

**DRAFT GUIDELINES  
FOR AN ENVIRONMENTAL IMPACT ASSESSMENT:  
PETROLEUM REFINERY (PROJECT EIDER ROCK)**

**Issued by the Minister of Environment  
for the Province of New Brunswick**

**to**

**Irving Oil Company, Limited**

**April 5, 2007**

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## 1.1 Background

Irving Oil Company, Limited is proposing the construction and operation of a new petroleum refinery. The proposed refinery would be capable of processing up to 300,000 barrels per day of crude oil and would be designed to produce a variety of petroleum products including diesel fuel, gasoline, petroleum coke and other petroleum products for the transportation fuel, home heating, and industrial energy markets.

The proposed project could also include the following elements and components (associated infrastructure):

- ancillary facilities including steam boilers, freshwater systems, wastewater systems, etc.
- tankage for storage of crude oil, raw materials, refined petroleum products, and feedstocks;
- petroleum coke storage and handling facility;
- marine terminals for shipping and receiving petroleum products and construction material;
- ROWs for pipelines, electrical power, petroleum coke conveying, rail spur, and access roads.

## 1.2 Purpose

These Guidelines are to be used by Irving Oil Company, Limited as a framework for conducting an Environmental Impact Assessment (EIA) of the proposed construction and operation of a new petroleum refinery and associated land-based and marine based infrastructure in east Saint John (Red Head area) for producing up to 300,000 barrels per day of refined petroleum products for the domestic and export markets.

The EIA Report is intended to meet the requirements of the New Brunswick Clean Environment Act Environmental Impact Assessment Regulation (87-83).

The environmental assessment will examine the potential environmental effects (both positive and negative) of the construction and operation of the refinery and all related facilities and infrastructure, and will identify appropriate mitigative/optimization measures.

## 1.3 Environmental Impact Assessment (EIA) Process

Under Regulation 87-83 of the NB Clean Environment Act, Irving Oil Company, Limited, as the proponent of the project, was required to register the Project as an undertaking for Environmental Impact Assessment (EIA) review. The proposal was registered on January 25, 2007. On February 7, 2007 the Minister of the New Brunswick Department of Environment (the Minister) determined that the completion of a Comprehensive EIA was required to assess the nature and significance of the proposal's potential impacts.

This project will likely require an environmental assessment federally and on January 26, 2007, the project description for the development proposal was distributed by the Canadian Environmental Assessment Agency to Environment Canada, Fisheries and Oceans Canada,

Health Canada, Indian and Northern Affairs Canada, Industry Canada, National Energy Board, Natural Resources Canada, the Canadian Transportation Agency, the Saint John Port Authority and Transport Canada, in accordance with the requirements of the *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*.

Federal authorities have met, and will continue to do so, to discuss the requirements of the environmental assessment process under the *Canadian Environmental Assessment Act*, including the type of review, scope of project and scope of assessment.

When the type of federal environmental assessment is determined, as well as the scope of the review, options for coordination of the federal and provincial environmental assessment requirements will be determined.

The Minister has appointed a Review Committee comprised of technical specialists from various government agencies whose jurisdictions may be affected by the undertaking. The agencies include:

- NB Department of Environment (DENV);
- NB Department of Natural Resources (DNR);
- NB Department of Health (DH);
- NB Department of Public Safety (DPS);
- NB Department of Energy (DOE);
- NB Department of Fisheries (DOF);
- Aboriginal Affairs Secretariat (AAS);
- NB Department of Transportation (DOT);
- NB Museum (NBM);
- NB Workplace Health, Safety and Compensation Commission (WHSCC);
- NB Wellness, Culture and Sport - Archaeological Services Unit (WC&S);
- The City of Saint John;
- Fisheries and Oceans Canada (DFO);
- Transport Canada (TC);
- Environment Canada (EC).

The Review Committee will include those listed above, with the addition of other provincial and federal government agencies as required. The Guidelines outline the approach the proponent must follow in conducting the EIA. The Guidelines identify important issues, which must be considered in assessing the potential impacts of the proposal.

Members of the public, stakeholders and the Aboriginal Communities are invited to comment on the Draft Guidelines and to identify any issues of concern that do not appear in the document. Following public input, and a detailed review by the Review Committee, the Minister will be issuing the Final Guidelines for the EIA.

Upon receipt of the Final EIA Guidelines, Irving Oil Company, Limited and/or its consultant must provide the Minister with detailed Terms of Reference (TOR), which describe the approach to be used in conducting the EIA. The TOR will be evaluated through a consultative process involving the proponent and the appropriate government review agencies (Review Committee). Irving Oil Company, Limited will also be required to provide the public, stakeholders and the aboriginal Communities with an opportunity to review and input on the TOR.

The principle objective of the EIA is to predict the potential impacts that can be expected should the project proceed, evaluate them and propose mitigation. The EIA study, conducted in consultation with the residents from the area of potential impact, is also expected to identify methods of optimizing positive impacts and minimizing negative impacts resulting from the project.

Information gathered during the study is compiled in a Draft EIA Report. The draft report is evaluated by the Review Committee to determine whether the study adequately addressed the issues raised in the Final EIA Guidelines. Should the Review Committee determine that the report does not adequately address the Guidelines, the proponent will be required to make revisions to address any identified deficiencies in order to advance the EIA process.

If, on the advice of the Review Committee, the Minister is satisfied that the EIA Report is adequate, the next step is additional consultation, to involve the public, stakeholders and the Aboriginal Communities in evaluating the potential impacts anticipated from this project.

A summary of the Final EIA Report is prepared on behalf of the Minister, to assist members of the public in becoming familiar with the information. The Review Committee also prepares a General Review Statement summarizing its comments on the Final EIA Report. These documents are released for a period of at least 30 days for public review and comment, after which, the schedule and location(s) of open houses/workshops and/or panel-type public meeting(s) are announced by the Minister.

Public meeting(s) generally take place near the area where the project is being proposed and provide all interested parties with an opportunity to make comments, raise concerns, or ask questions about any matter covered in the EIA study. Following the public meeting(s), a period of fifteen days is set aside for members of the public to submit written comments to the Minister. At the end of this period, a summary of public participation is made available to the public and presented to the Minister. At any time after this date, the Cabinet (Lieutenant-Governor in Council) may render a decision to issue or deny an approval for the project.

Specific procedures to be followed in conducting an EIA may be found in *Regulation 87-83, Environmental Impact Assessment Regulation - Clean Environment Act*. A procedural summary is available in the publication entitled "A Guide to Environmental Impact Assessment in New Brunswick." These documents may be obtained from the NB Department of Environment at the address provided below and the website:

<http://www.gnb.ca/0009/0377/0002/index.htm>

Any comments regarding the Draft EIA Guidelines may be forwarded by May 5, 2007 to:

Mr. Serge Gagnon  
Project Assessment Branch  
NB Department of Environment  
P.O. Box 6000  
Fredericton, NB  
E3B 5H1  
E-mail: [EIA-EIE@gnb.ca](mailto:EIA-EIE@gnb.ca)

Fax: (506) 453-2627

or to the  
Saint John Regional Office  
Regional Services Branch  
NB Department of Environment  
8 Castle Street  
Saint John, NB  
E2L 3B8

#### 1.4 Definitions/Glossary

**“Alternative means”** are defined as the various ways that are technically and economically feasible, that the project can be implemented or carried out. This could include, for example, alternative locations, routes and methods of development, implementation and mitigation.

**“Alternatives to”** the project is defined as functionally different ways to meet the project need and achieve the project purpose.

**“Environment”** – Under section 31.1(1) of the Clean Environment Act, "environment" is defined as:

- (a) air, water, or soil;
- (b) plant and animal life including human life; and
- (c) the social, economic, cultural and aesthetic conditions that influence the life of humans or a community as they are related to the matters described in (a) and (b).

**“Environmental Effect”** - In respect of a project, means:

- a) any change that the project may cause in the environment (i.e., both positive and negative changes), including any change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and
- b) any change to the project that may be caused by the environment whether any such change occurs within or outside Canada.

**“Project”** is defined as the petroleum refinery and any associated infrastructure, including but not limited to:

- ancillary facilities including steam boilers, freshwater systems, wastewater systems, etc.
- tankage for storage of crude oil, raw materials, refined petroleum products, and feedstocks;
- petroleum coke storage and handling facility;
- marine terminals for shipping and receiving petroleum products and construction material;
- ROWs for pipelines, electrical power, petroleum coke conveying, rail spur, and access roads.

## **2.0**

## **METHODOLOGICAL APPROACH TO EIA**

### **2.1 General**

The EIA process results in a detailed study of potential environmental impacts and identification of procedures that may be used to mitigate these effects. The EIA study must also identify methods of optimizing positive impacts and minimizing negative impacts resulting from the proposed project. Additional options identified during the environmental assessment process may be considered as appropriate.

To provide a focus for the EIA, environmental components of principal concern, commonly referred to as Valued Environmental Components (VECs), must be identified early in the assessment process. The method for determining VECs must be clearly stated by the proponent. The proponent shall seek public, stakeholder and Aboriginal Community knowledge, as appropriate, during the identification of appropriate VECs. The proposed VECs must be reviewed and accepted by the Review Committee in the early phases of the EIA. The EIA must clearly indicate the provisions for compliance with relevant regulatory requirements, guidelines and best management practices.

Presented in Section 4.0 of these Guidelines are a number of specific issues related to the project for study. However, this framework does not limit the proposed EIA study. Should additional issues arise from discussion with members of the Review Committee, or consultation with regulatory agencies, members of the public, stakeholders or the Aboriginal Communities, the proponent must incorporate these issues into the assessment of the project's potential impacts.

### **2.2 Study Boundaries and Scope of Factors**

The review must consider the potential environmental effects of the proposed project and all associated infrastructure within the spatial and temporal boundaries which encompass the periods and areas during and within which the project may potentially interact with, and have an environmental effect on, components of the environment. Irving Oil Company, Limited must clearly describe the boundaries of the study in time and space used in the evaluation of environmental effects for each of the Valued Environmental Components.

The temporal boundaries of the study (the length of time over which project environmental effects are anticipated to occur) must reflect the construction period, the operating life of the project, and the geographical extent of any potentially significant environmental effects that may remain beyond the operating period, including decommissioning and any potential accidents or malfunctions.

Spatial boundaries should reflect the extent to which project activities are anticipated to occur in the existing environment and the extent of anticipated/environmental effects, including cumulative environmental effects on the Valued Environmental Components. Boundaries such as administrative, technical, biophysical, socio-economic and project area should be defined and related to the impact assessment process as appropriate or applicable. In determining appropriate spatial boundaries, consideration should be given to environmental effects from the proposal on a local, regional and national scale.

## 2.3 Prediction of Environmental Effects

The main focus of the EIA is to predict environmental effects (i.e., both positive and negative) that may result from the proposed project and associated infrastructure, and their potential significance. Predictions must consider all aspects and phases (e.g. construction, operation, and decommissioning) of the proposed project, and any indirect environmental effects, cumulative effects, and any effects that may result from accidents or malfunctions. In addition, potential effects of the environment on the proposed project must be predicted, such as climate change effects or effects that may be caused by extreme weather events (e.g., intense precipitation events), etc.

EIA predictions are generally based on a combination of objective and subjective evaluation. The use of objective (measurable) analysis is strongly preferred where it is technically feasible and reasonable to do so. However, in recognition of any factor that may limit the ability to predict or measure environmental responses, predictions may be based on subjective evaluation using professional judgement and experience. Community knowledge and Aboriginal traditional knowledge should also be utilized, as applicable. In consideration of this, predictive statements must be accompanied by a discussion of the limitations of the analysis, references to supporting documentation and the qualifying credentials of those making the predictions.

Predictions must be made regarding the nature (adverse or positive), magnitude, duration, frequency, geographic extent and reversibility of the proposed project's potential environmental effects. The significance of these effects must also be determined. These predictions must:

- facilitate decision-making with respect to the proposed project;
- clearly specify any degree of uncertainty inherent in the projections;
- clearly identify positive and negative environmental effects (both biophysical and socio-economic) of the proposed project; and
- be amenable to testing and verification where possible through ongoing monitoring initiatives.

To clearly distinguish potentially significant environmental effects from those likely to be insignificant, the proponent must first define "significant." The definition must be based on scientific determinations, social values, public concerns, and economic judgements, and it shall be submitted to the Review Committee for review and approval along with the proposed VECs. In particular, the significance of proposed project-induced changes on VECs must be clearly stated in the EIA Report. The thresholds for significant effects on VECs (i.e., both positive and negative) must be related in terms of applicable criteria. Quantifiable reference to the magnitude, geographical extent, duration, frequency, reversibility and ecological context of the potential environmental effects is required. Significance must be determined in the context of project-specific and cumulative environmental effects and after taking into account the implementation of appropriate mitigation/optimization measures.

Significant effects on species (i.e., tolerance levels related to organisms in the environment), must take into account effects at the population-level. For species designated as endangered, effects on an individual constitute a population-level effect.



## **2.4 Cumulative Environmental Effects**

The term cumulative environmental effects refers to those effects, over a defined period of time and distance, resulting or likely to result from the proposed project and associated infrastructure, in combination with other past, present, or likely (imminent) future projects or activities. An assessment of cumulative environmental effects must be conducted as part of the EIA study, in consideration of identified VECs, and future projects that may be developed.

The goal of the cumulative effects assessment will be to place project-related impacts, their significance, and approaches to their management in the context of the “bigger picture,” and must include (but is not limited to):

- identification of regional issues of concern;
- a comprehensive description of how VECs were selected;
- a clear justification for the spatial and temporal boundaries used to address cumulative effects;
- a clear description of the analysis undertaken to assess the cumulative effects on the selected VECs (i.e., both positive and negative), and presentation of the results;
- a clear description of how mitigation measures address the cumulative environmental impacts; and
- the rationale for determining whether residual cumulative effects on VECs are significant.

## **2.5 Mitigation, Contingency and Compensation**

The EIA study must describe general and specific measures that are technically and economically feasible for the proponent to implement, to optimize any positive environmental effects and mitigate any negative effects resulting or potentially resulting from the proposed project and any associated infrastructure (i.e. maximize positive effects, and eliminate, prevent, avoid or minimize adverse effects). This must include a description of contingency measures (including emergency response plans) that have been designed to address potential accidents and malfunctions that could result in spills or unplanned releases of contaminants or products to the environment. Contingency plans must address worst-case scenarios and reflect a consideration of local conditions and sensitivities. Specific circumstances under which mitigative measures will be implemented must be clearly defined by the proponent. Mitigation options must be considered in a hierarchical manner with a clear priority placed on proactive measures for impact avoidance and pollution prevention opportunities. Opportunities to contribute to a regional approach to management of cumulative environmental effects must also be identified (refer to Section 2.4 above).

An outline for contingency plans must also be provided:

- for use in the event of an environmental emergency attributable to the project and associated infrastructure, within the spatial boundaries of the study; and
- for use in the event of significant impacts, attributable to the project and associated infrastructure, which are detected through monitoring (this plan must be designed to be implemented should impacts be detected through monitoring).

The study must also consider compensation mechanisms to be used in the event that any unforeseen, accidental, or residual environmental effects occur. These compensation mechanisms/plans must be

developed through consultation with federal and provincial agencies and other stakeholders, as appropriate. Compensation must be recognized as a last resort, but may be required if deliberate project-related effects cannot be otherwise mitigated.

## **2.6 Commitment to Monitoring and Follow-Up**

A well-defined program of monitoring and follow-up initiatives regarding environmental effects resulting or potentially resulting from the proposed project must be outlined in the EIA Report. Irving Oil Company, Limited must describe all of their proposed monitoring and follow-up programs, including their objectives, content, and implementation and reporting schedules. Monitoring programs will be required to:

- establish baseline conditions;
- determine regulatory compliance (compliance monitoring);
- test the predictions of the EIA (environmental effects monitoring, EEM); and
- evaluate the effectiveness of measures used to mitigate environmental effects (EEM).

Monitoring programs should include protocols that would guide interpretation of monitoring results and timely implementation of appropriate corrective actions.

Monitoring initiatives must be based upon accurate baseline information for the existing physical, biological and socio-economic environments. The proponent is expected to collect the necessary information through existing data sources (“data mining”) or through primary research such as fieldwork and laboratory testing, as required.

Where the EIA predictions are not based on objective information, monitoring programs must be designed, where possible, to collect relevant data not previously available.

Several taxa hold promise in terms of long term monitoring with respect to air pollutants (lichens), water quality (e.g.: dragonflies and other aquatic invertebrates), and the deposition of heavy metals and other contaminants (dried tissues from lichens, bryophytes, vascular plants, insects, terrestrial molluscs, or small mammals). This should be considered as part of the assessment and future long term monitoring.

## **2.7 Public, Stakeholder and Aboriginal Community Consultation**

Public consultation is an essential component of this EIA. Irving Oil Company, Limited must consult with persons and organizations potentially affected by the proposed project and associated infrastructure, and must inform and engage any interested individuals, groups, stakeholders and Aboriginal Communities in this assessment. This will include local governments and specific groups with mandates/initiatives in this area. The stakeholder consultation program of Irving Oil Company, Limited is to be reviewed and accepted in the early stages of the study.

Irving Oil Company, Limited will be expected to hold appropriate public consultation events and to use various media to engage public consultation (e.g., bulletins, website, e-mails, study updates, workshops, open-houses, etc): All interested parties will be provided with an opportunity to participate in any consultation initiatives in order to provide input in the assessment and/or make

their views known. Various stakeholders will be consulted throughout the environmental assessment process, including interested parties from the Aboriginal Communities; neighbouring residents; general public; non-government organizations and interest groups. The objectives of this consultation must be:

- to ensure that the potentially affected public, stakeholders and Aboriginal Communities are engaged in meaningful discussion and are well informed prior to the government's decision, as to the nature and extent of environmental effects attributable to the proposed project (i.e. both positive and negative effects); and
- to ensure that the values and concerns of the public, stakeholders and Aboriginal Communities are incorporated and adequately addressed in the study;
- to obtain expertise (where applicable) from various members of the public, stakeholders and Aboriginal communities;
- stakeholders, including the public must be informed of the status of the study at regular intervals/at key milestones during the study;

The EIA must document the dates and formats for public and other stakeholder consultation initiatives undertaken, the material presented, the opportunity for receiving input, a summary review of any concerns expressed, and how these concerns were addressed. It must be clear how the input from consultations was used in the assessment and what changes to the process or project were made as a result of comments provided.

## **2.8 Terms of Reference (TOR)**

The proponent must submit detailed TOR in response to the Final EIA Guidelines. The TOR must clearly describe the methods proposed for carrying out the EIA, and the means by which Irving Oil Company, Limited will consult with the public, stakeholders and Aboriginal Communities during the course of the EIA process.

The Proponent is required to provide, as part of the TOR, a cross-referenced index (Concordance or Disposition Table) showing where the content and issues of the Final EIA Guidelines have been addressed. The TRC will examine the TOR and comments/deficiencies may be provided to the proponent to address prior to finalization.

In addition, the TOR must outline the components of any proposed field programs, any anticipated challenges/obstacles to be encountered, proposed modelling approaches, identify key members of the study team, and fully describe all specific tasks to be completed as part of the study.

The Review Committee will examine the TOR and comments may be provided to Irving Oil Company, Limited for inclusion. In addition, public and stakeholder consultation must be undertaken by the proponent to allow interested parties, the public, stakeholders, and Aboriginal Communities to provide input to the TOR prior to finalization. The final TOR must be approved by the Review Committee.

### 3.0

## CONDUCT OF THE STUDY AND CONTENT OF REPORT

The EIA Report must be written in the clearest language possible. Where the complexity of the issues addressed requires the use of technical language, a glossary defining technical words and acronyms must be included. The International System of Units (SI) must be used throughout the report and all supporting documents. The study must include consideration of, but is not limited to, the appropriate regulations and guidelines.

The EIA Report must provide a complete and accurate description of the project from planning through construction, operation, maintenance and decommissioning, supported with appropriate maps and diagrams. Emphasis will be placed on describing those aspects of the project, including accidents and malfunctions that have a reasonable probability of occurrence and that could be expected to affect the environment. An identification of how potential environmental and man-made hazards have influenced the design and operation of the project will also be provided.

The following titles may be used as a framework for the development of the EIA Report:

- Executive Summary
- Introduction
- Regulatory Framework (e.g., Application of *Regulation 87-83*)
- Scope of the Project
- Scope of the Environmental Assessment
- Purpose and Description of the Project
- Alternative Means of Carrying Out the Project and their Environmental Effects
- Description of the Existing Environment
- Environmental Effects, including Effects of Malfunctions and Accidents & Cumulative Environmental Effects
- Mitigation Measures
- Significance of Residual Effects
- Public, Stakeholder, and Aboriginal Consultation
- Monitoring Initiatives and Follow-Up Programs
- The Capacity of Renewable Resources that are Likely to be Significantly Affected by the Project
- All Commitments made in the EIA Report
- Conclusion/Recommendation
- References

### 3.1 Project Description – Scope of Project

The scope of the project to be assessed pursuant to Regulation 87-83 will include: the construction, operation, and decommissioning of a petroleum refinery and all associated infrastructure. Emphasis will be placed on describing those aspects of the project (including accidents and malfunctions) that have a reasonable probability of occurrence that could be expected to affect the environment. It will also include shipping of petroleum as specified below.

The project to be assessed and its description in the EIA Report must include:

- the location, size, layout, capacity, boundaries of the petroleum refinery and all associated

facilities and infrastructure(e.g., ancillary facilities including steam boilers, freshwater systems, wastewater systems, etc. tankage for storage of crude oil, raw materials, refined petroleum products, and feedstocks; petroleum coke storage and handling facility; marine terminals; ROWs for pipelines, electrical power, petroleum coke conveying, rail spur, and access roads);

- freshwater requirements and proposed systems;
- wastewater systems and discharge locations;
- petroleum coke storage, handling and offloading facilities;
- the shipping sea transportation profile;
- the regulatory standards to which the components of this project will be built and operated;
- ship operation characteristics;
- the construction methodology and design description for the marine terminals;
- the loading and offloading systems;
- the storage tanks;
- rail spur;
- secondary containment systems;
- a detailed description of project-related emissions and wastes;
- pipelines to and from the refinery;
- power generating infrastructure;
- required land and marine exclusion zones;
- upsets of environmental control equipment which may change the nature of emissions and/or effluent;
- transportation, handling and storage systems of any hazardous materials, additives and by-products used/generated in the project;
- the impact of project related traffic on road infrastructure and the transportation network
- the construction methodology and design description for the refinery;
- the layout of the road, laydown, storage and office infrastructure;
- upsets of environmental control equipment from operations of the facility, which may change the nature of emissions and/or effluent;
- fire prevention and control equipment;

A voluntary commitment by Irving Oil Company, Limited has been made to undertake a TERMPOL Review of the project. As applicable, the project description will be based on the elements of the Termpol Review Process (TP743E) that are necessary to support the evaluation of the environmental effects of the project as outlined in Section 4.0 of these Guidelines.

### **3.2 Project Rationale**

The purpose and need of the project must be clearly identified. The report must provide clear justification for the project in order to allow for an evaluation of the relative environmental effects of the proposed development.

### **3.3 Identification and Analysis of Alternatives**

Using the approach indicated below, the study should evaluate alternatives to the project as proposed that are technically and economically feasible and alternative means of carrying out the project. This analysis will contribute to a further understanding of the project rationale and will facilitate decision-making with respect to its acceptability.

- (a) The null or "do nothing" alternative (not constructing and operating the refinery). The study must examine the implications of not proceeding with the project with reference to environmental (both biophysical and socio-economic) factors/effects.
- (b) The analysis must include consideration of alternative locations. A description of the methodology used to select the site and the results of the site selection process must be presented providing the rationale for rejecting other potential sites.
- (c) Alternative means of carrying out the project and the environmental effects of such alternative means, including but not limited to alternative shipping corridors that are technically and economically feasible as well as methods of receiving and shipping petroleum products. The analysis of alternatives to specific components of the project must also be conducted to allow for the identification of more environmentally effective practices.
- (d) There must also be an assessment of the various models that can be used to predict air emissions, thereby providing a justification for the model that will be chosen.

### **3.4 Description of the Existing Environment**

The EIA Report must describe the existing environment focusing on identified VECs (Valued Environmental Components) within the study boundaries. This description must reflect the dynamics of environmental components (biophysical, social, and economic), and identify trends in the context of predicted changes over time.

A description of the existing environment in the study area should consider, but not be limited to, the following:

- Atmospheric environmental components, including climatic and ambient air quality data;
- Terrestrial environmental components, including topography, geology, watershed hydrology/geohydrology, groundwater resources;
- Terrestrial biological environmental components, including species at risk and their habitats (flora and fauna), species migratory patterns, ecologically sensitive or significant areas, and protected areas/critical habitat features. Migratory bird descriptions (terrestrial and aquatic biological environmental components) must include when each species is likely to be present in the study area and areas typically used for nesting, foraging, and/or staging;
- Aquatic biological environmental components (freshwater, estuarine, and marine), including fish, fish habitat, fishery resources, species at risk and their habitats, species migratory patterns, ecologically sensitive or significant areas, and protected areas/critical habitat features;
- Aquatic physical environmental components (freshwater, estuarine, and marine), including bathymetric/geomorphologic, hydrodynamic, water quality, sediment and ice regime, and coastal and oceanographic data;
- Socio-economic environmental components, including demographic data (e.g., population and labour force), local economy, local services, past, current and foreseeable land use (including agriculture), zoning restrictions, the geographical location of regional fishing operations, the seasonal variations of fishing activities, archaeological and heritage resources, transportation and associated infrastructure, existing public health and safety concerns, and ambient noise levels (near potentially affected habitation). With specific

reference to fisheries, the description must include a socio-economic profile of each identified fishery;

- Current emission and effluent volumes and characteristics, including any points of discharge from stormwater and sewer collection systems (both routine and upset/ emergency scenarios);
- The potential for encountering contaminated soils/materials (including mobilization of naturally occurring contaminants);
- Localized seismic activity;
- Wetlands;
- Current and potential marine and land use and zoning restrictions;
- Airplane flight paths;
- Migratory routes for both birds and marine mammals;
- Local road networks;
- Existing public health and safety concerns;
- Ambient noise and odour levels (near potentially affected habitation);
- Transportation (traffic volumes and types of vehicles, and marine traffic and types of vessels);
- Current use of land and resources for traditional purposes by aboriginal persons.

In developing the description of the existing environmental setting, field investigations may be required to address information deficiencies and facilitate the assessment.

The above will also be required for all corridors related to infrastructure associated with this proposal (including: pipelines, wastewater treatment, freshwater sources, railway spur, electrical, etc.).

### **3.5 Cross-Referenced Index**

To assist the readers, a cross-referenced index (i.e., Concordance or Disposition Table), which shows where the content and issues outlined in the Final EIA Guidelines are addressed in the report, is required. This index must be submitted with the Draft EIA Report.

## **4.0**

## **POTENTIAL ENVIRONMENTAL EFFECTS**

Presented here are a number of specific issues for study. However, this framework does not limit the assessment. Should additional relevant issues, concerns, or potentially significant environmental effects be identified through discussion with members of the Review Committee, regulatory agencies, the public, stakeholders and the Aboriginal Communities, Irving Oil Company, Limited must incorporate these issues into the assessment. The assessment must include consideration of, but is not limited to, the appropriate regulations and guidelines.

The capacity of renewable resources that are likely to be significantly affected by the project (either positively or negatively) to meet the needs of the present and those of the future should also be considered. Cumulative environmental effects are to be considered individually for each identified VEC.

All potential project-related environmental effects (i.e., both positive and negative) resulting from the proposed construction and operation of the facility and all associated infrastructure (including potential effects resulting from accidents or malfunctions), must be included in the assessment. A comparison of net positive and negative impacts must also be included.

### **4.1 Effects on Atmospheric Environment**

Assess the environmental effects of the construction, operational/maintenance and decommissioning phases of the project on atmospheric environment, including air quality, sound quality, odour and climate. Any substantive emissions will first need to be quantified. This will be done on a local and regional basis. This will include an analysis of routine air emissions and upset conditions, including accidents and malfunctions. The effects of transportation related emissions will be considered including impacts on air quality, and human health (e.g., emissions resulting from any change in traffic patterns, etc.). Transportation related emissions would include emissions from construction equipment, additional traffic associated with the facility, marine traffic, etc.

Provide details on how emissions will be controlled at each emissions source and briefly discuss why the proposed technology was selected over other potential methods of control.

The potential ambient air quality impacts of emissions from each significant source should be assessed by conducting air dispersion and deposition modelling to predict the concentrations of air contaminants. The models selected should be EPA-approved for both ambient and deposition modelling. Please supply the inputs to the model and any assumptions used in the process. Note that inputs to the model should represent maximum emission rates of the units being modelled. A discussion of the results should include a discussion of existing ambient levels in Saint John and potential cumulative increases. Transboundary influences will also need to be discussed.

Emissions associated with site preparation, construction, and operation/maintenance phases that will contribute to the atmospheric load of Greenhouse Gas (GHG) emissions must be assessed. Provide details on how GHG emissions can be reduced or managed. This should include discussion regarding carbon capture, sequestration as well as CO<sub>2</sub> storage. Estimates of greenhouse gases should be placed in context with total emissions for New Brunswick and within the industry



nationally.

Include the impacts of operational upsets. Discuss how pollution control equipment will be used to limit emissions and how upsets can affect the surrounding environment and health of the public in general.

Efforts to mitigate the generation of odours and wind-borne dust from the proposed project must be provided. At every opportunity, odour generation should be attenuated. When odour generation cannot be completely mitigated, the proponent should be prepared to fully defend the emission and why it was not completely mitigated.

Demonstrate the ability of the proposed project to meet or exceed emission standards.

A discussion of the climatology of the area shall be provided including both micro and macro climatological effects.

A discussion of air quality monitoring options and their feasibility for implementation should be completed. This should include but not be limited to, supplementary control systems, continuous emission monitoring equipment, and ambient air quality monitoring systems.

## **4.2 Freshwater Resources**

Assess the potential environmental effects of the construction, operational/maintenance and decommissioning phases on groundwater and surface water resources. Water conservation through innovative technologies including recycling and using treated wastewater will need to be fully explored and evaluated as part of this assessment.

Provide details on the quantity and quality of water required for operation of refinery.

A Water Supply Source Assessment Process should be undertaken if the volume of groundwater to be used is greater than 50 m<sup>3</sup> per day, including water for fire protection. The potential for interference with domestic wells during the construction phase should be examined to evaluate environmental effects on groundwater resources.

In addition, any potential impacts to local groundwater users (water quantity and quality issues) due to construction and operation of the petroleum refinery and associated infrastructure will need to be discussed.

## **4.3 Effects on Public Health and Safety**

Public health will need to be assessed both in light of long term (chronic) conditions as well as short term (acute) conditions. Public health can be affected by emissions and environmental effects on air quality, drinking water quality and food, among other factors.

An assessment of the potential for environmental effects on public health will be required by conducting a Human Health and Ecological Risk Assessment (HHERA). The HHERA will consider the potential risks of adverse environmental effects of all project-related emissions during all phases of the project. Cumulative environmental effects will need to be considered as

part of the HHERA.

Identify circumstances where there may be increased impacts on human health and suggest possible programs for offsetting any increases.

Potential impacts to public safety will be considered as they relate to fires, explosions, spills, marine spills and collisions, and vehicle accidents.

Predict the risk to the local community and the larger City of Saint John in the event of an accident during the shipping, refining, handling, storage and transportation of petroleum products associated with the facilities.

Describe the specific, important malfunction and accident events that have a reasonable probability of occurring during the operation life of the project. Describe under what conditions a fire or explosion could occur at this facility or in the pipelines to and from the refinery.

Describe the procedures for the development and the anticipated components of an environmental protection/emergency response plan for construction, operation and decommissioning, including spill prevention, and spill response contingency planning.

Describe the key components relevant to safety during the construction activity.

Identify sources and characteristics of any potential risks to workers during construction and subsequent operation.

Describe how the infrastructure of the facility and management of the operation of the facility will minimize risk. Key components relevant to the management of malfunctions and accidents that may occur during the construction and subsequent operations should be described. Itemize safety qualification/certification required for construction and operation of the project.

An assessment of the potential impacts to civil aviation as a result of facility stacks will need to be undertaken.

#### **4.4 Freshwater Environment**

Assess the environmental effects of the proposed project on the freshwater environment, including (but not limited to) water quality, fish and fish habitat within the environmental assessment boundaries (including the corridors required for any associated infrastructure). A number of watercourses will potentially be impacted by this project (refinery and associated infrastructure) and will need to be assessed. Predict the environmental effect of any potential deterioration/improvement in water quality on freshwater environment VECs.

Describe the procedures for the development and the anticipated components of an environmental protection/emergency response plan as they relate to the freshwater environment, including spill prevention and spill response contingency planning.

As indicated previously a Human Health and Ecological Risk Assessment will be required to assess the environmental effects on the ecology including the freshwater environment. Any potential

interactions from this project and associated infrastructure with the Inner Bay of Fundy (IBOF) Atlantic Salmon must be described and assessed.

Rainbow smelt, shad, gaspereau, striped bass, American eel, Atlantic salmon and brook trout in the Saint John river and estuary may also need to be evaluated.

In addition, the following will need to be discussed:

- Potential for accidental releases of chemicals and petroleum products that could impact surface water/groundwater environment
- Production of wastewater, and wastewater treatment and release and impacts to surface water/groundwater.

#### **4.5 Effects on Terrestrial Environment**

Assess the potential environmental effects of construction, operation/maintenance and decommissioning of the project and associated infrastructure on terrestrial environments, including all plant and animal species and their habitat. Key issues that will need to be evaluated as part of this assessment are existing vegetation, terrestrial wildlife and wildlife habitat. Since this project is anticipated to potentially affect 240 ha. of land this will require extensive field survey and review.

The effects of the project and associated infrastructure on migratory birds and migratory bird habitat will also need to be evaluated. This would include any stacks or other portions of the works are likely to impact avian movement and/or migration routes.

As indicated previously a Human Health and Ecological Risk Assessment will be required to assess the environmental effects on the ecology associated with the terrestrial environment.

Assess the environmental effects of the project and associated infrastructure on species (flora and fauna) considered to be at risk under national, provincial and regional classification systems (i.e., endangered, threatened, species of special conservation status, and rare species) including species listed on the NB Endangered Species Act as well as the federal Species at Risk Act (SARA). Include consideration of any species at risk known to occur within the zones of influence of the proposed project and for which there are potential project-VEC interactions anticipated that could result in significant environmental effects.

The following information sources on species at risk in the general project area (and corridors for any associated infrastructure) must be consulted:

- Atlantic Canada Conservation Data Centre (AC CDC);
- SARA Species List (SARA Public Registry);
- COSEWIC List (latest version on the website);
- New Brunswick Museum;
- NB Endangered Species Act;
- Canadian Wildlife Service (CWS); and
- Local naturalist and interest groups.

#### **4.6 Effects on Wetland Environment**

An assessment of all wetlands within the assessment area, including any impacts associated with infrastructure related to the project, must be undertaken. The approach described in the *Federal Policy on Wetland Conservation (EC, 1991)* and the *New Brunswick Wetlands Conservation Policy (2002)* and draft *NBDNR Wetland Mitigation Guidelines for New Brunswick (2003)* must be followed.

#### **4.7 Effects on the Marine Environment**

An assessment of fish, fish habitat and migratory birds in the area affected by the project will need to be undertaken.

Predict effects to the VECs in the Bay of Fundy ecosystem from an increase in vessel traffic arising from the construction and operation of the refinery and the marine components associated with this facility.

Predict effects to the VECs in the vicinity of the marine terminal(s), the shipping channel approaches (between where the ships leave the existing shipping lanes and the terminal(s)), and any new anchorages.

The impact of construction, operation and maintenance activities on marine water quality and the benthic environment will need to be assessed. Predict the environmental effect of any potential deterioration in water quality on the VECs of the Marine Environment. This would include any wastewater discharge and any intake water required for the operation of the refinery.

Evaluate the risk to the VECs in the Bay of Fundy Marine Environment from an accidental release of any deleterious substances during construction, operation/maintenance and decommissioning.

Describe the procedures for the development and the anticipated components of an environmental protection/emergency response plan, including spill prevention, and spill response contingency planning.

Evaluate the potential impacts on any marine works that could have an impact on avian movement and migration routes.

Several species of conservation concern are found within the Bay of Fundy and will need to be assessed. Of particular concern is the population of North Atlantic Right Whales to which the Bay of Fundy is a seasonal home. The North Atlantic Right whales are listed as Endangered in the federal Species at Risk Act. In addition any impacts to the Harlequin Duck will also need to be assessed. The Harlequin Duck is listed as a species of special concern in the federal Species at Risk Act. The interaction of the project with species of special conservation concern is of overall concern and will be an important subject for consideration in the EIA.

#### **4.8 Commercial Fisheries**

There are currently fishing licenses issued for Saint John County for several species, including scallop, groundfish, rockweed, sea urchins, herring, lobster, mackerel and sturgeon. These commercial fisheries will need to be assessed as part of the EIA to determine if the project will result in environmental and/or socio-economic effects that alters commercial fishing activities or fisheries resources in quality or extent that result in impacts to fishers.

Long-term, project related declines in fishery resources will also need to be considered as part of this assessment.

The increase and frequency of traffic in the fishing grounds as well as any potential dredging during construction (and potential maintenance dredging) will also need to be evaluated to determine if could have an impact on fishing activities in the area.

#### **4.9 Effects on Labour and Economy (and other Socio-economic Effects)**

Predict the benefits of the project on labour and economy within the greater Saint John area and the Province of New Brunswick. Assess the direct and indirect creation of employment in the area associated with the construction and operation of this facility.

Provide a description of the source, quantity, mechanism, rate, form and characteristics of contaminants and other sources likely to be released to the environment causing a worker exposure during normal operation, a postulated malfunction and accident event.

The effect on existing tourism and recreational activities must be included.

The effect on local property values must be included.

The effect on industries, including the recreational and commercial fishing industry must be included.

Discuss any aesthetic/potential visual impacts of the proposed project and how these could impact the local or regional economy.

The effect of the proposed project on physical and cultural heritage, and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance must also be included.

#### **4.10 Community Services and Infrastructure**

An assessment of the community services and infrastructure will be required in order to evaluate the potential impacts from the large number of workers associated with the construction and operation of this facility both on a temporary and permanent basis. Community services and infrastructure includes: local emergency response, ongoing support services (health and social services), and accommodation, food services, and entertainment.

Any additional demand on local emergency response services and ongoing support services will need to be assessed. These services may be affected by the occurrence of an accidental event, or by the routine presence of workers associated with either construction or operation. There may also be impacts to local accommodations as a result of temporary and permanent workers required for this project.

Any increased demands on the above community services and infrastructure, as large numbers of temporary workers in an area could create unique concerns during the construction phase will need to be assessed. Such a situation may result in increased need for policing in certain areas, increased consumption of alcohol and other legal and illegal substances and increased need for social services.

#### **4.11 Effects on Land Use**

Assess the effects of the project and associated infrastructure on the current use of lands and resources by the public and private sectors.

There are residences located within the assessment area along the Red Head Road (and potentially the Proud Road or Old Black River Road) that could be impacted and will need to be assessed. In addition, residential areas near the existing refinery could be impacted by the linear facilities being considered to join both refineries and these would also need to be evaluated.

Evaluate the environmental and socio-economic effects of the project on Land Use in the immediate vicinity of the project (i.e., within the defined environmental assessment boundaries of the project).

Assess any potential impacts of the project on Mispic Beach and other recreational areas that could be affected by the project and associated infrastructure.

#### **4.12 Effects on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons**

Assess the effects of all aspects of the project (including any associated infrastructure) on the current use of lands and resources for traditional purposes by Aboriginal persons. This includes traditional hunting, fishing (including fishing in the marine environment), gathering, or ceremonial activities, which could be adversely affected by the presence of the project on these lands.

#### **4.13 Effects on Heritage and Archaeological Resources**

An assessment of heritage and archaeological resources will be required for the refinery site as well as for corridor associated with required infrastructure.

An area of high potential was identified in the Canaport LNG EIA. This area is located near the shore west of Mispic River and east of the LNG facility. If any project facilities are to be sited at this location (or near this location), additional work may be required to interpret and/or excavate the site.

#### **4.14 Effects on Land-Based Transportation/Road Infrastructure**

Assess the environmental effects of the proposed project on traffic patterns/flows, including a prediction with respect to current/future road infrastructure and use with reference to safety and the integrity of infrastructure on traffic flows, level of service, and accident rates. Predict the impacts of increased ground transportation in the region and specifically traffic to and from the proposed refinery site with reference to noise, safety, risks of spills and air quality. The study should consider localized impacts that may occur from fossil fuel combustion as a result of increased traffic.

During the construction phase of the project there would be substantial land-based activity that will require the movement of equipment, material and personnel to and from the project site. This traffic will result in an increase in traffic volumes, which may adversely affect congestion and collision rates. There may also be concern regarding the condition, allowable weights and dimensions of the existing road infrastructure. These potential effects will need to be evaluated.

Any effects associated with project related traffic during the operation phase will also need to be assessed, as project related traffic will continue in the form of personnel transportation and truck traffic carrying supplies, materials and products.

It is anticipated that some refined products may be shipped via rail. A new rail spur may be needed to allow for this. If a rail spur is to be constructed, an assessment of the routing will need to be undertaken. An additional concern is the potential environmental effects on road traffic, either resulting in greater congestion or higher collision rates, associated with any at grade crossings. In addition, an assessment of the emergency routes that may be impacted as a result of the rail spur will need to be undertaken.

#### **4.15 Effects of the Existing Environment on the Project**

Sensitivity of the proposed project to variations in meteorological conditions, including extreme events, must be investigated. Among the parameters to be considered are the effect of extreme precipitation events on site water management and the influence of wind, waves, ice, and flooding on facility operations (including any associated infrastructure). In addition, the sensitivity of the proposed project to climate variability and climate change must be identified and discussed. Not only will the assessment look at the current climatic setting in the area, but must also include a consideration of the potential future climatic conditions due to climate changes in the foreseeable and long-term future (e.g., global warming, changes in sea levels, etc., over a minimum 50 and 100 year period).

The assessment must take into account how the existing environment/natural and man-made hazards could adversely affect the project (e.g., acid rock drainage, severe meteorological conditions, seismic events, tidal influences, etc.).

#### **4.16 Navigation/Shipping**

Vessel navigation is considered a main component of the project as a result of receiving and shipping products to and from the refinery. A voluntary commitment by Irving Oil Company,

Limited has been made to undertake a TERMPOL Review of the project. The intent of the TERMPOL Review is to provide a means of “measuring the navigational risks associated with the location and operation of marine terminals for large oil tankers”.

An explanation of the management of vessel traffic in the Bay of Fundy will need to be provided, along with a prediction of the effect of increased ship traffic on existing ship traffic in the Bay of Fundy and Saint John Harbour.