



## **RECOMMENDATIONS SUMMARY**

### **Fort McKay Specific Assessment**

**Fort McKay  
Industry Relations Corporation**

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## 11.0 Recommendations Summary

### 11.1 Introduction

Fort McKay's provides recommendations within this assessment to address two levels of impacts. Project-specific recommendations are aimed at improving the performance of Shell's Projects, in the event they are approved and proceed. These recommendations are intended to lessen the adverse environmental impacts and the adverse impacts specifically on the Community of Fort McKay. Project-specific recommendations are limited in scope because they assume the project will proceed, and will proceed generally as designed and planned.

The greatest and most significant of the adverse impacts on Fort McKay arise from the cumulative effects of Shell's Projects combined with other existing, approved and planned projects. The mitigation and accommodation of cumulative effects requires strategies and measures that need governmental authority and action.

These two categories of recommendations overlap because Shell's Projects contribute and form part of the cumulative effects. In many cases, Shell can act in concert with other industry or government to implement the cumulative effects recommendations.

Fort McKay's recommendations are summarized in this section as well as presented at the end of each main section of the assessment:

- Fort McKay Specific Environmental Assessment (Sections 2 to 10)
- *Cultural Assessment Heritage Baseline*
- *Project-Specific Cultural Heritage Assessment*

### 11.2 Air Quality

#### 11.2.1 Sulphur Dioxide (SO<sub>2</sub>) Recommendations

Based on the current and future potential for regional SO<sub>2</sub> emissions to impact SO<sub>2</sub> levels in the Community of Fort McKay, Fort McKay has a number of specific recommendations related to the understanding and management of SO<sub>2</sub> related air quality issues in Fort McKay. These are:

##### 11.2.1.1 Project-Specific Recommendations

- An "attribution" continuous air quality monitoring station be located between the Community and the proposed Pierre River mine that will monitor for NO<sub>x</sub>,

TRS, SO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub>, O<sub>3</sub>, THC, VOCs and basic meteorological parameters, and that this station be incorporated into the WBEA ambient monitoring network. Such a monitoring station will assist in quantifying the impact of the proposed Pierre River Mine project on air quality in Fort McKay.

- If Shell generates and/or uses significant volumes of produced and/or refinery fuel gas, that the TRS content of this gas be reduced through sulfur removal to less than 50 ppm, and ideally, to less than 30 ppm in order minimize SO<sub>2</sub> emissions from this fuel source.

### **11.2.1.2 Cumulative Effects Recommendations**

- The regional models used to predict SO<sub>2</sub> concentrations in Fort McKay and on Fort McKay's Traditional Lands, be validated, updated and revised in order to:
  - increase the accuracy and reliability of predictions of the impacts of existing and future SO<sub>2</sub> emissions; and
  - identify, understand and manage the factors contributing to the occasional high hourly and daily SO<sub>2</sub> levels in Fort McKay
- Specific procedures should be developed for measuring and tracking air quality changes in the region, and in Fort McKay, including a process for formally reviewing air quality changes above specified levels, in consultation with Fort McKay. The purpose of this recommendation is to enable Fort McKay to understand current and future regional air quality changes and to ensure that significant deterioration, beyond acceptable levels (health and ecological protection and Keeping Clean Areas Clean) does not occur in the Community of Fort McKay and in the region.
- Shell and other regional operators work with Fort McKay to finalize its HTES air quality criteria and targets. This recommendation is aimed at enabling Fort McKay's goals and strategies for air quality management to be implemented and will also assist in future project planning and air quality and emission management programs.

**Note:** Some of these recommendations are similar to those for odour, PM, NO<sub>2</sub> and vegetation effects impact management.

### **11.2.2 Nitrogen Oxides (NO<sub>x</sub>, NO and NO<sub>2</sub>) Recommendations**

Based on the current potential for NO<sub>x</sub> emission-related effects on NO<sub>2</sub> levels in the Community of Fort McKay, Fort McKay has a number of specific recommendations related to the understanding and management of NO<sub>2</sub>-related air quality issues in Fort McKay. These are:

### Project-Specific Recommendations

- Representative mine fleet units used by Shell be subject to emission testing during typical use conditions to confirm mine fleet NO<sub>x</sub> emissions (as opposed to relying on modelled emissions).
- Shell's existing mine fleet be retrofitted with NO<sub>x</sub> emission control retrofit devices that become commercially available to continuously improve regional NO<sub>x</sub> emissions.
- An "attribution" continuous air quality monitoring station be located between the Community and the proposed Pierre River mine that would monitor for NO<sub>x</sub>, TRS, SO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub>, O<sub>3</sub>, THC, VOCs and basic meteorological parameters, and that this station be incorporated into the WBEA ambient monitoring network.
- Reduction of NO<sub>x</sub> emissions from Shell's proposed gas-fired co-generation units that emit more than 100 tonne/year of NO<sub>x</sub> based on the use of post combustion selective catalytic reduction technology or equivalent, consistent with what Shell is proposing for its asphaltene-fired co-generation units. This is intended to minimize regional NO<sub>x</sub> emission sources and ensure "best practices" for NO<sub>x</sub> emission management.

### Cumulative Effects Recommendations

- Regional air quality models be validated, improved and updated to improve predictions of NO<sub>2</sub> and NO concentrations and nitrogen deposition in Fort McKay on its Traditional Lands, which will improve model predictions of the health and environmental impacts of ongoing and future NO<sub>x</sub> emissions;
- That low NO<sub>x</sub> emission heavy hauler vehicles with NO<sub>x</sub> emissions similar to the USEPA Tier 4 limits for non-road vehicles in the 600-750 hp size range be developed and mandated in to better manage NO<sub>x</sub> emissions from one of the major regional NO<sub>x</sub> emission source types, i.e., heavy haulers.
- Specific procedures for measuring and tracking air quality changes in the region, and in Fort McKay, including a process for formally reviewing air quality changes above specific levels (health and ecological protection, Keeping Clean Areas Clean), in consultation with Fort McKay. The purpose of this recommendation is to ensure that deterioration beyond acceptable levels does not occur in the Community of Fort McKay and in the region.

**Note:** Some of these recommendations are similar to those for odour, PM, SO<sub>2</sub> and vegetation effects impact management.

### **11.2.3 Fine Particulate Matter (PM<sub>2.5</sub>) Recommendations**

The proposed project is not considered a large contributor to PM<sub>2.5</sub> emissions in the region. Based on the current potential for PM<sub>2.5</sub> emission related effects on PM<sub>2.5</sub> levels in the Community of Fort McKay as predicted by models and as periodically experienced currently, Fort McKay has a number of specific recommendations related to the understanding and management of PM<sub>2.5</sub> related air quality issues in Fort McKay. These are:

#### **Project-Specific Recommendations**

- Representative mine fleet units used by Shell be subject to emission testing during typical use conditions to confirm mine fleet PM<sub>2.5</sub> emissions (as opposed to relying on modelled emissions).
- Shell’s existing mine fleet be retrofitted with PM<sub>2.5</sub> emission control retrofit devices that become commercially available.
- An “attribution” continuous air quality monitoring station be located between the Community and the proposed Pierre River mine that would monitor for NO<sub>x</sub>, TRS, SO<sub>2</sub>, PM<sub>2.5</sub> and PM<sub>10</sub>, O<sub>3</sub>, THC, VOCs and basic meteorological parameters, and that this station be incorporated into the WBEA ambient monitoring network.
- NO<sub>x</sub> emissions from Shell’s proposed gas-fired co-generation units that emit more than 100 tonne/year of NO<sub>x</sub> be reduced, based on the use of post combustion selective catalytic reduction technology or equivalent, consistent with what Shell is proposing for its asphaltene-fired co-generation units. NO<sub>x</sub> is a contributor to fine particulate formation. The latter can be reduced by minimizing regional NO<sub>x</sub> emissions from major NO<sub>x</sub> emission sources and ensuring “best practices” for NO<sub>x</sub> emission management.

#### **Cumulative Effects Recommendations**

- Regional air quality models be validated, improved and updated to improve predictions of both primary and secondary PM<sub>2.5</sub> dispersion in Fort McKay on its Traditional Lands, which will improve model predictions of the impacts of ongoing and future PM<sub>2.5</sub> emissions.
- Specific procedures for measuring and tracking air quality changes in the region, and in Fort McKay, including a process for formally reviewing air quality changes above specific levels (health and ecological protection, Keeping Clean Areas Clean), in consultation with Fort McKay. The purpose of this recommendation is to ensure that deterioration beyond acceptable levels does not occur in the Community of Fort McKay and on its Traditional Lands.



(Note: some of these recommendations are similar to those for odour, PM, SO<sub>2</sub> and vegetation effects impact management).

#### **11.2.4 Odour Recommendations**

Based on the current issue with odours in the Community, the projected increases in odours associated with the Base, Application and Planned Development Cases and some of the obvious issues in accurately measuring and predicting odour issues, Fort McKay has a number of specific recommendations related to odour management.

##### **11.2.4.1 Odourous Emissions Management Recommendations**

###### **Project-Specific Recommendations**

- Solvent losses from the Jackpine Mine Expansion and Pierre River Mine tailings ponds should be restricted to less than 3 bbl per 1,000 bbl of bitumen within five years of commencing bitumen production at these mines. This will reduce potential odour causing solvent related emissions;
- To better characterize and quantify odourous emissions:
  - a detailed and ongoing emission characterization and quantification monitoring program for the tailings ponds be developed in conjunction with Fort McKay with the results of the monitoring reported to Fort McKay at regular intervals; and
  - develop a comprehensive plant site fugitive emissions detection, monitoring and characterization program and associated repair and reduction program that includes periodic DIAL (Differential Absorption Lidar) or equivalent monitoring and that this program be developed in conjunction with the Fort McKay IRC with the results of the monitoring reported to the Fort McKay IRC at regular intervals.

###### **Cumulative Effects Recommendations**

- All hydrocarbon and reduced sulphur monitoring data that has been generated to date related to mine faces, tailings ponds and fugitive bitumen processing and upgrading emissions be collected, collated and published. This will enable a better understanding and thus management of odour sources.
- To better understand and relate odourous emissions to actual odour responses and to improve odour modeling, predictions and management:

- A regional odour study be designed and implemented in consultation with Fort McKay, at key areas within Fort McKay's Traditional Lands and within the Community of Fort McKay;
- Odour panels be used to relate the data collected from this monitoring program to human characterization and response to air quality at the time of sampling, and
- Odour modeling and other predictive tools be developed that can be used to assess the potential odour impacts of oil sands projects.

#### **11.2.4.2 Odour Management in the Community of Fort McKay**

##### **Cumulative Effects Recommendations**

To address odour issues within the Community of Fort McKay it is recommended that:

- A notification protocol that is currently being developed by Fort McKay to address episodic air quality issues including odours, be adopted and compliance assured through regulatory measures; and
- An ongoing odour monitoring program be developed for the Community which includes human response-based odour monitoring and recording as well as an odour-based air sampling program.

#### **11.2.5 Vegetation and Ecosystem Assessment**

Based on the current potential for emission related adverse effects on vegetation, and the clear potential for significant areas of adverse vegetation impacts under future emission scenarios, Fort McKay has a number of specific recommendations related to management of these potential impacts and adverse effects. These are:

##### **11.2.5.1 NO<sub>x</sub> and VOC Emissions Management Recommendations**

##### **Project-Specific Recommendations**

- Solvent losses to its Jackpine Mine Expansion and Pierre River Mine tailings ponds should be restricted to less than 3 bbl per 1,000 bbl of bitumen within five years of commencing bitumen production at these mines. This will reduce the regional precursor concentrations of ozone forming compounds;
- That Shell be required to undertake a detailed and ongoing emission characterization and quantification monitoring program from the tailings ponds at its Jackpine Mine Expansion and Pierre River Mine tailings and that this program be developed in conjunction with Fort McKay with the results of the

monitoring reported to Fort McKay IRC regular intervals. This will improve understanding and management of the potential health odour and environmental effects of tailings pond emissions;

- Shell be required to develop and implement a comprehensive plant site fugitive emissions detection, monitoring/characterization program and associated repair and reduction program that includes periodic DIAL (Differential Absorption Lidar) or equivalent monitoring and that this program be developed in conjunction with Fort McKay, with the results of the monitoring reported to Fort McKay at regular intervals and upon request. This will enable better understanding and management of potential health, odour and environmental effects of tailings pond emissions,
- Shell be required to reduce the NO<sub>x</sub> emissions from all gas-fired boilers, heaters and gas turbines that emit more than 100 tonne/year of NO<sub>x</sub> and that these reductions be based on the use of post combustion selective catalytic reduction technology, or equivalent, which Shell is proposing for its asphaltene-fired co-generation units. This will reduce the regional precursor concentrations of ozone forming compounds.

### Cumulative Effects Recommendations

- All the hydrocarbon monitoring data that has been generated to date related to mine faces, tailings pond and fugitive bitumen processing and upgrading facility emissions be collected, collated and published to improve the availability of information and understanding of the VOC emissions from regional industrial operations and the potential impact of these emissions.

**Note:** Recommendations are similar to those for odour management (see Section 11.2.4.1) and nitrogen oxides.

### 11.2.5.2 Ammonia Monitoring Studies

#### Project-Specific Recommendations

- An assessment be undertaken in consultation with Fort McKay of the potential for ammonia releases from Shell's proposed projects and that methods be developed and implemented to minimize any such emissions.

#### Cumulative Effects Recommendations

- An regional ammonia monitoring study be designed and implemented in consultation with Fort McKay to monitor both point and area emission sources in the region for ammonia using low detection ammonia monitors.

### **11.2.5.3 Vegetation Effects Measurement and Management in the Regional Municipality of Wood Buffalo**

#### **Cumulative Effects Recommendations**

- To improve understanding of current and potential future regional air-related environmental effects and impacts, and the factors contributing to these effects and the development of management plans;
  - Implementation of the recommendations and work plan work as outlined in CEMA's Interim Nitrogen (Eutrophication) Management Recommendations and Work Plan which requires the development of nitrogen critical loads for sensitive regional ecosystems;
  - Implementation of CEMA's Acid Deposition Management Framework including full development and deployment of the time-to-effect dynamic acidification model for the entire region;
  - Implementation of CEMA's Ozone Management Framework and using the results of the Framework's ozone model predictions in the development of regional ozone monitoring programs and ozone precursor emission management planning;
  - Sensitive and spatially representative ecosystems be indentified and vegetation effects and exposure monitoring programs be developed that can accurately determine if, when and where adverse air-related vegetation effects are occurring and to validate and calibrate model predictions; and
  - Development of ambient air quality critical limits/levels for NO, NO<sub>2</sub> and NH<sub>3</sub> based on potential impacts on vegetation relevant to Fort McKay and its Traditional Lands.

## **11.3 Groundwater**

Fort McKay has identified a number of areas where impacts from Shell's proposed activities on the groundwater resources will have, or may have, significant effects on Fort McKay's ability to use Traditional Lands as they have in the past. Fort McKay's groundwater-related recommendations are as follows:

### **11.3.1 Project-Specific Recommendations**

- Offsets be developed, in consultation with Fort McKay, to mitigate the loss of existing and potential future groundwater sources.

- Shell be required, at its expense, to collect and have potability tests done on groundwater from any source on Traditional Lands at the request of Fort McKay prior to the use of the groundwater from that source.
- Development of a groundwater-monitoring program, in consultation with Fort McKay, designed to detect process-affected seepage that bypasses the interception and/or containment system for external and internal tailings disposal areas.
- The development and implementation of a ground water monitoring program to detect process-affected seepage that bypasses the collection system, after closure and reclamation.
- Monitoring to confirm that natural treatment systems, through which process-affected groundwater is directed, work effectively and if they do not, implement changes or mitigation measures to address the problems.
- The development of a ground water monitoring program, in consultation with Fort McKay, to determine the validity of computer and professional-judgment predictions that have the potential to impact ground water resources and the ability of the Community to utilize their traditional lands. Shell should be required to prepare a table summarizing computer-predicted and professional judgment impacts and to outline the groundwater level and quality monitoring to be undertaken to verify that the predictions are accurate. As monitoring data becomes available it should be added to the table and the updated table be provided to the Fort McKay IRC. Deviations from the predicted impacts, which indicate that impacts have been under assessed, shall result in a reassessment of impacts, updating of the table and reassessment of mitigation measures. The reassessment of any impacts be provided to the Fort McKay IRC, and mitigation measures developed in consultation with Fort McKay.

### **11.3.2 Cumulative-Effects Recommendations**

- A regional groundwater management framework be developed, in consultation with Fort McKay.

## **11.4 Surface Water Resources**

### **11.4.1 Lower Athabasca River Watershed**

#### **Project-Specific Recommendations**

- Shell either provide three to four months of water storage to ensure continued operations during periods of water withdrawal restrictions or present contingency plans for their operations should such an event arise.

## **Cumulative Effects Recommendation**

- Fort McKay recommends that a water management plan for the Lower Athabasca River be finalized on an expedited basis and that the regulators ensure that water withdrawal and other impact limits are established for the Lower Athabasca River Watershed. This is of critical important as the state of the Lower Athabasca River Watershed for the Application and Planned Development Cases is assessed as Threatened.

### **11.4.2 Muskeg River Watershed**

- The development and implementation of a complete Watershed Management Plan for the Muskeg River Watershed, in consultation with Fort McKay, to establish impact limits that retain both undisturbed areas and natural seasonal stream flow patterns, and provide direction to the Jackpine Mine Expansion and other developments. The state of the Muskeg River Watershed is assessed as Endangered for the Base Case, Application Case and Planned Development Case: a watershed management plan is critical (project-specific and cumulative effects recommendation).

### **11.4.3 Pierre River Watershed**

- That Shell takes steps to minimize large changes in streamflow associated with the Pierre River Mine. The Pierre River watershed is assessed as Threatened for the Application case, primarily due to changes in seasonal stream flow.

## **11.5 Water Quality and Fisheries Resources**

### **11.5.1 Muskeg River Watershed**

Based on Fort McKay's assessment of significant adverse effects in the Muskeg River watershed under the Base Case and Application Case, Fort McKay recommends the following:

#### **Project-Specific Recommendations**

- A mandatory minimum setback of 100 metres (m) for all fish bearing water courses, including the main stem of the Muskeg River, Jackpine Creek, Muskeg Creek and other fish-bearing tributaries of the Muskeg River.
- Prohibition of increases in water level of Kearl Lake and the development of methods to prevent such increases. This includes retaining as much of the natural shoreline and riparian area as is required to maintain natural processes and vegetation.

- Mitigation and accommodation measures be developed and consultation with Fort McKay with respect to the lost fishing opportunities caused by the Jackpine Mine, including but not limited to, the development of a fishing opportunities management plan. The Department of Fisheries and Oceans authorized habitat compensation is not compensation or mitigation from the perspective of Fort McKay's lost fishing and other traditional use opportunities due to unknowns about contamination of fish remaining in the system, concerns regarding potential mercury levels in fish in the compensation habitat, the loss of culturally-significant areas and the conversion of river habitat to artificial lakes.

### **Cumulative Effects Recommendations**

- Prior to any final decisions affecting the mainstem of the River, finalization of the Watershed Management Plan for the Muskeg River Watershed and Fort McKay be intricately involved in the development and finalization of the Muskeg River Watershed Plan.

#### **11.5.2 Pierre River Watershed**

Given that there is a potential for adverse effects caused by the Pierre River Mine project on water quality and significant adverse effects on fish habitat and fishing opportunities, Fort McKay recommends the following:

### **Project-Specific Recommendations**

- A minimum setback of 250 m from the Pierre River Mine project to the Athabasca River be established.
- A minimum setback of 100 m for all other fish bearing water courses, including all the diversion channels that drain into fish bearing waters, be established and mandated.
- Consultation with Fort McKay regarding the design of the project specific water quality, sediment quality and fish monitoring program for the Pierre River Mine.

### **Cumulative Effects Recommendations**

- In addition to project specific monitoring by Shell, monitoring of the Pierre River Mine Project watercourses and surface water bodies should be undertaken pursuant to a scientifically defensible and peer-reviewed regional monitoring program. While RAMP is a regional based monitoring program, it samples on an infrequent basis so therefore it cannot provide the only monitoring for the project or the region.

### **11.5.3 Overall Recommendations**

- A mitigation, compensation and accommodation plan to be developed in consultation with Fort McKay with respect to adverse effects and loss of key cultural and traditional use areas of the Muskeg River watershed, including Kearl Lake, and Athabasca River tributaries affected by the Pierre River Mine Project.
- Fort McKay recommends that the acceptance by government and reliance by industry on end pit lakes for treatment of mature fine tailings (MFT) and process waters be stopped until such time as this method of treatment is proven to be viable in a scientifically-defensible manner.

## **11.6 Wildlife Impacts**

### **11.6.1 Project-Specific and Cumulative Effects Recommendations**

All of Fort McKay's recommendations regarding wildlife address cumulative effects, which Shell's Projects contribute to. The following actions should be taken to further understand and address the impacts on wildlife populations:

- Immediate reduction of moose harvest levels allowed for non-Aboriginal hunters throughout the entire oil sands region until current moose populations are known. Current moose populations are unknown in many of the remaining (unmined) wildlife management units in the oil sands region.
- Completion of moose surveys for all oil sands region WMUs within the next two years to determine the moose population. Once the population is known, an appropriate management plan and actions be taken in consultation with Fort McKay.
- Determination of the remaining population of Canada Lynx, Marten, Fisher, Beaver and other wildlife populations. The population levels for these species are currently poorly understood. Once populations are determined, development of management and mitigation methods in consultation with Fort McKay.

The following recommendations will reduce this land-use conflict and impact to wildlife populations in Fort McKay's Traditional Lands:

- Establishment of conservation offsets, including protected areas, to preserve wildlife habitat and populations and provide opportunities for traditional land use in proximity to the Community of Fort McKay.
- Planning of oil sands development based upon wildlife habitat values and traditional land use. For example, preferentially allow oil development in land



that is less valuable to the Fort McKay Community and has lower wildlife habitat quality values.

- Limit approvals to developments that have the lowest environmental impacts on wildlife habitat. For example, in-situ developments with low emissions with effective wildlife mitigation (such as wildlife pipeline crossings) in low quality wildlife habitat.
- Acceleration of reclamation of disturbed areas in the mineable oil sands area. Additional development approval based upon reclamation performance and re-establishment of effective wildlife habitat. For example, approval of further development be contingent on the amount of moose habitat re-established in reclaimed areas or wildlife habitat protected with conservation offsets.

## 11.7 Vegetation Impacts

The following recommendations are proposed by Fort McKay to at least partially mitigate and manage the effects of the Projects and future disturbances within Fort McKay's Traditional Lands:

### 11.7.1 Project-Specific Recommendations

- If this project is approved, areas be identified and designed within the proposed mine plan that could potentially support the development of peatlands (fens or bogs) over the very long term. Shell be required to undertake research and development work on its Jackpine Mine site on peatland reclamation.
- Reclamation techniques for landscapes and upland forests be further developed and improved.
- Reclamation criteria for Shell's mine sites incorporate successful establishment of traditional plants within the disturbed areas, with monitoring and progress reporting to the regulators and Fort McKay. Design and implementation of a program to monitor the potential effects of surficial aquifer drawdown in wetlands adjacent to the Projects, including the lenticular patterned fen near McClelland Lake.
- The development and implementation by Shell of a program to salvage and relocate known occurrences of rare (vascular) species to areas outside of the Project footprints. This program should also evaluate the potential to re-introduce rare species into reclaimed areas.

### 11.7.2 Cumulative Effects Recommendations

- Establishment of enforceable criteria for the measurement of success and reclamation for all end land uses, including for wildlife habitat, traditional land

use and forestry. There is uncertainty with respect to ability of current reclamation practices and objectives to restore equivalent ecosystems that provide a range of functions including species diversity, full range of traditional use plants, or rare plants. This uncertainty needs to be addressed and resolved.

- The establishment of criteria to assess disturbance of ecosystems and landscapes with thresholds established for disturbance of key vegetation indicators in Fort McKay's Traditional Lands and the oil sands region, in consultation with Fort McKay
- Establishment of limits on the amount of development necessitating ground disturbance that can occur within Fort McKay's Traditional Lands and the oil sands region, in consultation with Fort McKay.
- Establishment of Protected areas to preserve traditional land use opportunities and associated resources in proximity to the Community, in consultation with Fort McKay.
- Further mitigation measures and accommodation strategy be developed in consultation with Fort McKay: reclamation does not provide effective mitigation for the Project specific or cumulative loss of Traditional Lands and resources upon which Fort McKay's culture and rights depend.

## **11.8 Biodiversity Impacts**

The effects of the changes to biodiversity in the FTSA will be experienced into the very far future for both the resource and the Community of Fort McKay. The following recommendations are proposed by Fort McKay to at least partially and potentially moderate the effects of the Projects and future disturbances within the FTSA:

### **11.8.1 Project-Specific Recommendations**

- If this project is approved, areas be identified and designed within the proposed mine plans that could potentially support the development of peat lands (fens or bogs) over the very long term. Shell should be required to undertake research and development work on its Jackpine Mine site on peatland reclamation. Wetlands are critical to the concept of an equivalent and diverse post-closure landscape for the Community of Fort McKay.
- Reclamation techniques are improved or developed, for a full range of upland and wetland types, to mitigate for the effects of disturbance to species, ecosystem and landscape level biodiversity.
- Reclamation criteria for Shell's mine sites incorporate successful establishment of traditional plants within the disturbed areas, with monitoring and progress

reporting to the regulators and Fort McKay. Design and implementation of a program to monitor the potential effects of surficial aquifer drawdown in wetlands adjacent to the Projects, including the lenticular patterned fen near McClelland Lake.

- The development and implementation by Shell of a program to salvage and relocate known occurrences of rare (vascular) species to areas outside of the Project footprints. This program should also evaluate the potential to re-introduce rare species into reclaimed areas.

### 11.8.2 Cumulative Effects Recommendations

- In assessing the environmental effects of the Projects on biodiversity, reclamation should not be accepted as a full and effective mitigation measure in the absence of proven wetland (peatland) reclamation technology. Reclamation, even if capable of restoring some types of wetlands, does not mitigate the loss of biodiversity in Project areas during the decades required for mining, closure and reclamation efforts.
- Establishment of enforceable criteria for the measurement of success and reclamation for all end land uses, including for wildlife habitat, traditional land use and forestry. There is uncertainty with respect to ability of current reclamation practices and objectives to restore equivalent ecosystems that provide a range of functions including species diversity, full range of traditional use plants, or rare plants. This uncertainty needs to be addressed and resolved.
- The establishment of criteria to assess disturbance of ecosystems and landscapes with thresholds established for disturbance of key vegetation indicators in Fort McKay's Traditional Lands and oil sands region, in consultation with Fort McKay
- Establishment of limits on the amount of development necessitating ground disturbance that can occur within Fort McKay's Traditional Lands and the oil sands region, in consultation with Fort McKay.
- Establishment of protected areas to preserve and retain traditional land use opportunities and associated resources in proximity to the Community, in consultation with Fort McKay.
- Further mitigation measures and accommodation strategy be developed in consultation with Fort McKay: reclamation does not provide effective mitigation for the project-specific or cumulative loss of Traditional Lands and resources upon which Fort McKay's culture and rights depend.

## **11.9 Disturbance and Access**

With respect to disturbance and access, Fort McKay's recommendations are in keeping with the Community's Healing the Earth Strategy (HTES; Fort McKay IRC 2010a) and focus on:

- retaining land for traditional uses;
- retaining existing access;
- improving access that has been negatively affected (e.g. access management);
- reclaiming disturbed land (see *Section 10 – Reclamation*); and
- offsets (e.g., protected areas) for land/access that have been adversely affected.

### **11.9.1 Project-Specific Recommendations**

- The maximum area permitted to be disturbed at any time at both the Pierre and Jackpine Mine Expansion, should be established with further disturbance being permitted only upon successful reclamation of previously disturbed areas.
- Lease/project specific access management plans be developed to facilitate access of Fort McKay community members to Traplines and other traditional use areas.
- Shell address specific trappers issues related to Fort McKay community members Traplines that occur within the Jackpine Mine Expansion development area
- Shell develop with Fort McKay a mitigation and offset plan in relation to the adverse effects and loss of key cultural and traditional use areas that would be affected by the Jackpine Mine Expansion and Pierre River Mine.
- Regulators develop with Fort McKay a mitigation, compensation and accommodation plan in relation to the adverse effects and loss of key cultural and traditional use areas that would be affected by the Jackpine Mine Expansion and Pierre River Mine.

### **11.9.2 Cumulative Effects Recommendations**

- The regulators should need to ensure that land-uses adjacent to the Community of Fort McKay and Fort McKay's TLE lands are compatible with land-uses identified by Fort McKay and do not adversely impact Fort McKay's lands. In particular, the regulators need to consult with Fort McKay regarding TLE lands that have been identified by Fort McKay, through its internal land use planning process, for preservation of culture (e.g., Moose Lake area, Creeburn Lake) or residential activities (e.g., Community of Fort McKay, proposed new sub-division

located near the Muskeg River) to ensure that these lands will not be adversely affected by industrial activity.

- The regulators should establish limits on the amount of development (i.e., ground disturbance) that can occur within the Fort McKay Traditional Lands and oil sands region and any one time.
- The regulators should establish limits on the amount of development (i.e., ground disturbance) and flow changes that can occur within watersheds within Fort McKay's Traditional Lands and the oil sands region at any one time.
- The regulators should establish, in consultation with Fort McKay, protected areas within Fort McKay Traditional Lands that protect a range of traditional uses and values, including the biodiversity necessary to preserve traditional land use. All protected areas need to be accessible to Fort McKay and a portion of protected areas need to be located near the Community.
- The regulators ensure that access management plans are developed within Fort McKay's Traditional Lands, in consultation with Fort McKay including but not limited to areas that have been identified by Fort McKay as high priorities for access management (Moose Lake corridor, East Athabasca Highway Corridor, Richardson Backcountry). Fort McKay should be involved in the implementation of these access management plans.
- The regulators should set limits on motorized access for non-Fort McKay members within Fort McKay's Traditional Lands.
- The regulators should ensure that Fort McKay's access to their traditional lands be restored and maintained in the face of increasing industrial development. This includes preferential access and modes of access for Fort McKay community members, where access may be restricted for non-Fort McKay community members.
- The regulators should set limits the density of linear features that can be allowed within Fort McKay's Traditional Lands at any given time, in consultation with Fort McKay. Density limits would require successful implementation of Integrated Landscape Management (coordination of access features between users) and would prevent further construction of access features once limits are reached.
- The regulators should ensure that access management plans allow appropriate uses within designated areas. For example, designated high-impact recreation areas – given the interest of a component of the Lower Athabasca Region's population in high-impact recreation (e.g., "quad" usage as a motor-sport, rather than as a means of back-country access), and the damage done to ecologically sensitive areas through this mode of recreation, Fort McKay believes that it may

be desirable to designate high-impact recreation areas in areas whose ecological function and integrity may already be compromised. Examples of candidate areas might include quarries, gravel pits and mine waste areas.

- Fort McKay should be made aware of economic opportunities arising from recreation and tourism associated with access and/or land use management plans.
- A mitigation, compensation and accommodation plan be developed in consultation with Fort McKay in relation to the adverse effects and loss of traditional land use opportunities within Fort McKay's Traditional Lands.
- Development of a co-management strategy with Fort McKay for the management of access and protected areas within Fort McKay's traditional lands.

### **11.10 Reclamation**

Reclamation of oil sands mining areas occurs so far in the future that multiple generations of Fort McKay people will be unable to exercise their rights on these lands. The pace of reclamation of the Jackpine Mine Expansion and the Pierre River Mines is very slow, generally as a result of mine plans that maintain most of the mine areas active throughout the life of these mines, resulting in much of the reclamation occurring near the end of mine life. After reclamation, the shape of the land and the proportions of the uplands and wetlands are changed and the muskeg (organic wetlands) is not replaced. Present technology does not allow for the reestablishment of the muskeg, an important component of the hydrology of the boreal forest. In the reclaimed landscapes, water is drained off the forested uplands into pit lakes where dilution and passive biological treatment is proposed to treat the water prior to release off of the mine area. This treatment is not yet proven by industry, it will require an undetermined period of time, and it does not address the quality of the water on the land upstream of the treatment wetlands or pit lakes. Placement of tailings materials into the pits prior to capping with water increases the salinity and organic compounds in the pit lake waters. Fort McKay does not support the placement of tailings in pit lakes.

Good water quality on the entire landscape is important to Fort McKay, this water is necessary to conduct traditional uses of the land and degraded water quality may not be adequate to support the animals and fish that have been traditionally harvested. The Community has also expressed concerns regarding the quality of plants and animals growing on the reclaimed areas and some community members have concerns regarding the loss of "spirit" in the land and subsequently the loss of effectiveness of medicines and other traditionally used plants and animals.

### 11.10.1 Project-Specific Recommendations

Fort McKay recommends:

- Mine plans be developed that reduce and limit the area of disturbance and facilitate the progressive reclamation of the mined area. Out of pit tailings areas be restricted both in size and in the duration of use.
- A maximum area to be disturbed at any time at both the Pierre River Mine and Jackpine Mine Expansion be established with further disturbances being permitted only upon successful reclamation of previously disturbed areas.
- Land should be reclaimed within 10 years of initial disturbance to allow Fort McKay access back to or through the lands.
- Placement of tailings in end pit lakes be prohibited in favour of alternative methods of tailings disposal or avoidance of the creation of wet tailings through alternative technologies. Final landscape design modified to include more potential wetland areas and methods must be developed to reclaim muskeg (organic wetlands).
- Recreation in the post-mining landscape of the surface water and groundwater hydrologic conditions that existed prior to mining.

### 11.10.2 Cumulative Effects Recommendations

- Establishment of criteria to determine reclamation success, including standards for water quality.
- Overburden or other mine waste materials with elevated sodium and sources of naphthenic acids and other elements of concern, be placed into landforms that are specifically constructed to keep these materials from interacting with surface water drainage or groundwater discharge.
- Development of reclamation planning and criteria, in consultation with Fort McKay, that is aimed at restoring the land for traditional and other uses by the Community and that incorporates the knowledge held by Fort McKay members regarding the land prior to disturbance: “to develop an end land use that which is most valuable to the people of Fort McKay and the broader region, it is useful to build ecosystem function with associated cultural practices” (Garibaldi 2006).
- Fort McKay be consulted and its approval sought prior to the issuance of any reclamation certificate on its Traditional Lands.
- Alternative accommodation measures including conservation offsets and protected areas be developed, in consultation with Fort McKay. Reclamation is not considered effective mitigation for the purpose of environmental assessment

or management of adverse effects due to the (a) uncertainty of the effectiveness of current reclamation processes and technology, (b) the lack of knowledge and ability to restore organic wetlands, (c) the length of time reclamation will take, and (d) the inability to restore the land to its pre-disturbance state.

## **11.11 Cultural Heritage**

### **11.11.1 Cultural Heritage Assessment Baseline**

As detailed in Section 12.0 of the *CHA Baseline*, Fort McKay has outlined numerous strategies to re-capture and maintain the cultural heritage of the Community. These are briefly summarized below (Fort McKay IRC 2010b).

#### **11.11.1.1 Cultural Resilience**

The Community's ability to adapt to environmental change while simultaneously supporting their cultural heritage and values is linked with maintaining or regaining sovereignty over how associated issues are addressed. As such, Fort McKay would like to develop systems and programs aimed at replacing the individual and Community health and well-being that is no longer achieved to the same extent through traditional pursuits and way of life.

#### **11.11.1.2 Reclamation**

Mine related land disturbance, even when accounting for reclamation, will result in a minimum of two to three generations<sup>1</sup> of Fort McKay Community members without access to significant portions of their Traditional Lands. Reclamation is sometimes referenced as a mitigation measure for impacts on traditional land use resulting from project development (e.g., Suncor Energy 2007). However, oil sands projects typically have a lifespan of 25–50 years (sometimes longer) from pre-construction to closure during which time little to no land access is possible for the Community. Even at closure, reclamation activities will not result in a landscape that resembles pre-disturbance conditions. According to Shell Canada Limited (2007b), a site is “considered to be restored if natural succession processes are restored” and does not require the establishment of a site to a mature stage. While these areas may be on a trajectory towards recovering biological diversity and function at the time reclamation certification is granted, they will likely not be suitable for a pre-disturbance range of traditional activities. This further extends the duration of impact beyond the estimate 25–50 years (two to three generations). Ultimately, this disturbance impact reaches into the far future with regards to cultural heritage.

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<sup>1</sup> The length of a generation is defined as 20 years (Ohno 1996).



Fort McKay has developed the Healing the Earth Strategy, to guide the Community's engagement in environmental activities (Fort McKay IRC 2010a). Structured under four strategic areas—retention, reclamation, improvement, and offset—the Community seeks to ensure that their Traditional Lands are managed in a way that addresses Community environmental concerns and respects Community values. Reclamation, which focuses on providing habitat that supports pre-development land use, helps guide Community input into the reclamation process on their Traditional Lands.

### **11.11.1.3 Language Retention**

Establishing programs and practices to support ongoing usage of Cree and Dene is of high importance to Fort McKay. Communication of cultural knowledge using their Aboriginal languages is no longer a common practice in the Community. Continued knowledge of such things as traditional place names, names and uses of traditional resources and a sophisticated awareness of rich meaning of cultural practices are at high risk of being lost without utilization of Aboriginal languages. As such, the Community is currently identifying steps to bolster Aboriginal language retention and practice.

### **11.11.1.4 Land-based Employment**

Community employment, particularly for young people, tends to be selected based on the current opportunities that people see available to them. This has resulted in many youth indicating that they may want to drive a heavy hauler truck, for example, because this is a job they continuously see and hear about. However, Fort McKay would like to realize more land-based employment such as tourism and guiding. The Community recognizes there are significant potential economic development opportunities that can be created within their Traditional Lands that connect with Community cultural values.

### **11.11.1.5 Further Development and Documentation of the Cultural Heritage Baseline**

The process of preparing the CHA Baseline revealed the complexity of the undertaking as well as the need for detailed and appropriate integration of social, economic, and health indicators. Further data and documentation will provide a richer, and more comprehensive, meaningful assessment for the Community of Fort McKay. Fort McKay looks forward to the opportunity to further develop the CHA Baseline and, in turn, future project-specific cultural heritage assessments.

During workshops and focus group conversations related to this report, Community members discussed the development of additional indicators that could be applied to particular cultural attributes as a way to further monitor changes to cultural heritage. Potential indicators may include measures such as the amount of time

spent hunting or distance travelled from Fort McKay to reach hunting locations. Development of these qualitative and quantitative indicators requires planning meetings and additional workshops with Community members. Fort McKay would like the opportunity to establish and monitor these indicators in the future.

#### **11.11.1.6 Cumulative Effects and Regional Initiatives**

Fort McKay has been an active participant in a great number of regional initiatives that were and are intended to support the Community's interests, including maintenance of their cultural heritage. However, whether the Lower Athabasca Regional Plan (LARP) the Moose Lake Access Management Plan (AMP) and other initiatives aimed at addressing regional cumulative impacts will alleviate the negative impacts of industry and other cultural stressors is not yet known. Although the work of these groups is helpful for governments and industry to understand environmental effects, this understanding in itself does not mitigate these effects. To that end, Fort McKay has provided recommendations in the Fort McKay Environmental Specific Assessment with regard to specific environmental effects (e.g., land disturbance, wildlife, odours, etc.). It has yet to be determined if these recommendations will be implemented.

#### **11.11.1.7 Cultural Heritage Strategy**

Further work is necessary to comprehensively address the significant adverse effects of industrial development on Fort McKay's cultural heritage. For example, establishment of a Community-developed Cultural Heritage Strategy is required to provide a clear approach to support and retain the Community's cultural heritage related needs.

Development of such a strategy requires further Community member input and discussion under the guidance of Fort McKay leadership. To best address cultural heritage, governments must consult with Fort McKay on how best to mitigate, compensate and accommodate adverse effects that the Community is currently experiencing on cultural heritage and opportunities for traditional land use.

#### **11.11.2 Project-Specific Recommendations**

Regulators ensure that Shell contribute to:

- Further development of Fort McKay's Cultural Heritage Strategy
- Other systems and programs aimed at strengthening individual and Community health and well-being that is no longer currently achieved to the same extent through traditional pursuits and way of life

### **11.11.3 Cumulative Effects Recommendations**

The measures discussed above will only partially moderate or offset the loss to Fort McKay of traditional land use opportunities and ability to exercise their Treaty and aboriginal rights. The governments need to develop further mitigation and accommodation measures with Fort McKay to address the cumulative effects of industrial development on their cultural heritage.

### **11.12 References**

Fort McKay Industry Relations Corporation. 2010a. Healing the Earth Strategy.

Fort McKay Industry Relations Corporation. 2010b. Cultural Heritage Assessment Baseline: Pre-Development (1960s) to Current (2008). March 2010.