

## **AER RESPONSES**

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## GENERAL

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### *Question 1*

**Provide an update on any project changes that have occurred since Teck filed the responses to supplemental information request no. 2.**

### *Response 1*

Since Teck Resources Limited (Teck) submitted the Integrated Application in November 2011, Teck and Shell Canada Limited (Shell) completed an asset exchange of oil sands leases (OSLs). Details of the asset exchange were provided in the October 2013 response to ERCB Round 2 SIR 1. The remaining Round 2 responses reflected Teck's intent to not develop resources associated with OSLs acquired from Shell until later in the Project life as well as the removal of the south development area (SDA). Teck has now undertaken further engineering studies that allow for the inclusion of resources from the former Shell leases. The resource is new (i.e., not part of Shell's Pierre River Mine Application) and would be accessed by extending the Main pit marginally south into OSL 744 and by adjusting the east wall of the Main pit. As a result of this work, the recoverable resource for the Frontier Oil Sands Mine Project (the Project) increases to 3.0 billion barrels of partially deasphalted bitumen, which is approximately 200 million barrels more than originally applied for and 600 million barrels more than was estimated in the responses to Round 2 SIRs (i.e., without the SDA).

Teck is one of the original members of Canada's Oil Sands Innovation Alliance (COSIA), which was founded in 2012. COSIA is a group of oil sands producers focused on accelerating the pace of improvement in environmental performance in Canada's oil sands through collaborative action and innovation. Based on learnings from COSIA, and an improved understanding of site-specific conditions, Teck has revised the tailings management strategy for the Project to accommodate the higher than typical ore fines content and the limited amount of suitable construction material. Teck will consider the implications of these enhancements in a Project Update that will be submitted to regulators in the first half of 2015. The update will consider Round 1 to 3 supplemental information requests (SIRs), Aboriginal and stakeholder statements of concern, incorporate additional environmental site assessment information, consider scientific advances and will reflect the evolving regulatory framework.

Although the Project is essentially the same, with a similar layout, disturbance area and production rate, Teck intends to update the Project's environmental impact assessment to ensure that regulators, Aboriginal communities and stakeholders are able to consider the most current Project plan. This is consistent with Teck's goal to disclose and appropriately communicate information in an accurate and timely manner to enable meaningful and constructive review and interactions. Since engineering studies

supporting this plan are in progress, this response provides a general description of each design change and its rationale. The Project Update will provide additional engineering detail as required to update the environmental impact assessment. This discussion follows the sequence of the Project Description (Volume 1) of the Integrated Application.

### **OVERVIEW**

The Project will be developed in two phases that are nominally 12 years apart:

- Phase 1 will comprise two production trains that will be constructed at the same time.
- Phase 2 will consist of a single additional production train that will be similar in design to the first two.

Once all three production trains are operational, the expected average production rate will be a nominal 260,000 barrels per calendar day (bbl/cd) of partially deasphalted bitumen. There is potential to increase the production rate to about 277,000 bbl/cd through debottlenecking and technical innovation.

Engineering studies have determined that it is possible to recover resource not previously targeted by Teck or Shell. As a result of this work, the recoverable resource for the Frontier Project would increase to 3.0 billion barrels of partially deasphalted bitumen, which is approximately 200 million barrels more than originally applied for and 600 million barrels more than was estimated in the responses to Round 2 SIRs (i.e., without the south development area). Recovery of this resource requires that the Project layout be updated; however, the overall Project disturbance area would be 118 ha less than what is specified in the Integrated Application (i.e., 29,217 ha instead of 29,335 ha).

Teck is updating the Project schedule based on the results of additional engineering. Contingent on regulatory approvals and economic climate, first oil is planned for the end of 2025, with production continuing until 2066.

### **GEOLOGY AND RESOURCE**

Teck has updated the geologic model based on the results of additional resource and geotechnical drilling and information obtained from Shell as part of the asset exchange. The new information allowed the geologic model domain to be expanded to the east and south. Overall, the geologic setting remains the same as presented in the Integrated Application. However, Teck has confirmed that the Frontier Project has a higher than typical ore fines content and a limited amount of suitable construction material. The additional information has also provided a better understanding of the lateral and vertical extent of the sand deposit beneath the east side of the external tailings area (ETA).

Teck has also updated the hydrogeologic model to include additional groundwater monitoring results and well response testing. As with the geologic model, the overall hydrogeologic setting remains the same, but with an improved understanding of local conditions.

## ***MINE PLAN***

The updated geologic model allowed the Main pit to be marginally expanded to the south and east. The pit extension to the south recovers new resource from OSL 744, which Teck obtained in the asset exchange with Shell. The expansion to the east optimizes the original pit wall. The updated mine plan also optimizes the location of external disposal areas (EDAs) and infrastructure. Other significant changes to the overall mine plan include:

- placing an EDA over Unnamed Lakes 1 and 2 and the surrounding area
- placing reclamation material stockpiles (RMS) east of ETA 1 and over backfilled in-pit locations
- adding two sand borrow pits for construction purposes
- using three crusher locations instead of two

Extending the pit south into OSL 744 requires diverting Big Creek. Because of topographic constraints, the diversion will bypass Unnamed Lake 1. This precludes using Unnamed Lake 1 as a sedimentation pond during Project operation as originally proposed. The post-closure topography also prevents the creek from being re-established at the end of mining. Since flows to Unnamed Lake 1 cannot be maintained during operation or post-closure, the lakes and surrounding area will be used for an EDA. Placing an EDA in this area optimizes the haul distance from the pit, resulting in fewer trucks and associated emissions.

The Integrated Application considered the area surrounding Unnamed Lake 1 and Unnamed Lake 2 to be disturbed when assessing effects to the terrestrial environment (i.e., the Project assessment area [PAA] as opposed to the PDA<sup>1</sup>). The Integrated Application also included fishery compensation for Unnamed Lake 1 and the creek that drains from it (Unnamed Creek 2) because these aquatic resources would both be disturbed by mining. (Note: Unnamed Lake 2 does not have fish habitat.) The primary reason that the area was not initially proposed for use as an EDA was the perceived opportunity to preserve the situational context of historical resources around the lake (see Volume 1, Section 2.2.3.2, Pages 2-10 to 2-12). These resources will now be recovered and preserved in advance of mining.

The decision to place RMSs east of ETA 1 was made to limit incremental disturbance to the north in the area where the Project intersects the southern extent of the Ronald Lake bison herd range. A decision was

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<sup>1</sup> The distinction between the PAA and PDA, which caused some confusion during the review of the Integrated Application, is no longer required and will not exist in the Project Update. The spatial extent of the Project will be defined only in terms of the PDA.

also made to place RMS over backfilled in-pit locations as this contributes to shorter haul distances, a reduction in the number of haul trucks and associated emissions as well as the size of the PDA.

Borrow pits for sand were added because additional drilling did not identify suitable deposits of construction material within the original PDA. Use of this material for starter dyke construction is preferable to interburden because it avoids over-excavation and hauling material long distances during pre-production. In addition to being uneconomical, longer haul distances would increase the number of trucks required and associated emissions. Teck anticipates that it will be possible to progressively reclaim portions of the borrow pits.

Mine optimization planning determined that three crusher locations were more efficient than two. Use of an additional crusher location is expected to contribute further to a reduction in the number of haul trucks and associated emissions.

Including the pit expansion, addition of sand borrow pits, and changes identified below, the PDA will be 118 ha smaller than proposed in the Integrated Application (i.e., 29,217 ha instead of 29,335 ha). When this is considered in conjunction with the 200 million barrels of additional resource, the Project achieves an improved resource recovery-to-disturbance ratio. Optimization of the mine plan has also reduced the perimeter of the PDA by about 50 km, which Teck expects will result in less habitat fragmentation.

### ***EXTRACTION***

The extraction process remains essentially the same as described in the Integrated Application. The main difference is a 5°C increase in the upper end of operating temperature range. This change is necessary to achieve acceptable resource recovery rates over a range of ore types and is driven by the high fines content of the ore. As discussed in the Tailings Management section, the thickeners have also been removed as part of the overall tailings management strategy.

### ***TAILINGS MANAGEMENT***

The tailings management strategy developed for the Integrated Application was based on engineering completed in 2009 and 2010. Since then, additional geotechnical drilling and information obtained from Shell as part of the asset exchange has confirmed that the Frontier Project has a higher than typical ore fines content and a limited amount of suitable construction material. Teck's membership and participation in COSIA has led to better understanding and knowledge of recent improvements and advances made in fine tailings treatment technologies. This has allowed Teck to improve the tailings management plan for the Project. Instead of producing thickened tailings using a thickener and utilizing thin lift drying to consolidate mature fine tailings, which would be trucked to EDAs, the updated strategy involves depositing coarse combined tailings (CCT) through dyke construction and beaching. Dykes will be constructed using CCT, forming a tailings area that will collect fluids and contain other tailings streams including secondary flotation tailings (SFT) and tailings solvent recovery unit (TSRU) tailings.

In the updated strategy, the CCT areas are expected to capture more than 50% of the fines in the coarse sand beaches and result in fewer fines being released to form fluid fine tailings (FFT). Remaining FFT will be subsequently processed using centrifuges to create centrifuged fine tailings (CFT), which will be placed in dedicated disposal areas (DDAs). Almost all of the CFT will be placed in-pit below the original ground level. Overall, the updated strategy is superior to that presented in the Integrated Application because:

- the outcome is more predictable (i.e., there is an increased surety of outcome because fines treatment is decoupled from the extraction and bitumen recovery process)
- the strategy is based on technologies that are currently used in oil sands operations
- double handling of tailings is avoided (i.e., both to and from the thin lift drying area)
- challenges associated with operating a large thin lift drying area are removed
- using the tailings area as a process device to collect and sequester fines is efficient as it reduces the amount of flocculent required and fines that need to be centrifuged
- the strategy enables progressive reclamation of the surface of an external tailings area during operations
- in-pit placement of treated FFT is inherently better than ex-pit locations because it eliminates long term ex-pit storage of treated fine tailings behind dams and provides a more robust reclamation landscape.

### ***WATER MANAGEMENT***

The water management objectives and strategy are consistent with those discussed in the Integrated Application. However, Teck has improved the water management plan based on the updated geologic and hydrogeologic models as well as the updated mine plan. The main changes to the water management plan are as follows:

- Big Creek will be diverted to facilitate mining OSL 744.
- Flows associated with Unnamed Creek 2 will be diverted to a dual-purpose off-stream storage pond (OSSP) and sedimentation pond that will be constructed using the natural topography.
- Various strategies will be used to reduce the use of granular material for channel armouring (given the general absence of such materials near the Project).
- A portion of the depressurization water will be injected into adjacent basal water sand units at the start of mining until sufficient storage capacity exists in an ETA.
- Seepage from the ETAs will be controlled using pumping wells during operation and by installing a barrier wall or equivalent at closure.
- The Project's river water withdrawal requirements will increase during the first few years of operation (to facilitate sufficient water inventory for two process trains at start-up) and will decrease thereafter, resulting in less overall water use during the life of the Project.

The Project Update will evaluate the environmental effects of these changes. Teck believes the changes are appropriate given site-specific conditions and that they will improve project economics and environmental performance.

The multi-purpose use of Project features such as the OSSP and previously mentioned placement of reclamation material stockpile (RMS) over disturbed areas is an efficient use of land. Minimizing the use of off-site sourced granular material reduces traffic and associated vehicle emissions. Injection of depressurization water into adjacent basal water sand units is an efficient interim measure that reduces emissions, disturbance and costs by reducing the size of pre-production storage ponds. Implementing the final groundwater seepage control strategy at closure avoids disturbing terrestrial habitat until later when progressive reclamation has commenced and improves project economics. The approach also provides decades to learn, study and evaluate the local hydrogeology and for technology to advance. This will ensure that the optimal site-specific seepage-control system exists to manage the post-closure period.

The increased river water withdrawal in the first few years of operation is a result of two process trains starting initially instead of one as proposed in the Integrated Application. Teck will manage this early need for water through a phased water license request, reducing the annual volume of water requested for most of the mine life. This will reduce Teck's overall requested volume of river water withdrawal.

### ***UTILITIES***

Project utilities will remain the same as presented in the Integrated Application. The exception is that the river water intake (RWI) location will change to Option 3 from Option 4. The potential for this change was identified in the response to ERCB Round 1 SIR 1 because the 2012 spring freshet caused the main channel to shift away from the proposed intake location. Since the channel did not re-establish at this location during the 2013 or 2014 spring freshets, it is evident that Option 4 is an inferior location that would require dredging or in-stream river training features. Accordingly, the Project Update will consider Option 3 (Dalkin Island). This location is preferred from a hydrotechnical perspective as it has a lower potential for siltation and remains above the 1:100 year flood limit. In addition, this location does not require excavation of the riverbank to accommodate infrastructure. Moreover, the new pipeline alignment from Option 3 avoids crossing Shell's Redclay Compensation Lake and results in less habitat fragmentation because it will be adjacent to a sand borrow pit and Shell's off-stream storage infrastructure. This latter point represents an opportunity for shared infrastructure that Teck can explore with Shell during future stages of engineering as enabled by their Projects Agreement.

### ***INFRASTRUCTURE***

Teck has completed an engineering study of alternate construction methods. This study has identified a plant layout that is safer, less expensive to build and has a smaller footprint. This improves Project economics because it is more efficient and uses fewer materials. The plant layout also improves environmental performance by using less material and lowering heat losses and potential for fugitive

emissions as a result of shorter pipe runs. Another change is the reliance on electric tower cranes during construction; these cranes are expected to be quieter and have lower emissions than diesel-powered mobile cranes.

Additional drilling determined that geotechnical conditions at the original plant site were suboptimal because of fine-grained and saturated soil conditions. An alternate plant site was identified that is adjacent to the location proposed in the Integrated Application. The alternate location exists over sandy soil that is mostly unsaturated. This will reduce the excavation and fill requirements and is projected to result in a reduction in pile depth. In addition to being more economical and simpler to construct, the new plant location is expected to result in lower construction related air emissions (trucking and excavation) and material use (piles).

Teck relocated the lodge to take advantage of footprint made available by the alternate construction method study. The new lodge location is adjacent to the administration complex at the plant site. This will require fewer buses and reduce travel, which is expected to appeal to workers. Fewer buses will contribute to a reduction in emissions, and having the lodge adjacent to the plant will help reduce habitat fragmentation compared to the Integrated Application.

The aerodrome has been relocated and reoriented. The new location no longer overlies the treatment wetland proposed as part of Shell's Pierre River Mine (PRM) project, thereby resolving a potential boundary issue. The new orientation reflects updated meteorological data, which determined that the prevailing wind direction in the Athabasca River valley is north-south.

### ***CLOSURE CONSERVATION AND RECLAMATION PLAN***

The overall reclamation strategy remains consistent with the Integrated Application; however, Teck has improved the plan by:

- using headwater lakes for sediment management
- reducing the total length of steep stream channels
- implementing various shoreline protection strategies
- emphasizing wetlands and bison habitat in the closure landscape
- placing most of the treated fluid fine tailings in-pit

Headwater lakes along the west margin of the Main pit will decrease the amount of granular fill required for channel armouring because the lakes will collect sediment over the long term. Reducing the sediment load allows for reduced stream velocities (i.e., flatter watercourses) and therefore, a reduced amount and size of channel armouring. The flatter topography is more conducive to wetlands, which may also form bison habitat. Use of headwater lakes considers site-specific conditions, specifically the general absence of on-site granular material. The lakes improve Project economics, reduce truck traffic and associated emissions, and avoid contributing to off-site land disturbance at the borrow sources. Similar to the rationale for headwater lakes, the use of submerged overburden berms to protect pit lake littoral zones reduces the need for granular material and enables a natural evolution to stable beach.

Since the Integrated Application was submitted, Alberta has released its *Wetland Policy* (Government of Alberta 2013) and Teck has gained an improved understanding of the Ronald Lake bison herd. Increasing the amount of wetland and bison habitat in the closure landscape has been prioritized for the closure, conservation and reclamation planning, which is in progress.

Placing most treated fluid fine tailings in pit below the original ground level leaves coarse combined tailings (CCT) in external tailings areas. Compared to treated fluid fine tailings, CCT provides a more robust ex-pit reclamation landscape because it consolidates and forms a stable material quicker than treated fluid fine tailings.

### **CONCLUSION**

Engineering needed to support the above directional changes is ongoing and is being used to inform the Project Update as data becomes available. Teck expects that the planned changes will result in a more technically robust and environmentally sound Project that considers input provided by regulators and Aboriginal communities. Teck's success in this regard will be evaluated through ongoing consultation, the updated environmental impact assessment and the continuing regulatory review process.

### **REFERENCES**

Government of Alberta. 2013. *Alberta Wetland Policy*. Alberta Environment and Sustainable Resource Development. September 2013. Edmonton, Alberta. ISBN: 978-1-4601-1286 (Print Version); 978-1-4601-1287-8 (Online Version).

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### **Question 2**

**Provide an update on any stakeholder engagement activities that have occurred since Teck filed the response to supplemental information request no. 2.**

- a) **What activities have been undertaken?**
- b) **What issues have been raised?**
- c) **What issues have been resolved and how?**
- d) **What issues remain outstanding and how will these issues be resolved?**

### **Response 2**

Teck provided an update on community, stakeholder and Aboriginal engagement activities conducted during the period of January 2013 to October 2013 in response to ERCB Round 2 SIR 2. Since October 2013, Teck has undertaken further engagement activities, which are outlined in this response. Some of these activities have focused on strengthening mutual relationships and trust. Other meetings and

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engagement have focused on working through community-specific issues; as such, their content may be confidential between Teck and the community. This SIR response summarizes engagement activities, communications or interactions Teck has undertaken since October 2013 to develop a greater understanding of interests and concerns about the Project and to identify possible areas for collaboration.

This response is organized by Aboriginal community followed by one regional stakeholder group. All items requested in the SIR (parts a through d) (i.e., activities, issues, resolution and future work) are described for each community, and collective engagement activities that apply to most communities and stakeholders are addressed first. The following communities and stakeholders are included:

- Athabasca Chipewyan First Nation (ACFN)
- Fort McKay (First Nation and Métis)
- Mikisew Cree First Nation (MCFN)
- Fort Chipewyan Métis (Métis Local 125)
- Fort McMurray Métis (Métis Local 1935)
- Lac La Biche Métis (Métis Local 1909)
- Fort McMurray First Nation #468
- The Regional Municipality of Wood Buffalo

### ***COLLECTIVE ENGAGEMENT ACTIVITIES AND ACTIONS***

Since October 2013, some Aboriginal communities have expressed concerns regarding information gaps in the assessment for the Frontier Project. For example, in a joint technical review (submitted March 2014), ACFN and MCFN noted the following concerns:

- information gaps in the environmental assessment
- lack of socio-economic baseline data
- limited inclusion of traditional knowledge
- gaps in the assessment of effects to rights, culture and cumulative effects

Métis communities have also requested that Teck provide funding for them to conduct traditional land use (TLU) studies in the area of the Project. In response to these concerns and requests, Teck has supported additional studies (see Table 2-1) with the goal of better understanding Aboriginal interests, use of the land, and potential effects of the Project on those land uses.

**Table 2-1 Additional Studies Resulting from Aboriginal Community Engagement**

Source	Additional Studies
ACFN	<ul style="list-style-type: none"> <li>• Potential for a community-led, Project-specific cultural impact assessment pending further discussions</li> <li>• Several additional studies are proposed to address concerns regarding information gaps in the Frontier Project assessment. These studies would include data about effects of the Project on:               <ul style="list-style-type: none"> <li>• the Poplar Point Indian Reserve</li> <li>• bison habitat</li> <li>• traditional foods and where these foods are obtained</li> <li>• key resources for ACFN members</li> <li>• ACFN cultural resilience</li> <li>• the ability of ACFN to respond to change while retaining cultural elements</li> </ul> </li> </ul>
MCFN	<ul style="list-style-type: none"> <li>• A community-led, Project-specific cultural impact assessment</li> <li>• Three additional MCFN-led studies that focus on addressing concerns about information gaps in the Frontier Project assessment. These include:               <ul style="list-style-type: none"> <li>• a documentary that documents a traditional MCFN bison hunt</li> <li>• a species-specific MCFN indigenous knowledge and use report on bison for the Frontier Project</li> <li>• a community-based monitoring program focused on polycyclic aromatic hydrocarbons (PAHs)</li> </ul> </li> </ul>
Fort McKay	Teck is working directly with Fort McKay outside of the regulatory process.
Métis Local 125	<ul style="list-style-type: none"> <li>• A community-led, Project-specific cultural impact assessment</li> <li>• Project-specific TLU study</li> <li>• Community-led, Project-specific cultural impact assessment</li> </ul>
Métis Local 1935	<ul style="list-style-type: none"> <li>• A community-led, Project-specific cultural impact assessment</li> <li>• Project-specific TLU study</li> <li>• Community-led, Project-specific cultural impact assessment</li> </ul>

Teck organized a meeting to provide additional information about the proposed fish habitat compensation lake (FHCL) and to introduce the concept of a Fisheries Offsetting Framework. This meeting, held in July 2014, included most of the Aboriginal communities with interests in the Frontier Project. Aboriginal community members in attendance expressed the following issues and concerns:

- Fisheries and Oceans Canada (DFO) not being able to provide certainty about compensation lake productivity
- terrestrial impacts of habitat offsets (i.e., potentially taking up high-quality bison habitat to offset fisheries impacts)
- regulatory oversight of compensation lakes
- the lack of community consultation once compensation lakes are established. Some Aboriginal communities would like continued engagement about habitat compensation throughout the life of the Project. Aboriginal communities are particularly interested in being part of the conversation about the success of the FHCL.

- habitat compensation ratios are often not considered appropriate to mitigate project effects on fisheries
- mercury levels in compensation lakes
- certainty about compensation lake success. Aboriginal communities bear the risks associated with unsuccessful habitat compensation and want to know how uncertainty can be managed.

Teck and the Aboriginal communities agreed to continue to meet to discuss Teck's conceptual fish habitat compensation plan (CFHCP) and the development of a Fisheries Offsetting Framework for the Frontier Project. The July 2014 meeting was an introductory meeting with further consultations to follow. Teck plans to work with Aboriginal communities to undertake these consultations in a manner that enables community input and seeks to resolve concerns.

### ***ATHABASCA CHIPEWYAN FIRST NATION (ACFN)***

- a) Since filing the Round 2 SIR responses, Teck's engagement with ACFN has included:
- two meetings with the ACFN Industry Relations Corporation (IRC) (February 2014 and July 2014)
  - one meeting with ACFN Elders in Fort Chipewyan (May 2014)
  - the July 2014 meeting to review Teck's proposed FHCL and Fisheries Offsetting Framework (described previously as part of the collective engagement activities and actions with other Aboriginal communities)
- b) ACFN has provided several reports and formal correspondence to Teck that clearly describe ACFN's issues and concerns with the Frontier Project, particularly regarding impacts to ACFN's treaty and Aboriginal rights. In addition, ACFN has documented issues and concerns regarding nearby proposed developments; these submissions further inform Teck's understanding of ACFN's concerns. Many of these issues are formally tracked as statements of concern (SOCs) as part of the regulatory process for the Frontier Project. Other issues are tracked as part of Teck's internal processes as additional issues to address.

ACFN's submissions related to the Frontier Project include all past statements of concern (June 2012, February 2013) and the following materials:

- *Athabasca Chipewyan First Nation Indigenous Knowledge and Use Report and Assessment for Teck Resources Limited Proposed Frontier Oil Sands Mine Project* (November 2013; received February 2014)
- ACFN and MCFN joint technical review of Teck's responses to Round 2 SIRs (December 4, 2013)

- ACFN and MCFN Technical Sufficiency Review of the Frontier Integrated Application (March 2014; submitted jointly with MCFN)
- ACFN comments on the Teck Frontier Joint Review Panel draft Agreement and Terms of Reference (April 17, 2014)

The Project-specific ACFN Knowledge and Use Report outlines concerns and potential impacts of the Frontier Project on ACFN traditional land use. On March 27, 2014, ACFN and MCFN provided a joint technical review of Teck's responses to the ACFN and MCFN technical sufficiency review of the Frontier Project. The cover letter to the technical review highlighted the following concerns:

- deficiencies in the Integrated Application
- gaps in the environmental assessment
- lack of socio-economic baseline data
- limited inclusion of traditional knowledge
- gaps in the assessment of effects to rights, culture and cumulative effects

Teck refers regulators to the technical sufficiency review for additional detail about specific concerns expressed.

In the March 2014 joint technical review, ACFN and MCFN expressed concern with the review process itself as well as the content of Teck's responses to Round 2 SIRs. These March 2014 SOCs, combined with other culture and rights-related concerns expressed in the ACFN Knowledge and Use Report, relate to the following disciplines and topics:

- access to the land
- human health effects
- water quality, particularly for drinking while practicing traditional land use, and for habitat
- water availability, particularly for navigation and habitat
- fish and fish habitat
- wildlife, including bison, caribou, moose, muskrat, migratory birds
- groundwater quality
- air quality
- noise
- light
- vegetation
- harvesting
- reclamation
- inclusion of traditional knowledge and Aboriginal perspectives in the effects assessment and subsequent mitigation measures
- sensory and experience effects to traditional land use practices and spiritual experience on the land

- cumulative effects to human health, environment, Aboriginal rights and culture
- lack of meaningful participation in planning, monitoring, ongoing management and reclamation of areas and issues of concern for the First Nation

This list is illustrative and not exhaustive. Note that its order does not reflect priority or emphasis.

### **Additional ACFN Concerns**

During meetings and through correspondence, ACFN representatives and community members have provided Teck with feedback and concerns related to the Frontier Project. Often these concerns align with the disciplines and topics listed above. The following summaries of meetings are provided to demonstrate the types of concerns ACFN has raised directly with Teck.

Teck met with the ACFN IRC on February 6, 2014 to discuss the Frontier Project. During this meeting, ACFN expressed many concerns. Notes from the meeting are included in Appendix 2b.1.

Teck held a meeting with ACFN Elders on May 15, 2014. ACFN expressed many concerns at the meeting, which are summarized in point-form notes in Appendix 2b.2. Many ACFN Elders opposed the Project. Concerns expressed during the meeting related to:

- water withdrawals and water quality
- traditional food availability, quality and potential contamination
- impacts to culture
- lack of trust
- lack of respect and inclusion of Aboriginal perspective and governance
- extremely long duration of tailings reclamation
- long duration of tailings contaminants staying in groundwater
- many other subjects relating to one Elder's statement that "when you break the land, you break our spirit"

Teck met with the ACFN IRC again on July 10, 2014 to discuss the Frontier Project. Concerns noted at that meeting are listed in Appendix 2b.3.

On April 17, 2014, ACFN submitted comments on the Teck Frontier Joint Review Panel draft Agreement and Terms of Reference. Here, ACFN expressed concerns regarding the potential for the Project to adversely impact and infringe on its Section 35 rights, and concern that the draft Agreement and Terms of Reference did not contain sufficient language to require a full and proper assessment of the potential adverse impacts on and potential infringement of its Section 35 rights. The following specific concerns were expressed:

- the need for explicit requirements for assessing effects on reserve lands
- the need to require incorporation of the Aboriginal perspective into the assessment
- the need for explicit and detailed requirements and guidance for assessing socio-economic effects in relation to Aboriginal people

- that the assessment of effects and impacts must not be confined by the narrow definitions and mandate of the *Canadian Environmental Assessment Act* (2012)
- that the Agreement and Terms of Reference should reflect the current statutory regime in Alberta, including the regulator's jurisdiction to issue authorization under the *Environmental Protection and Enhancement Act* (EPEA)
- the need to hold at least a portion of the hearings in Fort Chipewyan
- the need for clarity around the Panel's mandate to consider and decide questions of constitutional law

### **ACFN Concerns Regarding the Ronald Lake Bison Herd**

The Frontier Project and other development activities that might affect the Ronald Lake bison herd are a source of concern for ACFN. Specifically, ACFN has expressed concerns related to:

- the overall sustainability of the Ronald Lake bison herd
- cumulative effects on the herd
- a perceived lack of consideration of ACFN traditional knowledge and land use in the assessment or design of mitigation measures
- potential effects on the health of the community and its culture
- concern that Teck's predictions and conclusions about the effects and impacts of the Project on lands and the community are not based on substantial knowledge or evidence

ACFN has expressed, in correspondence with Teck, that it would like to better understand the effects of the Frontier Project on bison habitat. Specifically, ACFN has indicated the need for additional habitat studies that could be paired with bison population analysis and traditional knowledge to better understand the quantity and location of available bison habitat. Using this information, ACFN wishes to determine the extent of bison habitat that is suitable for exercising its treaty rights, specifically in terms of accessibility and the ability to process and transport its harvest.

In summary, for the purposes of this response, Teck understands from conversations, meetings, correspondence, and reports from ACFN representatives, and testimony from ACFN hunters and Elders, that the key topics of concern relate to:

- potential impacts to bison (i.e., bison habitat, population, sensory disturbance, changes to movement patterns)
- potential direct impacts to ACFN bison hunting (e.g., access to land, bison movement and accessibility)
- effects on the quality of the experience of bison hunting
- meaningful inclusion of traditional knowledge and ACFN land use in the effects analysis and significance determination for the Project
- cumulative effects on bison and the potential negative impact on ACFN culture

Each of these topics has a number of associated specific technical and management-related issues, which Teck tracks in a detailed tracking table.

- c) Teck has addressed many joint ACFN and MCFN technical SOCs through Teck's responses to SOCs in February 2013. It is Teck's understanding that the SOCs conveyed in the March 2014 technical sufficiency review express most, if not all, of ACFN's (and MCFN's) outstanding technical issues. This assumption will be confirmed through further discussion with ACFN and MCFN. Additional issues related to impacts to Aboriginal rights and culture have been captured in other documents and Teck is committed to working with ACFN and MCFN to resolve these.
- d) Although Teck feels that some concerns have been resolved, a number of the concerns outlined in this response have not been resolved to the satisfaction of ACFN. Teck takes these concerns seriously and plans to take a number of steps to seek resolution on these issues.

ACFN has expressed dissatisfaction with many of Teck's responses to ACFN's issues and concerns. Teck has heard that ACFN would like Teck to address issues with the aim to resolve them rather than respond to issues without clear resolution. Teck is open to working on such an effort with ACFN in good faith. In addition, ACFN has clearly stated that it has concerns with the degree and manner with which ACFN's traditional knowledge and Aboriginal perspectives have been considered and incorporated by Teck, particularly in the assessment of impacts to ACFN's rights and culture. Recognizing that additional work needs to be done, Teck has requested to meet with ACFN to co-create a process to address outstanding concerns, to revisit certain conclusions made by Teck in the Integrated Application, and to work toward understanding and incorporating ACFN's traditional land use and traditional knowledge into the assessment in a meaningful way. On March 31, 2014, Teck sent a letter to ACFN and MCFN updating them on its progress in answering their SOCs and technical reviews about the Project. At that time, Teck invited ACFN to participate in the creation of such a collaborative process.

Teck is hopeful that a collaborative, coordinated approach will result in meaningful outcomes. Teck will update regulators on a regular basis about the progress of these discussions. Teck will not be filing responses to Round 3 SIRs that pertain to traditional knowledge or the assessment of impacts to ACFN's rights and culture with regulators until the parties have pursued the collaborative process referred to above, or until Teck and ACFN agree otherwise.

ACFN has requested that Teck provide funding for seven additional studies to address concerns regarding information gaps in the assessment for the Frontier Project. The proposed studies would further engage ACFN members with respect to the Project and collect additional information about effects of the Project on:

- the Poplar Point Indian Reserve
- bison habitat
- traditional foods and where these foods are obtained
- key resources for ACFN members

- ACFN cultural resilience
- the ability of ACFN to respond to change while retaining cultural elements

Teck has committed to funding most of these studies and is working with ACFN to prioritize which studies to initiate first. At the time of drafting this response, ACFN is working to develop detailed scopes of work and budgets for these studies. Teck and ACFN expect some of these studies to begin in 2014 and work to continue into 2015. Teck and ACFN will update regulators as these studies are completed and as Teck and ACFN consider outcomes.

Additionally, at the time of drafting this response, Teck and ACFN are in discussions regarding a scope of work for a community-led, Project-specific cultural impact assessment.

Regarding the Ronald Lake bison herd, Teck believes that additional effort in specific areas of study or supplemental assessment will further understanding and increase community confidence in assessment and predictions. Ultimately, Teck hopes that these efforts will provide ACFN with the confidence that its key issues and concerns have been addressed and resolved.

Alberta Environment and Sustainable Resource Development (ESRD) has created a multiparty technical team to address information gaps and direct future studies on the Ronald Lake bison herd. ACFN is a participant of this team, as is Teck. Teck is hopeful that this process will provide additional information about the Ronald Lake bison herd, and will meaningfully integrate traditional knowledge in future studies.

#### ***FORT MCKAY (FIRST NATION AND MÉTIS)***

a) Since filing the Round 2 SIR responses, engagement activities with the Fort McKay First Nation and Métis have included:

- regular meetings with the Fort McKay Sustainability Department
- one advisory committee meeting (November 2013); the committee comprises community members and Elders and exists for the purpose of consulting with Teck on the Frontier Project
- two technical workshops to discuss specific issues of concern to Fort McKay (November 2013 and March 2014)
- the July 2014 meeting to review Teck's proposed FHCL and Fisheries Offsetting Framework (described previously as part of the collective engagement activities and actions with other Aboriginal communities)

Teck also participated in a series of meetings with Fort McKay and operators east of the Athabasca River to discuss and develop solutions for Fort McKay traditional land users that experience challenges in accessing traditional lands on the east side of the Athabasca River. Although the Frontier Project is located west of the Athabasca River, Teck participated in these meetings to better understand access challenges for traditional land users in preparation for developing an access

management plan (AMP) for the Frontier Project. Teck will consult with Fort McKay in the development of the AMP.

- b-d) Fort McKay sent an e-mail on November 6, 2013, requesting that Teck note, in bimonthly consultation logs, that Fort McKay did not accept Teck's 2008 *Frontier Project Aboriginal Consultation Plan*. Teck complied with this request and ensured that the consultation logs reflected Fort McKay's position with respect to the Aboriginal Consultation Plan.

In a letter to the Canadian Environmental Assessment Agency (CEAA) on December 3, 2013, Fort McKay informed regulators that Teck has agreed to provide additional technical information sought by Fort McKay directly to the community and that Fort McKay does not currently have any comments for CEAA on the sufficiency of information provided by Teck. Fort McKay reserves the right to present its views on the Project at a future public hearing. Teck is currently working with Fort McKay, outside of the regulatory process, to address outstanding concerns with the Frontier Project.

On March 31, 2014, Fort McKay provided comments on the Teck Frontier Joint Review Panel draft Agreement and Terms of Reference. Fort McKay expressed the following concerns:

- The requirement to assess impacts on asserted or established Aboriginal or treaty rights does not specifically reference reserve lands.
- Neither Alberta nor Canada follows up on the recommendations made by Joint Review Panels.
- Fort McKay does not see how the Panel can consider the residual impact of the Project, after mitigations have been applied, without first knowing what mitigations Teck, Alberta, and Canada will actually undertake and implement.

At the time of drafting this response, Teck and Fort McKay are in discussions regarding a scope of work for a community-led, Project-specific cultural impact assessment. Teck and Fort McKay are also working to address outstanding traditional land use concerns, outside of the regulatory process.

#### ***MIKISEW CREE FIRST NATION (MCFN)***

- a) Since filing the Round 2 SIR response, Teck has undertaken the following engagement activities with MCFN:
- two meetings with the MCFN Government and Industry Relations (GIR) office (November 2013 and March 2014)
  - one MCFN advisory committee meeting (February 7, 2014)
  - the July 2014 meeting to review Teck's proposed FHCL and Fisheries Offsetting Framework (described previously as part of the collective engagement activities and actions with other Aboriginal communities)

- b) MCFN has provided several reports and formal correspondence to Teck that clearly describe issues and concerns MCFN has with the Frontier Project. In addition, MCFN has documented substantive issues and concerns regarding nearby proposed developments and Teck's winter work programs; these submissions further inform Teck's understanding of MCFN's concerns. Many of these issues are formally tracked as statements of concern (SOCs) as part of the regulatory process for the Frontier Project. Other issues are tracked as part of Teck's internal processes as additional issues to address, where Teck has the ability or jurisdiction to resolve them.

MCFN's submissions describing its interests and concerns related to the Frontier Project include all past statements of concern and the following materials:

- *Mikisew Cree First Nation Indigenous Knowledge and Use Report and Assessment for Teck Resources Limited's Proposed Frontier Oil Sands Mine Project* (November 2013)
- MCFN and ACFN joint technical review of Teck's responses to Round 1 SIRs (February 28, 2013)
- MCFN and ACFN joint technical review of Teck's responses to Round 2 SIRs (December 4, 2013)
- ACFN and MCFN Technical Sufficiency Review of the Frontier Integrated Application (March 2014; submitted jointly with ACFN)
- MCFN comments on the Teck Frontier Joint Review Panel draft Agreement and Terms of Reference (April 17, 2014 and May 27, 2014)
- MCFN correspondence (dated June 24, 2014) regarding clearing in the Project area
- Various correspondence relating to Teck's winter drilling programs for the Frontier Project

The Project-specific MCFN Indigenous Knowledge and Use report outlines concerns and potential impacts of the Frontier Project on MCFN traditional land use. On March 27, 2014, MCFN and ACFN provided a joint technical sufficiency review of the Frontier Project. The cover letter to the technical review highlighted the following concerns:

- deficiencies in the Integrated Application
- gaps in the environmental assessment
- lack of socio-economic baseline data
- limited inclusion of traditional knowledge
- gaps in the assessment of effects to rights, culture and cumulative effects

Teck refers the regulator to these technical reviews for additional detail about the concerns expressed.

The December 2013 technical review of Teck's response to Round 2 SIRs describes technical issues and concerns with consultation and regulatory process. In the March 2014 technical sufficiency review, MCFN and ACFN again expressed concern with the review process as well as the content of Teck's responses to Round 2 SIRs and to the joint technical review attached to MCFN and ACFN's

June 2012 SOCs. These SOCs, combined with other concerns expressed in the MCFN Indigenous Knowledge and Use Report, relate to the following disciplines and topics:

- access to the land
- human health effects
- water quality, particularly for drinking while practicing traditional land use, and for habitat
- water availability, particularly for navigation and habitat
- fish and fish habitat
- wildlife, including bison, buffalo prairie, caribou, moose, muskrat and migratory birds
- groundwater quality
- air quality
- noise
- light
- vegetation
- harvesting
- reclamation
- inclusion of traditional knowledge and Aboriginal perspectives in the effects assessment and subsequent mitigation measures
- quality of the experience on the land including sensory and experience effects to traditional land use practices and spiritual experience on the land
- cumulative effects to human health, environment, Aboriginal rights and culture
- lack of meaningful participation in planning, monitoring, ongoing management and reclamation of areas and issues of concern for the First Nation
- regulatory and consultation process including timelines and capacity

This list is illustrative and not exhaustive. Note that its order does not reflect priority or emphasis.

### **Additional MCFN Concerns**

During meetings and through correspondence, MCFN representatives and community members have provided Teck with additional feedback and concerns related to the Frontier Project. Often these concerns align with the disciplines and topics listed above. The following summaries of meetings are provided to demonstrate the types of concerns MCFN has raised directly with Teck.

Teck met with an MCFN advisory committee on February 7, 2014 in Fort Chipewyan to discuss the Frontier Project. After the meeting, MCFN provided a letter to Teck summarizing the concerns expressed by advisory committee members. These included:

- the Project's location within MCFN traditional territory, including its proximity to Fort Chipewyan, where many MCFN members reside, and the Peace-Athabasca Delta

- potential adverse effects on:
  - water quality and quantity
  - human health
  - the Ronald Lake bison herd
  - the practice of rights-based activities, such as hunting and gathering
- sharing traditional knowledge and other traditional cultural practices
- cumulative effects

Additional concerns were expressed through conversation and are listed in Appendix 2b.4.

Teck met with the MCFN GIR on March 5, 2014 to discuss the Project. At the meeting, MCFN:

- explained that the process of consultation within the community is complicated and it is often difficult for community members to see and understand the work undertaken between a proponent and MCFN. MCFN stated that community members repeatedly express concerns but may not see where or how those concerns are addressed in a project application or through the regulatory review process.
- expressed interest in knowing how the indigenous knowledge provided can be applied in the Project's planning
- requested that Teck summarize Teck's understanding of indigenous knowledge and how Teck might consider the traditional land use and traditional knowledge information

On April 17, 2014, MCFN submitted comments on the Teck Frontier Joint Review Panel draft Agreement and Terms of Reference. MCFN comments were submitted as tracked changes in a Word document and a letter providing context for MCFN's comments. To summarize, MCFN requested that the Terms of Reference give legitimate consideration of the Aboriginal perspective and traditional knowledge, and that the environmental assessment incorporate traditional knowledge. In addition, MCFN recommended that:

- there be explicit mention of the constitutional obligations to discharge their statutory obligations constitutionally for the Minister of the Environment, Canada and the Alberta Energy Regulator (AER)
- "Aboriginal perspectives" and "Aboriginal Rights" be included in the definitions section
- the definitions of "culture" and "cultural heritage" be clarified
- the definition of "impact(s)" be clarified to mean the potential direct, indirect and cumulative adverse impacts of the Project, as broadly interpreted from the Aboriginal perspective and taking into account traditional knowledge, on Aboriginal rights, traditional uses, culture and socio-economic conditions of Aboriginal groups
- the geographic scope of the assessment of the Project's environmental effects and impacts cannot be limited to the area directly disturbed by the Project

- the Joint Review Panel accept and incorporate in its assessment information about the adequacy of the Crown's and the proponent's consultation with Aboriginal communities
- the Joint Review Panel consider evidence presented concerning indigenous knowledge or traditional knowledge specific to any species, resource, valued component, key indicator, or any other factor within the scope of the assessment
- the Panel consider evidence presented concerning acceptable limits of change, appropriate thresholds for assessing impacts, or other tools or approaches appropriate to assessing factors associated with Aboriginal rights, traditional uses and culture
- an explanation be provided about how the Aboriginal perspective and traditional knowledge were incorporated in the conclusions of the cumulative effects assessment
- 75 days be provided to complete sufficiency reviews
- there be a pre-hearing conference
- the hearing be located in an Aboriginal community
- an entire section added in Appendix 2 on "Factors for Assessing Impacts"

For the complete revisions suggested by MCFN, Teck directs the reader to the April 17 submission.

Since April 2014, MCFN and Teck have met on several occasions and have identified areas where further engagement is necessary in relation to potential impacts on the Ronald Lake bison herd, the Peace-Athabasca Delta, MCFN's rights and culture and concerns relating to the incorporation of indigenous knowledge. During this period, Teck and MCFN have also discussed the following issues but have not reached agreement to date:

- a consultation process for seeking to address impacts to MCFN
- a process for incorporating indigenous knowledge into the Project Update (see the response to AER Round 3 SIR 1) and Project planning
- Teck's reliance on the Lower Athabasca Region Plan
- capacity funding for the collaborative process
- joint terms of reference for a rights and culture impact assessment

Work on these issues is ongoing.

### **MCFN Concerns Regarding the Ronald Lake Bison Herd**

MCFN has expressed concerns related to:

- the overall sustainability of the Ronald Lake bison herd
- cumulative effects on the herd, including its habitat
- lack of consideration by Teck of MCFN's traditional knowledge and land use in the assessment of effects or design of mitigation measures
- potential effects on the health of the community and its culture
- concerns that Teck's predictions and conclusions about the effects and impacts of the Project on lands and community are not based on substantial knowledge or evidence

MCFN is particularly concerned that any incorrect predictions that might lead to negative, significant impacts on the Ronald Lake bison herd could also lead to permanent impacts to the herd, to MCFN's treaty and Aboriginal rights, and to its traditional indigenous culture. This summary focuses on the primary concerns heard by Teck from MCFN related to local and regional effects of the Frontier Project on the bison herd.

As Teck understands from conversations, meetings, correspondence, and reports from MCFN representatives, and testimony from MCFN hunters and Elders, that key topics of concern relate to:

- potential impacts to bison (i.e., bison habitat, population, sensory disturbance, changes to movement patterns)
- potential direct impacts to MCFN bison hunting (e.g., access to land, bison movement and accessibility)
- effects on the quality of the experience, both cultural and spiritual, of bison hunting
- meaningful inclusion of traditional knowledge and Aboriginal perspective in the effects analysis and significance determination for the Project
- cumulative effects on bison and the potential negative impact on MCFN culture

Each of these topic areas has a number of associated specific technical and management-related issues, which Teck tracks in a detailed tracking table.

In addition, MCFN remains concerned about the status of wood bison under the *Species at Risk Act* (SARA). On June 5, 2014, MCFN expressed concerns about the decision by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to recommend that the status of wood bison under SARA be changed from Threatened to Special Concern. Specifically, MCFN is concerned that this recommendation fails to consider:

- recent threats to wood bison and the Ronald Lake bison herd
- the best available scientific knowledge about the Ronald Lake bison herd, which shows that it is ecologically and genetically significant as a result of its disease-free status and genetic difference from bison herds in Wood Buffalo National Park
- the best available Aboriginal traditional knowledge, or any traditional knowledge from MCFN knowledge holders, given that no meaningful effort was made to include MCFN in the assessment process
- whether it would have been appropriate to consider the Ronald Lake bison herd a distinct “designable unit” under SARA
- that MCFN and Teck have jointly identified gaps in available information about the Ronald Lake bison herd and areas where Teck might need to reassess certain conclusions regarding potential impacts to the herd following further engagement with MCFN

### **MCFN Concerns Regarding Capacity and Regulatory Processes**

Teck met with the MCFN GIR on November 7, 2013 to discuss the Frontier Project. At the meeting, MCFN expressed capacity concerns. Specifically, MCFN feels that funding provided by Teck to support the GIR office is not commensurate with the amount of work required to engage in and coordinate consultations for the Frontier Project.

MCFN has repeatedly expressed concerns with the consultation and regulatory process and timelines related to the Frontier Project. On November 22, 2013, MCFN provided a letter to the Government of Alberta outlining concerns with the approach to consultation on the Frontier Project. MCFN expressed concern that the Government of Alberta had not adequately consulted on the Frontier Project to date, had not responded to or acknowledged MCFN's traditional use information, had not developed a clear consultation process, and had not been responsive to concerns and requests from the MCFN. MCFN also stated that Teck's engagement in relation to the Frontier Project has been deficient.

- c) Teck has addressed several of MCFN and ACFN's technical SOCs through Teck's responses to SOCs in February 2013. It is Teck's understanding that the SOCs conveyed in the March 2014 technical sufficiency review express most, if not all, of MCFN's (and ACFN's) outstanding technical issues. This assumption will be confirmed through further discussion with MCFN and ACFN. Additional issues related to impacts to Aboriginal rights and culture have been captured in other documents and Teck is committed to working with MCFN and ACFN to resolve these.

Teck has agreed to provide capacity funding to the MCFN GIR that is commensurate with the amount of work required to engage in and coordinate consultations for the Frontier Project and to work with MCFN to seek to address consultation and capacity concerns as they arise.

- d) MCFN has clearly stated that it has concerns with the degree and manner with which its traditional knowledge and Aboriginal perspectives have been considered and incorporated by Teck, particularly in assessing impacts to MCFN's rights and culture. Recognizing that additional work needs to be done, Teck and MCFN have agreed to work together to co-create a process to meaningfully address outstanding interests and concerns and to revisit certain conclusions relating to rights, culture, bison and the Peace-Athabasca Delta that Teck made in the Integrated Application and environmental assessment for the Project. MCFN has agreed to work with Teck to further understand and incorporate its Aboriginal perspectives, including traditional knowledge and values, into the assessment in a meaningful way.

In an effort to address key issues and concerns for the MCFN community, Teck has funded three additional studies. These studies will all be MCFN-led and will focus on addressing concerns about information gaps in the Frontier Project assessment. They include:

- a documentary that documents a traditional MCFN bison hunt

- a species-specific MCFN indigenous knowledge and use report on bison for the Frontier Project. The objective of this study is to produce a species-specific indigenous knowledge report that considers the Frontier Project. MCFN and Teck expect the outcomes of the report to inform discussion between MCFN, Teck and the Crown regarding bison.
- a community-based monitoring program focused on polycyclic aromatic hydrocarbons (PAHs). This study will collect data on PAH concentrations in the Peace-Athabasca Delta region to inform MCFN leadership about risks from increased development on the health of MCFN members.

Teck and MCFN have also agreed on a scope of work for a community-led, Project-specific Aboriginal rights and cultural impact assessment.

Teck and MCFN are hopeful that a collaborative, coordinated approach will result in meaningful outcomes. Accordingly, there are places in these SIR responses where Teck is not providing answers or assessments relating to MCFN until Teck and MCFN have had an opportunity to pursue the collaborative, coordinated approach. Teck and MCFN will update regulators on a regular basis about the progress of these discussions. Teck has agreed to not file responses to SIRs, such as this one, regarding traditional knowledge or the assessment of impacts to MCFN's rights and culture with regulators until Teck and MCFN have pursued the collaborative process referred to above, or Teck and MCFN agree otherwise.

Regarding the Ronald Lake bison herd, ESRD has created a multiparty technical team to address information gaps and direct future studies. MCFN is a participant of this team, as is Teck. Teck is hopeful that this process will provide additional information on the Ronald Lake bison herd, and will meaningfully integrate traditional knowledge in future studies. MCFN has told Teck that it has a number of concerns about this technical team and has asked Teck to present these concerns in this response. MCFN concerns include:

- exclusion from designing and carrying out these studies
- the role of indigenous knowledge in the work of the technical team
- a lack of transparency with the team
- other concerns relating to the draft Terms of Reference

Teck understands that the draft Terms of Reference do not incorporate assessment of impacts to MCFN's rights. MCFN has also raised concerns about Alberta's unwillingness to provide bison data to MCFN.

Teck agrees with MCFN that additional effort in specific areas of study or supplemental assessment (i.e., outside of the work being undertaken by the technical team) could lead to deeper understanding, increase prediction confidence, and more widely include traditional knowledge and perspectives. Ultimately, Teck hopes that these additional efforts will provide MCFN with the confidence to feel that its key issues and concerns have been addressed and resolved.

Teck strongly supports this important supplemental work and believes that it will be most successful if conducted as a collaborative effort between the parties, with significant involvement of MCFN community members and direction by MCFN representatives and leadership. Teck understands that this work has been a priority of MCFN for some time and is committed to taking a collaborative approach.

***FORT CHIPEWYAN MÉTIS (MÉTIS LOCAL 125)***

- a) Since filing the Round 2 SIR response, Teck has continued to engage Métis Local 125. Specific engagement activities have included:
- one meeting with the Métis Local 125 president and board of directors (January 2014)
  - one meeting with representatives of the Métis Local 125 office (March 2014)
  - two meetings (November 2013 and May 2014) with an advisory committee comprising community members and Elders dedicated to engagement and consultation for the Frontier Project
  - the July 2014 meeting to review Teck's proposed FHCL and Fisheries Offsetting Framework (described previously as part of the collective engagement activities and actions with other Aboriginal communities)
- b) On November 28, 2013, Métis Local 125 provided a technical review of the Frontier Project Integrated Application that expressed a number of concerns. Teck refers the regulator to the publically available technical review for full details.

Métis Local 125 provided comment on Teck's responses to Round 2 SIRs on December 16, 2013. The Métis Local 125 submission identified information gaps and expressed the following concerns:

- inadequate Crown consultation
- lack of a Métis consultation policy and capacity
- Métis Local 125 have been 'begging' for real consultation and consideration of the impacts of Crown decisions on their rights
- Teck's statements regarding registered fur management area (RFMA) #1275 are inaccurate.
- Teck has lumped Métis groups with other Aboriginal communities, giving the false impression that Teck has been undertaking robust, or really any, consultation with Métis
- Teck has not provided a process or explanation for how it intends to incorporate community concerns
- Teck has relied on Alberta's advice to industry on consultation and has done 'as little as possible' with Métis

Teck met with the Métis Local 125 office on March 4, 2014. At this time, Métis Local 125 expressed concerns and requested capacity funding for additional studies to better understand the Frontier Project.

Teck met with the Métis Local 125 advisory committee on May 14, 2014. Although specific concerns were not expressed, advisory committee members expressed an interest in how Teck is working to better understand the Ronald Lake bison herd.

Métis Local 125 also provided comment on the Teck Frontier Joint Review Panel draft Agreement and Terms of Reference. Métis Local 125 requested that panel members have a traditional knowledge perspective and that exploration be included when assessing Project effects on Aboriginal and treaty rights.

- c) Teck and the Métis Local 125 have recently agreed on a scope of work for a community-led, Project-specific cultural impact assessment. Further, Teck has committed to a Métis Local 125 Project-specific traditional land use study, which is expected to be complete in fall 2014 or early 2015. The outcomes of the traditional land use study and cultural impact assessment, combined with the effects of the Project on traditional land use, will form the basis of mitigation Teck can provide for interests specific to Métis Local 125.
- d) Upon completion of the Project-specific traditional land use study and cultural impact assessment, Teck intends to work with the Métis Local 125 to develop a process to meaningfully incorporate additional traditional knowledge and land use information into Project assessment and planning, and to support resolution of outstanding concerns.

#### ***FORT MCMURRAY MÉTIS (MÉTIS LOCAL 1935)***

- a) Since filing the Round 2 SIR response, Teck has undertaken the following engagement activities with Métis Local 1935:
  - one meeting with the Métis Local 1935 office (October 2013)
  - one meeting with the Métis Local 1935 advisory committee (May 2014)
  - the July 2014 meeting to review Teck's proposed FHCL and Fisheries Offsetting Framework (described previously as part of the collective engagement activities and actions with other Aboriginal communities)
- b) Métis Local 1935 commented on Teck's responses to Round 2 SIRs on December 16, 2013. Teck refers the regulator to the publically available review for full details.

Teck met with a Métis Local 1935 advisory committee on May 16, 2014. During the meeting, members of the advisory committee expressed concerns regarding:

- the size of tailings ponds in the oil sands mining region
  - effects of noise from bird deterrents on tailings ponds
  - how Teck will protect on-site staff in light of recent bear attacks in the region
- c) Teck and the Métis Local 1935 have jointly developed a consultation work plan that guides consultation and community engagement, including consultation capacity funding, for the Frontier Project. Teck and Métis Local 1935 plan to update the consultation work plan annually.

Teck and Métis Local 1935 have recently agreed on a scope of work for a community-led, Project-specific cultural impact assessment. Additionally, Teck has committed to funding a Project-specific traditional land use study by Métis Local 1935. This study is expected to be completed in fall 2014.

- d) Upon completion of the Project-specific traditional land use study and cultural impact assessment, Teck intends to work with Métis Local 1935 to develop a process to meaningfully incorporate additional traditional knowledge and land use information into Project assessment and planning, and to support resolution of outstanding concerns.

### **LAC LA BICHE MÉTIS (MÉTIS LOCAL 1909)**

- a) Teck met with Métis Local 1909 on April 21, 2014. During this meeting, Métis Local 1909 requested that Teck provide funding for a Project-specific traditional land use study to support a better understanding of effects to Métis Local 1909 traditional land use. Métis Local 1909 is located more than 400 km from the Frontier Project site. Given the distance of the community from the Frontier Project and the lack of specific concerns expressed by Métis Local 1909, Teck does not believe a substantial traditional land use study is appropriate and has offered to meet with potentially affected, concerned or interested community members to better understand potential effects and specific concerns associated with the Frontier Project. If, during consultation with the community, Métis Local 1909 identifies specific concerns related to land use in the Project area, Teck is willing to consider conducting a screening-level study to better understand Métis Local 1909 land use in the area.

Métis Local 1909 provided comments on the Teck Frontier Joint Review Panel draft Agreement and Terms of Reference. The comments included the following requests:

- that “participants” include Métis
- that Métis Local 1909 receive CEAA participant funding to carry out traditional land use studies and participate in the hearing process
- that specific words be included in the scope of the cumulative impacts assessment

Métis Local 1909 was invited to participate in the July 2014 meeting with other Aboriginal communities to review Teck’s proposed FHCL and Fisheries Offsetting Framework. Métis Local 1909 did not attend this meeting.

- b) Métis Local 1909 informed Teck that one member holds a trapline (RFMA #1570) north of the Project area and would like to meet with Teck to better understand the Project. Although the trapline will not be directly impacted by the Frontier Project, the trapper may have concerns about accessing the trapline. Teck has met with this trapper to discuss the Frontier Project.

Métis Local 1909 continues to express concern regarding potential impacts to traditional land use, but has not provided Teck any specific information about how Métis Local 1909 members’ land use could be affected by the Project.

- c) Teck has offered to meet with potentially affected, concerned or interested community members to better understand potential effects and concerns associated with the Frontier Project. As stated in the response to part b, Teck has met with the holder of RFMA #1570 to discuss the Frontier Project
- d) Métis Local 1909 has expressed an interest in realizing some benefit from the Frontier Project. Teck has discussed the community's economic development and community development aspirations and has committed to finding opportunities to support the community in these endeavors, where feasible.  
Teck will continue to engage Métis Local 1909 regarding the Frontier Project to better understand concerns, interests and potential effects of the Project.

***MÉTIS NATION OF ALBERTA REGION 1 (MNA R1)***

- a) Teck has requested to meet with MNA R1 to continue discussing concerns and interests with the Frontier Project, but no proposed meeting dates have been successful for MNA R1.  
MNA R1 was invited to participate in the July 2014 meeting with other Aboriginal communities to review Teck's proposed FHCL and Fisheries Offsetting Framework. MNA R1 did not attend this meeting.
- b) On December 16, 2013, MNA R1 provided comments on Teck's responses to Round 2 SIRs. Teck refers the regulator to the publically available review for full details.
- c) Teck has responded to MNA R1's review of Teck's responses to Round 2 SIRs; however, since Teck has not met with MNA R1 since providing the response, Teck has been unable to confirm if the response has resolved MNA R1's concerns.
- d) Teck will continue to engage MNA R1 regarding the Frontier Project to better understand concerns, interests and potential effects of the Project. Teck looks forward to meeting with MNA R1 to discuss concerns that have been resolved, those that remain outstanding, and how Teck can work with MNA R1 in a manner that supports issue resolution.

***FORT MCMURRAY FIRST NATION #468***

- a-d) No concerns have been raised since October 2013. Teck has previously responded to SOCs from Fort McMurray First Nation #468 and has offered to meet with this community to seek resolution to these concerns. The Nation has not followed up with Teck to arrange a meeting.  
Fort McMurray First Nation #468 was invited to participate in the July 2014 meeting with other Aboriginal communities to review Teck's proposed FHCL and Fisheries Offsetting Framework. Fort McMurray First Nation #468 did not attend this meeting.  
At this time, Teck believes the issues stated in SOCs from Fort McMurray First Nation #468 have been resolved. Teck will continue to engage Fort McMurray First Nation #468, particularly regarding business and employment opportunities as they arise.

***REGIONAL MUNICIPALITY OF WOOD BUFFALO (RMWB)***

a-d) Representatives from Teck's community relations and regulatory group met with the RMWB's industry relations group on March 4, 2014. The RMWB expressed the following interests and concerns regarding oil sands development in the region as well as the Frontier Project:

- Surface access and management of vehicle traffic is important to the RMWB.
- There is a proliferation of airstrips in the RMWB.
- Traffic concerns exist for Highway 63 including the volume of light vehicles on the road, and the number of heavy and wide loads being transported through the region.
- RMWB reserves the right to participate in regulatory hearings to speak to cumulative concerns in the region, even if a Memorandum of Understanding (MOU) is concluded with a project proponent.
- RMWB would like Teck to sign a Mutual Aid Agreement on emergency response so that, in the event of an emergency, Teck and municipal responders can coordinate municipal emergency responses.

The RMWB has tabled a draft MOU for Teck to consider. Discussions are progressing between Teck and the RMWB regarding the MOU for the Frontier Project.



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## MINING

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### **Question 3**

**Provide an update on drilling, including**

- a) a core hole location map, showing actual and planned drilling, in .DXF format, and
- b) any core hole data not previously submitted to the AER. Core hole data must be submitted in accordance with the table and codes provided in SIR No. 1, Appendix 1, and in .XLS or .CSV format.

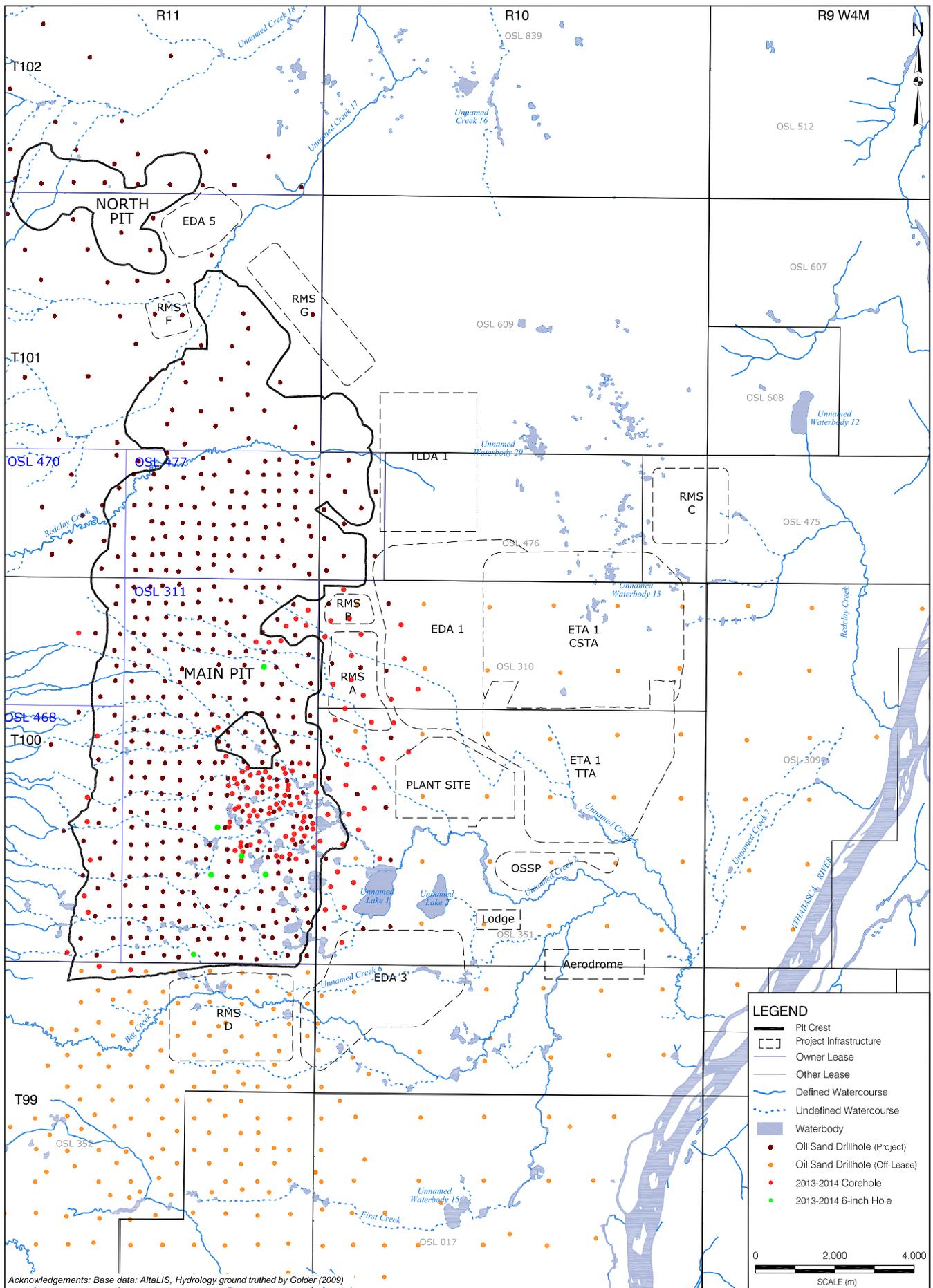
### **Response 3**

- a) From January to March 2014, Teck completed a drilling program consisting of 118 resource and 44 large-diameter coreholes for the Frontier Project. This was the first oil sands coring program completed for the Project since the Integrated Application was submitted in November 2011. Applications for the coreholes were originally submitted in 2012, and drilling was scheduled for January to March 2013. However, on February 18, 2013, AER notified Teck that the well licence applications for Oil Sands Exploration (OSE) 120047, 120049 and 120099 would be subject to a public hearing. The hearing schedule effectively precluded resource drilling in 2013. The hearing was held in August 2013, and in October 2013 the AER approved Teck's applications and issued the corresponding well licences (AER 2013). The coreholes were drilled during the following winter drilling season, from January to March 2014.

For a map showing the locations of coreholes completed during the 2014 drilling program, see Figure 3a-1. An electronic DXF file is provided in Appendix 3a.1.

Teck has selected drilling locations for the next resource corehole program. These locations have not been submitted to the AER. Future resource corehole programs will focus on obtaining information about the resource deposit necessary to satisfy AER *Directive 082* requirements, confirm the current design basis and progress future mine planning for mine design, process and tailings design work.

- b) The oil sands cores collected during the 2014 drilling program are being described and analyzed at commercial laboratory facilities in both Edmonton and Calgary. Final corehole results are expected in 2014. When completed, these results will be submitted to the AER in the requested format.



**Figure 3a-1: Corehole Locations**

Frontier Project - Response to Supplemental Information Request: Round 3 - AER

## **REFERENCES**

AER (Alberta Energy Regulator). 2013. *Teck Resources Limited Application for Oil Sands Evaluation Well Licences Undefined Field, October 21, 2013*. Decision 2013 ABAER 017. Available at: <http://www.aer.ca/documents/decisions/2013/2013-ABAER-017.pdf>. Accessed July 2014.

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## **Question 4**

**SIR2 Response, ERCB Response 1, Pages 1. Teck states, “. . .Teck transferred oil sands rights associated with OSL 14 to Shell Canada Limited (Shell) and Shell transferred the rights to OSLs 309, 310, 351, 475, 476, 607, 608, 609 and the northeastern portion of OSL 352 to Teck. The asset exchange significantly reduced the lease boundary interfaces between the Frontier Project and the Pierre River Mine (PRM).”**

- a) **Discuss the possibility of and preventions to extending the main pit east to develop oil sands in the transferred OSLs.**
- b) **Quantify the total bitumen-in-place, at a TV:BIP of 12:1 and 16:1, that Teck could mine by extending the main pit east to include the transferred OSLs.**

## **Response 4**

- a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:
  - recover additional resource from the leases acquired from Shell during the Teck–Shell asset exchange
  - optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
  - reflect additional engineering studies and information obtained from Shell as part of the asset exchange
  - consider input received from regulators and potentially affected Aboriginal communities during the review process

Teck's understanding of the resource potential between the main pit and the Athabasca River has not changed as a result of the asset exchange. Specifically, there is limited potential to extend the pit east. Changes in this area will consist of an optimization of the east pit wall. Part b of this response provides our preliminary analysis of the incremental resource potential in the area. The possibilities and preventions to extending the main pit east will be further discussed in the Project Update.

- b) As discussed in Volume 1, Section 4.3.7.1, Pages 4-14 to 4-15, there are about 49 million recoverable barrels of bitumen in the former Shell OSLs (about 56 million barrels of bitumen in place) at a total volume to bitumen in place (TV:BIP) ratio of 12:1. Engineering required to inform the Project Update (see AER Round 3 SIR 1) is in progress; however, preliminary analysis indicates that extending the mine pit further east into the transferred OSLs could add about 135 million barrels of bitumen in place at a TV:BIP 16:1 cut-off. As noted in the response to AER Round 2 SIR 1, the updated Project is expected to recover approximately 3.0 billion barrels of partially deasphalted bitumen product, which is 200 million barrels more than identified in the Integrated Application and 600 million barrels more than considered in the responses to Round 2 SIRs (i.e., without the south development area). The resource recovery is incremental to what was included in the original applications for the Frontier Project and PRM.

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### **Question 5**

**SIR1 Response, Volume 1, Response 28, Page 73. Teck states, “However, a significant delay in the SDA would affect the development of the MDA with respect to (iv) ore and fines blending. . .The ore and fines blending strategy for the Frontier Project involves using the 11.60% feed from the SDA to blend with the 10.70% feed from the MDA during the last 24 years of operation at the MDA.” Further, Teck has indicated in SIR2 Response, ERCB Response 1, Page 3, that the mining sequence has not changed as a result of eliminating the SDA.**

- a) **Describe the challenges that Teck anticipates it may encounter due to the loss of its original ore and fines blending strategy, and how Teck will address each challenge (i.e., meeting *Directive 082* requirements, processing ore with higher fines).**

### **Response 5**

- a) Although the south development area (SDA) resource was of higher grade and lower fines than the average for the Project, it accounted for only about 12% of the overall ore tonnage. Therefore, its positive blending effect was relatively minor.

Teck does not believe the removal of the SDA ore source is cause for concern. The plant is designed to accommodate a range of ore types over the life of the Project, and this design range is not expected to materially change with the removal of the SDA. Operational blending practices, which are typical at an oil sands mine, will help to reduce the effect of variable ore sources.

As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to realize opportunities associated with the Teck–Shell asset exchange. This includes extending the Main pit marginally further south and east and changing the tailings management strategy. As described above for the removal of the SDA, Teck does not believe that this additional ore source is cause for concern because the plant is designed to accommodate a range of

ore types and operational blending practices will help reduce the effect of variable ore sources. In fact, engineering studies undertaken as part of the Project Update have optimized the ore blending strategy, resulting in the recovery of about 135 million additional barrels of bitumen.

As indicated in the response to AER Round 3 SIR 3, Teck has selected drilling locations for the next resource corehole program. Future resource corehole programs will focus on obtaining information about the resource deposit necessary to satisfy AER *Directive 082* requirements, confirm the current design basis and progress future mine planning, process and tailings design work.



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## PROCESSING

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### **Question 6**

**SIR2 Response, ERCB Response 17, Page 45. Teck states, “With the removal of the SDA from the Project (see ERCB Round 2 SIR 1), the overall Project mass balance changes.”**

**a) Provide an updated SIR1, Volume 1, Response 53, Figures 53a-1 and 53a-2, Pages 103 and 104, which includes SIR2 Response, ERCB Response 18, Figure 18a-1, Page 47.**

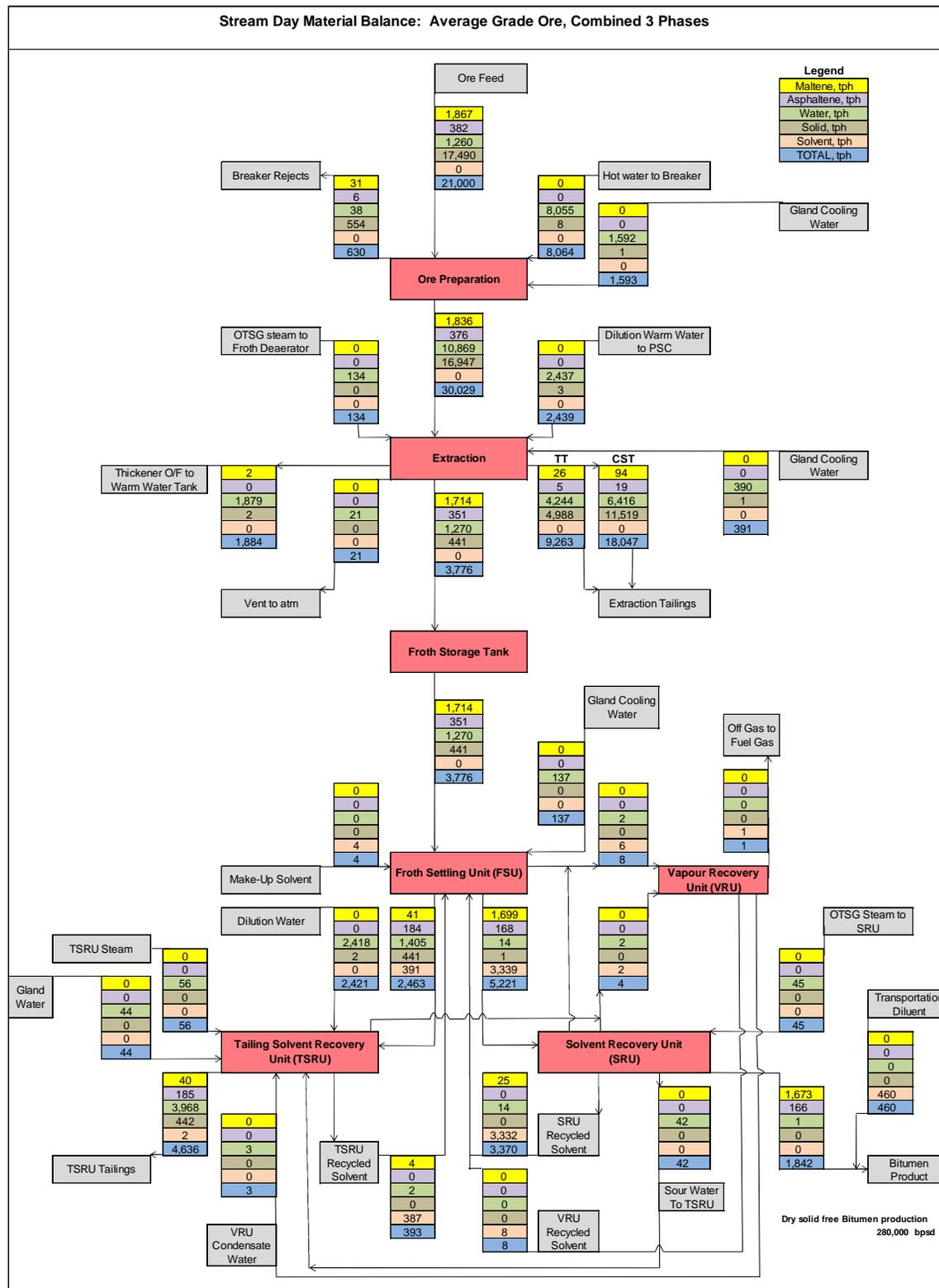
### **Response 6**

a) Revised material (mass) balances are provided for average-grade ore during average winter-summer conditions. Figures 6a-1 and 6a-2 show the updated material balances per stream day and calendar day, respectively, and represent Phases 1 to 3 combined. Phase 4 is no longer included because of the Teck–Shell asset exchange described in ERCB Round 2 SIR 1. The material balance for the vapour recovery unit (VRU) has also been updated.

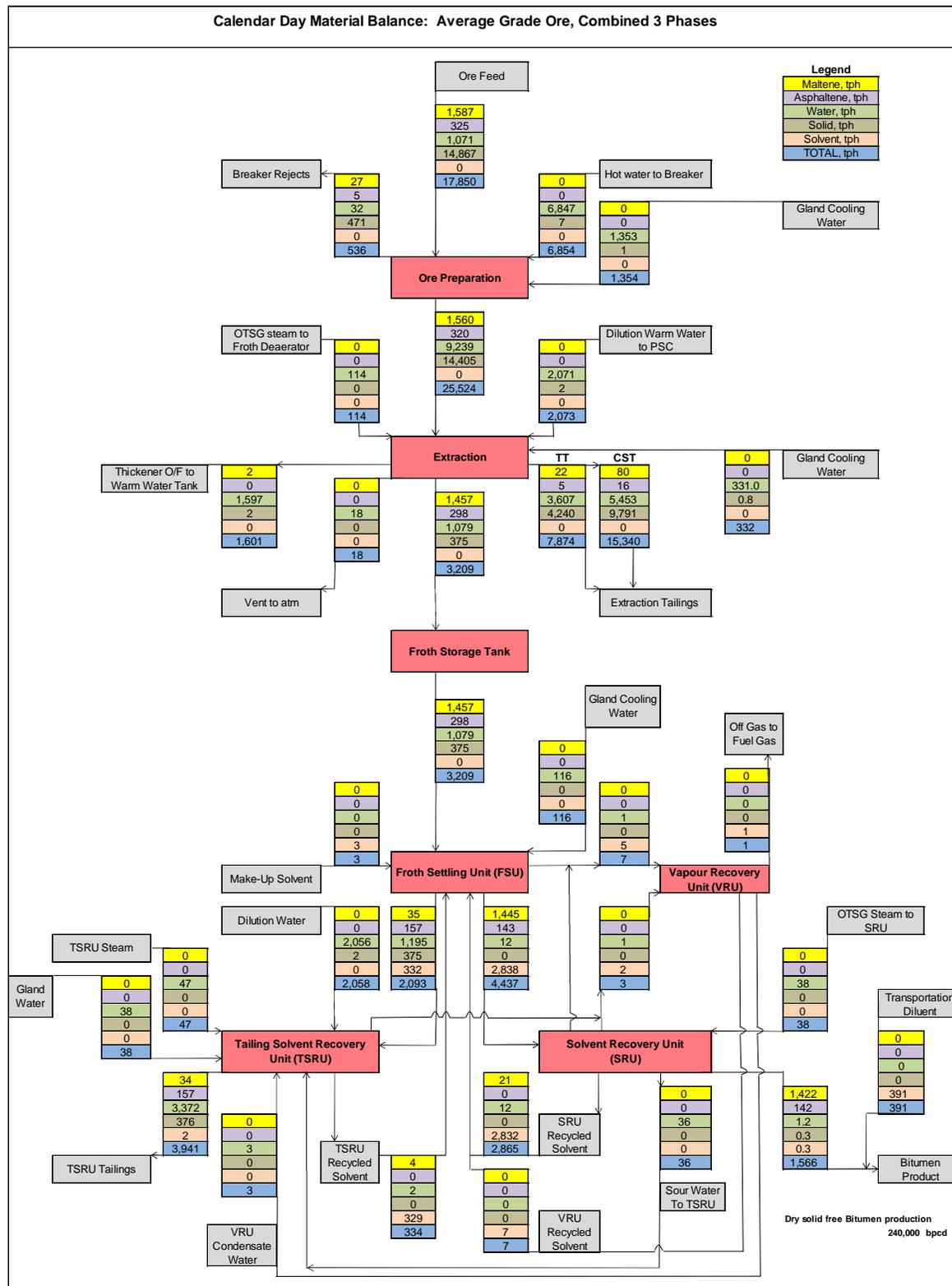
As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:

- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
- optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
- reflect additional engineering studies and information obtained from Shell as part of the asset exchange
- consider input received from regulators and potentially affected Aboriginal communities during the review process

The material balances presented here will be revised and included in the Project Update.



**Figure 6a-1 Material Balance for Average Grade Ore, Phases 1 to 3 Combined – Stream-Day (Revised Figure 53a-2)**



**Figure 6a-2 Material Balance for Average Grade Ore, Phases 1 to 3 Combined – Calendar-Day (Revised Figure 53a-1)**



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## TAILINGS

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### **Question 7**

**SIR2 Response, ERCB Response 1, Page 3. Teck states, “The tailings balance changes because froth from the SDA will not be processed at the main plant with the resultant froth treatment tailings (FTT) disposed of in external tailings area 1 (ETA 1).”**

- a) Where applicable, provide updated Application, Volume 1, Section 6,**
- i) Tables 6.5-1 through 6.5-8, Pages 6-15 through 6-29;**
  - ii) Figure 6.6-1, Page 6-31;**
  - iii) Figure 6.6-4, Page 6-35;**
  - iv) Figure 6.7-1, Page 6-37;**
  - v) Table 6.7-1, Pages 6-38 and 6-39; and**
  - vi) Table 6.7-4, Page 6-44.**

### **Response 7**

- a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:
- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
  - optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
  - reflect additional engineering studies and information obtained from Shell as part of the asset exchange
  - consider input received from regulators and potentially affected Aboriginal communities during the review process

Items identified in this SIR will be considered as part of the Project Update.

### **Question 8**

**SIR2 Response, ERCB Response 21, Page 50. Teck states, “It is assumed that the TT deposit. . .will meet the intent of the strength criteria identified in *Directive 074*.” Figure 21a-1, Page 51 shows that the expected solids content of the TT deposit will be 60wt% about two and half years after deposition, and 68 wt% at the end of the 12-year deposition cycle. Based on existing tailings management knowledge, TT deposits with less than 60 wt% solids are not expected to achieve the undrained shear strength of 5 kPa within one year of deposition, as required by *Directive 074*.**

**a) Describe how the TT deposit will achieve undrained shear strength of 5 kPa one year after deposition.**

### **Response 8**

a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:

- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
- optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
- reflect additional engineering studies and information obtained from Shell as part of the asset exchange
- consider input received from regulators and potentially affected Aboriginal communities during the review process

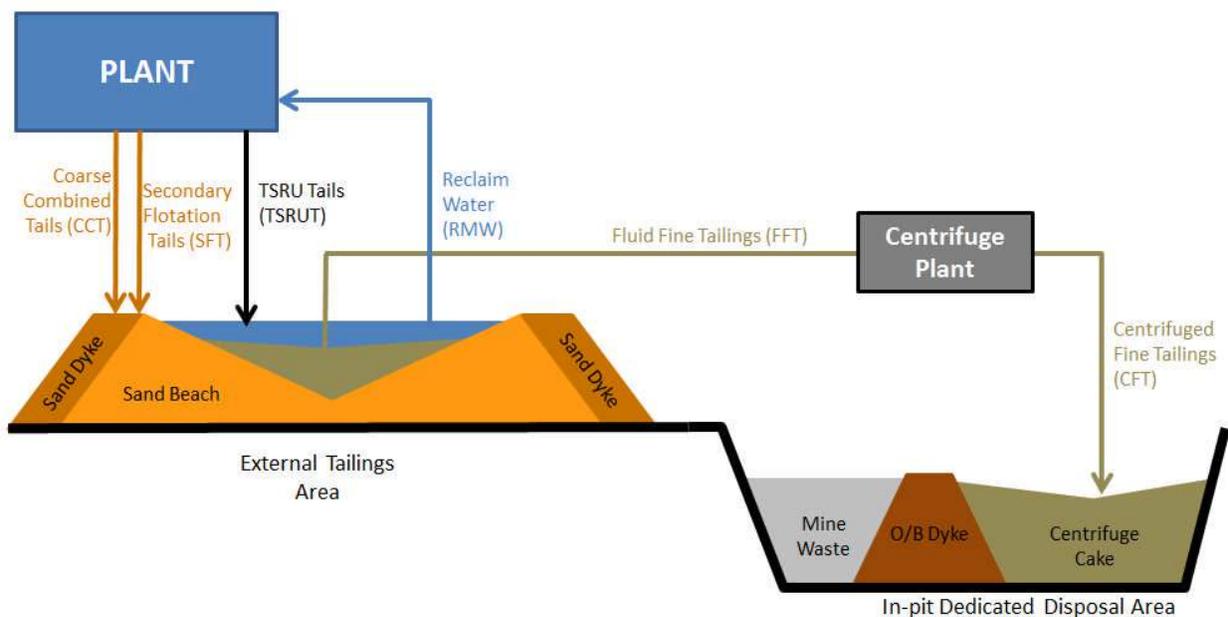
The tailings management strategy developed for the Integrated Application was based on engineering completed in 2009 and 2010. Since then, Teck’s understanding of tailings management options has improved because of additional processability testing and knowledge gained through membership in COSIA. This has allowed Teck to improve the tailings management plan for the Project. Instead of producing thickened tailings using a thickener and thin lift drying to consolidate mature fine tailings, which would be trucked to EDAs, the updated strategy involves depositing coarse combined tailings (CCT) through dyke construction and beaching. Dykes will be constructed using CCT, forming a tailings area that will collect fluids and contain other tailings streams including secondary flotation tailings (SFT) and tailings solvent recovery unit tailings (TSRU).

In the updated strategy, the tailings area is used as a process device that is expected to capture more than 50% of the fines in the coarse sand matrix and result in fewer fines being released to form fluid fine tailings (FFT). Remaining FFT will be processed using centrifuges to create centrifuged fine tailings (CFT), which will be placed in a dedicated disposal area (DDA). Most of the CFT will be placed in-pit below the original ground level. For a schematic cross-section showing the updated

tailings management strategy for the Project, see Figure 8a-1. Overall, the updated strategy is superior to that presented in the Integrated Application because

- the outcome is more predictable (i.e., there is an increased surety of outcome because fines treatment is decoupled from the extraction and bitumen recovery process)
- the strategy is based on technologies that are currently used in oil sands operations
- double handling of tailings is avoided (i.e., both to and from the thin lift drying area)
- challenges associated with operating a large thin lift drying area are removed
- using the tailings area as a process device to collect and sequester fines is efficient as it reduces the amount of flocculent required and fines that need to be centrifuged
- the strategy enables progressive reclamation of the surface of an external tailings area during operations
- in-pit placement of treated FFT is inherently better than ex-pit locations because it eliminates long-term ex-pit storage of treated fine tailings behind dams and provides a more robust reclamation landscape.

Additional information about the tailings management strategy will be provided as part of the Project Update as engineering advances. However, consistent with the response to ERCB Round 2 SIR 21, Teck believes that the updated tailings deposition scheme will meet the intent of *Directive 074* in achieving a trafficable landscape that facilitates progressive reclamation. Although the overall tailings management plan is improved, processed fines are unlikely to achieve 5 kPa one year after deposition. However, the strength gain over time will support capping of the in-pit DDAs prior to mine closure and the post-closure landscape will fully meet the intent of the directive.



**Figure 8a-1 Updated Tailings Management Strategy**



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## NOISE

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### **Question 9**

**SIR2 Response, ERCB Response 1, Page 5. Teck states, “Removal of the SDA from the Project will result in the following changes to sound levels: reduced noise because of less mining equipment and activities at the SDA; reduced noise due to elimination of haul road and utility corridor between SDA and MDA; reduced number of receptors (i.e., receptor R14) along the 1.5-km boundary between the SDA and PRM.”**

- a) **Revise the acoustic section of the EIA to reflect**
- i) reduced noise because of less mining equipment and activities in the SDA,**
  - ii) reduced noise due to elimination of haul road and utility corridor between SDA and MDA,**
  - iii) reduced number of receptors along the 1.5-km boundary between the SDA and PRM, and**
  - iv) if applicable, the new midpoint of peak emissions year.**

### **Response 9**

- a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:
- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
  - optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
  - reflect additional engineering studies and information obtained from Shell as part of the asset exchange
  - consider input received from regulators and potentially affected Aboriginal communities during the review process

Items identified in this SIR will be considered in the Project Update.



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## AIR

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### **Question 10**

SIR2 Response, ESRD and CEAA Response 132, Page 379. Teck indicates that the gas turbine output capacity is 105.1 megawatts (378.4 gigajoules per hour (GJ/h)) and that the heat-recovery-steam-generation (HRSG) boiler gas turbine output capacity is 1396.1 GJ/h.

a) Provide the input capacity, in GJ/h, for the gas turbine and HRSG boiler gas turbine.

### **Response 10**

a) The input and output capacities for each cogeneration unit are provided in Table 10a-1. The overall thermal efficiency of the cogeneration system is 80%.

**Table 10a-1 Cogeneration Input and Output Capacity**

Cogeneration	Input Capacity (GJ/h)	Output Capacity (GJ/h)
Gas turbine	1,249	378
Heat-recovery-steam-generation (HRSG) boiler	956	1,396

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### **Question 11**

SIR2 Response, ESRD and CEAA Response Appendices, Appendix 7a.1 Air Quality Revision (Volume 4, Section 3), Section 3.3.4, Page 3-6. Teck states, “For the Integrated Application, the CALMET model uses mesoscale data generated by the Weather Research & Forecasting (WRF) model. For the revised assessment, alternate mesoscale meteorological data generated using the Fifth-Generation NCAR/Penn State Mesoscale Model (MM5) are used.” In Section 3.3.4.2, Pages 3-6 through 3-10, Teck compares the WRF with the MM5 approach, and states that both approaches “overpredict” or “underpredict” by an approximate percentage.

- a) Provide the differences in the WRF and MM5 model inputs (e.g., SDA inclusion, changes to base case).
- b) Confirm Teck is comparing the results of the WRF and MM5 predictions against ambient measurements.

### **Response 11**

a) In the revised air quality assessment (see the response to ESRD/CEAA Round 2 SIR 7, Appendix 7a.1), Section 3.3.4.2 only compares CALPUFF model predictions associated with existing condition emissions to ambient Wood Buffalo Environmental Association (WBEA) monitoring station measurements. The following comparisons are made:

- CALPUFF model predictions (CALPUFF/CALMET/WRF approach) associated with existing emissions to ambient WBEA measurements
- CALPUFF model predictions (CALPUFF/CALMET/MM5 approach) associated with existing emissions to ambient WBEA measurements

Section 3.3.4.2 also compares predictions from these two modelling approaches with each other.

Existing condition emissions only include developments that are currently operating. They nominally represent the emissions that are associated with the ambient WBEA measurement period. Existing condition emissions for the revised air quality assessment are the same as those used for the Integrated Application.

Other than the use of CALMET data based on WRF and MM5, all other input parameters are the same for the two modelling approaches and comparisons. Therefore, the only difference between the two approaches is the meteorological data assumption (i.e., the use of WRF versus MM5).

For the other assessment cases, there are additional differences as identified in the response to ESRD/CEAA Round 2 SIR 7, Appendix 7a.1. Specifically, the revised Base Case adopts the alternate Base Case emission profile as presented in the response to ESRD/CEAA Round 1 SIR 308. Additionally, the revised Application Case and the revised Planned Development Case (PDC) adopt the alternate Base Case emission profile and the removal of the SDA emissions.

b) ESRD/CEAA Round 2 SIR 7, Attachment 7a.1D compares model predictions against ambient concentration measurements. This comparison is more detailed than the overview comparison provided in Section 3.3.4.2 and includes comparisons for the CALPUFF/CALMET/WRF approach and for the CALPUFF/CALMET/MM5 approach.

Measurement data collected at 14 continuous monitoring stations operated by WBEA are compared with predicted concentrations. These 14 stations include five community stations and nine industry stations. WBEA also runs a network of 37 passive monitoring stations in the region. Data from these passive stations were also compared to predicted concentrations.

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## TERRESTRIAL

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### **Question 12**

**SIR2 Response, ERCB Response 1, Figure 1-1, Page 2. Teck has exchanged assets with Shell, changing its original project area.**

- a) Where applicable, provide updated**
- i) Application, Volume 1, Section 4, Figures 4.5-2 through 4.5-19, Pages 4-31 through 4-48, and include the proposed approval boundary;**
  - ii) Application, Volume 1, Section 13, Figure 13.6-14, Page 13-100;**
  - iii) SIR1 Response, Volume 1, Response 2, Figure 2a-1, Page 3;**
  - iv) SIR1 Response, Volume 1, Response 71, Figure 71d-1, Page 148;**
  - v) Application, Volume 1, Section 13, Figures 13.5-7 and 13.5-8, Pages 13-61 and 13-62; and**
  - vi) SIR1 Response, Volume 2, Volume 1, Response 160, Figure 160a-13, Page 6-51.**
- b) Provide the SHP and DXF/DWG data in NAD 1983 coordinates used to create the figures submitted in (a) (i) through (iv).**
- c) Discuss any progressive reclamation opportunities that resulted from the asset exchange with Shell.**

### **Response 12**

- a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:
- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
  - optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
  - reflect additional engineering studies and information obtained from Shell as part of the asset exchange
  - consider input received from regulators and potentially affected Aboriginal communities during the review process

Items identified in this SIR will be considered in the Project Update.

- b) See the response to part a. Teck will provide the requested data as part of the Project Update.
- c) See the response to part a.

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### **Question 13**

The *Alberta Wetland Policy*, Page 14 indicates that mitigation hierarchy, in order of preferred response, is avoidance, minimization, and replacement, where replacement is “. . . a last resort, and where avoidance and minimization efforts are not feasible or prove ineffective. . . .” However, SIR2 Response, ERCB Response 28(a), Table 28a-1, Pages 64 and 65, indicates a decrease in wetlands from an existing predevelopment area of 12,548 ha, or 52% of the PDA, to 4,520 ha, or 19% of the PDA, at closure. Further, the *Alberta Wetland Policy*, Page 18 and 19 indicates how replacement requirements will be established.

- a) Describe how Teck will modify its development and closure reclamation plans to comply with the mitigation hierarchy and the replacement requirements of the *Alberta Wetland Policy*.
- b) Describe the process Teck would follow to identify wetland replacement opportunities beyond those currently included as wetland reclamation in the closure plan.

### **Response 13**

- a) For existing conditions (i.e., 2008), Teck has identified that 12,459 ha (52%) of the revised PDA are wetlands. When compared to the conceptual closure plan for the revised PDA, there is a decrease of 8,027 ha (33%) of wetlands. More detailed development and reclamation planning will be completed during future stages of engineering including the Project Update (see the response to AER Round 3 SIR 1). As part of this planning, Teck will evaluate options to avoid or minimize effects to wetlands where feasible (e.g., detailed linear corridor planning, including mechanisms to decrease corridor width or mitigate potential effects through activities such as snow ramping). Teck will also look for opportunities to expand the proportion of wetlands in the closure landscape while also considering other end land uses.

Mitigation options will be discussed with regulators and potentially affected Aboriginal communities. As part of the anticipated *EPEA* approval and *CEAA* Decision Statement for the Project, Teck will provide information to regulators about any changes to its development and reclamation plans as part of the Project’s annual closure, conservation and reclamation (CC&R) report.

Teck will continue to look to avoid and minimize Project effects to wetlands and increase their occurrence and distribution on the closure landscape, Teck does expect the Project to result in an overall loss of wetland area in the PDA. This decrease in wetland area on the post-closure landscape results from an increase in topographic diversity inherent in mined landscapes. To compensate for this decrease, Teck anticipates that there will likely be a Project requirement for replacement. In

accordance with the *Alberta Wetland Policy* (Government of Alberta 2013), this might take the form of restorative replacement, which would occur outside the PDA (e.g., enhancement of degraded wetlands), or non-restorative replacement (e.g., research, conservation allowances).

b) As noted in the *Alberta Wetland Policy*:

*A comprehensive decision making framework, including a sound wetland research strategy, will guide the application replacement measures. Additional criteria will direct the inclusion of constructed wetlands as an element of restorative replacement as well as the proportion of non-restorative replacement measures that are permitted as part of a replacement package.*

Teck will look for guidance on wetland replacement from the comprehensive decision making framework and additional criteria that will be developed by the province. As described in the *Alberta Wetland Policy*, Teck will follow a process that could include both restorative and non-restorative replacement.

#### **REFERENCES**

Government of Alberta. 2013. *Alberta Wetland Policy*. Alberta Environment and Sustainable Resource Development. September 2013. Edmonton, Alberta. ISBN: 978-1-4601-1286 (Print Version); 978-1-4601-1287-8 (Online Version).



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## SOCIOECONOMICS

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### **Question 14**

**SIR2 Response, ERCB Response 1, Page 5. Teck states, “Removal of the SDA and the associated reduction in production over the life of the Project results in a shortened construction schedule. . .; . . .a reduction in the Project economic (gross domestic product [GDP] and household income) and employment (construction and operations workers) effects; reduced taxes and royalties. . . .”**

- a) **Provide an updated project schedule.**
- b) **Provide updated estimates of**
  - i) **GDP and household income,**
  - ii) **Provincial and Federal taxes, and**
  - iii) **royalties.**

### **Response 14**

- a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:
  - recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
  - optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
  - reflect additional engineering studies and information obtained from Shell as part of the asset exchange
  - consider input received from regulators and potentially affected Aboriginal communities during the review process

Items identified in this SIR will be considered in the Project Update.

- b) See the response to part a.

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### **Question 15**

**SIR2 Response, ERCB Response 1, Appendix 1.2, Page 1.2-1. Teck states, “Removal of the SDA will reduce on-site construction employment by 10% (from about 41,600 person-years (PYs) to about 37,000 PYs), leading to a similar reduction in total Project-related construction employment effects (direct, indirect and induced).” Further, Teck states, “Total operation employment effects (direct, indirect and induced) are similarly reduced by about 20%.”**

- a) Provide updated information on the direct, indirect, and induced effects of the project on construction and operations employment.**

### **Response 15**

- a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:
- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
  - optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
  - reflect additional engineering studies and information obtained from Shell as part of the asset exchange
  - consider input received from regulators and potentially affected Aboriginal communities during the review process

Items identified in this SIR will be considered in the Project Update.

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### **Question 16**

**SIR2 Response, ERCB Response 1, Appendix 1.2, Page 1.2-1. Teck states, “Removal of the SDA reduces total Project expenditures by roughly 10% to 15% during both construction and operations.” Further, Teck states, “Regarding municipal property taxes, the elimination of Phase 4 results in an approximate 15% reduction in annual property taxes once the Project reaches maximum build out.”**

- a) Provide updated estimates of capital and operating costs.**
- b) Provide updated estimates of annual property taxes.**
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### **Response 16**

a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:

- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
- optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
- reflect additional engineering studies and information obtained from Shell as part of the asset exchange
- consider input received from regulators and potentially affected Aboriginal communities during the review process

Items identified in this SIR will be considered in the Project Update.

b) See the response to part a.

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### **Question 17**

**SIR2 Response, ERCB Response 1, Appendix 1.2, Page 1.2-2. Teck states, “Associated effects to the study region’s housing, municipal and social infrastructure is, by extension, also expected to decrease by a similar order of magnitude.”**

**a) Provide updated estimates of the associated effects to the study region’s housing.**

### **Response 17**

a) As discussed in the response to AER Round 3 SIR 1, Teck intends to update the Integrated Application for the Project to:

- recover additional resource from leases acquired from Shell during the Teck–Shell asset exchange
- optimize the tailings management strategy in consideration of the current state of engineering practice and improved understanding of site-specific conditions
- reflect additional engineering studies and information obtained from Shell as part of the asset exchange
- consider input received from regulators and potentially affected Aboriginal communities during the review process

Items identified in this SIR will be considered in the Project Update.

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