

# **Terms of Reference for Environmental Impact Assessment Report**

**Benga Mining Limited  
Grassy Mountain Coal Project  
(about 7 km from Blairmore, Alberta)**

**March 19, 2015**

**Alberta Energy Regulator**

Terms of Reference for Environmental Impact Assessment Report, Benga Mining Limited,  
Grassy Mountain Coal Project

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## 1 Purpose of the Terms of Reference

The purpose of this document is to identify for Benga Mining Limited (Benga Mining) the information required by government agencies for an environmental impact assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act (EPEA)* as it relates to the Grassy Mountain Coal Project (the project).

The proposed project, located in southwest Alberta within the Crowsnest Pass, is an open pit coal mine and coal processing plant with a conveyor system and rail load-out facility. Benga Mining acquired the Grassy Mountain property and coal leases from Devon Canada and Consol of Canada (50/50 joint venture) in 2013. Since acquiring interest in the property, Benga Mining has been conducting prefeasibility studies, re-evaluating the historical coal-quality data, and taking fresh samples to update the coal-quality evaluation. The current focus of exploratory, technical, and environmental work centres on the proposed surface mine area for the project.

The Crowsnest Pass, running east–west through Crowsnest Ridge, is a valley that has the southernmost rail and highway routes through the Canadian Rockies. The majority of the proposed mining activities are in the Municipal District of Ranchland, with some of the infrastructure located in the Municipality of Crowsnest Pass. The proposed mine and coal processing plant would be about 7 kilometres (km) north of the community of Blairmore. The project would occur on lands that are privately owned (mostly by Benga Mining), as well as on Crown land. The proposed mine permit boundary (areas within which all activities will occur) is about 6121 hectares (ha) in size, while the total disturbance is only estimated to be about 2800 ha.

## 2 Scope of the EIA Report

Benga Mining will prepare and submit an EIA report that examines the environmental and socioeconomic impacts of the entire project. The EIA report will be a standalone document providing environmental and socioeconomic data, results, and analysis for the project area, local study areas, and regional study areas, including a cumulative effects assessment. The EIA report will also include information on aboriginal consultation and public engagement done for the project.

Benga Mining will consider all applicable provincial and federal legislation, codes of practice, guidelines, policies, standards, and directives in conducting the EIA. The EIA report will be prepared in accordance with these terms of reference, the environmental information requirements prescribed under *EPEA* and associated regulations, and the *Canadian Environmental Assessment Act (CEAA)* if applicable. The EIA report will form part of Benga Mining's application to the Alberta Energy Regulator (AER).

Benga Mining will refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* (the guide), published by Alberta Environment, and these terms of reference when preparing the EIA

report. In any case, where there is a difference in requirements between the guide and these terms of reference, the terms of reference shall take precedence.

### **3 Content of the EIA Report**

#### **3.1 Public Engagement and Aboriginal Consultation**

- [A] Describe the concerns and issues expressed by the public and the actions taken to address those concerns and issues, including how public input was incorporated into the project development, impact mitigation, and monitoring.
- [B] Describe the concerns and issues expressed by aboriginal communities and the actions taken to address those concerns and issues, including how aboriginal community input was incorporated into the project design, EIA development, impact mitigation, monitoring, and reclamation. Describe consultation undertaken with aboriginal communities and groups with respect to traditional ecological knowledge and potential impacts on current use of land and water resources for traditional purposes.
- [C] Describe plans to maintain the public engagement and aboriginal consultation processes following completion of the EIA report to ensure that the public and aboriginal peoples will have an appropriate forum for expressing their views on the ongoing development, operation, and reclamation of the project.
- [D] Describe the efforts to obtain public input and identify concerns with the proposed project, including public consultation methods, locations, and timing.

#### **3.2 Project Description**

##### **3.2.1 Overview**

- [A] Provide a project description in sufficient detail to provide context for the EIA, including the following:
  - a. background on the proponent, with specific reference to existing operations, proposed operations, mineral resources, environmental studies, and community involvement;
  - b. an analysis of the need for the project and consideration of alternatives to the proposed activity, including not proceeding with the proposed activity;
  - c. a development plan that outlines
    - i. the phases of development;
    - ii. transportation, infrastructure, and access routes;

- iii. activities associated with each stage of the project; and
  - iv. impacts from a delay in proceeding with the project or any phase of the project or not going ahead with the project.
- [B] Provide maps and drawings for the project components and activities that include
  - a. existing infrastructure, leases, and clearings, including exploration clearings;
  - b. the extent of mine excavation and dump areas in each stage of the project;
  - c. coal recovery and processing facilities;
  - d. dewatering and water control facilities;
  - e. other buildings and infrastructures, including temporary facilities (e.g., conveyors, power lines, and utilities);
  - f. containment structures such as retention ponds and storage ponds (e.g., stormwater runoff);
  - g. water wells/intakes, pipelines, and storage structures;
  - h. waste storage, transfer treatment, and disposal sites;
  - i. field maintenance operations; and
  - j. sources of aggregate resources, borrow material, and other construction material and locations of any stockpiles that will be developed.
- [C] Describe the primary resource recovery process, any proposed follow-up recovery process, and other related processes and process facilities of the project.
- [D] Discuss the amount and source of energy required for the project.
- [E] Describe the proposed method to transport product to markets.
- [F] Provide a list of facilities for which locations will be determined later.
- [G] Provide the adaptive management approach that will be implemented throughout the life of the project. Include how monitoring, mitigation, and evaluation are incorporated.

### 3.2.2 Constraints

- [A] Discuss the process and criteria used to identify constraints to development and how the project has been designed to accommodate those constraints. Include the following:
- a. any applicable regional plan as per the *Alberta Land Stewardship Act (ALSA)*, as well as others such as the *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)*;
  - b. land-use policies and resource management initiatives that pertain to the project;
  - c. aboriginal use of land and water resources for traditional purposes;
  - d. all known trap lines;
  - e. the environmental setting;
  - f. cumulative environmental impacts in the region;
  - g. cumulative social impacts in the region;
  - h. results of project-specific or regional monitoring;
  - i. potential for new or additional technology to increase resource recovery in the future; and
  - j. potential for changes in the regulatory regime.

### 3.2.3 Regional and Cooperative Efforts

- [A] Discuss the proponent's involvement in regional and cooperative efforts to address environmental and socioeconomic issues associated with regional development.
- [B] Describe opportunities for sharing infrastructure (e.g., access roads, utility corridors, water infrastructure) with other resource development stakeholders. Provide rationale where these opportunities will not be implemented.

### 3.2.4 Transportation

- [A] Prepare a traffic impact assessment as per Alberta Transportation's *Traffic Impact Assessment Guideline* ([www.transportation.alberta.ca/613.htm](http://www.transportation.alberta.ca/613.htm)):
- a. describe background traffic and consider the cumulative impacts of traffic due to other existing and planned developments using the same highways and accesses;
  - b. discuss anticipated changes to highway traffic (e.g., type, volume) due to the project;



- c. assess potential traffic impacts for all stages of the project (e.g., construction, operation, maintenance, expansion, and shutdown); and
  - d. determine any necessary improvements and methods to mitigate traffic impacts.
- [B] Describe and map the locations of any new road or intersection construction, as well as any improvements to existing roads or intersections, related to the development of the project, from the boundary of the project area up to and including the highway access points.
- a. Discuss the alternatives and the rationale behind the preferred approach.
  - b. Discuss compatibility of the preferred approach with Alberta Transportation's immediate and future plans.
  - c. Describe the impacts on local communities of the changes in transportation and infrastructure.
  - d. Provide a proposed schedule for the work.
- [C] Describe any infrastructure or activity that could have a potential impact on existing roads (e.g., pipelines or utilities crossing highways; any facilities close to the highways; any smoke, dust, noise, light or precipitation generated by the project that could impact the highways and road users).
- [D] Provide a summary of any discussions with Alberta Transportation in regards to the project and its traffic impacts.

### 3.2.5 Air Emissions Management

- [A] Discuss the selection criteria used, options considered, and rationale for selecting control technologies to minimize air emissions and for air quality management.
- [B] Provide emission profiles (type, rate, and source) for the project's emissions during operations, including point and non-point sources and fugitive emissions (including mine faces), and for emissions during construction. Consider both normal and upset conditions. Discuss
- a. odorous or visible emissions from the proposed facilities;
  - b. annual and total greenhouse gas emissions for all stages of the project. Identify the primary sources and provide examples of calculations;
  - c. the project's contribution to total provincial and national greenhouse gas emissions on an annual basis;
  - d. the proponent's overall greenhouse gas management plans;

- e. the proponent's plans to manage emissions from the mining fleet;
- f. the amount and nature of criteria air contaminant emissions; and
- g. the amount and nature of acidifying emissions, probable deposition patterns, and rates.

### 3.2.6 Water Management

#### 3.2.6.1 Water Supply

[A] Describe the water supply requirements for the project, including

- a. the criteria used, options considered, and rationale for selection of water supply sources;
- b. the expected water balance during all stages of the project. Discuss assumptions made and methods chosen to arrive at the water balances;
- c. the process water, potable water, and non-potable water requirements and sources for construction, start-up, normal and emergency operating situations, decommissioning, and reclamation. Identify the volume of water to be withdrawn from each source, considering plans for wastewater reuse;
- d. the location of sources/intakes and associated infrastructure (e.g., pipelines for water supply);
- e. the variability in the amount of water required on an annual and seasonal basis as the project is implemented;
- f. the expected cumulative effects on water losses/gains resulting from the project operations;
- g. potable water treatment systems for all stages of the project;
- h. type and quantity of potable water treatment chemicals used; and
- i. measures for ensuring efficient use of water, including alternatives to reduce the consumption of non-saline water, such as water use minimization, recycling, conservation, and technological improvements.

#### 3.2.6.2 Surface Water

[A] Describe the surface water management strategy for all stages of the project, including

- a. design factors considered, such as
  - i. site drainage,
  - ii. runoff management,

- iii. road and plant runoff,
  - iv. erosion/sediment control,
  - v. geotechnical stability concerns,
  - vi. groundwater and surface water protection,
  - vii. mine pit dewatering,
  - viii. groundwater seepage, and
  - ix. flood protection;
- b. permanent or temporary alterations or realignments of watercourses, wetlands, and other water bodies;
  - c. the pre- and post-disturbance alignment and condition of all ephemeral and permanent streams, wetlands, and water bodies, including those created by the project; and
  - d. factors used in the design of water management facilities that are in accordance with *Water (Ministerial) Regulation, Part 6 (Dam and Canal Safety)*, as well as the Canadian Dam Safety Association *Dam Safety Guidelines*, including expected flood events and flood protection.
- [B] Describe and map all crossings of watercourses or water bodies (including bridges, culverts, and pipelines) required.
- [C] Describe discharges to the watershed from existing and reclaimed sites, including potential end-pit lakes, and the management strategy for handling such releases.

### 3.2.6.3 Wastewater Management

- [A] Describe the wastewater management strategy for the project, including
- a. the source, quantity, and composition of wastewater streams from each component of the proposed operation (e.g., coal mining, coal processing) for all project conditions, including normal, start-up, worst-case, and upset conditions;
  - b. the design of facilities that will handle, treat, and store wastewater streams, including measures to prevent or minimize potential impacts to the environment, and the type and quantity of any chemicals used in wastewater treatment;
  - c. the options for wastewater treatment, including the rationale for selecting the preferred option and a discussion of why the other options were not chosen;

- d. the options for the disposal of wastewater in the context of best management practices and best available technologies, including the rationale for choosing the preferred option and the measures taken to prevent impacts on potable groundwater, aquatic ecosystems, and vegetation;
- e. how make-up water requirements and disposal volumes will be minimized;
- f. the potable water and sewage treatment systems for both the construction and operation stages. Discuss the sewage treatment system options considered, including the rationale for the option selected; and
- g. a monitoring plan for wastewater releases, including the rationale used to determine the frequency of sampling and the parameters to be measured.

### 3.2.7 Waste Management

- [A] Discuss the selection criteria used, options considered, and rationale for waste disposal. Discuss the strategy for on-site waste disposal versus off-site waste disposal.
- [B] Characterize and quantify the anticipated dangerous goods, and hazardous, non-hazardous, and recyclable wastes generated by the project, and
  - a. describe the composition and volume of specific waste streams and discuss how each stream will be managed;
  - b. describe the management plan for exploratory drilling wastes, overburden, and other mining wastes, as well as any by-products;
  - c. describe how any disposal sites will be constructed; and
  - d. describe plans for pollution prevention, including recycling and reducing waste quantities over the life of the project.
- [C] Provide a list of chemical products to be manufactured, processed, or otherwise used for the project and describe, in general terms, how these products will be stored and managed. Identify products containing substances that are
  - a. toxics under the *Canadian Environmental Protection Act, 1999*;
  - b. listed on the National Pollutant Release Inventory;
  - c. dangerous goods as defined by the federal *Transportation of Dangerous Goods Act*; or
  - d. on the Domestic Substances List and categorized as requiring further assessment under Canada's Chemicals Management Plan.

[D] Describe the nature and amount of on-site hydrocarbon storage. Discuss containment and other environmental protection measures.

### 3.2.8 Conservation and Reclamation

[A] Provide a conceptual conservation and reclamation plan for the project. Describe and map, as applicable,

- a. any existing conservation and reclamation plan;
- b. current land use and capability and proposed post-development land use and capability;
- c. anticipated timeframes for completion of reclamation stages and release of lands back to the Crown, including an outline of the key milestone dates for reclamation and how progress to achieve these milestones will be measured;
- d. constraints to reclamation, such as timing of activities, availability of reclamation materials, and influence of natural processes and cycles, including natural disturbance regimes;
- e. post-development land capability with respect to
  - i. self-sustaining topography, drainage, and surface watercourses representative of the surrounding area,
  - ii. existing traditional use with consideration for traditional vegetation and wildlife species in the reclaimed landscape,
  - iii. end-pit lakes,
  - iv. wetlands,
  - v. self-sustaining vegetation communities representative of the surrounding area capable of ecological succession, and
  - vi. reforestation and forest productivity;
- f. a revegetation plan for the disturbed terrestrial, riparian, and wetland areas;
- g. water supply capability of post-mine landscape;
- h. reclamation material salvage, storage areas, and handling procedures;
- i. reclamation material replacement indicating depth, volume, and type;
- j. existing and final reclaimed site drainage plans;

- k. integration of surface and near-surface drainage within the project area; and
  - l. promotion of biodiversity.
- [B] Provide a map of the predicted ecological land classification for the post-reclamation landscape considering potential land uses, including traditional uses and how the landscape and soils have been designed to accommodate future land use.
- [C] Provide a conceptual plan to monitor reclamation performance and success (including soils, vegetation, wildlife, and aquatic resources).
- [D] Describe how the use of progressive reclamation was considered in the project design and reclamation planning.
- [E] Discuss uncertainties related to the conceptual reclamation plan.

## **4 Environmental Assessment**

### **4.1 Air Quality, Climate, and Noise**

#### **4.1.1 Baseline Information**

- [A] Discuss the baseline climatic and air quality conditions, including
- a. the type and frequency of meteorological conditions that may result in poor air quality; and
  - b. appropriate ambient air quality parameters.
- [B] Provide representative baseline noise levels at receptor locations.

#### **4.1.2 Impact Assessment**

- [A] Identify components of the project that will affect air quality and
- a. describe the potential for reduced air quality (including odours and visibility) resulting from the project and discuss any implications of the expected air quality for environmental protection and public health;
  - b. estimate ground-level concentrations of appropriate air quality parameters;
  - c. discuss any expected changes to particulate deposition, nitrogen deposition, or acidic deposition patterns;
  - d. identify areas that are predicted to exceed potential acid input (PAI) critical loading criteria;

- e. discuss interactive effects that may occur resulting from co-exposure of a receptor to all emissions; and
  - f. describe air quality impacts resulting from the project, including impacts on habitat diversity and quantity, soil resources, vegetation resources, and water quality.
- [B] Identify stages or elements of the project that are sensitive to changes or variability in climate parameters, including frequency and severity of extreme weather events. Discuss what impacts changes to climate parameters may have on elements of the project that are sensitive to climate parameters.
- [C] Identify components of the project that have the potential to increase noise levels and discuss the implications. Present the results of a noise assessment. Include
- a. potentially affected people and wildlife;
  - b. an estimate of the increased noise levels resulting from the development; and
  - c. the implications of any increased noise levels.

## 4.2 Hydrogeology

### 4.2.1 Baseline Information

- [A] Provide an overview of the existing geology and hydrogeology from the surface down to, and including, the coal zones, and, if applicable, to the base of any deeper strata that would be potentially impacted by mining. Document any new hydrogeological investigations, including methodology and results, undertaken as part of the EIA, and
- a. present regional and project-area geology to illustrate depth, thickness, and spatial extent of lithology, stratigraphic units, and structural features;
  - b. present regional and project-area hydrogeology describing
    - i. the major aquifers, aquitards, and aquicludes (Quaternary and bedrock), their spatial distribution, properties, hydraulic connections between aquifers, hydraulic heads, gradients, groundwater flow directions and velocities. Include maps and cross sections;
    - ii. the chemistry of groundwater aquifers, including baseline concentrations of major ions, metals, and hydrocarbon indicators;

- iii. the potential discharge zones, potential recharge zones and sources, areas of groundwater-surface water interaction and areas of Quaternary aquifer-bedrock groundwater interaction;
- iv. water well development and groundwater use, including an inventory of groundwater users;
- v. the recharge potential for Quaternary aquifers; and
- vi. potential hydraulic connection between coal zones and other aquifers resulting from project operations.

#### 4.2.2 Impact Assessment

- [A] Describe project components and activities that have the potential to affect groundwater resource quantity and quality at all stages of the project.
- [B] Describe the nature and significance of the potential project impacts on groundwater with respect to
  - a. interrelationship between groundwater and surface water in terms of surface water quantity and quality;
  - b. implications for terrestrial and riparian vegetation, wildlife, and aquatic resources, including wetlands;
  - c. changes in groundwater quality and quantity;
  - d. conflicts with other groundwater users and proposed resolutions to these conflicts;
  - e. potential implications of seasonal variations; and
  - f. groundwater withdrawal for project operations, including any expected alterations in the groundwater flow regime during and following project operations.
- [C] Describe programs to manage and protect groundwater resources, including
  - a. the early detection of potential contamination;
  - b. groundwater remediation options in the event that adverse effects are detected; and
  - c. the monitoring of groundwater production or dewatering impacts.



## 4.3 Hydrology

### 4.3.1 Baseline Information

- [A] Describe and map the surface hydrology. Include flow regimes of streams in the project area.
- [B] Provide surface flow baseline data, including
  - a. seasonal variation, low, average, and peak flows for watercourses; and
  - b. low, average and peak levels for water bodies.
- [C] Identify any surface water users who have existing approvals, permits, or licences.

### 4.3.2 Impact Assessment

- [A] Discuss changes to watersheds, including surface and near-surface drainage conditions, potential flow impediment, and potential changes in open-water surface areas caused by the project.
- [B] Describe the extent of hydrological changes that will result from disturbances to groundwater and surface water movement.
  - a. Include changes to surface flow, water levels, and channel regime in watercourses (during minimum, average, and peak flows) and water levels in water bodies.
  - b. Assess the potential impact of any alterations in flow on the hydrology and identify all temporary and permanent alterations, channel realignments, disturbances, and surface water withdrawals.
  - c. Discuss both the project-specific and cumulative impacts of these changes on hydrology (e.g., timing, volume, peak and minimum flow rates, river regime, and lake levels), including the significance of impacts on downstream watercourses.
  - d. Identify any potential erosion problems in watercourses resulting from the project.
- [C] Discuss changes in sedimentation patterns in receiving waters resulting from the project.
- [D] Describe impacts on other surface water users resulting from the project. Identify any potential water use conflicts.
- [E] Describe potential downstream impacts if surface water is removed.
- [F] Discuss the impact of low-flow conditions and in-stream flow needs on water supply and water and wastewater management strategies.

[G] Discuss how potential impacts of temporary and permanent roads on wetland hydrology will be minimized and mitigated.

#### 4.4 Surface Water Quality

##### 4.4.1 Baseline Information

[A] Describe the baseline water quality of watercourses and water bodies. Discuss the effects of seasonal variations, flow and other factors on water quality.

##### 4.4.2 Impact Assessment

[A] Identify project components that may influence or impact surface water quality.

[B] Describe the potential impacts of the project on surface water quality:

- a. discuss any changes in water quality resulting from the project that may exceed the *Surface Water Quality Guidelines for Use in Alberta* or the *Canadian Water Quality Guidelines*;
- b. discuss seasonal variation and potential impacts on surface water quality;
- c. assess the potential project-related and cumulative impacts of acidifying and other air emissions on surface water quality; and
- d. discuss the effect of changes in surface runoff or groundwater discharge on water quality in surface water bodies.

#### 4.5 Aquatic Ecology

##### 4.5.1 Baseline Information

[A] Describe and map the existing fish resources of the lakes, rivers, ephemeral water bodies, and other waters. For each species, describe composition, distribution, relative abundance, movements, and general life history parameters. Also, identify any species that are

- a. listed as “at risk,” “may be at risk”, or “sensitive” in the General Status of Alberta Wild Species;
- b. listed in Schedule 1 of the federal *Species at Risk Act*;
- c. listed as “at risk” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC); and
- d. species used traditionally and currently by aboriginal groups.

- [B] Describe and map existing critical or sensitive areas, such as spawning, rearing, and over-wintering habitats, and seasonal habitat use, including migration and spawning routes.
- [C] Describe the current and potential use of the fish resources by aboriginal, sport, or commercial fisheries.
- [D] Describe and quantify the current extent of aquatic habitat fragmentation.

#### 4.5.2 Impact Assessment

- [A] Describe the potential impacts to fish and fish habitat, such as stream alterations and changes to substrate conditions or water quality and quantity, while considering
  - a. fish tainting, survival of eggs and fry, chronic or acute health effects, and increased stress on fish populations from release of contaminants, sedimentation, flow alterations, and temperature and habitat changes;
  - b. potential impacts on riparian areas that could affect aquatic biological resources and productivity;
  - c. the potential for increased fishing pressures in the region that could arise from the increased workforce and improved access resulting from the project. Identify the implications on the fish resource and describe any potential mitigation strategies to minimize these impacts, including any plans to restrict employee and visitor access;
  - d. changes to benthic invertebrate communities that may affect food quality and availability for fish; and
  - e. the potential for increased fragmentation of aquatic habitat.
- [B] Identify the key aquatic indicators that the proponent used to assess project impacts. Discuss the rationale for their selection.
- [C] Discuss the design, construction, and operational factors to be incorporated into the project to minimize impacts on fish and fish habitat and protect aquatic resources. Describe how any water intakes have been designed to avoid entrapment and entrainment of fish and provide information on the species of fish considered.
- [D] Identify plans proposed to offset any loss in the productivity of fish habitat. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat.
- [E] Discuss the significance of any impacts on water quality and implications to aquatic resources (e.g., biota, biodiversity, and habitat) and related implications for First Nations' traditional and current use of these resources.

- [F] Describe the effects of any surface water withdrawals considered, including cumulative effects on fish and fish habitat.

## 4.6 Vegetation

### 4.6.1 Baseline Information

- [A] Describe and map vegetation communities. Identify the occurrence, relative abundance, and distribution of each vegetation community, as well as identify any species that are
- a. listed as “at risk,” “may be at risk,” or “sensitive” in the General Status of Alberta Wild Species;
  - b. listed in Schedule 1 of the federal *Species at Risk Act*;
  - c. listed as “at risk” by COSEWIC; and
  - d. traditionally and currently used species.
- [B] Describe and quantify the current extent of habitat fragmentation.
- [C] Discuss the potential of each ecosite phase to support rare plant species; plants for traditional, medicinal, and cultural purposes; old growth forests; and communities of limited distribution. Consider their importance for local and regional habitat, sustained forest growth, rare plant habitat, and the hydrologic regime.
- [D] Describe the regional relevance of landscape units that are identified as rare.
- [E] Provide timber productivity ratings for both the project area and the local study area, including identification of productive forested, non-productive forested, and non-forested lands.

### 4.6.2 Impact Assessment

- [A] Describe and assess the potential impacts of the project on vegetation communities.
- [B] Discuss any potential impacts the project may have on rare or endangered plant species.
- [C] Identify key vegetation indicators used to assess the project impacts. Discuss the rationale for the indicator’s selection.
- [D] Discuss temporary (include timeframe) and permanent changes to vegetation and wetland communities and comment on
- a. the impacts on other environmental resources (e.g., habitat diversity and quantity, water quality and quantity, erosion potential);

- b. the impacts on recreation, aboriginal, and other uses; and
- c. the sensitivity to disturbance (including acid deposition), as well as the techniques used to estimate sensitivity to disturbance and reclamation, of each vegetation community.

- [E] Describe the regional impact of any ecosite phase to be removed.
- [F] Discuss from an ecological perspective, the expected timelines for establishment and recovery of vegetation communities and the expected differences in the resulting vegetative community structures.
- [G] Provide a map of the predicted ecological land classifications that shows the reclaimed vegetation. Comment on the importance of the size, distribution, and variety of the reclaimed landscape units from both a local and regional perspective.
- [H] Discuss the impact of any loss of wetlands, including how the loss will affect land use.
- [I] Discuss weeds and non-native invasive species and describe how these species will be assessed and controlled prior to and during operation and reclamation.
- [J] Discuss the predicted changes to upland, riparian, and wetland habitats resulting from increased fragmentation.

#### 4.7 Wildlife

##### 4.7.1 Baseline Information

- [A] Describe and map existing wildlife resources (amphibians, reptiles, birds, and terrestrial and aquatic mammals). Describe species composition, distribution, relative abundance, seasonal movements, movement corridors, habitat requirements, key habitat areas, general life history, and their use and potential use of habitats. Also, identify any species that are
  - a. listed as “at risk,” “may be at risk”, or “sensitive” in the General Status of Alberta Wild Species;
  - b. listed in Schedule 1 of the federal *Species at Risk Act*;
  - c. listed as “at risk” by COSEWIC; and
  - d. species of traditional and current use and cultural keystone species.
- [B] Describe, quantify, and map all existing habitat disturbance (including exploration activities) and identify those habitat disturbances that are related to existing approved project operations.

#### 4.7.2 Impact Assessment

- [A] Describe and assess the potential impacts of the project on wildlife populations and wildlife habitats, considering
- a. how the project will affect wildlife's relative abundance, movement patterns, and distribution for all stages of the project;
  - b. how improved or altered access may affect wildlife, including potential obstruction of movements, increased vehicle-wildlife collisions, and increased hunting pressures;
  - c. how increased habitat fragmentation may affect wildlife, considering edge effects, the availability of core habitat, and the influence of linear features and infrastructure on wildlife movements;
  - d. the spatial and temporal changes to habitat availability and habitat effectiveness (types, quality, quantity, diversity, and distribution);
  - e. potential impacts on wildlife resulting from changes to air and water quality, including both acute and chronic effects to animal health;
  - f. the resilience and recovery capabilities of wildlife populations and habitats to disturbance; and
  - g. the potential for the project area to be returned to its existing state with respect to wildlife populations and their habitats.
- [B] Identify key indicator species and discuss the rationale for their selection.
- [C] Comment on the availability of species for traditional use, considering habitat loss, habitat avoidance, vehicle-wildlife collisions, increased non-aboriginal hunting pressure, and other project-related impacts on wildlife populations.

### 4.8 Biodiversity

#### 4.8.1 Baseline Information

- [A] Describe the terrestrial and aquatic biodiversity metrics that will be used to characterize the existing ecosystems and probable impacts of the project, and
- a. describe the process and rationale used to select biotic and abiotic indicators for biodiversity within selected taxonomic groups;
  - b. determine the relative abundance of species in each ecosite phase;

- c. provide locations and lists of species, as well as summaries of observed and estimated species richness and evenness for each ecosite phase;
- d. provide a measure of biodiversity on baseline sites that are representative of the proposed reclamation ecosites; and
- e. rank each ecological unit for biodiversity potential. Describe the techniques used in the ranking process.

#### 4.8.2 Impact Assessment

- [A] Describe the metrics used to assess the probable impacts of the project. Discuss the contribution of the project to any anticipated changes in regional biodiversity and the potential impact to local and regional ecosystems.
- [B] Identify and evaluate the extent of potential effects of fragmentation on biodiversity that may result from the project. Discuss those effects at all relevant scales (from site specific to landscape level).

### 4.9 Terrain and Soils

#### 4.9.1 Baseline Information

- [A] Provide descriptions and maps of the terrain and soils conditions, including
  - a. surficial geology and topography;
  - b. soil types and their distribution. Provide an ecological context for the soils by supplying a soil survey report and maps to survey intensity Level 2 for the project area;
  - c. suitability and availability of soils within the project area for reclamation;
  - d. soils that could be affected by the project with emphasis on potential acidification (by soil type); and
  - e. descriptions and locations of erosion-sensitive soils.

#### 4.9.2 Impact Assessment

- [A] Describe project activities and related issues that could affect soil quality (e.g., compaction, contaminants) and
  - a. indicate the amount (ha) of surface disturbance from plant, mine, overburden disposal, reclamation material stockpiles, infrastructure (e.g., pipelines, power lines, access roads),

- aggregate and borrow sites, construction camps, waste disposal, and other construction and operation activities;
- b. provide an inventory of the pre- and post-disturbance land capability classes for soils in both the project area and the local study area and describe the impacts to land capability resulting from the project. Indicate the size and location of soil types and land capability classes that will be disturbed;
  - c. discuss the relevance of any changes for the local and regional landscapes, biodiversity, productivity, ecological integrity, aesthetics, and future use resulting from disturbance during the life of the project;
  - d. describe potential sources of soil contamination;
  - e. describe the impact of the project on soil types and reclamation suitability and the approximate volume of soil materials for reclamation. Discuss any constraints or limitations to achieving vegetation/habitat reclamation based on anticipated soil conditions (e.g., compaction, contaminants, salinity, soil moisture, nutrient depletion, erosion, etc.); and
  - f. discuss the potential for soil erosion during the life of the project.
- [B] Discuss the potential impacts caused by mulching and storing woody debris, considering, among other items, vulnerability to fire, degradation of soil quality, and increased footprint.

#### 4.10 Land Use and Management

##### 4.10.1 Baseline Information

- [A] Describe the existing land and resource uses and potential conflicts, considering oil and gas development, agriculture, forestry, tourism, and outdoor recreational activities.
- [B] Describe and map all Crown land and Crown reservations (Holding Reservation, Protective Notation, Consultative Notation).
- [C] Identify and map unique sites or special features such as parks and protected areas, heritage rivers, historic sites, environmentally significant areas, culturally significant sites, and other designations (World Heritage sites, Ramsar sites, internationally important bird areas, etc.).
- [D] Describe existing access control measures.



#### 4.10.2 Impact Assessment

- [A] Describe access corridors needed and/or planned by other resource development stakeholders, including those responsible for forest management areas and other timber quota holders, and describe
- a. how their needs are accommodated to reduce overall environmental impact from resource development; and
  - b. opportunities for cooperation on access development.
- [B] Indicate where Crown land dispositions may be needed for roads or other infrastructure for the project.
- [C] Provide a description and timing of land-clearing activities.
- [D] Identify the potential impact of the project on land uses, including
- a. impacts to unique sites or special features;
  - b. the results of consultation with Parks Canada Agency on potential impacts of the project to the lands, waters, air, and natural and cultural heritage resources of national parks, national historic sites, national marine conservation areas, Canadian heritage rivers, UNESCO World Heritage sites and Ramsar Convention Wetlands of International Importance. Where impacts are predicted, provide the results of the analysis and clearly identify the impacts to the special protected area;
  - c. impacts caused by changes in public access arising from linear development, including secondary effects related to increased hunter, angler, and other recreational access; decreased access to traditional use sites; and facilitated predator movement;
  - d. the implications of relevant land-use policies and resource management initiatives for the project, including any constraints to development. Discuss how the project will be consistent with the intent of these initiatives;
  - e. potential impacts to aggregate reserves that may be located on land under the proponent's control and reserves in the region;
  - f. the impact of development and reclamation on commercial forest harvesting in the project area. Include opportunities for timber salvage, revegetation, reforestation, and harvest for the reduction of fuel hazard;

- g. the amount of commercial and non-commercial forest land base that will be disturbed by the project. Compare the pre-disturbance and reclaimed percentages and distribution of all forested communities in the project area;
- h. how the project impacts annual allowable cuts and quotas within the forest management agreement area;
- i. the potential impact on existing land uses of anticipated changes (type and extent) to the pre-disturbance topography, elevation, and drainage pattern within the project area; and
- j. impacts of the project on public access, regional recreational activities, aboriginal land use, and other land uses during and after development activities.

[E] Identify any access restrictions, including, where appropriate, measures taken to control access to the project area while ensuring continued access to adjacent wildland areas.

[F] Provide a fire control plan highlighting

- a. measures taken to ensure continued access for firefighters to adjacent wildland areas;
- b. forest fire prevention, detection, reporting, and suppression measures, including proposed firefighting equipment;
- c. measures for determining the clearing width of power line rights-of-way; and
- d. required mitigative measures for areas adjacent to the project area based on the FireSmart Wildfire Assessment System.

## 5 Historic Resources

[A] Describe consultation with Alberta Culture (AC) concerning the need for a historic resource impact assessment (HRIA) for the project, and

- a. provide a general overview of the results of any previous historic resource studies, including archaeological resources, paleontological resources, historic period sites, and any other historic resources as defined within the *Historical Resources Act*;
- b. summarize the results from the field program done to assess the archaeological, paleontological, and historic significance of both the project area and the local study area;
- c. provide a summary of the results of the HRIA conducted to assess the potential impact of the project on archaeological, paleontological, and historic resources;

- d. provide an outline of the program and schedule of field investigations that AC may require the proponent to undertake to further assess and mitigate the impacts of the project on historic resources; and
- e. document any concerns about historic resources raised during consultation on the project.

## 6 Traditional Ecological Knowledge and Land Use

[A] Provide

- a. a map and description of traditional and current land and water resource use areas, including areas of fishing, hunting, trapping, and nutritional, medicinal, or cultural plant harvesting by affected aboriginal peoples (if the aboriginal community or group is willing to have these locations disclosed);
- b. a map of vision quest sites, cabin sites, spiritual sites, graves, and other traditional use sites considered historic resources under the *Historical Resources Act* (if the aboriginal community or group is willing to have these locations disclosed), as well as traditional trails and resource activity patterns;
- c. a description of the extent of traditional and current use of land and water in both the project area and the local study area, including areas of fishing, hunting, trapping, nutritional or medicinal plant harvesting, and cultural use by affected aboriginal peoples; and
- d. a discussion of
  - i. the availability of vegetation, fish, and wildlife species for food, traditional, medicinal, and cultural purposes in the identified traditional land and water use areas, considering all project-related impacts,
  - ii. access to traditional lands and waters in the project area during all stages of the project; and
  - iii. aboriginal views on monitoring and reclamation.

[B] Describe how traditional ecological knowledge and traditional land use information was incorporated into the project design and development, technical components of the EIA, the conservation and reclamation plan, and monitoring and mitigation plans.

## **7 Public Health and Safety Assessment**

### **7.1 Public Health**

- [A] Determine quantitatively whether there may be public health impacts from the project. Describe those aspects of the project that may impact public health or the delivery of regional health services.
- [B] Document any health concerns raised by stakeholders during consultation on the project.
- [C] Document any concerns aboriginal communities or groups have about existing development and about the proposed project on their health. Include an aboriginal receptor type in the assessment.
- [D] Describe the potential health impacts resulting from higher regional traffic volumes and the increased risk of accidental leaks and spills.

### **7.2 Public Safety**

- [A] Describe those aspects of the project that may impact public safety.
  - a. Describe the proponent's emergency response plan for minimizing adverse environmental impacts, including public notification protocol and safety procedures and emergency reporting procedures for spill containment and management.
  - b. Document any safety concerns raised by stakeholders during consultation on the project.
  - c. Describe how local residents will be contacted during an emergency and the type of information that will be provided.
  - d. Describe the existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations, regional mutual-aid programs, and municipal emergency response agencies.
  - e. Describe the potential safety impacts from higher regional traffic volumes.

## **8 Socioeconomic Assessment**

### **8.1 Baseline Information**

- [A] Describe the existing socioeconomic conditions and communities in the region.

- [B] Describe factors that may affect existing socioeconomic conditions, including
- a. population changes;
  - b. the proponent's policies and programs regarding the use of local, regional, and Alberta goods and services;
  - c. the project schedule and the overall engineering and contracting plan for the project;
  - d. the workforce requirements for all stages of the project, including a description of when peak-activity periods will occur; and
  - e. the planned accommodations for the workforce for all stages of the project. Discuss the rationale for their selection.

## 8.2 Impact Assessment

- [A] Describe the socioeconomic impacts of project construction and operation, including
- a. impacts on
    - i. local training, employment, and businesses,
    - ii. the regional and provincial economies,
    - iii. housing,
    - iv. recreational activities,
    - v. hunting, fishing, trapping, and gathering; and
    - vi. traditional land use by aboriginal communities and groups; and
  - b. the need for additional Crown land to meet project needs.
- [B] Discuss plans to work with aboriginal communities and groups, local residents, and businesses regarding employment, training, and other economic development opportunities arising from the project.
- [C] Provide the estimated total project cost, including a breakdown for engineering and project management, equipment and materials, and labour for both construction and operation stages. Indicate the percentage of expenditures expected to occur in the region, Alberta, and Canada, as well as outside of Canada.

## **9 Mitigation Measures**

- [A] Discuss mitigation measures to avoid, minimize, or eliminate the potential impacts for all stages of the project.
- [B] Identify those mitigation measures that will be implemented for each associated impact and provide the rationale for their selection.
- [C] Discuss the potential effectiveness of the proposed mitigation.

## **10 Residual Impacts**

- [A] Describe the residual impacts of the project following implementation of the proponent's mitigation measures and outline plans to manage those residual impacts.

## **11 Monitoring**

- [A] Describe the proponent's current and proposed monitoring programs, including
  - a. how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans;
  - b. the regional monitoring that will be undertaken to assist in managing environmental effects, confirm performance of mitigation measures, and improve environmental protection strategies;
  - c. how these monitoring programs are consistent with other current or proposed regional monitoring programs;
  - d. monitoring performed in conjunction with other stakeholders, including aboriginal communities and groups;
  - e. new monitoring initiatives that may be required as a result of the project;
  - f. how monitoring data will be disseminated to the public or other interested parties; and
  - g. how the results of monitoring programs and publicly available monitoring information will be integrated with the proponent's environmental management system.