

**GUIDELINES FOR THE  
PREPARATION OF THE  
ENVIRONMENTAL IMPACT STATEMENT**

**ENCANA SHALLOW GAS INFILL  
DEVELOPMENT PROJECT IN THE SUFFIELD  
NATIONAL WILDLIFE AREA**

**IN ACCORDANCE WITH THE  
*CANADIAN ENVIRONMENTAL ASSESSMENT ACT***

**DECEMBER 2006**

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## **PART I      BACKGROUND**

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### **1. INTRODUCTION**

#### **1.1 Purpose of the Guidelines**

The purpose of this document is to identify for the proponent, EnCana Corporation, and potential stakeholders the nature, scope and extent of the information required by the Joint Review Panel (JRP) in the preparation of the environmental impact statement. EnCana will prepare and submit an environmental impact statement that examines the potential environmental effects, including cumulative effects, of the construction, operation, reclamation, decommissioning and abandonment of the project and evaluates their significance. Part II of these Guidelines outlines in detail the content of the environmental impact statement to be prepared.

Exchanges between the proponent and government organizations as well as other stakeholders where appropriate are encouraged so that the environmental impact statement responds adequately to the guidelines. The proponent shall report on such exchanges in the environmental impact statement.

#### **1.2 Environmental Assessment Process**

The proponent, EnCana Corporation, proposes an infill drilling development project (the “project”), which would allow for up to 1,275 shallow sweet natural gas wells in the Canadian Forces Base Suffield National Wildlife Area over a three-year period. Infill drilling is drilling that occurs within the boundaries of an existing developed gas or oil field. The wells would be connected into existing and new natural gas gathering infrastructure for delivery of the produced natural gas to market. The project would add approximately 220 km of additional pipeline and would double the number of wells currently in the Suffield National Wildlife Area (Suffield NWA). Associated with these wells, EnCana is proposing new infrastructure such as sumps, water and waste management development, including disposal areas and drilling fluid management, and infrastructure that connects the wells to existing facilities.

The Suffield NWA was established in 2003 under the *Canada Wildlife Act* and protects an area in excess of 458 square kilometres within the boundaries of Canadian Forces Base Suffield. The site was recognized as having nationally significant environmental features which include the unique contiguous block of native prairie and sensitive dune habitat, a high density of species at risk and the function of the national wildlife area for baseline research and as a buffer for military activities. Lands of the Suffield NWA have been out-of-bounds to military training since 1972, as an environmentally protected zone, and were precluded from deep rights access for petroleum development. Cattle grazing and shallow gas recovery have continued subject to the environmental screening protocols specified in the respective Memorandum of Agreements controlling those activities, the *Wildlife Area Regulations*, and the management principles of the national wildlife area.

The project is subject to the *Canadian Environmental Assessment Act* given the requirement for the Proponent to obtain a federal authorization pursuant to sections 3 and 4 of the *Wildlife Area Regulations*. For the Suffield NWA, the Department of National Defence has been delegated the responsibility for the administration of the area and those sections of the *Canada Wildlife Act* that apply to it, including the permitting responsibilities. Because of this regulatory role, the Department of National Defence is the responsible authority for the conduct of this environmental assessment.

Since it involves the construction of a gas pipeline in a National Wildlife Area as defined in section 2 of the *Canada Wildlife Act*, the project is subject to a comprehensive study, as specified in paragraph 2(c), Part I of the *Comprehensive Study List Regulations*. As stipulated under the comprehensive study process, the responsible authority held a public consultation on the scope of the environmental assessment and reported to the federal Minister of the Environment on the scope of the environmental assessment, public concerns, the possibility of adverse environmental effects and concerns regarding the comprehensive study's ability to address all of the questions raised by the project. Given the responsible authority's recommendation and the level of public concern, the Minister of the Environment decided to refer the environmental assessment of the project to a review panel.

In Alberta, petroleum and natural gas operations are regulated provincially by the Alberta Energy and Utilities Board (EUB). The EUB has statutory responsibilities pursuant to the *Alberta Energy and Utilities Board Act*, the *Oil and Gas Conservation Act* and *Regulations*, the *Pipeline Act* and *Regulations* and the *Energy Resources Conservation Act*. Although EnCana's drilling and pipeline activities are subject to regulatory approvals by the EUB, detailed environmental assessment by Alberta Environment is not required. Nevertheless, the EUB is mandated to consider environmental matters in determining whether an application is in the public interest. To help make this determination regarding EnCana's applications, the EUB has decided to participate in the federal environmental assessment process.

To avoid duplication in the process, the Canadian Environmental Assessment Agency (the Agency) and the EUB have agreed to enter into an agreement to establish a Joint Review Panel consistent with the *Canada-Alberta Agreement for Environmental Assessment Cooperation*. Both Agreements are available on the Agency's web site at the following address: <http://www.ceaa-acee.gc.ca>

### **1.3 Public Consultation on the Guidelines and Approval**

A draft version of the guidelines was made available for consultation by the Canadian Environmental Assessment Agency. All comments received and the draft guidelines are available on the public registry.

After taking into consideration the public's comments received during the consultation period, the guidelines have been finalized by the Joint Review Panel, sent to the proponent and made public.

## 2. SCOPE OF THE PROJECT

The scope of the project includes the construction, operation, reclamation, decommissioning, and abandonment of the project components and activities proposed by EnCana and described in section 2 of the document entitled *CFB Suffield National Wildlife Area Shallow Gas Infill Development Project – Project Description*, November 1, 2005 by Encana and as outlined in the Appendix of the Agreement for the Establishment of a Joint Review Panel.

In summary, EnCana has proposed to drill up to 1,275 shallow sweet natural gas wells (up to 16 wells per section of one square mile) in the Suffield NWA over a three-year period. The wells would be connected into existing and new natural gas gathering infrastructure for delivery of the produced natural gas to market. The project would add approximately 220 km of additional pipeline and would double the number of wells, currently in the Suffield NWA. The gas would be transported to existing compressor stations located on the perimeter of the Canadian Forces Base Suffield.

The project components include:

- up to 1275 new infill wells located throughout the Suffield NWA;
- approximately 180 kilometres of two (2) inch high-density plastic pipe to tie the wells into an existing pipeline;
- approximately 40 kilometres of six (6) or eight (8) inch steel pipelines to transport the gas to compressor stations located outside of the Suffield NWA;
- ground level facilities, such as, pig catchers and gas meters;
- any additional sumps and water disposal wells;
- any new waste management facilities or modification to existing facilities;
- any modifications to compressor facilities;
- all related works and activities including all temporary facilities required for the construction and operation of the above-mentioned facilities, namely:
  - permanent and temporary access roads or trails;
  - a communications system;
  - all temporary or permanent power supply;
  - water supply;
  - construction worksites and storage areas;
  - handling and storage of petroleum products and hazardous materials;
  - handling, storage and use of explosives, if any.

### **3. GUIDING PRINCIPLES**

Certain basic principles of the environmental assessment requirements that must be met are set out below.

#### **3.1 Environmental Assessment: A Planning Tool**

Environmental assessment is a process to predict the environmental effects of proposed initiatives before a decision is taken on whether the proposal should proceed. It identifies possible environmental effects, proposes measures to mitigate adverse effects and predicts whether there will be significant adverse environmental effects after mitigation measures are implemented.

#### **3.2 Public Participation**

Public participation is a central objective of an environmental assessment process and a means to ensure that a proponent addresses public concerns. In preparing its environmental impact statement, the proponent is encouraged to consult the affected communities, interested regional and national organizations, resource users and relevant government agencies.

Meaningful public involvement can only take place if the public has a clear understanding of the nature of the proposed project as early as possible in the review process. Therefore, the proponent is encouraged to:

- continue to provide up-to-date information to the public and especially to the communities likely to be most affected by the project;
- involve the main interested parties in determining how best to deliver that information, that is, the type of information required, format and presentation methods, as well as the need for community meetings;
- explain the results of the environmental impact statement in a clear and direct manner to make the issues comprehensible to the widest possible audience.

#### **3.3 Local Knowledge**

Populations living in proximity to the project may have substantial and distinct knowledge, which may be essential to the assessment of the effects of the project, and their mitigation. Local knowledge will have an important contribution to make and the proponent shall fully consider local knowledge and expertise in preparing the environmental impact statement.

For the purposes of the present environmental assessment, local knowledge may be regarded as the knowledge, understanding and values that local populations, including First Nations, have that bear on the effects of the project and proposed mitigation measures. This knowledge is based on personal observation, collective experience and/or oral transmission over generations.

Local knowledge relating to factual information on such matters as ecosystem function, resource abundance, distribution and quality, social and economic well-being, and to explanations of these facts and causal relations among them, is required for the development of adequate baseline information, identification of key issues, prediction of the effects, and assessment of their significance, all of which are essential to the environmental impact statement and its review.

Local knowledge can be obtained with the cooperation of other concerned parties. The proponent shall incorporate into the environmental impact statement the local knowledge to which it has access or that it may reasonably be expected to acquire through appropriate diligence, in keeping with appropriate ethical standards and without breaching obligations of confidentiality. The proponent shall facilitate the presentation of such knowledge to the review panel, interested parties and concerned communities.

### 3.4 Sustainable Development

Sustainable development seeks to meet the needs of present generations without compromising the ability of future generations to meet their own needs. Its three objectives are preserving environmental integrity, improving social equity and improving economic efficiency.

A project that takes these concerns into account shall strive to integrate and balance these three objectives in the planning and decision-making process and shall incorporate citizen participation. The project, including its alternative means, shall take into account the relations and interactions among the various components of the ecosystems and meeting the needs of the population.

### 3.5 Precautionary Principle

One of the purposes of environmental assessment is to ensure that projects are considered in a careful and precautionary manner before authorities take action in connection with them, in order to ensure that such projects do not cause significant adverse environmental effects.

Principle 15 of the 1992 Rio Declaration on Environment and Development states that “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” In applying the precautionary approach, the proponent shall:

- demonstrate that the proposed actions are examined in a careful and precautionary manner in order to ensure that they do not cause serious or irreversible damage to the environment, especially with respect to environmental functions and integrity, considering system tolerance and resilience, and will not interfere with the conservation of wildlife in a protected area;
- outline the assumptions made about the effects of the proposed actions and the approaches to minimize these effects;
- identify any follow-up and monitoring activities planned, particularly in areas where scientific uncertainty exists in the prediction of effects; and
- present public views on the acceptability of these effects.



## 4. PREPARATION AND PRESENTATION OF THE ENVIRONMENTAL IMPACT STATEMENT

### 4.1 Study Strategy and Methodology

The proponent shall observe the intent of the guidelines. It is possible that these guidelines include matters that, in the judgement of the proponent, are not relevant to the review of the project. If such matters are omitted from the environmental impact statement, the omissions shall be clearly justified so the review bodies, public and other interested parties have an opportunity to consider and comment on this judgement.

The Suffield NWA includes a large amount of native prairie grassland, sand hills, river breaks and wetlands. These serve as habitat for many species (plants, mammals, birds, reptiles, amphibians and insects), including several species listed as being at risk in Canada. **The environmental impact statement should primarily focus on effects on the plants and wildlife, and on the ecosystems that form the wildlife habitat found in the National Wildlife Area. Any adverse effects on these ecological features, which make the National Wildlife Area special, should be avoided wherever possible.**

The proponent shall explain and justify methods used to predict potential environmental effects of the project on the valued environmental components, on the interactions among these components and on the relations of these components within the environment. The information presented shall be substantiated. In particular, the proponent shall describe how valued environmental components were identified and what methods were used to predict and assess the environmental effects of the project on these components.

The value of an environmental component not only relates to its role in the ecosystem but also to the value placed on it by humans from a cultural, social, scientific and economic point of view. The proponent shall indicate how the significance of effects was assessed and justify the selected criteria.

Wherever the proponent makes use of qualitative criteria to compare the various design and development options, to describe the environment, or to assess the effects of the project, each of these criteria shall be defined, their relative importance stated, and the differences between the categories indicated. The proponent shall substantiate the classification of each criterion.

In describing methodology, the proponent shall explain how it used scientific, engineering, local and other knowledge. All hypotheses and assumptions shall be clearly identified and justified. All data, models and studies shall be documented so that the analyses are transparent and reproducible. All data collection methods shall be specified. The degree of uncertainty, reliability and sensitivity of models used to reach conclusions shall be indicated.

All conclusions regarding the receiving environment and predictions as well as an assessment of environmental effects shall be substantiated. The proponent shall support all analyses, interpretation of results and conclusions with a review of the appropriate literature, providing all references required and indicating the public availability of all

works consulted, when appropriate. Any contribution based on local knowledge shall be specified and sources identified, where appropriate.

The environmental impact statement shall identify all significant gaps in knowledge and explain their relevance to key conclusions drawn. The proponent shall indicate the appropriate measures to bridge these gaps. Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from local knowledge, the proponent shall present a balanced version of the various points of view as well as a statement of the final conclusions.

## **4.2 Presentation of the Environmental Impact Statement**

Whenever possible, the proponent shall avoid repetitions by describing, in the same section of the environmental impact statement, the component of the receiving environment, the anticipated effects on this component, the proposed mitigation and compensation measures, the significance of residual effects and, when relevant, the proposed monitoring and follow-up programs.

For purposes of brevity, the environmental impact statement shall also make reference to the information that has already been presented in other sections of the document, rather than repeating it. A key subject index would also be useful and should reference locations in the text by volume, section and sub-section. Detailed studies shall be provided in separate volumes and shall be referenced by volume, section and page in the text of the main document of the environmental impact statement.

The proponent shall present the environmental impact statement in the clearest possible language. A glossary defining technical words and acronyms shall be included. The proponent shall provide charts, diagrams, tables and maps to clarify the text. Perspective drawings that clearly convey the various components of the project shall also be provided. Wherever possible, maps shall be presented in common scales and datum to allow for comparison and overlay of mapped features.

To facilitate the identification of the documents submitted and their coding in the Canadian Environmental Assessment Registry, the title page of the environmental impact statement and its related documents should contain the following information:

- project name and location;
- title of the document, including the term “environmental impact statement”;
- subtitle of the document;
- names of the proponent;
- names of the consultants, as appropriate;
- date.

The proponent shall provide copies of the environmental impact statement for distribution, including an electronic version in PDF format, as directed by the Panel

Secretariat. If addenda, resulting from the questions and comments from the review panel, are produced, copies of these shall also be made available in the same format.

The proponent shall make the environmental impact statement available on an Internet site.

### **4.3 Executive Summary**

The proponent shall provide an executive summary that allows for a concise and complete overview of the environmental impact statement, including a project overview and the key findings relevant to the decision making process.

## **PART II     CONTENT OF THE ENVIRONMENTAL IMPACT STATEMENT**

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### **1. CONTEXT**

#### **1.1 The Proponent**

The proponent shall:

- identify itself and the name of the legal entity that will develop, manage and operate the project;
- provide an identification of mineral rights holders in the project and surrounding area;
- explain corporate and management structures, as well as insurance and liability management related to the project;
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the project;
- summarize key elements of EnCana's environment, health and safety management system and discuss how the system will be integrated into the project; and
- identify key personnel, contractors, and/or sub-contractors responsible for preparing the environmental impact statement.

In addition the proponent shall describe the EnCana Corporation and its history in Canada's oil and gas industry, with specific reference to the existing EnCana oil and gas developments in Canadian Forces Base Suffield.

#### **1.2 Overview of the Project**

The intent of this overview is to provide the key components rather than a detailed description of the project, which will follow in Section 3.2, Part II of the present guidelines.

The proponent shall briefly summarize the project, by presenting the project components, associated activities, scheduling details, the timing of each phase of the project and other key features. If the project is part of a larger sequence of projects, the proponent shall outline the larger context and present the relevant references, if available.

#### **1.3 Geographical Setting**

The proponent shall provide a concise description of the geographical setting in which the project will take place. The description shall be focused on those aspects of the environment important for understanding the potential environmental effects of the project. This description shall integrate the natural and human elements of the environment in order to explain the interrelationships between the physical and biological

aspects and the people and their communities. This description may include the following information:

- main ecological constraints of the environment;
- land use;
- local communities; and
- the environmental significance and value of the Suffield National Wildlife Area.

## **1.4 Legal Framework and the Role of Government**

To understand the context of the project's environmental assessment, this section should identify, for each jurisdiction, the government bodies involved in the environmental assessment as well as the environmental assessment process. More specifically, for all components of the project, the proponent shall:

- identify the environmental and other specific regulatory approvals and legislation that are applicable to the project at the provincial and federal government levels;
- identify government policies, resource management, planning or study initiatives pertinent to the project and discuss their implications;
- identify and delineate major components of the project and identify those being applied for and constructed within the duration of approvals under provincial and federal legislation;
- provide a summary of the regional, provincial or national objectives, standards or guidelines that have been used by EnCana to assist in the evaluation of any predicted environmental impacts;
- identify all property rights for use or required by the project, including all agreements signed or to be signed by the proponent and the governments.

Of particular relevance are the government policies and requirements that are specific to the proponent's activities in the Suffield NWA. The proponent will demonstrate that its project will not interfere with the conservation of wildlife.

## **2. PROJECT JUSTIFICATION**

In this section of the environmental impact statement, the proponent shall present the purpose of and need for the project as well as the alternatives to the project.

### **2.1 Need and Purpose of the Project**

The proponent will outline the need for and the purpose for the project.

The need for the project is defined as the problem or opportunity the project is intending to solve or satisfy. The 'need for' will establish the fundamental rationale of the project.

The ‘purpose of’ the project defines what the proponent hopes to accomplish by carrying out the project.

‘Need for’ and ‘Purpose of’ the project should be established from the perspective of the proponent and provide a context for the consideration of alternatives to the project.

## **2.2 Alternatives to the Project**

The proponent will:

- identify the alternatives to the project that were considered, including the possibility and implications of its non-implementation or postponement;
- develop criteria to identify the major environmental, economic and technical costs and benefits of the alternatives; and
- identify the preferred alternatives to the project based on the relative consideration of the environmental, economic and technical costs and benefits.

The alternatives to a project are defined as functionally different ways of addressing the need for the project and pursuing the purposes of the project. Alternatives to the project should be established in relation to the project need and purpose and from the perspective of the proponent.

Analysis of the alternatives to the project should serve to validate that the preferred alternative is a reasonable approach to meeting the need for and purpose of the project.

## **3. DESCRIPTION OF ALTERNATIVE MEANS CONSIDERED AND THE SELECTED PROJECT**

### **3.1 Alternative Means of Carrying out the Project**

The proponent shall describe the alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means. Alternative means may include, for example, alternative drilling methods (e.g. fewer well pads in centralized locations with multiple wells drilled from each pad), alternative waste management options, alternative transportation modes and routes, and other reclamation and decommissioning options.

The analysis will include:

- a description of the alternatives, how or why they are or are not technically and economically feasible, and the rationale for rejecting some alternatives;
- identification of the environmental effects of the technically and economically feasible alternatives; and
- the rationale for the preferred alternative.

The proponent should discuss experience with other projects that incorporate infill drilling up to 16 wells per section, including similarities and dissimilarities with the proposed project, and degree of success.

To identify the preferred alternative means of carrying out the project, the proponent will:

- identify the preferred means based on the relative consideration of environmental effects, and of technical and economic feasibility;.
- determine and apply criteria that identify alternative means as unacceptable on the basis of significant environmental effects; and
- determine criteria to examine the environmental effects of each remaining alternative means to identify a preferred alternative.

### **3.2 Description of the Selected Project**

The environmental impact statement shall describe the known and foreseeable characteristics associated with the selected project. This description shall include the activities, temporary and permanent structures as well as the work planned during the various phases of the project, namely the construction, operation, maintenance, foreseeable modifications as well as, where applicable, the abandonment, decommissioning and reclamation of the sites related to all of the project's components.

The proponent shall provide maps of the following project components on an appropriate scale and where applicable, indicating how they integrate with the existing works, and how they relate to CFB Suffield, the National Wildlife Area, local communities, and valued environmental components (e.g., water bodies, vegetation, soils, wildlife habitat, wetlands, cultural and archaeological sites and traditional land use areas):

- temporary structures;
- gas pools or zone of production;
- existing and proposed drilling and production sites, processing/treatment facilities;
- existing and proposed buildings and infrastructure (roads, pipelines, compressor facilities, communications and utilities);
- existing and proposed transportation and access routes;
- existing and proposed storage and containment structures such as tanks, berms and retention ponds;
- existing and proposed water sources;
- aggregate resources and other road construction material required and onsite availability;
- existing and proposed waste storage areas and disposal sites;

The proponent shall describe the above components and other components, including the following:

- the well sites, including:
  - their layout and design and use of any production equipment;
  - the process and criteria for well site selection;
  - a summary of the petrophysical and reservoir properties of the formations that may be produced;
  - an estimate of the expected production rates;
  - an estimate of the reserves of natural gas and duration for wells to be on production;
  - an estimate of the life for wells currently producing in the area;
  - whether the existing wells can adequately deplete the resource;
  - the degree to which drilling of the proposed wells may accelerate production, deplete the reservoir more quickly or otherwise improve recovery;
  - a map and/or a description of potential hydrocarbons such as coal bed methane and deep natural gas that may underlie the proposed development area. Identify geologic or engineering opportunities for re-entry of existing well bores and use of infrastructure or access for the production of other hydrocarbons following depletion of shallow gas pools.
- the pipelines, including a description of the following elements:
  - layout, width of right-of-way, technical characteristics of the pipeline;
  - pigging facilities, if any;
  - compression, pumping and metering facilities, if any;
  - shutoff valves;
  - cathodic protection and anti-corrosion measures and installations, if any;
  - waste sites for hydrostatic tests;
  - water crossing methods, if applicable;
  - means of maintaining rights-of-way;
- all related works and activities including all temporary installations required for the construction of the above-mentioned facilities, in particular:
  - permanent and temporary access roads to and within the project area, including the need to upgrade existing roads. Include the design, timing, construction standards or methods, crossings of access points, the volume of material needed, if any, and the availability of materials in the area;
  - access corridors needed and/or planned by other resource stakeholders and users of the site area. Describe how their needs are accommodated to reduce overall environmental effects from resource development. Describe the steps taken to integrate their needs into the location and design of the access infrastructure;
  - access management during the construction and operation phases;
  - borrow areas;
  - telecommunications networks;



- temporary and permanent power supply lines and any other power supply system;
- construction worksites, garages and storage areas;
- handling and storage of petroleum products and hazardous materials, including:
  - the location, nature and amount of on-site hydrocarbon storage;
  - the composition, volume and management of specific waste streams;
  - a listing of chemical products to be used, including products containing substances that are:
    - i. *Canadian Environmental Protection Act* toxics;
    - ii. on the Priority Substances List 2 or Accelerated Reduction/Elimination of Toxics and those defined as dangerous goods pursuant to the federal *Transportation of Dangerous Goods Act*. Classify the wastes generated and characterize each stream under the *Alberta Environment User's Guide for Waste Managers*;
    - iii. on the National Pollutant Release Inventory; and
    - iv. on Track 1 substances targeted under Environment Canada's Toxic Substances.
- amount of drilling wastes produced by the project, the options considered for disposal and the option(s) chosen, including the strategy for onsite waste disposal versus offsite waste disposal;
- water supply (potable and non-potable) requirements, including:
  - annual volumes from each source (for groundwater sources, consider Alberta Environment's *Groundwater Evaluation Guideline*);
  - design details, location of sources/intakes and associated infrastructure;
  - the variability in the amount of water required on an annual and seasonal basis;
  - contingency plans for water supply, including the potential for extended periods of drought;
  - options for using non-potable groundwater and criteria used to assess the feasibility of its use;
  - water treatment facility, including the type and quantity of any chemicals used in treatment;
- water management plan for the construction, operation and reclamation phase, including a consideration of the following factors: site drainage, road and well site run-off, containment, erosion control, slumping areas, groundwater protection, groundwater seepage, potable water, produced water and flood protection, permanent or temporary alterations or diversions to watercourses and wetlands;

- wastewater management plan to address site runoff, groundwater protection, deep well disposal and wastewater discharge, including:
  - source, quantity and composition of each wastewater stream;
  - design of facilities that will handle, treat, store and release wastewater streams;
  - the type and quantity of any chemicals used in wastewater treatment;
  - locations and formations for the disposal of wastewaters, including:
    - i. formation characterization;
    - ii. hydrodynamic flow regime;
    - iii. water quality;
    - iv. chemical composition and compatibility;
    - v. containment potential within the disposal zones, and
    - vi. injection capacity.
- a conceptual reclamation plan considering the following:
  - reclamation requirements specified by relevant regulatory organizations and stakeholder preferences;
  - project development phasing, and reclamation sequencing for each phase of development;
  - integration of operations, reclamation planning and reclamation activities;
  - revegetation plan for the disturbed terrestrial and aquatic areas, identifying the species types that will be used for seeding or planting, and the vegetation management practices. Include the rationale for selection based on the need for the development of self-sustaining biologically diverse ecosystems consistent with the appropriate sub-region of the Prairie Natural Region (e.g. Mixed Grassland Region) with reference to the use of native vegetation species;
  - re-establishment of self-sustaining topography, drainage and surface watercourses and vegetation communities representative of the surrounding area;
  - how reclamation will be implemented should the project, or portions thereof, change ownership, or the proponent becomes insolvent.
- other information:
  - work schedule according to the various phases of the project;
  - scheduling changes that could affect the project;
  - potential cooperative development opportunities for the proposed project (e.g. shared infrastructure);
  - required labour force and daily work schedules, according to each phase of the project;
  - lifetime of the project and future development phases (including need for additional compression facilities), if any;
  - estimated costs of the project and the alternative means.

The proponent is encouraged to design and build its infrastructure in the most energy efficient manner possible while minimizing adverse environmental effects. As for pollution and pollution prevention, the proponent should use methods, products and materials that will contribute to reducing the quantity of pollutants and waste as well as global risks to human health and the environment.

#### **4. PUBLIC CONSULTATION**

The proponent shall describe the consultations and the information sessions that it will hold or that it has already held within the context of the project at the local, regional and national levels, where applicable. It shall indicate the methods used and their relevance, the places where the consultation was held, the persons and organizations consulted, the concerns voiced and the extent to which this information was incorporated in the design of the project as well as in the environmental impact statement. Moreover, the proponent shall describe any outstanding issues.

Consultation should include discussions with the following, as appropriate:

- i) Alberta provincial representatives;
- ii) Federal government representatives;
- iii) First Nations organizations;
- iv) Commercial, industrial, agricultural, recreational and traditional land users;
- v) Environmental organizations and citizen's coalitions; and
- vi) Other potentially interested parties.

#### **5. DESCRIPTION OF THE RECEIVING ENVIRONMENT**

This section of the environmental impact statement establishes the boundaries of relevant study areas and describes the components of the biophysical and human environments relevant to the project.

##### **5.1 Study Area Boundaries**

The proponent shall specify, justify and present the study areas. The study areas will take into account the extent of the anticipated effects and the appropriate ecological and human boundaries for the various environmental components. The boundaries will be specific to environmental components and thus will generally be different for different environmental components.

The spatial boundaries shall include all areas where changes in the environment may be caused by the proposed project regardless of any administrative boundaries. At and beyond the study areas the anticipated environmental conditions should be similar with and without the proposed project. The proponent shall provide maps of suitable scale that include legal land descriptions, topographical and other natural features that illustrate the proposed study areas.

The temporal boundaries of the project shall cover all phases of the project: construction, operation, maintenance, foreseeable modifications and, where relevant, the abandonment and decommissioning of works and the reclamation of the sites affected by the project. If the proponent does not believe the full temporal boundaries should be used, the report shall identify the boundaries used and provide a rationale for the boundaries selected.

## 5.2 Identification of the Key Issues

To better focus the environmental impact statement, the proponent shall identify the key issues related to the project.

The Suffield NWA includes a large amount of native prairie grassland, sand hills, river breaks and wetlands. These serve as habitat for many species (plants, mammals, birds, reptiles, amphibians and insects), including several species listed as being at risk in Canada. **The environmental impact statement should primarily focus on effects on the plants and wildlife, and on the ecosystems that form the wildlife habitat found in the National Wildlife Area. Any adverse effects on these ecological features, which make the National Wildlife Area special, should be avoided wherever possible.**

It is understood that the process for defining the key issues is iterative and that the list of issues can be modified during the effect analysis phase. The issues can be revised and adjusted in relation to the information acquired in the field and during consultations held by the proponent.

For information purposes, the following are factors that could prove relevant in the choice of the key issues:

- public concerns related to the component;
- economic significance;
- protected status of the component;
- regulatory requirements;
- rarity or special status of the component;
- preservation of biodiversity;
- sensitivity of the component to disturbances or pollution;
- importance of the component's ecological role;
- cultural and social significance of the component.

## 5.3 Description of the Relevant Components

The environmental impact statement shall describe relevant aspects of the existing environment in the study area prior to implementation of the project, which constitutes the reference state of the environment. Where appropriate, the proponent shall present a time series of data and sufficient information to establish the averages, trends and extremes of the data. For key environmental and social components, the proponent shall determine how far back in time (the Joint Review Panel suggests approximately 1975

when oil and gas projects and activities were initiated on the Canadian Forces Base Suffield) and how far into the future the study should be conducted. Rationale for the temporal boundaries chosen should be provided. The proponent will identify any deficiencies in information, and how these deficiencies will be addressed.

Using qualitative and quantitative surveys, the study shall describe, as factually as possible, the components of the biophysical and human environments likely to be affected by the project. If the information available from government or other agencies is insufficient or no longer representative, the proponent shall complete the description of the environment with surveys according to generally accepted practices.

This description focuses on the components relevant to the key issues and effects of the project. It shall only include the data necessary to analyze the effects. The environmental impact statement shall provide all of the information required to understand or interpret the data (methods, survey dates and times, weather conditions, location of sampling stations, etc.). The methods used should be sufficient for the purposes of identifying and assessing environmental effects.

In describing the biophysical environment, the environmental impact statement shall provide a general overview of the physical and biological components likely to be affected or to affect the project, paying particular attention to the significant elements of the natural heritage. The impact statement shall, wherever possible, explain the relationships and interactions between the various components of the environment, making it possible to delimit ecosystems with high potential and of particular interest.

The Joint Review Panel understands that oil and gas development activity has been occurring on CFB Suffield, and within the National Wildlife Area, since approximately 1975. As such the Joint Review Panel is interested in understanding how the effects of past oil and gas development activity have been mitigated and/or managed. The EIS should include a concise discussion of past oil and gas development activity, the environmental effects that have occurred as a result and the measures that have been taken to mitigate or manage those effects, including an assessment of the degree to which those mitigation measures have been successful. Any long-term monitoring or follow-up programs and the key results should be also described. This information will help the Joint Review Panel to understand the potential environmental effects of the proposal and how they may be addressed and managed.

In a general way and without limiting themselves thereto, the proponent shall therefore describe the natural and human environments, within the study area, as they existed prior to implementation of the project, with special attention to the following:

### **5.3.1 Physical Environment**

1. any climate parameters relevant to the project activities and its effects;
2. climate change trends and projections and how they affect the study area in accordance with the document entitled *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners*;

3. a discussion of air quality parameters most relevant to the study area and the project including:
  - a summary of ambient air quality data in the study area, or most representative of the study area;
  - an inventory of existing and approved projects within and outside the study area whose emissions from point sources or fugitives contribute to the ambient air quality in the study area;
4. the surficial geology, terrain and soils conditions, including:
  - a topographic map of the study areas and a description of topographic patterns (e.g., elevation, slope gradient, relief);
  - surficial geology including surface topography of the study areas and the bedrock;
  - a description of the geologic formations from which natural gas may be produced;
  - a description of the extent and nature of sediments infilling the Lethbridge Preglacial Valley aquifer to the extent necessary to determine the potential for contaminant dispersal through the aquifer<sup>1</sup>;
  - a characterization of soil properties of the representative soils types in the project area with respect to baseline soil properties required to assess grazing capability;
  - a map of the soil types, textural classes of surface and parent material and their distribution throughout the study areas using appropriate survey intensity levels, consistent with existing classification and mapping systems developed by the Department of National Defence<sup>2</sup>;
  - an inventory of the land capability classes for soils for the purpose of designing an effective reclamation plan, including the location of saline and alkali soils, dunes, erosion sensitive, and otherwise stony surface materials;
5. for any well sites close to canyon or coulee walls, location of slope instability and unstable fractured bedrock;
6. regional, local and site-specific hydrogeology describing:
  - the spatial distribution of aquifers and aquitards, their properties and the hydraulic connections between hydrostratigraphic units (include local and regional hydrostratigraphic cross sections);
  - the hydraulic head, hydraulic gradients and groundwater flow directions and velocities;
  - the chemistry of groundwater including background, baseline concentrations of major ions, metals and hydrocarbon indicators;
  - the existing and potential discharge zones, existing and potential recharge zones and sources, areas of groundwater-surface water interaction and areas of Quaternary aquifer-bedrock aquifer interaction;

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<sup>1</sup> For clarification on this point, the proponent is invited to review correspondence from Natural Resources Canada to the Canadian Environmental Assessment Agency, dated June 13, 2006 and December 6, 2006. These letters are available on the project's public registry.

<sup>2</sup> McNeill, R., B. Adams and B. Smith. (2003). Soil Survey of CFB Suffield. LandWise Inc. Lethbridge

- all water well development and groundwater use, including an inventory of all groundwater users;
  - the base of groundwater protection in the region;
  - the recharge potential for Quaternary aquifers;
  - the potential hydraulic connection between production zones and other aquifers;
  - the site-specific aquifer(s), shallow groundwater and geotechnical conditions beneath these proposed facilities;
  - groundwater quality in a regional and site-specific context;
7. any watercourses potentially affected by the project, including:
    - the width, depth, flow, current velocity, bank slope, substrate type (clay, silt, sand, gravel, cobble, rock, etc.). Indicate if the watercourse is permanent or intermittent;
    - local and regional surface flow baseline data, including low, average and peak flows;
    - description and map of existing drainage patterns;
    - any alterations in flow on the local and regional hydrology;
    - identification of all temporary and permanent alterations, channel realignments, disturbances or surface withdrawals, their magnitude, duration and frequency;
  8. the water quality and sediment quality of watercourses (including seasonal or large alkalai water bodies) potentially affected by the project including baseline and any historical data, using all appropriate water and sediment quality parameters, their seasonal variations and relationships to flow and other controlling factors;
  9. existing ambient noise levels (at site boundaries and at sensitive sites);
  10. baseline biophysical information in a manner that enables an ecological land classification of the study areas to be completed, utilizing the existing classification systems that is consistent with existing classification and mapping systems developed by the Department of National Defence and the Canadian Wildlife Service (see Guideline references);

### **5.3.2 Biological Environment**

11. existing wildlife resources, their use and potential uses of habitats in the study areas;
12. description and evaluation of ecological land units as plant and wildlife habitat;
13. composition, distribution and abundance of terrestrial vegetation, using an appropriate ecological land classification that is consistent with existing classification and mapping systems developed by the Canadian Wildlife Service<sup>3</sup>;
14. description and quantification of the existing disturbance footprint, including the wildlife habitat capability, the level of land cover fragmentation and native prairie loss outstanding as a result of the disturbance footprint;

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<sup>3</sup> Adams, G.D. et al. March 1997. Vegetation Component Report Canadian Forces Base Suffield National Wildlife Area Wildlife Inventory; Canadian Wildlife Service, Prairie and Northern Region, Edmonton.

15. description of fire management practices for the vegetation cover in the Suffield NWA;
16. specific composition, distribution, abundance, seasonal movements, movement corridors, habitats requirements, key habitat areas and general life history, including endemics, of wildlife in the study area;
17. prairie endemic wildlife and plant species (in terms of abundance, distribution and diversity) and their significant habitats, whether they are terrestrial or aquatic;
18. species that are included in Schedules 1, 2 or 3 of the Species at Risk Act, and include extirpated, endangered, threatened, or special concern, or likely to be designated as such, and COSEWIC (2002). Describe the use of the environment and habitat by these species;
19. species listed in the Provincial *General Status of Alberta Wild Species* 2000;
20. identification and mapping of plant communities and wildlife habitats requiring special protection;
21. existing range/pasture use and capability in the study area. Conduct and discuss a pre-development rangeland health assessment using Range/Pasture Health Assessment (Alberta Rangeland Health Task Group, 2000) to assess pre-disturbance and post reclamation rangeland capability and the return of equivalent capability, except for areas where well site development will be excluded (e.g. wetland, steep slopes, active sand dunes);
22. description and location of wetlands in the study area, including type, function (water quality, quantity, habitat, etc.) and area of each wetland, using an appropriate wetland classification scheme that is consistent with classification and mapping systems developed by the Canadian Wildlife Service<sup>4</sup>;
23. description of the fish and other aquatic resources in or reliant upon the waters found in the study area and in other fish-bearing water likely to be affected by the project, including:
  - species composition, distribution, relative abundance, movements and general life history parameters;
  - a description (including maps) of the habitat likely to be affected;
  - key indicator species (provide the rationale and selection criteria used);
  - critical or sensitive areas such as spawning, rearing, and over-wintering habitats. Discuss seasonal habitat use including migration and spawning routes;

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<sup>4</sup> Adams, G.D. et al. March 1998. Wetlands Component Report Canadian Forces Base Suffield National Wildlife Area. Canadian Wildlife Service Prairie and Northern Region, Saskatoon.



24. the bird species that are present in the study area, including those listed in the *Migratory Birds Convention Act*, and are likely to use the study area, including the characteristics of their habitats (e.g., nesting, feeding, migration, etc.) that could be affected by the project. The proponent, without limiting itself thereto and depending on the circumstances, shall:
- provide a list of bird species that are likely to use the environment targeted by the project and indicate species that appear on federal and provincial lists;
  - specify the location and areas of bird habitats and describe (e.g., number of nesting couples/ha) how they could be used by birds (breeding, nesting, feeding, resting, migration);
  - accurately locate and describe the habitats well-suited for precarious bird species that appear on federal and provincial lists and have been or are likely to be found in the study area;
  - provide a list of bird species present in the study area that are of scientific, social, economic or cultural interest (explain why);
25. discuss ecological land units in consideration of their potential to support rare plant species and communities of limited distribution. Consider their importance for local and regional habitat, rare plant habitat and the hydrologic regime;
26. determine the suite of biotic and abiotic biodiversity indicators for terrestrial and aquatic ecosystems that characterize naturally functioning ecosystems in the study area(s) and represent broader taxonomic assemblages using the definition for biodiversity provided in the Canadian Biodiversity Strategy (1995);
- discuss the selection process and rationale used to select biotic and abiotic biodiversity indicators;
  - ensure that baseline information collected in each terrestrial and aquatic community is accompanied by sufficient plots in each soil-landscape phase to provide statistically sound data using a suitable sampling method;
  - discuss the regional presence and abundance of species in each soil-landscape phase or ecological type within selected taxonomic groups;
  - provide species lists and summaries of observed and estimated species richness and evenness;
  - rank each ecological unit for biodiversity potential by combining measures of species richness, overlap in species lists, importance of individual species or association, uniqueness and other appropriate measures. Describe the techniques used in the ranking process;
  - provide a measure of biodiversity on baseline sites that are representative of the proposed reclamation soil-landscape;
  - compare biodiversity at sites with existing oil and gas activities with comparable sites proposed for development;

### 5.3.3 Human Environment

27. cadastral mapping of the project's main components;
28. ownership status of land by describing the rights of ownership and use granted, the procedure for acquiring these rights or the status of the agreements to be signed;
29. status of Prairie Farm Rehabilitation Administration agreements for the study areas;
30. occupation and current and planned land use of the study area, including other petroleum and natural gas rights and dispositions, agreements for military activities;
31. the use of fish resources for sport or commercial fisheries;
32. the gathering of country food and collection of plant propagules for reclamation purposes, in the project area or such areas that could be affected by the project;
33. current use of land, wildlife and plant resources, both terrestrial and aquatic, for traditional purposes by Aboriginal persons;
34. land use policies and resource management initiatives, including those that pertain to the protected area designation of the study area;
35. unique sites or special features in the study area, including any Special Places candidate sites, Environmentally Sensitive Areas, reserves or protected areas, conservation agreement lands and habitat enhancement projects;
36. cultural, historical, archaeological and paleontological resources. This study should be prepared by a professional archaeologist or historical resource consultant. It should include:
  - an overview of regional archaeological knowledge with an emphasis on land use through time;
  - a preliminary overview of the region's post-contact history with an emphasis on historical land use;
  - an identification of all known historical/archaeological resources in the project area;
  - an analysis and evaluation of the significance of known resources and their relationship to the landscape;
  - a landscape analysis of the area and preparation of a system for ranking the sensitivity of archaeological and historical resources. Areas of potential impact should be evaluated utilizing the ranking system and should include detailed mapping clearly showing the evaluation of the sensitivity of the potential impact areas to contain historical and/or archaeological resources;
  - a summary of consultation with appropriate Aboriginal groups and an evaluation of their interests in this area;
  - an explanation of criteria used to establish the ranking system employed;
  - recommendations for the most appropriate approaches to the identification of historical/archaeological resources likely to be affected during the drilling operations, and the identification of the most appropriate mitigation procedures;
37. landscapes, including a visual study to determine exceptional scenic quality;
38. social, economic and cultural profiles of the region.

## **6. DETERMINATION AND ASSESSMENT OF THE ENVIRONMENTAL EFFECTS**

### **6.1 General Points**

This section shall describe the project's effects on the biophysical and human environment. The proponent shall indicate the project's effects during construction, operation, maintenance, abandonment, decommissioning of works and reclamation of sites affected by the project, and describe these effects using the appropriate criteria. The proponent shall consider both the direct and indirect, reversible and irreversible, short- and long-term and cumulative environmental effects of the project. In predicting and assessing the project's effects, the proponent shall indicate important details and clearly state the elements and functions of the environment that may be affected, specifying the location, extent and duration of these effects and their overall impact. This assessment shall focus primarily on the key issues identified by the proponent.

Predictions shall be based on clearly stated cause-effect hypotheses. The proponent shall describe how it has tested the cause and effects hypotheses. With respect to quantitative models and predictions, the proponent shall discuss the hypotheses that underlie the model, the quality of the data and the degree of certainty of the predictions obtained. In terms of the degree of certainty of the methods and data used, the proponent shall exercise caution in assessing the effects and, therefore, also in the choice and scope of the mitigation measures as well as the follow-up programs.

The assessment of the effects of each of the works and activities, in all phases, shall be based on a comparison of the biophysical and human environments between the predicted future conditions with the project and the predicted future conditions without the project. The assessment shall reveal the environmental effects of the project, the mitigation measures proposed to be implemented and an assessment of the effectiveness of those measures. Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective, should be clearly and concisely described.

### **6.2 Effects to Consider**

The proponent shall present as accurately as possible the anticipated effects on the elements described in Section 5.3. More specifically, the assessment shall, without being limited thereto, address the following elements:

### 6.2.1 Physical Environment

1. the potential project effects on surface water and groundwater, including:
  - changes to the quantity of surface flow, water levels and channel regime in local watercourses (during minimum, average and peak flows), including the potential downstream effect;
  - assessment of the effect of any alterations in flow on the local and regional hydrology;
  - changes to the watershed(s), including surface and near-surface drainage conditions, potential flow impediment, and potential changes in open water surface areas caused by construction of access routes, drilling and well pads, and other facilities;
  - if any surface water withdrawals are considered, description of the effects of withdrawal;
  - areas that may be temporarily or permanently encroached upon, drained or modified as a result of the project, with a description of these environments with respect to the various types of fish habitats (potential or confirmed);
  - modifications of hydrological and hydrometric conditions on fish habitat and the fish species' lifecycle activities (e.g., reproduction, fry-rearing, movements, etc.);
  - effects of physical-chemical changes to the environment on the fish species and their habitats (turbidity, contaminants, sedimentation, flow alterations and habitat changes, etc.);
  - identification of any potential erosion problems in the local creek channels due to existing or proposed project activities;
  - relationship between groundwater and surface water in terms of surface water quantity and quality;
  - potential for connection between surface water, groundwater, producing zones and disposal zones;
  - implications on terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands;
  - components of the project that may affect surface water quality;
  - the effects of drilling practices on shallow potable groundwater quality;
  - changes in water quality that may indicate a potential adverse effect or non-compliance with the *Canadian Water Quality Guidelines*;
  - conflicts with other groundwater and surface water users, and proposed resolutions to such conflicts;
  - potential implications of seasonal variations in water levels and water quality;
2. effects on the drainage and the quality of drainage run-off from infrastructures and the environmental effects of the contaminants they may contain (oil, grease, chlorides, etc.) on the receiving environment;

3. the project's contribution to atmospheric emissions, including emissions profile (type, rate and source) for each component of the project (point sources, fugitive emissions, construction and well testing);
4. the expected annual and total greenhouse gas (GHG) emissions and the project's contribution to total provincial and national GHG emissions on an annual basis;
5. the intensity of GHG emissions per unit of product produced and discuss how it compares with similar projects;
6. components of the project that are sensitive to changes or variability in climate parameters and the effects of these changes on the project;
7. the potential effects of any increased road dust levels on potentially-affected communities, wildlife and vegetation;
8. effects on soil, including:
  - the anticipated changes to soil quality (compaction, erosion, structure, loosening, drainage). Identify these soils (by soil type) with a soil map;
  - the anticipated changes (type and extent) to baseline topography, elevations and drainage patterns;
  - the effects of proposed drilling methods on the surface landscape, surficial and bedrock geology;
  - identification of any activities with respect to drilling methods that may cause soil contamination;
  - location of erosion sensitive, and otherwise stony surface materials and discussion of potential effects on these deposits and the associated landforms;
  - the amount of surface disturbance caused by drilling waste disposal;

### **6.2.2 Biological Environment**

9. the current and proposed level of habitat fragmentation for the study area. The techniques used in the fragmentation analysis shall also be described. Identify and evaluate the extent of effects from fragmentation, such as introduction of non-native plant species on native species composition, and any changes to plant and animal communities that may result from the project;
10. potential effects on wildlife populations, habitat use, habitat availability and quality and food supply;
11. habitat loss and change in terms of loss of native prairie, habitat change as mediated by habitat structural change, abandonment, reduced effectiveness, fragmentation or alteration, as they relate to reproductive potential, population viability and recruitment for regional wildlife populations;
12. how the proposed activities will affect the conservation of wildlife, pursuant to the *National Wildlife Area Regulations* and the *Species at Risk Act* and in the context of the mandate of the National Wildlife Area;

13. the spatial and temporal changes to habitat (cover types, ecological land unit in terms of quality, quantity, diversity and distribution) and to wildlife distribution, relative abundance, movements, habitat availability and the potential to return the area to pre-disturbance wildlife habitat and population conditions, including:
  - anticipated effects on wildlife due to improved or altered access into the area and the level of vehicle movements both on designated routes and at random over the landscape (e.g., vehicle collisions with wildlife, obstructions to daily or seasonal movements, dust and noise);
  - anticipated effects of habitat fragmentation and structure changes in vegetation communities and the implications to wildlife, by identifying and mapping the changes anticipated by the project and other planned activities on a local and regional scale;
  - any existing wildlife studies that may be occurring in the study area(s) and how the proponent plans to integrate its operational activities and mitigation strategies with existing research;
14. the potential effects of the project on rare plants and animals including species at risk and their critical habitat, as listed in Schedule 1, 2 and 3 of the *Species at Risk Act*, the Committee on the Status of Endangered Wildlife in Canada and the provincial *General Status of Alberta Wild Species*, 2000, for each habitat unit;
15. where plant communities or ecological land unit classes are identified as rare, or where a significant percentage of a specific type may be removed by the project or fragmented by the disturbance footprint, describe the regional significance of those units and the anticipated effects;
16. the potential impacts on riparian areas that could affect aquatic biological resources and productivity taking into account any anticipated modifications to fish habitat;
17. the potential effects on fish and aquatic communities;
18. losses, structural changes, or fragmentation of habitat (quality, area, functions) for avian species and communities, with special attention on precarious species, grassland endemics and alien species of particular social, economic and cultural interest;
19. modifications in the abundance, distribution and productivity of land mammals;
20. losses of area, fragmentation and functions of wetlands;
21. the potential introduction and spread of non-native plant species, and invasive species on native species composition and any changes to plant and animal communities that may result;
22. the effects of the project on biodiversity, including:
  - the contribution of the project to any anticipated changes in regional biodiversity including measures to minimize such change;
  - how changes in biodiversity and endemism could potentially affect local and regional ecosystems;
23. risk of causing significant effects on renewable resources and compromising the capacity of these resources to respond to present needs as well as those of future generations;

### **6.2.3 Human Environment**

24. effects of the work on the natural and cultural heritage, including effects on important archaeological assets;
25. potential effects on the current use of lands and resources used for traditional purposes by aboriginal persons;
26. effects on the visual environment and changes to the aesthetic quality of the landscapes;
27. effects on public and community service infrastructures such as roads, railways, water supplies, public safety services;
28. anticipated changes to traffic (e.g., type, and volume) on local highways during the construction and operation of the project. Discuss any effect expected on the primary and secondary highway system and other regional roads. Consider other existing and planned operations in the region;
29. the effects of road maintenance on the nearby environmental components;
30. effects on the integrity of the Suffield NWA and its ability to serve as a research control location for measuring the effects of land use activities on a native prairie ecosystem;
31. if surface water withdrawal is considered, the effects of water withdrawal on users who have existing approvals, permits or licenses;
32. local, regional and provincial economic spin-offs associated with the project and other economic factors (positive and negative) that affect the population (job opportunities, development of related services, local procurement, land and property values) as well as businesses and local government;
33. the potential effects of the project on land uses, including:
  - anticipated effects on grazing;
  - any anticipated effects related to changes in public access (e.g. by workers, operators, field technicians, etc.);
  - identification of any land use policies and resource management initiatives, including those that pertain to the “protected area designation” of the study area and discuss how the proposed development will be consistent with the intent of the guidelines and objectives of these initiatives;
  - the implications of the above mentioned land and resource use policies, including any constraints to development;
34. the potential effects on unique sites or special features including Special Places candidate sites, Environmentally Sensitive Areas, reserves or protected areas;

35. potential effects on health including discussion of the following:

- 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;
- the anticipated effects on human health related to the potential contamination of country foods;
- the potential to increase human exposure to contaminants from changes to water quality and drinking water consumption, air quality and soil quality, including:
  - a. geographical/hydrological linkage between private / community drinking water supplies and the project;
  - b. effects on private / community drinking water supplies under operational and accidental spill scenarios.

### **6.3 Other Effects to Consider**

#### **6.3.1 Accidents and Malfunctions**

The proponent will identify the probability of potential accidents and malfunctions related to the project, including an explanation of how those events were identified, potential consequences (including the potential environmental effects), the worst case scenarios and the effects of these scenarios. The proponent will explain the potential magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the malfunction and accident events.

Potential accidents and malfunctions may include those associated with the following activities:

- the transportation of natural gas and other chemicals or substances that are potentially harmful to the environment to and from the Project;
- waste management and disposal;
- loss of well control;
- handling and use of chemicals and hazardous materials on-site; and
- any other project components or systems that have the potential, through accident or malfunction, to adversely affect the natural environment.

The failure of certain works caused by human error or exceptional natural events could cause major effects. The proponent will therefore also conduct an analysis of the risks of natural events, technological accidents or unintended consequences of military activity, determine their effects and present a preliminary emergency measures plan for the construction and operation phases of the works to be built and for existing works requiring a modification in management.



#### 6.3.1.1 Risk Analysis

The risk analysis of technological accidents or unintended consequences of military activity is based on identifying dangers (degree of hazard of products, system malfunctions, sources of failure, etc.) that can be used to establish accident scenarios. A record of accidents that have occurred for similar projects would be useful to establish potential accident and malfunction scenarios.

As part of its analysis, the proponent shall take into account the effects of the environment on the project. The proponent shall conduct a study of potential landslides in areas along coulees, particularly those associated with the South Saskatchewan River valley close to proposed well sites, pipelines and road access.

The proponent should also examine the potential for casing failures and the likely environmental effects of such a failure. Measures to reduce the environmental risks from casing failures shall be identified.

The proponent will determine whether drilling in the Lethbridge Preglacial valley aquifer could result in potential accidents. The proponent will describe any specific safety measures that would be put in place to prevent any accidents that may arise<sup>5</sup>.

The proponent shall examine all of the factors that could compromise or improve the security conditions in the regions affected by the project. It shall carry out the risk analysis according to generally-accepted practices. The analysis shall include a description of the methods and hypotheses that constitute the basis of the risk analysis, and specify the limitations of the methods employed and the uncertainties regarding the results, where applicable.

The risk analysis shall include an estimate of the repercussions related to accident scenarios. This step shall serve to define the areas where the safety of the surrounding populations and the integrity of the environment could be affected, as well as the presence of sensitive elements.

#### 6.3.1.2 Safety Measures

To reduce the risks identified in the previous section, the proponent shall describe the safety measures planned for the different project locations. Specifically, the proponent shall provide the following information:

- security systems and prevention measures (leak detection systems, monitoring systems, Blow-Out Preventers, fire-control systems, standby emergency systems, hazard detection systems, etc.);
- how the systems' operations will minimize the risks of accidents and natural hazards;
- methods of detecting pipeline and casing failures and action plan in the event of a failure;

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<sup>5</sup> For clarification on this point, the proponent is invited to review correspondence from Natural Resources Canada to the Canadian Environmental Assessment Agency, dated June 13, 2006 and December 6, 2006. These letters are available on the project's public registry.

- 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.

#### 6.3.1.3 Emergency Action Plan

The proponent shall present a preliminary emergency action plan for the project's main components that provides for an adequate response in the event of an accident. An emergency action plan generally includes the following elements:

- alert and evacuation plans for employees;
- relevant information in the case of an emergency (persons in charge, equipment available, plans and maps locating works, etc.);
- emergency intervention structure and decision-making mechanisms within the company;
- existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations and municipal emergency response agencies and methods of communication with these external emergency preparedness organizations;
- protection measures to protect populations facing potential risks;
- methods for efficiently alerting populations facing potential risks, in collaboration with municipal and government bodies concerned (alerting public authorities and providing up-to-date information on the situation);
- program to update and re-evaluate emergency measures.

This plan will address the main actions to be taken to deal with crisis situations. It shall present the risks related to the safety of people and property, describe the measures planned to protect the population and the environment in the event of an accident and indicate the type of expertise required at the site.

The preliminary plan shall clearly describe the relationship with relevant regional and municipal authorities as well as communications mechanisms and the possibilities for integrating it into the emergency plans of those authorities. If an emergency plan has already been submitted for a given territorial unit, it should be updated in order to integrate the new facility.

### 6.3.2 Cumulative Effects

The proponent shall identify and assess the project's cumulative effects. Cumulative effects are defined as changes to the environment due to the project combined with the existence of other works or other past, present and reasonably foreseeable future projects.

In the cumulative effects assessment, the proponent shall adhere to the approach described in the Canadian Environmental Assessment Agency's *Cumulative Effects Assessment Practitioners Guide* (1999).

Cumulative effects may result if:

- implementation of the project being studied caused direct residual negative effects, taking into account the application of technically and economically feasible mitigation measures on the environmental components;
- the same environmental components are affected by other past, present or reasonably foreseeable future actions (projects or activities).

The environmental components that will not be affected by the project or will be affected positively by the project can, therefore, be omitted from the cumulative effects assessment. A cumulative effect on an environmental component may, however, be important even if the assessment of the project's effects on this component reveals that the effects of the project are minor.

Accordingly, the proponent shall:

- identify and justify the environmental components that will constitute the focus of the cumulative effects assessment. The proponent's assessment should emphasize the cumulative effects on the main valued environmental components that could potentially be most affected by the project. To this end, the proponent must consider, without limiting itself thereto, the following components likely to be affected by the project:
  - endangered or valued wildlife;
  - endangered or valued plant species, including native prairie ecosystem;
  - sensitive soils or landforms such as sand hills or dunes;
  - the Suffield NWA and the conservation of wildlife pursuant to the *National Wildlife Area Regulations* and in the context of the mandate and integrity of the National Wildlife Area;
- present a justification for the geographic and temporal boundaries of the cumulative effects assessment. The boundaries for the cumulative effects assessments will again depend on the effects being considered (i.e., will generally be different for different effects). These cumulative effects boundaries will also generally be different from (larger than) the boundaries for the corresponding project effects. The past temporal boundary will go back to the years (approximately 1975) when oil and gas projects and activities were initiated on the Canadian Forces Base Suffield;
- describe and justify the choice of projects and selected activities for the cumulative effects assessment. These shall include past activities and projects, those being carried out and future projects or activities likely to be carried out;

- describe the mitigation measures that are technically and economically feasible, determine the significance of the cumulative effects. The proponent shall assess the effectiveness of the measures applied to mitigate the cumulative effects. In cases where measures exist that are beyond the scope of the proponent's responsibility that could be effectively applied to mitigate these effects, the proponent shall identify these effects and the parties that have the authority to act. In such cases, the proponent shall summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term;
- develop a follow-up program to verify the accuracy of the assessment or to dispel the uncertainty concerning the effectiveness of mitigation measures for certain cumulative effects.

## **7. MITIGATION, COMPENSATION AND RESIDUAL EFFECTS**

### **7.1 Mitigation and Compensation Measures**

Under the *Canadian Environmental Assessment Act*, mitigation is defined as the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. As a first step, the proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include the modification of the design of the project or relocation of project components.

The proponent shall describe the standard mitigation practices, policies and commitments that constitute mitigation measures and that will be applied as part of standard practice regardless of location. The proponent shall then describe its environmental protection plan and its environmental management system, through which it will deliver this plan. The plan shall provide an overall perspective on how potentially adverse effects will be minimized and managed over time. As well, the proponent shall describe its commitments, policies and arrangements directed at promoting beneficial or mitigating adverse socioeconomic effects. The proponent shall discuss the mechanisms it will use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.

The environmental impact statement shall specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the project's various construction and operation phases to eliminate or reduce the significance of adverse effects. The impact statement shall also present an assessment of the effectiveness of the proposed mitigation measures. The reasons for judging if the mitigation measure reduces the significance of an adverse effect shall be made explicit.

In addition, the proponent will identify the extent to which technology innovations will help mitigate environmental effects (e.g., restoration of native prairie).

For residual effects, the proponent may propose compensation measures for the biological environment and the citizens and communities affected.

In developing mitigation measures, the following should be considered:

- how surface disturbance will be minimized;
- soil and reclamation material salvage indicating areas where salvage will occur (e.g. well pads, access routes), the depth and volume of soil to be salvaged, soil storage areas and soil handling procedures indicating relationship to predevelopment conditions;
- areas of soil replacement indicating depth, volume, timing, technique and type of reclamation material;
- discussion of remedial measures to alleviate anticipated erosion;
- re-establishment of self-sustaining topography, drainage and surface watercourses, and vegetation and wildlife communities representative of the surrounding area;
- greenhouse gas management as it relates to well testing;
- control technologies used to minimize air emissions of the project;
- emergency flaring scenarios (e.g., frequency and duration) and proposed measures to ensure flaring events are minimized;
- gas collection, conservation and applicability of technology for vapour recovery for the project;
- opportunities to undertake progressive reclamation to offset new disturbance;
- a revegetation plan for the disturbed terrestrial and aquatic areas, identifying the species types that will be used for seeding or planting, and the vegetation management practices. Include the rationale for selection based on the need for the development of self-sustaining biologically diverse ecosystems consistent with the appropriate sub-region of the Prairie Natural Region (e.g. Mixed Grassland Region) with reference to the use of native vegetation species;
- a weed/vegetation management plan that will detail how the proponent will prevent the establishment and control the spread of restricted and noxious weeds and invasive species within the site study area (as listed in the *Alberta Weed Control Act*);
- the design, construction and operational factors to be incorporated into the project for the protection of fish resources. Identify plans proposed to offset any loss in the productivity of fish habitats. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat including the development of a “No Net Loss” fish habitat objective;
- measures to protect wetlands (including avoidance), and describe how the proposed measures would be expected to meet the *Federal Policy on Wetland Conservation*;
- discuss plans to return disturbed areas to a self-sustaining habitat of equivalent land capability, considering factors such as biological capability and diversity and end land use objectives appropriate for a National Wildlife Area and describe proposed performance measures for reclamation success;
- methods and alternatives to re-establish native grasslands including, but not limited to, native seed salvage and native sod salvage;

- a plan to mitigate the adverse effects of site clearing on rare plants and plant communities;
- setbacks around environmentally sensitive areas such as critical habitats, surface waterbodies, riparian areas and wetlands as well as a plan for how these setbacks would be implemented;
- plans for using chemicals to manage weed growth near drainages or waterbodies, including strategies for minimizing adverse environmental impacts associated with the use of such chemicals;
- strategy and mitigation plan to minimize impacts on wildlife and wildlife habitat through the life of the project and to return productive wildlife habitat to the area, considering:
  - habitat enhancement measures and a schedule for the return of habitat capability to areas impacted by the Project;
  - consistency of the plan with applicable regional, provincial and federal wildlife habitat objectives, policies and regulations, in particular with the National Wildlife Area Regulations and the *Species at Risk Act*;
  - the need for access controls or other management strategies to protect wildlife during and after project operations;
  - indicate what measures will be taken to prevent habituation of wildlife and increasing the potential for human-wildlife encounters and consequent destruction of wildlife including any staff training program, garbage containment or regular follow-up;
- an access management plan to minimize effects from vehicle and foot traffic in the study area;
- measures to enhance any beneficial environmental effects.

## 7.2 Determination of the Significance of Residual Effects

After having established the mitigation and compensation measures, the impact statement shall present the residual effects of the project on the components of the biophysical and human environments.

The impact statement shall include a summary of the project's residual effects so that the reader clearly understands the real consequences of the project, the degree of mitigation of the effects and which effects cannot be mitigated or compensated for. A summary table that presents the effects before necessary mitigation measures on the various components of the environment, the mitigation measures applied and the residual effects shall be included in the study.

This approach implies that the proposed mitigation measures shall be considered an integral part of the project at the time when the significance of the project's environmental effects is determined. During the course of the project, the proponent shall ensure that these measures are effectively implemented.

The impact statement shall include an evaluation of the significance of the residual effects in conjunction with the application of mitigation measures that are technically and economically feasible. The chosen method and the criteria used to determine the

significance of the effects shall be clearly described and explained. The proponent may assess the significance of predicted effects, for example, according to the following:

- intensity of the effect;
- geographic extent;
- duration and frequency;
- degree to which effects are reversible or irreversible;
- sensitivity or vulnerability of the component;
- uniqueness or rarity of the component;
- value of the component at the local, regional and national levels;
- formal recognition of the component by an act, policy, regulation or other official decision (park, ecological reserve, threatened or vulnerable species, etc.);
- risks to health, safety or well-being of the local communities;
- capacity of renewable resources to meet present and future needs.

The analysis of the significance of the effects shall contain sufficient information to allow the authorities concerned and the public to understand and evaluate the reasoning of the proponent. In particular, the proponent will provide a summary of the regional, provincial or national objectives, standards or guidelines that have been used to assist in the evaluation of the significance of environmental effect.

If significant negative effects are identified, the proponent shall determine the probability that they will occur. The proponent shall also address the degree of scientific uncertainty related to the data and methods used within the framework of its environmental analysis.

## **8. Monitoring and Follow-up Program**

The following sections aim to establish the outline of the monitoring and follow-up programs associated with the project to be presented in the environmental impact statement.

### **8.1 Monitoring Program**

The proponent shall prepare an environmental monitoring program, which it plans to carry out during the construction, operation, maintenance, abandonment, decommissioning and reclamation phases of the sites affected by the project and the related facilities, activities and projects.

This program will help ensure that the project is implemented as proposed, that the mitigation or compensation measures proposed to minimize the project's environmental effects are effectively implemented, and that the conditions set at the time of the project's authorization and the requirements pertaining to the relevant laws and regulations are met. The monitoring program will also make it possible to check the proper operation of works, equipment and facilities. If necessary, the program will help reorient the work and

possibly make improvements at the time of construction and implementation of the various elements of the project.

Specifically, the environmental impact statement shall present an outline of the preliminary environmental monitoring program, which shall include:

- identification of the interventions that pose risks to one or more of the components and the measures and means planned to protect the environment;
- description of the characteristics of the monitoring program where foreseeable (e.g., location of interventions, planned protocols, list of measured parameters, analytical methods employed, schedule, human and financial resources required);
- description of the proponent's intervention mechanisms in the event of the observation of non-compliance with the legal and environmental requirements or with the obligations imposed on contractors by the environmental provisions of their contracts;
- the guidelines for preparing monitoring reports (number, content, frequency, format) that will be sent to the authorities concerned.

The proponent will document current and planned participation in regional cooperative efforts to address environmental and socio-economic issues associated with oil and gas development during the life of the project. This would include EnCana's participation in regional air, water, wildlife, vegetation and other environmental monitoring programs, health studies, research, traditional ecological knowledge and socio-economic studies.

## **8.2 Follow-up Program**

The purpose of the follow-up program is to verify the accuracy of the predictions made in the assessment of the effects as well as the effectiveness of the mitigation measures. The duration of the follow-up program shall be as long as is needed for the environment to regain its equilibrium and to evaluate the effectiveness of the mitigation measures.

The impact statement shall present a preliminary follow-up program. This program shall include:

- objectives of the follow-up program and the components targeted by the program;
- list of elements requiring follow-up;
- number of follow-up studies planned as well as their main characteristics (list of the parameters to be measured, planned implementation timetable, etc.);
- intervention mechanism used in the event that an unexpected deterioration of the environment is observed;
- commitments of the proponent regarding the dissemination of follow-up results among the concerned populations;
- accessibility and sharing of data for the general population;
- opportunity for the proponent to take advantage of the participation of stakeholders on the affected territory, during the implementation of the program;



- involvement of local and regional organizations (such as the Suffield Environmental Advisory Committee) in the design, implementation and evaluation of the follow-up results as well as any updates, including a communication mechanism between these organizations and the proponent;
- communication plan for data gathered.

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