

**FINAL TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT**

FOR THE PROPOSED

**COAL VALLEY MINING EXPANSION
MERCOAL WEST AND YELLOWHEAD TOWER MINE PROJECT**

ISSUED BY: ALBERTA ENVIRONMENT

DATE: May 29, 2007

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1.0 Introduction

1.1 Purpose

The purpose of this document is to identify the information that Coal Valley Mine (CVM) will provide to the public and government agencies in its Environmental Impact Assessment (EIA) report for the proposed Mercoal West / Yellowhead Tower Mine Expansion (the Project). CVM will prepare and submit an Environmental Impact Assessment (EIA) report that examines the environmental and socio-economic effects of the construction, operation and reclamation of the Project. The Project is to be located at Townships 48-49, Ranges 21-23, west of the 5th meridian within Yellowhead County.

1.2 Scope of Environmental Impact Assessment Report

The EIA report will be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under the *Environmental Protection and Enhancement Act (EPEA)* and Regulations, and any Alberta Energy and Utilities Board (EUB) or federal legislation which may apply to the Project. The EIA report will:

- a) Assist the public and government in understanding the environmental and socio-economic impacts of the Project's development, operation and reclamation plans, and will assist CVM in its decision-making process;
- b) Discuss possible measures, including established measures and possible improvements based on research and development to prevent or mitigate impacts;
- c) Assist in the monitoring of environmental protection measures;
- d) Identify residual environmental impacts and their significance including cumulative and regional development considerations; and
- e) Address:
 - i. Project impacts;
 - ii. Mitigation options;
 - iii. Residual effects relevant to the assessment of the Project including, as appropriate, those related to other industrial operations. As appropriate for various types of impacts predictions should be presented in terms of magnitude, frequency, durations, seasonal timing, reversibility and geographic extent;
 - iv. Include tables that cross-reference the report (subsections) to the EIA Terms of Reference; and
 - v. Include a glossary of terms including definition sources and a list of abbreviations to assist the reader in understanding the materials provided.

The EIA report will form part of CVM's application to the EUB and Alberta Environment (AENV) for construction, operation and reclamation of the Project. A summary of the EIA report will also be included as part of the Application.

1.3 Public Consultation

CVM's public consultation program will facilitate communication with members of the public and industry who may be affected, directly or indirectly, by the proposed Project and will provide them with an opportunity to participate in the EIA process. The EIA report will document the results of the public consultation program (see Section 10.0 for details) and will provide environmental information to address the issues raised.

1.4 Proponent's Submission

CVM is responsible for the preparation of the EIA report and related applications. The submission will be prepared in accordance with these Final Terms of Reference and issues raised during the public consultation process.

2.0 Project Overview

2.1 Project Summary

CVM shall:

- a) Provide a corporate profile, an overview of the proposed Project, the key environmental, resource management and economic issues that are important for a public interest decision and a summary of the results of the EIA;
- b) Identify those responsible for the development, management and operation of the proposed Project; and
- c) Provide a brief history of the exploration and operations in the Coal Valley area.

2.2 Principal Development Area and EIA Study Area

The Principal Development Area (PDA) includes all lands subject to direct disturbance from the Project and associated infrastructure, including access and utility corridors. For the PDA, provide:

- a) The legal land description;
- b) The boundaries of the PDA;
- c) A map that identifies the locations of all proposed development activities; and
- d) A map and photo mosaic showing the area proposed to be disturbed in relation to existing topographic features, township grids, wetlands and waterbodies.

The Study Area(s) shall include the spatial and temporal boundaries within which measurable effects of the Project alone or in combination with other land use activities, either approved or proposed, are reasonably anticipated. The Study Area(s) may have a Local or Regional context which shall be clearly described within the Assessment. Anticipated environmental conditions outside the Study Area(s) should be similar with or without the Project. For the Study Area(s), provide:

- a) The boundaries of the Study Area(s), and identify the Local and Regional context chosen to assess impacts on maps of appropriate scale; and
- b) The rationale used to define Local and Regional Study Areas.

2.3 EIA Summary

Provide a summary of the EIA report, addressing:

- a) Environmental and land use conditions in the EIA Study Area without the Project;
- b) Activities and components of the Project that are anticipated to influence environmental and land use conditions;
- c) The anticipated environmental effects, with emphasis on regional and cumulative considerations;
- d) Proposed mitigation measures, monitoring and management plans;
- e) Any Project-related residual effects, their contribution to regional cumulative effects, and their implications for the future management of regional cumulative effects; and
- f) Effects of the environment on the project.

List and discuss key environmental issues and issues which are important for the achievement of sustainable environmental and resource management that were identified during the preparation of the

EIA report and public consultation. Differentiate between emerging issues (with ongoing uncertainties), issues with quantifiable and significant environmental effects, and issues that can be resolved through available technology and existing management approaches. Provide a matrix or summary chart to describe this section.

3.0 Regulatory Planning and Framework

CVM shall:

- a) Identify all regulatory approvals that have been granted that relate to the proposed Project;
- b) Identify the government legislation, regulatory approvals and agreements applicable to the review of the proposed Project. List the major components of the proposed Project that will be applied for and constructed within the duration of proposed approvals under the EPEA and Water Act;
- c) Identify other regulatory authorizations that will be required for the proposed Project and describe the schedule and mechanisms CVM will utilize to comply with these regulatory processes;
- d) Identify and discuss any provincial multi-stakeholder planning initiatives or policies to the extent that they apply to the proposed Project (such as *A Coal Development Policy for Alberta*, *Water for Life Strategy*, *Land Use Zoning*, *Wildlife Management Areas*, *Fish Conservation Strategy for Alberta 2006-2010*, *Climate Change Central*, *Clean Air Strategic Alliance*, *West Central Airshed*, *North East Slopes Sustainability Strategy*, and *Integrated Resource Management Plans*), and discuss what action will be taken to support the desired environmental outcomes stated in these plans/policies;
- e) Provide a summary of the regional, provincial or national objectives, standards or guidelines that have been used by CVM to assist in the evaluation of the significance of environmental effects; and provide documentation of consultation with local municipalities and discuss how the proposed Project would be consistent with the intent of municipal plans, bylaws and initiatives.

4.0 Project Description and Management Plans

CVM shall:

- a) Provide the scope of the proposed Project description in sufficient detail to allow quantitative assessment of the environmental consequences. If the scope of information varies among components or phases of the proposed Project, CVM shall provide a rationale demonstrating that the information is sufficient for EIA purposes;
- b) Describe the proposed Project components, infrastructure and activities. Identify alternatives available that are currently employed within related sectors, and discuss the alternatives considered, the alternative selection process, the potential effects that activities and infrastructure may have on the environment and the natural resources to be used for the proposed Project. Outline the management plans to minimize the discharge of pollutants, manage wastes, reclaim disturbed lands and water bodies, optimize resource use, monitor effects, ensure public safety, as well as describe contingency plans for minimizing negative effects of the Project to the environment or the public;
- c) Describe all of the activities and components of the proposed Project that are proposed for approval. Provide outlines of the relevant management plans for these activities and the management strategies that will be used to assure successful implementation of these plans.

4.1 Project Need and Alternatives Considered

CVM shall address the following:

- a) The need for coal production on the chosen site, the alternatives to the Project and the potential alternative of not proceeding with development;
- b) Alternative mining methods and their environmental implications;
- c) Contingency plans if major project components or methods prove to be unfeasible or do not perform as expected, including prolonged suspension of any Project activity;
- d) The implication of a delay in proceeding with the proposed Project, or any phase of the proposed Project; and
- e) Potential cooperative development opportunities for the proposed Project (e.g., shared infrastructure and the implications of the proposed Project for ongoing regional management and research initiatives).

4.2 Project Components and Development Timing

4.2.1 Mine Plan

CVM shall provide a description and drawings of the proposed surface coal mine plan and geotechnical considerations, including but not limited to:

- a) Economic, technical and environmental factors that contributed to the decision-making process or development within the Principal Development Area;
- b) Site selection process for new infrastructure such as powerlines and access roads. Indicate the technical, geotechnical, economic and environmental criteria considered;
- c) General mine development activities and schedules that characterize the construction, operation, reclamation and abandonment phases;
- d) Proposed mining methods, mine design criteria, development activities and schedules for the Project, including activities such as soil salvage, haul road construction, coal handling and reclamation;
- e) Maps and diagrams at appropriate scale to illustrate the development plan, water management systems, associated infrastructure and reclamation plan; and
- f) Specific activities that will be undertaken to prevent or reduce the potential for adverse environmental or social impacts through the mine planning process.

4.2.2 Development Timing

CVM shall provide a description and site development plan to illustrate the proposed stages or phases of the activities and likely development timing, explaining:

- a) The timing for the proposed Project to come on-stream;
- b) The timing and duration of key pre-construction, construction, operational, decommissioning, reclamation activities and monitoring; and
- c) The key factors controlling the schedule and uncertainties.

4.3 Product Handling

CVM shall:

- a) Identify the location and amount of all on-site storage associated with the Project, including storage of coal, catalysts, chemicals, products, by-products, intermediates and wastes; and
- b) Explain containment and environmental protection measures with reference to relevant government guidelines.

4.4 Utilities and Transportation

CVM shall describe the proposed Project infrastructure requirements including but not limited to:

- a) Vehicular access to the proposed Project and identify any upgrading needs;
- b) Any expected changes in traffic volume, by Average Annual Daily Traffic (AADT) and type on area municipalities, highways and roads in the surrounding area and the proposed mitigation with consideration of cumulative effects with other existing and planned operations, during the construction, operation and reclamation of the proposed Project;
- c) Maps of appropriate scales the infrastructure and transportation (access) requirements for the proposed Project;
- d) How personnel will travel to the mine site and how materials will be delivered during construction, operation and reclamation phases of the proposed Project;
- e) The result of consultation with the local transportation authorities and other stakeholders, including transportation studies that are underway or planned. If regional infrastructure is required, identify the locations, routes and any upgrading needs and who would be responsible for installation and approval of these facilities;
- f) The shared use of facilities and utilities by the proposed Project;
- g) Any barriers or limits to existing transportation infrastructure; and
- h) Any barriers or limits to existing recreational access routes.

4.5 Transmission Lines

CVM shall:

- a) Discuss the capacity of the existing transmission lines in the Coal Valley area to handle the additional power required when the proposed Project comes on-stream;
- b) Provide the potential location of proposed transmission lines;
- c) Provide results of discussion with the Alberta Electrical System Operator regarding power use of the provincial electrical grid; and
- d) Identify the regulatory processes and decisions that will determine what changes to the transmission system are required to accommodate the proposed Project.

4.6 Water Supply and Water Management

CVM shall describe the process water requirements and discuss design considerations to ensure efficient use of water.

- a) Identify the potential sources of water quality concerns associated with the mine extension. Describe the monitoring and control systems to reduce potential impacts on water quality. Provide the water management program to address surface runoff, groundwater and pit dewatering;
- b) Discuss the factors considered in the design of water management facilities such as settling ponds, as well as the manner of pond sediment removal and disposal that may be required during the operation phase. Discuss the handling and use of flocculants in the water quality management program; and
- c) Summarize permanent or temporary alterations or diversions to watercourses and provide a summary of methods proposed to minimize impacts to surface water and ground water flows within affected watersheds.

4.7 Air Emissions Management

CVM shall identify the type, volume and source of air emissions for the proposed Project:

- a) Identify all potential sources of emissions (total particulates, PM₁₀, PM_{2.5}, CO (carbon monoxide), NO_x (oxides of nitrogen) and SO₂ (sulphur dioxide)) from the Project, including but not limited to, mining activities, coal handling facility, vehicles, road ways and any other related activities;
- b) Describe any mitigation, monitoring and control systems that CVM proposes to reduce potential impacts from emissions;
- c) Describe the air management program to address all relevant fugitive dust and other emissions.

4.8 Greenhouse Gas Emissions

CVM shall provide the following:

- a) The expected annual and total greenhouse gas (GHG) emissions over the construction, operation and decommissioning phases of the Project including calculations;
- b) The Project's contribution to total provincial and national GHG emissions on an annual basis;
- c) How the Project design and GHG management plans have taken into account the need for continuous improvement with respect to GHG emissions and their consideration of *Albertans and Climate Change: Taking Action*;
- d) CVM's overall GHG management plans, any plans for the use of offsets (nationally or internationally) and the expected results of implementing the plans.

4.9 Hydrocarbon, Chemical and Waste Management

CVM shall:

- a) Identify anticipated hazardous and non-hazardous wastes and recyclables and dangerous goods generated or used in the mining operation.
- b) Identify how each waste stream will be managed; and
- c) Demonstrate that the selected management options are consistent with the current regulatory requirements and industry practice.

4.10 Environmental Management System and Contingency Plans

CVM shall summarize key elements of its environmental, health and safety management system and discuss how it will be integrated into the proposed Project and address the following:

- a) Corporate policies and procedures, operator competency training, spill and air emission reporting procedures and emergency response plans;
- b) Plans to mitigate and minimize the production or release into the environment of substances that may have an adverse effect; and
- c) The emergency response plan's capability to deal with unpredicted negative impacts.

4.11 Reclamation and Closure Plan

CVM shall provide a conceptual and progressive reclamation closure plan for the proposed Project that outlines existing land uses, reclamation concepts applicable to the environmental setting, regulatory requirements, stakeholder preferences, proposed end land use objectives and other factors necessary for this plan to be implemented, including:

- a) Reclamation methods relative to drainage control, land stability, soil salvage, soil replacement, revegetation and interim land management;
- b) Criteria for salvaging soils for reclamation, based on the availability and suitability of soils;
- c) An estimation of volumes of soil available for salvage with a reconciliation of soil replacement requirements for reclamation;
- d) A soil handling and replacement plan for the Principal Development Area including details of techniques, timing, depth, volumes, and type of reclamation material;

- e) Reclamation and land use objectives and describe how the reclamation plan will meet those objectives, including contouring, surface and near-surface drainage restoration, erosion control, and revegetation. Describe proposed techniques and rational within the context of industry standards and best management practices, and any relevant Subregional Integrated Resource Plan(s);
- f) A discussion of plans for abandonment including mine sites, processing facilities, product storage sites, access routes, watercourse crossings, and utility corridors;
- g) A reclamation schedule and a description of how reclamation success will be measured and evaluated, including estimated target dates for when reclaimed lands will be re-opened to public access;
- h) A contingency reclamation schedule including plans to prioritize reclamation of high-risk sites should mining operations need to be suspended or terminated due to unforeseen factors;
- i) A revegetation plan which includes seed mixes, timing, monitoring, interim land management (erosion control) and weed control;
- j) A site diagram showing post reclamation site conditions including topography, surface drainage, final vegetation and other significant features;
- k) A discussion of the aquatic components of the post-reclamation landscape, including end pit lakes. Address issues related to the design of a self-sustaining and productive aquatic ecosystem; and
- l) Anticipated differences between pre- and post-development landscape, vegetation types, wildlife habitats, aesthetics, and recreational use.

5.0 Environmental Assessment

CVM shall define assessment scenarios including:

- a) A Baseline Case, which includes existing environmental conditions, existing and approved projects or activities;
- b) An Application Case, which includes the Baseline Case plus the Project; and
- c) A Cumulative Effects Assessment (CEA), which includes past studies, existing and anticipated future environmental conditions, existing projects or activities, plus other planned projects or activities.

Note: For the purposes of defining assessment scenarios, “approved” means approved by any federal, provincial or municipal regulatory authority. “Planned” is considered any project of activity that has been publicly disclosed during the time period ending six months prior to the submission of the Project Application and EIA report.

5.1 Environmental Assessment Requirements

CVM shall provide information on the existing environmental resources and resource uses that could be affected by development. Identify the environmental components potentially affected by the Project. Describe the assessment methodology and rationalize the selection of key indicators. These environmental indicators will be used to estimate the scale of impact and to evaluate the appropriateness of the environmental management programs.

For each environmental component and indicator:

- a) Describe the existing baseline condition;
- b) Identify the activities associated with the Principal Development Area that have the potential to affect the environmental component and indicator being considered;
- c) Define and provide the rationale for the spatial and temporal boundaries for the Study Area(s) used for the assessment;

- d) Describe the nature of the environmental effects associated with the Project including information on magnitude, probability of occurrence, frequency, extent, duration and seasonal timing for each environmental effect;
- e) Present environmental protection plans to prevent, minimize or mitigate negative environmental effects from the Project;
- f) Identify residual impacts and comment on their significance;
- g) Present plans to identify, monitor and manage potential environmental changes in order to demonstrate that the Project will operate in an environmentally-sound manner over the life of the Project; and
- h) Provide maps of suitable scale that include legal land descriptions, topographical and other natural features that illustrate the proposed Principal Development Area, Study Area(s), and all proposed development activities.

5.2 Modelling

CVM shall document any assumptions used to obtain modelling predictions submitted as part of the EIA report. Clearly identify the limitations of the model(s) including sources of error and relative accuracy. Discuss the applicability and reasons for using a particular model.

5.3 Cumulative Environmental Effects (CEA)

Assessment of cumulative effects will be an integral component of the EIA report. CVM will conduct a cumulative environmental effects assessment of the Project based on the EUB/AENV/Natural Resources Conservation Board Information Letter “*Cumulative Effects Assessment in Environmental Impact Assessment Reports under the Alberta Environmental Protection and Enhancement Act (June 2000)*”. This will include a comprehensive summary of all proposed monitoring, research and other strategies of plans to minimize, mitigate and manage any potential adverse effects. The identification and assessment of the likely cumulative environmental effects of the Project will:

- a) Define the spatial and temporal Study Area boundaries and provide the rationale for assumptions used to define those boundaries for each environmental component examined;
- b) Describe the current (baseline) state of the environment in the Regional Study Area (used for the cumulative effects assessment);
- c) Assess the incremental consequences that are likely to result from the Project in combination with other existing, approved and planned projects in the region;
- d) Demonstrate that relevant information and data used from other development projects is appropriate for use in this EIA report; and
- e) Explain this approach and methods used to identify and assess cumulative effects including cooperative opportunities and initiatives undertaken to further the collective confidence in data and analysis to support conclusions.

5.4 Land Use

CVM shall provide the following:

- a) Existing land uses in the Study Area(s) including industrial, commercial and recreational uses;
- b) A discussion of plans to address community issues and the concerns of existing landowners due to the various impacts of the proposed Project activities;
- c) A list of mineral and subsurface leases and leaseholders in proximity to the proposed Project;
- d) A description of unique sites or special features in the Study Area(s);
- e) A description of the land use and resource policies and planning initiatives in the Study Area(s);
- f) A discussion of the consistency between the zoning and the proposed development;

- g) Components of the Project that have the potential to affect other land uses and discuss the nature and significance of the effects on those land uses;
- h) Mitigation strategies to address these anticipated impacts and an outline of CVM's management capacity to implement these strategies;
- i) Public participation program and plans to mitigate impacts with the existing land users;
- j) Cumulative effects of the Project relative to other existing or proposed projects on regional and public land uses, including outdoor recreation, during and after development; and
- k) Plans to mitigate the effects of the Project and alternatives considered.

5.5 Air Quality and Noise

CVM shall describe baseline climatic and ambient air quality conditions in the Study Area(s). In addition, provide the following information:

- a) Components of the Project that will affect air quality both locally and regionally;
- b) Air quality components of concern, including emissions from point sources, construction activities, mine operations and hauling activities;
- c) Nature and significance of changes in ambient air quality expected as a result of the Project and the impacts associated with these changes. Discuss how air emissions will likely disperse. Describe methodology used to determine changes in ambient air quality, justify the methodology used and identify any shortcomings or constraints on the findings. Ensure air quality dispersion modelling is completed in accordance with *Alberta Environment's Air Quality Model Guideline*;
- d) A plan to minimize dust and other emission levels from the Project;
- e) Nature and significance of changes in noise levels as a result of the Project;
- f) Implications of increased noise levels and proposed measures to minimize noise resulting from the development. This will be done considering magnitude, frequency, duration and time of day and the performance potential of these measures;
- g) An assessment of cumulative effects of the Project on air quality and noise in the Regional Study Area(s); and
- h) Mitigation and monitoring measures to address air quality and noise concerns.

5.6 Climate Change

CVM shall:

- a) Review and discuss climate change and the local and/or regional, inter-provincial/territorial changes to the environmental conditions resulting from climate conditions, including trends and projections where available;
- b) Identify stages or elements of the Project that are sensitive to changes or variability in climate parameters. Discuss what impacts the change to climate parameters may have on elements of the Project that are sensitive to climate parameters; and
- c) Comment on the adaptability of the Project in the event the region's climate changes. Discuss any follow-up programs and adaptive management considerations.

5.7 Geology, Terrain and Soils

CVM shall describe and map on an appropriate scale, the geology, terrain and soils and drainage patterns of the Study Area, and provide the following:

- a) Biophysical map of the Study Area(s) baseline topography and soils mapping;
- b) Evaluation of the sensitivity of soil materials and landforms to erosion;
- c) Components of the proposed development that have the potential to affect geology, terrain and soils;

- d) Characterization of the distribution and properties (e.g., salinity/sodicity) of bedrock and overburden as needed to plan construction and reclamation and maintain equivalent land capability;
- e) Nature and significance of the anticipated changes to the pre-development topography, elevation, drainage patterns and soils that will result from surface disturbance at the site and any potential for subsidence;
- f) Soil management plan to ensure adequate volumes, proper soil salvage, storage, replacement techniques and stabilization when required for reclamation;
- g) Assessment of cumulative effects of the Project on geology, terrain and soils in the Regional Study Area(s); and
- h) Mitigation and monitoring measures to be implemented to reduce the impacts of any effects identified.

5.8 Vegetation

CVM shall discuss and map plant communities in the Study Area(s) using, as appropriate, the Alberta Vegetation Inventory (AVI) including the following:

- a) Conduct an inventory, map and describe the existing terrestrial and aquatic vegetation;
- b) Conduct a rare plant survey in the local Study Area(s) that employs recognized survey protocols and is designed specifically for rare plant species and communities in the region and discuss the results based on a literature review and on information stored in the Alberta Natural Heritage Information Centre;
- c) Discuss and assess potential impacts of the project on vegetation (abundance, diversity, health, rare species and rare plant communities) during operation and reclamation and discuss the implications of these impacts on other resources (wildlife habitat quantity and diversity, water quality, erosion potential and soil conservation);
- d) Discuss weeds and non-native invasive species and describe how these species will be assessed and controlled prior to and during operation and reclamation;
- e) Discuss the mitigation measures to be implemented to minimize impacts on vegetation;
- f) Describe measures to avoid or minimize disturbance to rare plant species and communities;
- g) Assess the cumulative effects of the Project on vegetation in the Regional Study Area(s); and
- h) Discuss how the vegetation monitoring programs at CVM have been used to adaptively manage the mitigation measures and monitoring programs.

5.9 Wildlife

CVM shall describe existing wildlife resources (amphibians, reptiles, birds and terrestrial and aquatic mammals), and their use of habitats in the Study Area(s). Document the anticipated changes to wildlife in the Study Area(s). Specifically:

- a) Document and describe wildlife in the Study Area(s) using recognized protocols to provide current information. Emphasis will be on “endangered” and “threatened” species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and in the *Alberta Wildlife Act* (“species at risk” or “species that may be at risk”);
- b) Identify wildlife species composition, seasonal distribution and movement, relative abundance, habitat use and general life history in the Study Area(s);
- c) Discuss the criteria and selection process for wildlife indicator species used in the EIA report;
- d) Discuss and assess the potential impacts of the proposed Project on wildlife, wildlife habitat use, and habitat quality during the phases of mine operation and reclamation. Consider and describe habitat change as it relates to local and regional wildlife populations over the life of the project. Discuss potential cumulative effects of the proposed Project on wildlife in combination with other proposed, existing and approved developments in the Study Area(s);

- e) Identify wildlife studies that are being conducted in the Study Area(s) and discuss how CVM plans to integrate its mine operation and mitigation activities with these studies;
- f) Identify habitat enhancement projects that are present in the Study Area(s) and discuss the impact of the Project on these enhancement projects; and
- g) Provide a strategy to mitigate impacts on wildlife and wildlife habitat as a result of mining operations, considering:
 - i. A mitigation plan and a schedule of mitigation measures for wildlife and significant wildlife habitat areas through the life of the Project;
 - ii. Consistency of the plan with applicable regional, provincial and federal wildlife habitat objectives and policies;
 - iii. The need for access control and other management strategies to protect wildlife during the phases of mine operation and reclamation; and
 - iv. Monitoring programs to assess impacts on wildlife and wildlife habitat and the effectiveness of mitigation measures and reclamation for wildlife.

5.10 Biodiversity

CVM shall use the definition for biodiversity in the *Canadian Biodiversity Strategy (1995)*, to determine the suite of target elements that will be used to assess biodiversity in terrestrial and aquatic ecosystems, that will be used to characterize the existing ecosystems and that will be used to represent broad taxonomic assemblages, and

- a) Discuss the process and rationale used to select target elements for biodiversity;
- b) Within selected taxonomic groups, discuss the presence and abundance of species in each ecological type. Provide species lists and summaries of observed and estimated species richness and evenness for each ecological type;
- c) Rank each ecological unit for biodiversity potential by combining measures of species richness, overlap in species lists, significance of individual species or associations, uniqueness and other appropriate measures. Describe the techniques used in the ranking process;
- d) Discuss the contribution of the Project to any anticipated changes in regional biodiversity, including measures to minimize such changes;
- e) Discuss pre- and post-topography, soil, and parent material conditions and their contribution to biodiversity;
- f) Provide a measure of biodiversity on baseline sites that are representative of the proposed reclamation ecotypes;
- g) Discuss how CVM's plan for mitigation, reclamation and monitoring relates to "*Sustaining Alberta's Biodiversity, An Overview of Government of Alberta Initiatives Supporting the Canadian Biodiversity Strategy*" (*Alberta Environmental Protection 1998*).

5.11 Fragmentation

CVM shall determine the current and proposed level of habitat fragmentation in the Study Area(s). Describe the techniques used in the fragmentation analysis. Identify and evaluate the extent of potential effects from fragmentation, e.g. potential introduction of non-native plant species on native species composition and any changes to plant communities.

5.12 Surface Hydrology

CVM shall discuss baseline surface hydrology and hydrologic parameters including precipitation, evaporation and surface water runoff in the Study Area(s) and model interactions among such parameters. Identify proposed Project activities that may affect surface water during all stages including site

preparation, construction, operations, decommissioning and reclamation in the Study Area(s). In addition:

- a) Describe the surface drainage patterns and surface water hydrology of the Study Area(s) including seasonal flow patterns and, if possible, annual flow;
- b) Identify the components of the Project that have the potential to affect surface hydrology during and after the Project;
- c) Describe stream crossings, water management structures, and permanent or temporary alterations or diversions to watercourses. Discuss these in terms of location, extent, timing, duration, and design criteria to mitigate negative impacts to ecosystem function and channel fragmentation. Provide the rationale for the type of stream crossing method chosen. Identify wastewater effluents, groundwater dewatering and runoff from the mine development area in terms of source, volume, duration, and timing during the life of the Project;
- d) Describe the nature and significance of alterations in surface drainage patterns, as well as alterations to the timing, volume, frequency, rate of change, and duration of peak flows and low flows that may arise as a result of the Project;
- e) Discuss surface water management plans and measures to reduce impacts on surface hydrology resulting from the mine extension. Describe design parameters to minimize effects, including the location and dimensions of buffers. Discuss probable maximum flood and probable maximum precipitation events and indicate how these may influence design of water management systems and contingency plans. Assess the impacts of these changes, including impacts on downstream areas. Identify aquatic or fishery resources that may be affected by changes in hydrology. Discuss both temporary and permanent changes to surface hydrology and how these may affect natural ecosystem function, including consideration of both local and regional impacts;
- f) Describe and assess the impacts of the proposed Project on wetlands in conjunction with other project-induced variations in hydrology (surface and groundwater flows). Describe the location, type, and condition of wetlands within the Study Area(s), and discuss the impact of any loss of wetlands on end land use, habitat fragmentation and biodiversity;
- g) Identify residual impacts on surface drainage patterns and surface water hydrology, and assess the qualitative and quantitative deviation from normal and/or naturalized flows to watersheds within the Study Area(s);
- h) Assess the cumulative effects of the Project on surface hydrology in the Regional Study Area(s);
- i) Present plans to monitor impacts on surface water hydrology and the effectiveness of mitigation programs including plans for meteorological and hydrometric monitoring if chosen.

5.13 Groundwater

CVM shall provide an overview of the existing geologic and hydrogeologic setting in the Study Area(s) and:

- a) Provide an overview of the existing hydrogeological setting including: a description of aquifers, hydraulic characteristics, groundwater quality, groundwater users and the interaction of surface water and regional/local groundwater flow;
- b) Identify the components and activities of the Project that have the potential to affect groundwater resources;
- c) Identify potential impacts to groundwater quality and quantity from various Project activities;
- d) Identify the nature and significance of the predicted effects and include any field and modelling methods used to determine the effects of the proposed Project on existing and future groundwater supplies;
- e) Discuss groundwater discharges to watercourses in terms of volumes, rates, timing and duration and the potential for interruption of groundwater flows to surface water systems;
- f) Identify and map groundwater recharge sites and assess the potential impacts of the project on recharge rates, timing and duration;

- g) Describe the post-mining groundwater regime with an assessment of the nature and significance of changes from the pre-mining condition;
- h) Describe the proposed mitigation to minimize impacts on groundwater quality and quantity;
- i) Describe the proposed monitoring plan to evaluate the effectiveness of mitigation measures taken; and
- j) Assess the cumulative effects of the Project on groundwater in the Regional Study Area(s).

5.14 Surface Water Quality

Describe baseline water quality conditions of surface waterbodies that will be influenced by the proposed Project or have the potential of being influenced by some or all aspects of the proposed Project. For these waterbodies, summarize baseline data for water and non-fish aquatic biota.

- a) Describe baseline water quality conditions in the Study Area with reference to the appropriate water quality parameters (temperature, pH, conductivity, cations and anions, metals, dissolved oxygen, suspended sediment, dissolved solids, and nutrients), their seasonality and relationship to flow and other controlling factors;
- b) Describe the Project activities for all stages, including construction, operation and reclamation that have the potential to affect surface water quality including constructed waterbodies such as end-pit lakes during and after the life of the Project;
- c) Assess the magnitude of the potential impacts of activities on surface water quality. Determine the local and regional extent of potential impacts as well as their frequency, duration, magnitude and seasonality. Assess the magnitude of each potential impact on water quality relative to existing water quality and accepted water quality guidelines;
- d) Describe the proposed mitigation measures (water and waste water management treatment systems) in the context of best management practices and best available technologies to protect water quality during and after the Project;
- e) Provide a monitoring program to assess water quality and the effectiveness of water quality management systems; and
- f) Assess the cumulative effects of the Project on surface water quality in the Regional Study Area(s).

5.15 Aquatic Resources

CVM shall identify and discuss the existing aquatic resources, including benthic invertebrates, fish resource and fish habitat in the creeks, the rivers or any other waterbodies that might be impacted by the proposed Project. Inventory where data gaps exist, as well as:

- a) Identify fish species composition, distribution, relative abundance, movements and general life parameters in those waterbodies. Document any species found which are considered at risk, endangered, or of special management concern (COSEWIC, *The General Status of Alberta Wild Species (2001)*). Identify key indicator species and provide the rationale and selection criteria used. Identify critical or sensitive areas such as spawning, rearing and over-wintering habitats. Describe and document the critical life stages and requirements for key fish species. Discuss the use of the fish resources by existing or potential domestic and sport fisheries;
- b) Identify any project and related infrastructure (e.g., roads, utilities), construction, operation and reclamation activities that potentially affect aquatic resources including benthic invertebrates, fish resources, fish habitat, angling activity and riparian areas. Describe how stream alterations, changes to substrate conditions, stream flow conditions and water quality may affect fish and fish habitat in the Study Area(s);
- c) Discuss the nature of the potential effects, their duration and whether they are site-specific, local or regional in spatial extent;

- d) Conduct a CEA of the proposed Project in combination with other existing and proposed developments in the area on the fish and fish habitat resources of the Study Area(s);
- e) Outline any mitigative measures and habitat enhancement techniques that could be implemented to prevent or minimize adverse effects;
- f) Identify residual impacts on fish and fish habitat and discuss their significance in the context of local and regional fisheries; and
- g) Identify any monitoring programs that will be initiated by CVM to identify and manage the effects of the proposed Project on fisheries, fisheries habitat and angling activity in order to confirm the effectiveness of mitigative strategies employed to ensure protection of the fisheries resources in the Study Area(s).

6.0 Public Health and Safety

CVM shall describe those aspects of the proposed Project that may have implications for public health or the delivery of regional health services. Discuss the following:

- a) Identify and discuss the data and methods used by CVM to assess the impacts of the Project on human health and safety;
- b) Assess the potential health implications of the compounds that will be released to the environment from the proposed operation in relation to exposure limits established to prevent acute and chronic adverse effects on human health;
- c) Identify the human health impact of potential contamination of country foods and natural food sources taking into consideration all project activities;
- d) Provide information on samples of selected species of vegetation known to be consumed by humans;
- e) Discuss the potential to increase human exposure to contaminants from changes to water quality, air quality and soil quality taking into consideration all project activities;
- f) If during consultation on the project, health concerns are identified by Aboriginal stakeholders please document their concerns;
- g) Assess cumulative health effects to receptors, that are likely to result from the project in combination with other existing, approved, and planned projects;
- h) As appropriate, identify anticipated follow-up work, including regional cooperative studies. Identify how such work will be implemented and coordinated with ongoing air, soil and water quality initiatives;
- i) Identify and discuss potential health and safety impacts due to higher regional traffic volumes and the increased risk of accidental leaks and spills;
- j) Document health and safety concerns raised by stakeholders during the consultation on the Project;
- k) Provide a summary of CVM's emergency response plan and discuss mitigation plans that will be implemented to ensure workforce and public safety during pre-construction, construction, operation and reclamation of the Project. Include prevention and safety measures for wildfire occurrences, accidental release or spill of chemicals to the environment and failures of structures retaining water or fluid wastes;
- l) Describe how local residents will be contacted during an emergency and what type of information will be communicated to them; and
- m) Describe existing agreements with area municipalities or industry groups such as, safety co-operatives, emergency response associations and municipal emergency response agencies.

7.0 Traditional Ecological Knowledge and Land Use

CVM shall provide detail on the consultation undertaking with Aboriginal communities with respect to traditional ecological knowledge and traditional land use and:

- a) Communicate project activities, progress, and results to the Aboriginal communities potentially affected by the project, and provide detail on the consultation;
- b) Provide results on consultation with Aboriginal stakeholders to determine the type, extent, and timing of traditional land use within the Study Area(s). Discuss the vegetation and wildlife used for nutritional and medicinal purposes and any potential effects the Project may have;
- c) Identify the existing and traditional land uses including fishing, hunting, plant harvesting (nutritional or medicinal) and cultural use with specific regard given to local Aboriginal peoples; and identify cabin sites, spiritual sites and graves;
- d) Determine the projected and cumulative impact of the Project on these uses and identify possible mitigation strategies;
- e) Provide a general overview of any previous heritage resource studies that have been conducted in the Study Area; and
- f) Describe how Traditional Ecological Knowledge was incorporated into the technical components of the EIA.

8.0 Historical Resources

CVM shall:

- a) Provide a summary of the results of the previous historical resource studies that have been conducted in the Study Area(s) including archaeological resources, palaeontological resources and historic period sites and any other historical resources as defined within the *Historical Resources Act*;
- b) Provide a general overview of the results of any Historical Resources Impact Assessments and/or mitigation studies that are carried out with respect to the proposed Project;
- c) Provide an outline of the historical resources management program and schedule of field investigations that may be required to further assess and mitigate the potential effects of the proposed Project on historical resources. Document any discussions with area residents and First Nations with respect to the management program;
- d) Provide a summary of CVM's consultation with Aboriginal groups to determine the extent of traditional use of the Study Area(s) from both an historic and ongoing use perspective; and
- e) Document stakeholder concerns with respect to the development of the proposed Project based on the historical significance of the Study Area(s) and its current use by traditional users.

9.0 Socio-economic Assessment

CVM shall document the baseline (existing) socio-economic conditions and trends (e.g., changes in population and labour force), and discuss the nature and significance of construction and operation of the Project on the region and provincial socio-economic conditions, as well as any impacts associated with these effects, including consideration of the following:

- a) Workforce, including:
 - i) Timing of workforce requirements for construction and operation,
 - ii) Breakdown of the type and number of direct jobs to be created,
 - iii) Outline of when peak employment periods will occur;
- b) Local employment and training and business opportunities, including:

- i) Any steps that will be taken to increase local participation in meeting project requirements,
 - ii) A summary of procurement policies and programs the company has in place;
- c) Regional and provincial economic benefits, including:
 - i) Taxes,
 - ii) Royalties,
 - iii) Spin-off employment (indirect and induced);
- d) Local public services and infrastructure, including:
 - i) Transportation,
 - ii) Education,
 - iii) Health,
 - iv) Municipal,
 - v) Recreation,
 - vi) Social services;
- e) Socio-economic opportunities for First Nations and effects on traditional land use;
- f) Population effects, including:
 - i) Housing and affordable housing,
 - ii) Workforce camp (if needed),
 - iii) Traffic and traffic safety,
 - iv) Law enforcement and emergency services.

Discuss the socio-economic implications of not proceeding with the Project. Identify any concerns related to socio-economics that have been raised by the local municipality or any other stakeholder in the region. As well, identify any measures proposed to enhance positive or mitigate negative socio-economic effects of the Project.

10.0 Public Consultation Requirements

CVM shall:

- a) Document the public consultation process implemented for the proposed Project including the involvement of local residents and other key stakeholders within the Study Area(s). Summarize the existing public consultation processes undertaken by CVM;
- b) Discuss the methods by which information was provided to the public, the type of information provided and the nature of responses received;
- c) Describe the consultative process and show how public input was obtained and addressed. Indicate where and when public meetings were held and, to the extent possible, list attendees and provide a summary of concerns and ideas that were brought to the attention of CVM;
- d) Discuss the concerns expressed by the public and the actions taken to address the concerns;
- e) Discuss how resolution of the concerns and issues were incorporated into the proposed Project development, impact mitigation and monitoring; and
- f) Discuss plans to maintain the public consultation process following completion of the EIA review to ensure that the public will have an appropriate forum for providing their input and expressing their views on the ongoing development, operation and reclamation of the proposed Project.