficiencies in the analyses of project and cumulative effects on the Ronald Lake wood bison herd be addressed to increase confidence in Shell Canada's assessment. Currently, EC has low confidence in the accuracy of Shell Canada's assessment. Given the status of the herd as a federally listed species at risk, its high traditional resource and cultural importance, and the potential for significant adverse effects on the herd, additional analyses to increase the accuracy of the assessment should be considered. The Ronald Lake wood bison herd is the only herd of wood bison that can be legally hunted by Aboriginal groups in the region, thus impacts to the herd may have substantial effects on traditional resource use. Effects on this herd are thus subject to review under CEAA s.5(1)(c)(iii) (specifically, effects on "*the current use of lands and resources for traditional purposes*").

EC also notes that baseline information on the herd is lacking and those studies, led by Alberta and supported by industry, are underway to fill data gaps. Accurate or complete information on population size, trends, distribution (annual and seasonal range), movement patterns, habitat use and key habitat areas, disease status, genetic status, and sensitivity to disturbance are not available (or have not been summarized from existing data) and would greatly improve the assessment of effects on this herd. The Government of Alberta initiated a bison radio telemetry study in late March 2013 and is currently collecting data on 10 cows from the Ronald Lake herd (Government of Alberta 2013). Additional collars will be placed on bulls in early 2014. This information will be vital for assessing the potential effects of the project and cumulative disturbances on the Ronald Lake herd and in making informed management and regulatory decisions. EC requests that data from these studies be included in the project review, to the extent possible, to ensure the Panel has sufficient information to make an informed decision on the significance of project and cumulative effects on the herd.

Outstanding Information:

EC requests that Shell Canada:

1. Evaluate the significance of project and cumulative effects within the current herd range (not the RSA). As part of this analysis, EC requests that:
 - Herd range is based on the most recent information available, including TEK, provincial and industry surveys, and ongoing telemetry work;
 - Herd range include annual and seasonal ranges for both males and females, as distribution of each sex may differ (e.g., bulls can range considerably farther than cows); and
 - Range maps are provided for all assessment cases; Ideally, delineation of seasonal herd ranges should be based on a minimum of one year of telemetry data collection to ensure accurate representation of ranges. (EC notes that telemetry work to delineate ranges is ongoing and additional data are required (e.g., no data are currently available on male bison). Sufficient information to accurately delineate seasonal ranges for cow bison should be available by April 2014, but later for bull bison (which will likely be collared in early 2014). Accurate information on bison distribution and range is critical for understanding the effects of the project and cumulative developments on the herd.
2. Evaluate the carrying capacity of the Ronald Lake herd range (for both annual and seasonal ranges), using a quantitative and scientifically sound approach, to determine whether bison displaced by the project and cumulative disturbances are likely to remain in their current range (as delineated in (1) above), move out of current range, or experience increased risk of mortality as a result of decreased resource availability. The evaluation of range carrying capacity is important for

determining whether habitat is currently limiting in the herd's known range, or may become limiting following project and cumulative developments. Delineation of carrying capacity will require understanding of resource selection by Ronald Lake bison, which can be determined through analysis of telemetry data taking into consideration the following:

- The results of this analysis should be incorporated into the determination of significance of project and cumulative effects on the herd; and
 - Results of this analysis should also be used to determine potential effects of displacement of bison on traditional resource use of the herd.
3. Evaluate the distribution of bison in southern WBNP, using existing information, to determine the degree of overlap of diseased park bison with the Ronald Lake range (as determined in (1) above), and whether displaced bison from the herd would be at increased risk of contact with diseased bison. As part of this analysis, Shell Canada should also evaluate movement patterns of Ronald Lake bison using telemetry data (for both males and females), to better understand travel distances and the likelihood of displacement further into WBNP.
 - The results of these analyses should be incorporated into the determination of significance of project and cumulative effects on the herd.
 4. Evaluate the response of Ronald Lake wood bison to winter exploration activities and other disturbances in the herd's range to quantitatively determine responses to ongoing disturbances, including displacement distances, and include this information in the analysis of project and cumulative effects (including models). Information for this analysis may be obtained, in part, through an analysis of telemetry data, or other existing or proposed studies on the herd.
 5. Validate its wood bison habitat model using existing telemetry data, and update its model and analyses if validation results are poor (or consider a resource selection model approach). This is important for accurately delineating range carrying capacity.
 - EC specifically requests that Shell Canada use existing telemetry data to identify high use or key habitat areas for Ronald Lake wood bison within their current range, and incorporate this information into the determination of significance of project and cumulative effects on the herd.
 6. Summarize all known information on mortality factors and mortality rate of Ronald Lake wood bison (including unregulated hunting and predation), identify how

mortality factors and rate may change during project construction and operations and as a result of cumulative developments, and implications of these changes to herd viability and significance of effects.

7. Incorporate Aboriginal traditional knowledge into each of the responses above, as appropriate, and actively engage concerned Aboriginal groups when developing its responses (e.g., through workshops and/or working groups) to ensure that current Aboriginal concerns, knowledge and views on the Ronald Lake bison herd are adequately incorporated into the responses. A record of engagement should be provided.

References:

Government of Alberta. 2013. Ronald Lake Bison (*Bison bison*) Winter 2012-2013 Activities. Progress Report (Draft). July 2013.

F. Peatland & Patterned Fens

In its response to JRP SIR 46, Shell Canada provides two reasons why Alberta Vegetation Inventory (AVI) mapping could not be used for RSA scale analysis (Section 5, SIR 46, pg. 3-172): (1) AVI data is not available over the entire study area, and (2) computational limitations of its GIS. It is not clear from Shell Canada's response what proportion of the RSA is not covered by AVI, and whether an analysis of AVI in a subsection of the RSA would provide the Panel with useful representative (and more accurate) information on occurrence of peatlands and patterned fens in the RSA, and environmental consequence of effects. Furthermore, computational limitations may be overcome by tiling (or splitting) large data sets for analysis, and then re-combining the output. It is unclear if Shell Canada has pursued this approach.

EC's Position:

EC continues to be concerned about the low accuracy of the RSA habitat mapping (see also comments on JRP SIR 8 regarding classification error). Shell Canada's analysis of peatland and patterned fens in the RSA based on expected proportion of resources (based on estimates from the entire Boreal ecoregion) is problematic because the spatial distribution of peatlands and fens is not known, making it difficult (if not impossible) to accurately determine the amount of habitat loss caused by disturbance (and subsequent environmental consequence). Furthermore, it is not known if estimates from the Boreal ecoregion reflect peatland and fen distribution in the RSA; Shell Canada provides no information to support this assumption. These limitations result in high uncertainty in Shell Canada's analysis.

Outstanding Information:

EC requests that other methods be evaluated to provide a more accurate assessment of habitat loss and environmental consequence in the RSA. EC requests that Shell Canada:

1. Provide a map showing the overlap of the RSA and available AVI data and calculate the proportion of the RSA not covered by AVI;
2. Clarify why AVI data cannot be tiled or split for analysis and then re-combined in the GIS;
3. Use available AVI data to calculate the area of peatland and patterned fen affected by disturbance and subsequent environmental consequence within this sub-section of the RSA; and
4. Update the response to JRP SIR 50 (a) and (c) based on loss of peatlands in the sub-section of the RSA.

IV. ECOTOXICOLOGY AND WILDLIFE HEALTH

A. 2007 Wildlife Health Risk Assessment vs. 2013 Screening Wildlife Risk Assessment

The provincial TOR (Section 5.6.4, g) requires Shell Canada to describe: *“anticipated effects on wildlife as a result of changes to air and water, including both acute and chronic effects on animal health.”*

Shell Canada addresses the provincial TOR through the Wildlife Health Risk Assessment (WHRA) (Volume 3, Section 5.4, Shell Canada 2007). The WHRA *“describes the potential for adverse population effects to terrestrial wildlife posed by PRM’s release of Chemicals of Potential Concern (COPC).”* In 2013, Shell Canada completed a Screening Wildlife Risk Assessment (SLWRA; JRP SIRs Appendix 3.3) to capture the potential effects of PRM and an updated list of operating, approved and planned oil sands projects in the regional study area. Shell Canada states *“as the findings of the 2013 SLWRA did not markedly differ from those presented in the EIA WHRA (2007), the scope of the current assessment was not expanded to the detailed quantitative risk assessment originally presented in the EIA.”*

EC’s Position:

Some information in Shell Canada’s 2013 SLWRA differs from the original 2007 WHRA. For instance, the 2007 WHRA identified positive risk quotients for aluminum, antimony, manganese, vanadium and methyl mercury for various mammalian and avian species. The 2013 SLWRA only reported positive risk quotients for antimony, selenium and vanadium.

Outstanding Information:

1. EC requests that Shell Canada provide a detailed explanation outlining why the risk quotients for certain COPCs as outlined above differed between the 2007 WHRA and the 2013 SLWRA.

V. EMERGENCIES

A. Accidents and Malfunctions

In JRP SIR 73 the Panel requests that Shell Canada “*provide an analysis of the environmental effects to sensitive elements of the environment, of all accidents and malfunctions listed in the May 2011 submission.*”

Shell Canada’s response indicates that: “*Scenarios selected in this assessment are intended to be representative of accidents and malfunctions that may potentially result in a significant impact to public safety and/or the natural environment... Shell Canada’s assessment considers the probability of the potential consequences and the environmental effects related to the potential scenarios listed in Table 73-1.*” (Accidents and Malfunctions, page 3-269)

Shell Canada’s response indicates that hydrocarbon storage tanks “*are located within the operating complex... within a closed circuit drainage system, and appropriate setback from residents and primary watercourses.*” Shell Canada also indicates that “*For hydrocarbon storage tanks, Shell Canada incorporates the following where appropriate to prevent or mitigate the effects of a major loss of containment:*

- *Containment dyke with an impermeable liner and volume capacity equivalent to 110% of a single tank, and area road/ditches that provide further containment (in the event of a breached dyke);*
- *Fixed foam systems on tanks to minimize the chance of ignition;*
- *Installation of mobile water cannons/fire foam cannons and high capacity hydrants to fight fires;”* (Accidents and Malfunctions, Scenario 1, page 3-279).

EC’s Position:

EC recognizes that Shell Canada has identified and documented a number of probable accident and malfunction scenarios for PRM. EC is of the view, however, that certain important gaps exist in Shell Canada’s contingency planning.

Spills of process-affected water, tailings, process chemicals, hydrocarbons and other substances have the potential to affect water quality and harm fish and aquatic organisms. Shell Canada has not provided any worst-case scenarios to inform their mitigation plans. Shell Canada has provided some cursory information on emergency response plans and procedures (ERPP) for the accidents and/or malfunctions that may occur during the operations phase of the Project. Without detailed information, there is

a lack of understanding as to what extent Shell Canada and its subcontractors will be able to address their responsibilities for prevention, preparedness, response, and mitigation of project-related accidents, spills, releases, or discharges. The primary goals of preparing and implementing ERPPs are to prevent emergency incidents from occurring and to facilitate the undertaking of appropriate response activities in the event that an emergency incident does occur. In this respect, EC is of the view that modelling of, and planning for worst-case scenarios is an industry best practice that provides project proponents with the opportunity to demonstrate the extent of their emergency response preparedness planning abilities as well as their emergency response capacities. Ideally, worst-case scenario planning would be informed by a detailed and in-depth risk assessment as opposed to an assessment of the probability of the potential consequences and the environmental effects resulting from accidents and malfunctions that may occur.

Outstanding Information:

EC requests that Shell Canada:

1. Undertake detailed worst-case scenario planning and trajectory modelling for all accident and malfunction scenarios having likely impacts to the Athabasca River, namely for: Scenario 2: Hydrocarbon pipeline loss of containment and spill into watercourse (Athabasca River); and Scenario 4: External tailings disposal area dyke failure.
2. Undertake hydrologic trajectory modelling, for all seasons throughout the year, for any worst-case scenario having a high probability of affecting the Athabasca River.
3. Develop and promote an emergency response communications plan to inform the public and aboriginal groups of the notification procedures, and of what to do in the event of such a spill incident affecting the Athabasca River.
4. Shell Canada has taken design precautions involving appropriately-sized containment capacity (*i.e.* appropriate to contained product only) and appropriate tank siting setbacks away from primary watercourses. EC requests that Shell Canada provide a detailed explanation of how they will prevent deleterious firefighting foam and/or firefighting water runoff (in the event of a possible ignition and pursuant firefighting activities) from potentially draining to a fish-bearing watercourse or to a tributary thereof (if any) - an action that would constitute a contravention of subsection 36(3) of the *Fisheries Act*.



Health Santé
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Your file Votre référence

Our file Notre référence

December 16, 2013

Pierre River Mine Joint Review Panel Secretariat
160 Elgin Street, 22nd Floor, Ottawa, ON K1A 0H3
Tel.: 1-866-582-1884
Fax: 613-957-0941

Subject: Health Canada's comment on the sufficiency of information provided by Shell Canada Energy for the proposed Pierre River Mine Project CEAR #59539

Dear Mr. Bolton:

Thank you for the Joint Review Panel's (JRP) request of November 7, 2013 to comment on the adequacy of additional information provided by Shell Canada Energy on the Pierre River Mine (PRM) project (*Pierre River Mine Project- Responses to the Joint Review Panel's Supplemental Information Request October 31, 2013*).

Health Canada (HC) is participating as a Federal Authority in accordance with Section 20 of the *Canadian Environmental Assessment Act, 2012*, providing the JRP with expert information regarding the validity and adequacy of the assessment of the potential impacts of the proposed project on human health. The objective of HC's review is to enable a more complete analysis and understanding of potential human health effects of the project on Aboriginal people. HC has participated in the review of the Shell PRM project's Environmental Impact Assessment and supplemental information submissions.

On September 10, 2012, HC sent a letter to the JRP indicating that, from HC's perspective, there was sufficient information in areas related to our mandate to proceed to a public hearing. On October 31, 2013, Shell Canada Energy provided additional information on the PRM project to the JRP. HC has reviewed the additional information and, is still of the opinion that there is sufficient information in areas related to our mandate to proceed to a public hearing.

Should you have any questions concerning HC's response, please contact me at <personal information removed>

Sincerely,

<original signed by>

Mary Frances MacLellan-Wright
Regional Director
Regions and Programs Branch- Prairie Region

Canada



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January 17, 2014

RDIMS: 9084771

Alex Bolton
Chair, Joint Review Panel
Pierre River Mine Project
Canadian Environmental Assessment Agency
160 Elgin Street, 22nd Floor
Place Bell Canada
Ottawa, Ontario, Alberta
K1A 0H3

Subject: Sufficiency Review – Pierre River Mine Project

Dear: Mr. Bolton

In response to the Joint Review Panel (JRP) public notice invitation dated November 7, 2013, Transport Canada is providing, the following comments on the adequacy of the additional information Shell Canada Energy's (Shell) provided in response to the Joint Review Panel's (JRP) Supplemental Information Request.

Transport Canada is responsible for federal transportation policies and programs that promote an integrated transportation system that is safe, secure, efficient and environmentally responsible.

With respect to the Pierre River Mine Project proposed by Shell, Transport Canada's mandate is to ensure the public right of navigation under the *Navigable Waters Protection Act* (NWP). Transport Canada may have to issue approvals under the NWP that would permit this project to be carried out in whole or in part, and thus will participate in the environmental assessment process as a Federal Authority under the *Canadian Environmental Assessment Act, 2012*.

In consideration of the current information provided by Shell in its *Environmental Impact Statement* (EIS) and its responses to Supplemental Information Requests the following approvals to be issued under the NWP will likely be required:

- An approval under section 5 for the proposed bridge over the Athabasca River
- An approval under section 5 for the proposed Athabasca River intake structure

Canada

Upon reviewing Shell's most recent *Submission of Information to the Joint Review Panel*, dated October 31, 2013, Transport Canada has identified one area for redress and clarification based on the response Shell has provided to SIR 28.

- SIR 28 – Shell Canada has predicted that the cumulative impact of water withdrawals, in combination with potential climate change, will likely result in a 19 cm decrease in water level within reach 4 of the Athabasca River in 2050.
 - What are the impacts to navigation on the Athabasca River and the Peace Athabasca Delta, as a result of the cumulative impact of water withdrawals and the identified decrease in water levels?

Transport Canada looks forward to continued dialogue and cooperation with Shell in order to obtain additional clarification and detailed construction plans of the proposed Pierre River Mine Project.

Sincerely,

<original signed by>

Todd Frederickson
Regional Director
Programs, Prairie and Northern Region

c: Dale Kirkland
Adam Downing



Natural Resources
Canada

Ressources naturelles
Canada

January 16, 2014

CEAR #59539

VIA EMAIL: Shell.Reviews@ceaa-acee.gc.ca

Pierre River Mine Joint Review Panel Secretariat
160 Elgin Street, 22nd Floor,
Ottawa, ON K1A 0H3

RE: Natural Resources Canada's Submission to the Joint Review Panel for the Shell Pierre River Mine Project

Attention: Mr. Alex Bolton, Chair, Joint Review Panel

This letter is in response to the request by the Joint Review Panel on November 7, 2013, for Natural Resources Canada's (NRCan's) views on the adequacy of the additional information provided by the Proponent (Shell Canada Limited).

NRCan has participated in the review of the Environmental Impact Statement, and Supplemental Information. NRCan, as a Federal Authority under the *Canadian Environmental Assessment Act 2012*, has provided expert knowledge and advice in: physical hydrogeology (groundwater quantity and related mitigation and monitoring); geotechnical science and geohazards; forestry, and tailings management.

It is NRCan's view that there is sufficient information, with regards to the topics for which we provided expert knowledge and advice, to proceed to public hearing. NRCan appreciates the opportunity to comment on these issues. Should you require additional information, please contact Shelley Ball, Senior Environmental Assessment Officer at <personal information removed>

Sincerely,

<original signed by>

Mark Pearson
Director General, External Relations
Natural Resources Canada

c.c.: John Clarke, SPI
Donna Kirkwood, ESS
Nicole McDonald, IETS
Ken Mallet, CFS