



Environment Environnement  
Canada Canada

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February 2, 2015

EC file: 4194-10-6037

Jill Adams, Panel Manager  
Pierre River Mine Joint Review Panel Secretariat  
Canadian Environmental Assessment Agency  
160 Elgin Street, 22<sup>nd</sup> Floor  
Place Bell Canada  
Ottawa, ON K1A 0H3

Via Email: [Shell.Reviews@ceaa-acee.gc.ca](mailto:Shell.Reviews@ceaa-acee.gc.ca)

Attention: Ms. Adams

**RE: October 17, 2014 Meeting on Regional Study Area Methodologies between Environment Canada and Shell Canada Energy**

Environment Canada (EC) met with Shell Canada Energy on October 17, 2014, to discuss methodology for delineating spatial boundaries of terrestrial regional study areas in environmental assessments. Both participants agreed that the meeting was relevant to the Pierre River Mine review, and that the meeting notes should be made available on the CEAA registry in the interest of transparency. Environment Canada agreed to forward the notes to the Panel Secretariat to ensure they were a part of the public record.

Please find appended, for your consideration, the meeting notes and presentation slides from the October 17<sup>th</sup>, 2014 meeting.

For further clarification on any aspect of the submission, please contact Lorna Hendrickson at (204) 983-1781 or [Lorna.Hendrickson@ec.gc.ca](mailto:Lorna.Hendrickson@ec.gc.ca).

Sincerely,

<original signed by>

Susanne Forbrich  
Regional Director

Attachment(s) – *Meeting with Shell Canada Energy and Environment Canada on Regional Study Area Methodologies, Terrestrial Regional Study Area Meeting*

cc: Dave Baines, Shell Canada Limited  
Lorna Hendrickson, Environment Canada  
EC Internal Distribution

**Meeting with Shell Canada, Golder, Environment Canada (EC) and the Canadian Environmental Assessment Agency (the Agency)**

**Friday, October 17, 2014**

**Calgary, Alberta**

Participants:

*Golder Associates*

Martin Jalkotzy

Wayne Speller

*Shell Canada Limited*

Margwyn Zacaruk (by phone)

Michelle Barrett

Gary Millard

*Environment Canada*

Shelly Boss

Lorna Hendrickson

Richard Wiacek

Robin Zielke

Miles Zurawell

*The Agency*

Sean Carriere (observer, by phone)

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- Environment Canada (EC) met with Shell Canada and Golder (hereinafter referred to as Shell), at their request, to discuss methodology for delineating spatial boundaries of terrestrial regional study areas (RSA) in environmental assessments, using the proposed Pierre River Mine (PRM) project as an example.
  - EC clarified its role in the environmental assessment process as that of a technical advisor that can provide comments (pros and cons) regarding RSA methodologies. EC indicated that any comments provided should not be construed as approving certain approaches, nor would EC be prescriptive in any advice provided at the meeting. It is Shell's responsibility to select an appropriate approach to address the PRM Joint Review Panel's supplemental information request (SIR). Shell confirmed they were of a common understanding.
  - Shell indicated that they are planning to have a similar discussion with Aboriginal Groups regarding the RSA, although they have not discussed the timing of these meetings with Aboriginal groups yet. EC indicated support for Shell meeting with the aboriginal groups and seeking their input on RSA

methodology. EC recognizes value in seeking multiple sources of information and encourages Shell to engage Aboriginal Groups on the RSA early in the process.

- Shell also indicated that they are pursuing similar discussions with Alberta regarding the RSA.

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*Technical discussions (see presentation):*

Shell: Asking 'what should we consider?' in addressing concerns raised in the PRM information requests.

EC: For Shell Jackpine Mine Expansion (JPME), EC's did not comment on the size of the RSA per se, but rather on how it was used to assess significance of project effects. For PRM, the presence of wood bison and other species with discrete ranges makes it worthwhile considering a different approach for the RSA. However, Aboriginal groups and non-governmental organizations (NGOs) did have concerns about the size of the Jackpine RSA. Does Shell also plan to engage NGO's on the RSA issue?

Shell: Shell has not considered engaging NGO's yet.

Shell Question 1: What is the purpose of the terrestrial RSA?

EC: A primary purpose of the RSA is to assess cumulative effects. The RSA can have some value for assessing project-specific effects at a larger scale, but this value depends on the size of RSA. Project effects can become diluted in very large RSAs. Therefore, as an RSA grows in size, the evaluation of project effects becomes less meaningful. The recent trend is for oil sands panels to look at the Local Study Area (LSA) for project effects and the RSA for cumulative effects. When assessing project effects, it may be worthwhile looking at both scales to provide perspective. Assessing significance of project effects at multiple spatial scales gives decision makers more information on which to make decisions.

Shell: Other assessments of open pit mine projects in Canada have not found significant effects, questioning why the last two (including JPME) have been significant? Feel it is cumulative effects that have changed things, so RSA is large enough to capture that.

EC: We cannot speak to the Joint Review Panel's (JRP) thinking and conclusions. However, baseline conditions have changed in the oil sands region, e.g., number of species at risk, which have increased in recent years. The JRP did pick up on our comments regarding a dilution effect; their approach to deal with this is to adjust the RSA size. There may be other approaches, e.g., how the information on project effects is interpreted within a larger RSA.

Shell: What are the factors that need to be considered when determining an RSA? Where to draw boundaries, e.g., if in middle of common group of activities, include all or chop up?

EC: RSA sizing should be informed by the species you are looking at (e.g, range of wood bison). It is possible to consider multiple RSA boundaries depending on the species present. This could be done for species with defined ranges, e.g., have a general RSA and separate caribou and bison RSAs. EC noted

that it is not known whether the JRP is looking for this. For JPME, bison impacts were assessed in the entire RSA, but they have a restricted range, so another approach may be needed.

Shell: Shell commented that they are being asked to assess caribou, but they aren't in the LSA. For species at risk with defined ranges where the project lies outside, do we then assess impacts to the habitat that they're not using?

EC: Can be challenging. Shell needs to look at all available information, including Aboriginal Traditional Knowledge (ATK), and talk to Alberta Environment and Sustainable Resource Development (AESRD) because they define the range and have information on range sizes. Caribou is a sensitive issue, and EC recommends Shell seek all of the best information available when determining the type of analysis necessary.

Shell Question 2: Should the Terrestrial RSA being reviewed by a JRP comply with the Provincial TOR set out for a project? (Presentation slide 5)

EC: We cannot comment on the provincial TOR. Shell would need to ask the AER.

Shell Question 3a: What are the relevant spatial constraints when developing a Terrestrial RSA? Can it be too large or small? (Presentation slide 6-8)

EC: Yes, the RSA can be too large or small. RSA size depends on a number of factors, including the species present, cumulative effects, and how the RSA is being used to evaluate the significance of project effects. There are a number of RSA approaches to consider that may be acceptable depending on the project and issues. Shell needs to consider all of the factors and determine which methodology is best for this project, and best to address the JRP SIR.

Shell: Regarding dilution effect, Shell is concerned that dilution is pre-supposing the answer vs. putting information in and getting out an answer.

EC: EC does not agree that reducing the dilution effect (using a smaller RSA) would pre-suppose the answer. To get around any perceived problem, one solution may be to evaluate effects at various spatial scales to get a full understanding of project impacts (both locally and regionally). The appropriate approach depends on the species being evaluated (e.g., whether they have defined ranges), and the nature of the effects in the area. However, the more information provided to decision makers the better. Assessing effects at a very large scale (i.e. regional) has a role but more from a Provincial planning perspective (e.g. LARP).

Shell Question 3b: What are the constraints in the selection of an RSA? (Presentation slide 8)

Shell: the Minalable oil sands are central within the existing RSA, so feeling it is capturing cumulative effects and repeatability.

EC: Noted that the existing RSA no longer captures all effects, e.g, Ronald Lake Bison Herd range occurs outside of the JPME/PRM RSA.

Shell: Is the distance to the RSA boundary relevant, for example a bison RSA might only cover part of the project?

Also how to define an RSA for whooping crane, would it be migration route?

EC: Following a precautionary approach, it might be best to include more area, depending on what is known about species range (and level of uncertainty), but Shell would need to provide justification.

Whooping crane – may not have full information on migration route so best to be precautionary in how to define migratory pathways. Certainly should use all existing information, and could consider evaluating effects at multiple spatial scales.

Shell Question 4: What influence should data availability have on the spatial extent and location of the Terrestrial RSA? (slide 9)

EC: As commented on for JPME, there are big limitations with the coarse scale Landsat data Shell is using to delineate the RSA vegetation/habitat types, particularly old growth forests and wetlands and there is a need for improvement. The Landsat imagery provides no information on age class, and data on wetlands is very coarse. With no information on age class, it is not possible to model old growth habitat for migratory birds, which creates potential for very high error. Coarse scale wetland mapping (which effectively clumps higher resolution ecosite habitat units) may overestimate the amount of high quality habitat for yellow rail and therefore underestimate project and cumulative impacts. Other mapping products should be considered. It is preferable to be consistent in the data type as much as possible, as opposed to using multiple data types within the same RSA (e.g. AVI, SPOT, Landsat), but this may not be possible if a large RSA is selected.

Shell Question 5: Which boundaries should be incorporated within the RSA? (slide 10) All of them but how would you weight them?

EC: From a wildlife perspective, could first consider species information (e.g., range) and then consider various geographical or administrative boundaries that are relevant to different species. Therefore, may want to prioritize ecological parameters before administrative boundaries. Use of wildlife ranges versus geographical or administrative boundaries depends on a number of factors, including whether there is a defined species range (e.g., boreal caribou and wood bison) and the primary impact pathway (habitat or non-habitat/mortality based). Also suggest that Aboriginal Traditional Knowledge and concerns be incorporated and a precautionary approach taken.

Shell: Aboriginal Traditional Lands – modify a science-derived RSA with Aboriginal Traditional Land use?

EC: EC stresses the need to address the concerns of Aboriginal groups. Their input may influence the RSA Shell chooses. At this time, RSA sizing requires more discussion with Aboriginal groups and the Agency. Most of the discussion today has focused on the western science side of things, and there is a need for Shell to engage Aboriginal groups to receive information on TLU and TK side of things. EC reiterates that our comments are not intended to be prescriptive, and do not speak for Panel.

Shell: Recognize the need for more engagement with Aboriginal groups and other stakeholders and have plans to do so. They are hoping to talk to Aboriginal groups early next year. Have no updates on the Project Update, but will be submitting November and February updates to the JRP. Recognize the importance of consulting with Aboriginal groups.

October 17, 2014

# Terrestrial Regional Study Area Meeting





# Terrestrial Regional Study Area Meeting

- Introductions
- Health and Safety
- Background
- Meeting Objectives
- Discuss Terms of Reference Questions
- Next Steps





# Terrestrial Regional Study Area Meeting

## 1. What is the purpose of the Terrestrial RSA?

Project	RSA Characteristics
Shell JME and PRM TOR (2007)	<ul style="list-style-type: none"><li>“...spatial limit of individual environmental components outside the Project Area boundaries where an effect from the Project can reasonably be expected.”</li></ul>
Total Joslyn North Mine	<ul style="list-style-type: none"><li>Used to assess impacts on terrestrial indicators and for the CEA.</li><li>The Zone of Influence approach (ZOI), where the RSA (400,261 ha) is an 11 km buffer around Lease 24 (1 moose home range diameter) plus the ZOIs of other projects that overlap with the Project.</li></ul>
Kearl Lake Project	<ul style="list-style-type: none"><li>RSA (1,195,956 ha) encompasses the farthest measureable effect associated with the project. Deemed to be the 0.25 keq H<sup>+</sup>/ha/a (kiloequivalent hydrogen ions per hectare per year) isopleth for potential acid input (PAI), and was developed for the potential development assessment case.</li><li>RSA extended east to include other developments and tied to administrative and geographic boundaries (i.e., townships and ranges).</li></ul>



# Terrestrial Regional Study Area Meeting

Project	RSA Characteristics
Frontier Project	<ul style="list-style-type: none"><li>• RSA (1,195,560 ha) captures the farthest measurable effects associated with the Project directly relevant to terrestrial resources. These effects are expected to be related to annual critical levels of NO<sub>2</sub>.</li><li>• Follows administrative and geographic boundaries (i.e., townships and ranges).</li></ul>
JME and PRM, Horizon, Muskeg River Mine Expansion, Voyageur South, Jackpine Mine Phase 1	<ul style="list-style-type: none"><li>• RSA (2,277,375 ha) designed to evaluate effects at an ecologically relevant scale and to capture the effects of most existing, approved, and planned development within the Oil Sands Region north of Fort McMurray.</li><li>• Based primarily on ecological parameters such as moose home range size, designated woodland caribou ranges, watersheds, geographic and ecological areas (e.g., Birch Mountains).</li></ul>
Lower Churchill Hydroelectric Generation Project	<ul style="list-style-type: none"><li>• The Assessment Area for the Terrestrial Environment VEC is the geographic area within which Project effects would occur for each KI and where the significance of environmental effects is determined.</li><li>• For all KIs, except caribou, the Assessment Area coincides with the lower Churchill River watershed (2,521,400 ha).</li><li>• Owing to the threatened status of caribou, the Red Wine Mountain (RWM) herd's recent range has been selected as the Assessment Area for caribou (5,746,900 ha).</li></ul>



# Terrestrial Regional Study Area Meeting

2. Should the Terrestrial RSA being reviewed by a JRP comply with the Provincial TOR set out for a project?

From Shell JME and PRM TOR (2007):

- Section 2.2 e) states that the RSA be defined “considering the location and range of probable Project and cumulative effects, including those related to regional or cumulative effects...”
- Section 4.7 b) states “the amount and nature of any acidifying emissions, as well as, probable deposition areas and potential effects to soils, vegetation and waterbodies” be discussed.
- Section 5.2 states “The spatial boundaries shall include all areas where measurable changes in the environment may be caused by the Project regardless of any political boundaries, such as provincial or national park borders.”
- Section 5.6.2 d) requires inclusion of “the predicted acidifying impact to local and regional soils resulting from the Project with reference to local studies, current guidelines and management objectives for acidifying emissions consistent with the CEMA acid deposition management framework.”



# Terrestrial Regional Study Area Meeting

3. What are the relevant spatial constraints when developing a Terrestrial RSA, including:
  - a. Can the RSA be too large or too small?

Project	RSA Size	JRP Comments
Lower Churchill Hydroelectric Generation Project (2011)	5,746,900 ha (for caribou)	<ul style="list-style-type: none"><li>Panel did not specifically comment on RSA areal extent.</li></ul>
Cheviot Coal Mine (2000)	5,538,400 ha	<ul style="list-style-type: none"><li>Panel found Terrestrial RSA areal extent appropriate – represented ecological context.</li></ul>
CNRL Horizon (2004)	2,277,376 ha	<ul style="list-style-type: none"><li>Panel found terrestrial boundary reasonable and that it reflected the project's ecological context.</li></ul>



# Terrestrial Regional Study Area Meeting

Project	RSA Size	JRP Comments
Shell Jackpine Mine Phase 1 (2004)	2,277,376 ha	<ul style="list-style-type: none"><li>Panel did not comment on RSA areal extent.</li></ul>
Muskeg River Mine Expansion (2006)	2,277,376 ha	<ul style="list-style-type: none"><li>Panel did not comment on RSA areal extent.</li></ul>
Shell Jackpine Mine Expansion (2013)	2,277,376 ha	<ul style="list-style-type: none"><li>Panel felt study area was too large and caused a dilution effect.</li></ul>
Kearl Lake OSM (2007)	1,195,956 ha	<ul style="list-style-type: none"><li>no specific panel comments on areal extent of RSA.</li></ul>
Teck Frontier OSM (2011)	1,195,956 ha	<ul style="list-style-type: none"><li>Question 204 – requested that RSA be adjusted northward to capture cumulative effects in this area.</li></ul>
Total Joslyn North OSM (2011)	400,261 ha	<ul style="list-style-type: none"><li>While interveners felt study area was too small, Panel supported the spatial boundary.</li></ul>
Encana Suffield Shallow Gas (2009)	279,891 ha	<ul style="list-style-type: none"><li>Panel found terrestrial boundary too small to assess cumulative effects.</li></ul>



# Terrestrial Regional Study Area Meeting

3. What are the relevant spatial constraints when developing a Terrestrial RSA, including:
  - b. What are the constraints in the selection of an RSA? (i.e., is distance from the project footprint to the boundary of the Terrestrial RSA a constraint?)

Project	RSA Characteristics
Shell JME and PRM TOR (2007)	<ul style="list-style-type: none"><li>“...spatial limit of individual environmental components outside the Project Area boundaries where an effect from the Project can reasonably be expected.”</li></ul>
Total Joslyn North Mine	<ul style="list-style-type: none"><li>Footprint positioned at the eastern boundary (Athabasca River).</li><li>Confined by the Athabasca River on the east.</li></ul>
Kearl Lake Project	<ul style="list-style-type: none"><li>Footprint in the NW corner of the RSA.</li></ul>
Frontier Project	<ul style="list-style-type: none"><li>Footprint in the NW corner of the RSA.</li></ul>
JME and PRM, CNRL Horizon, Muskeg River Mine Expansion, Suncor Voyageur South, Jackpine Mine Phase 1	<ul style="list-style-type: none"><li>Footprints generally to the centre of the RSA, although the Suncor footprint was noticeably to the south of centre, and PRM to the north of centre.</li></ul>
Lower Churchill Hydroelectric Generation Project	<ul style="list-style-type: none"><li>Footprints (2) at the east side of RSAs.</li></ul>



# Terrestrial Regional Study Area Meeting

## 4. What influence should data availability have on the spatial extent and location of the Terrestrial RSA?

### Disturbance:

Issue is primarily access. If the RSA extends beyond Alberta, disturbance data of the same level of quality might not be available.

### Landcover:

Data Type	Source Imagery	Level of Detail	Data Extent	Limitation
AVI	High-resolution aerial imagery	High	Available only within FMA areas	Potential
Landcover classification from mid-level resolution satellite imagery	Mid-resolution satellite imagery (3-5m), e.g. SPOT	Mid	N/A	None
Published landcover classifications (AGCC, ABMI)	Landsat	Low	Available only within Alberta	Potential
Existing Golder landcover classification	Landsat	Low	N/A	None



# Terrestrial Regional Study Area Meeting

5. Which environmental, geographic and political boundaries should be incorporated within the Terrestrial RSA? Examples of these boundaries could include, but are not limited to:
- a) geographic and ecological areas – e.g., Birch Mountains, Moose Mountains
  - b) wildlife home ranges and habitat – e.g., moose, caribou, wood bison, migratory birds
  - c) natural region and vegetation classification boundaries
  - d) major river system watersheds
  - e) spatial extent of predicted cumulative aerial deposition patterns
  - f) administrative boundaries – e.g., township/range boundaries, municipal boundaries, Province boundaries, provincial and national park boundaries, wildlife management units, forest management units
  - g) regional planning boundaries – e.g., Terrestrial Ecosystem Management Framework (TEMF) or Lower Athabasca Regional Plan (LARP) boundaries
  - h) footprint and “zone of influence” of existing, approved and planned developments
  - i) Aboriginal Rights and Interests including but not limited to traditional land use boundaries and cultural heritage





# Terrestrial Regional Study Area Meeting

- Wildlife home ranges

Species	Average Range Radius (km)	Average Range Area (ha)
Caribou	65.5	1,785,196
Moose	4.7	61,227
Fisher	3.1	47,200
Western Toad	1.4	34,057



# Terrestrial Regional Study Area Meeting

- Next Steps