Terms of Reference

As Required by the Environment Act
For Preparation of an Environmental Assessment Report

Proponent: Keltic Petrochemical Inc.

Project: Petrochemical Plant and LNG Facilities, Goldboro, NS

Environment and Labour

April 8, 2005

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BACKGROUND

Presented in this document are the Terms of Reference for the Environmental Assessment Report (EA Report) required for the Petrochemical Plant and Liquified Natural Gas (LNG) Facilities project (Project), in accordance with the requirements of Part IV of the *Environment Act* (1995). Keltic Petrochemicals Inc. (Proponent) must include all the information requested within the Terms of Reference as a minimum, in accordance with the *Environmental Assessment Regulations* pursuant to Part IV of the *Environment Act*.

This Terms of Reference includes Valued Ecosystem Components (VECs) which must be adequately addressed in the Environmental Assessment Report (EA Report). The Proponent must identify any additional VECs to be examined during the assessment process.

The order in which information is presented is at the discretion of the Proponent, however, a concordance table will be required to indicate where the information can be found. The Proponent may provide additional information to assist the Environmental Assessment Board (EA Board) in making their recommendation to the Minister and assist the Minister in making the decision for the Project. Since the EA Report is intended for public review, the information should be presented in non-technical language wherever possible and appropriate, including a non-technical executive summary. The Proponent will be required to submit an electronic copy of the EA Report in accordance with the Environmental Assessment Branch (EA Branch) Bulletin on Requirements for Submitting Electronic Copies of Environmental Assessment (EA) Documents for publication on the Department's website.

Introduction

The Proponent proposes to construct and operate a Petrochemical Complex supported by a LNG importation and vapourization facility and an electrical co-generation plant. The project will also include construction of a 53 km two lane all-weather highway. The Project will be located on land in the Goldboro Industrial Park to be purchased from the Municipality of the District of Guysborough.

Nova Scotia EA Requirements

The proposed Project is subject to a Class 2 EA under the *Environment Act*, which requires the Proponent to prepare an EA Report for the Project. Regulations require that the proposed Terms of Reference for the EA Report be prepared by the Environmental Assessment Administrator (Administrator) and made available for public review. The proposed Terms of Reference were released for comment between January 19, 2005 and February 28, 2005. The Terms of Reference were finalized based on comments received during the review period.

Government of Canada's EA Requirements

A project description has been submitted to the federal government. Federal EA requirements are being determined.

1.0 INTRODUCTION

This section shall introduce the reader to the EA Report and include the purpose for the document within the context of Part IV of the Nova Scotia *Environment Act* and *Environmental Assessment Regulations*.

The Nova Scotia *Environmental Assessment Regulations* require the EA Report to include, but not be limited to, the following information:

- a description of the proposed undertaking;
- the reason for the undertaking;
- other methods of carrying out the undertaking;
- a description of alternatives to the undertaking;
- a description of the environment that might reasonably be affected by the undertaking;
- the environmental effects of the undertaking;
- an evaluation of advantages and disadvantages to the environment of the undertaking;
- measures that may be taken to prevent, mitigate or remedy negative environmental effects and maximize the positive environmental effects on the environment;
- a discussion of adverse effects or significant environmental effects which cannot or will not be avoided or mitigated through the application of environmental control technology;
- a program to monitor environmental effects produced by the undertaking during its construction, operation and abandonment stages;
- a program of public information to explain the undertaking.

2.0 PROJECT DESCRIPTION

This section of the EA Report shall describe each component of the project as it is planned through its full life cycle, including site preparation, construction, commissioning, operation, maintenance and decommissioning of:

- LNG facility – marine terminal, tugs and berthing facilities, LNG transfer,

vessel movement, storage and vapourization facilities; vapour handling system and associated infrastructure/support facilities; including emergency shutdown system, hazard detection system, security system and facilities, and fire response system

- Petrochemical facilities – metering stations; Ethylene, Propylene, Polypropylene, HDPE, LDPE, LLDPE process units; feedstock and product storage systems; fuel systems; water and steam system; shipping and receiving facilities, including marginal wharf; and associated support facilities, including laboratories, administrative buildings, and security

- Electrical co-generation plant and associated support facilities

- Highway and associated structures, including all intersections with existing roads and watercourse crossings

- Shipping, including vessel types and sizes, frequency of shipping and planned routes

- Service water and drinking water systems

- Administration and service buildings

- Sanitary wastewater system

2.1 The Proponent

This section shall outline the Proponent's corporate commitment to sustainable development and environmental protection goals and principles. Including pertinent corporate policies, programs, plans, strategies, protocols, guidelines, codes, and environmental management systems (EMS).

Provide summary information on the nature of the management structure and organizational accountability for designing, constructing, operating and modifying the Project; implementing environmental mitigation measures and environmental monitoring; and managing potential adverse environmental effects.

Provide details on relevant corporate experience (the Proponent and related companies) with similar large-scale operations in Canada and in other countries with similar regulatory and social policy regimes. Describe experience in building and operating other LNG or petrochemical operations, power generation plants, highways and other related infrastructure (including marine terminals). Provide a record of the environmental performance and capability of the Proponent in conducting this type of

project. Indicate the environmental record of key sub-contractors.

2.2 Project Location

Describe how the Project site was chosen, including a discussion of the specific environmental considerations used in site selection of all project components, and the advantages of the proposed site. Describe the Project's compatibility with existing local and regional land-use policies and plans, and opportunities to integrate project planning into regional scale development efforts. Discuss compatibility of the Project location in relation to Aboriginal Peoples' harvesting activities and other land uses.

Provide details on ownership of property within the Project footprint (including the highway) including lands owned by the Proponent, the Crown, or private lands. Provide details of existing agreements to develop the Project on lands not owned by the Proponent. Provide detailed plans for the required acquisition or use of private lands and Crown Lands, and discuss any contingencies should these lands not be available for project development.

Describe the ultimate boundaries of the Project, including the highway corridor, in a regional context including existing and proposed land uses and infrastructure such as road networks, railways, power lines, pipelines, proximity to settled areas, individual and community water supplies, wetlands, water bodies, streams, ecologically sensitive areas and archaeological sites. Include mapping at an appropriate scale.

Provide a list and map of communities in the region potentially affected by the Project and indicate the distance between those communities and the specific project components as appropriate. Identify proposed local shipping routes for importing and exporting products.

2.3 Project Design

This section shall describe the design plans and appropriate design standards for all components of this project, including the LNG terminal and vapourization facility, the petrochemical complex, the electric co-generation plant, the marginal wharf, and the highway. All associated infrastructure including pipelines, fuel storage structures, water storage or impoundment structures, water treatment equipment and structures, new or upgrades to water and/or sewage lines, power transmission lines and any other infrastructure, must be detailed. Also discuss environmental controls planned for the Project and how, environmental protection, conservation, best management practices (BMPs) and best available technology have been considered in the design.

This section shall also provide potential design variations and implications (including advantages or disadvantages to the environment) of those variations. Any assumptions

which underlie the details of the Project design shall be described. Where specific codes of practice, guidelines and policies apply to items to be addressed, those documents shall be cited.

2.4 Construction

This section shall include a description of the following:

2.4.1 Identify and describe by location, all physical works and activities carried out during the construction phase, including but not limited to: clearing and grubbing; blasting; site access and roadways; marine construction methods; road construction methods; dangerous goods storage areas; watercourse crossings or diversions; utilities; description of equipment used for construction, both terrestrial and marine.

2.4.2 Proposed construction schedules, including days of the week, times of the day, seasonal schedules and anticipated commencement and completion dates.

2.4.3 Describe the criteria for the selection of candidate sites for the disposal of excess/waste excavated rock and overburden, including those for acid producing bedrock.

2.4.4 Identify by project component, all construction methods, standards, codes of practice, policies and guidelines, that will be used during construction (including provincial design standards required for the construction of a public highway). Identify environmental BMPs that will be utilized during construction.

2.5 Project Operation

Describe the operation of all project components, including the highway; LNG terminal and storage; co-gen plant; vapourization facility; petrochemical complex, including marginal wharf and electrical co-generation plant, and supporting infrastructure to all components.

The description of the operation shall include:

2.5.1 Equipment description and specifications including appropriate diagrams and flow charts for LNG terminal and storage facilities, petrochemical plant, co-generation plant and infrastructure components.

2.5.2 Details (including characteristics and toxicities) and quantities of all

products, produced, stored and imported to the facilities (including byproducts and chemical intermediaries)

2.5.3 Routine and maintenance operations for all project components.

2.5.4 Water balance and energy balance including specification and volumes of plant fuels and outputs, maintenance operations, and contingency plans.

2.5.5 Environmental controls and BMPs, including pollution prevention techniques in addition to traditional treatment and disposal practices.

2.5.6 Details on the ownership, operation, and maintenance of the highway at the time of commissioning. Details of any agreements to transfer ownership of the highway must be provided. Provide details of the anticipated traffic loads during highway operation.

2.6 Decommissioning and Reclamation

Describe the proposed plans for decommissioning the facility, including all infrastructure and reclamation of any impacted site. The report shall also discuss the future land use options of the property following decommissioning and reclamation.

3.0 REGULATORY ENVIRONMENT

Describe the existing regulatory environment (Federal, Provincial, Municipal) including all permitting, licensing and regulatory requirements and Municipal Planning Strategy and Bylaw requirements that apply to all phases of the Project and associated infrastructure. Provide a schedule indicating anticipated dates for required regulatory approvals.

Describe which guidelines and standards would apply to the Project (e.g., Canada-Wide Standards for Particulate Matter and Ozone, and Canadian Council of Ministers of the Environment (CCME) National Emission Guidelines for Stationary Combustion Turbines). Those applicable standards or guidelines shall also be referenced in the appropriate sections of the Report and linked to environmental protection objectives.

4.0 NEED FOR THE PROJECT

In recognition of the fact that the Project has the potential to cause negative impacts upon the environment, this section shall discuss the purpose and public need for all project components including LNG facilities, petrochemical plant, electrical co-

generation plant, and the highway. This section shall also discuss the need for petrochemicals and LNG in Nova Scotia, Canada, and globally. Discuss how the Project makes a value added contribution to the oil and gas industry in the province.

5.0 A DESCRIPTION OF ALTERNATIVES TO THE PROJECT

This section of the EA Report shall describe functionally different ways to meet the Project need and achieve the Project purpose, such as increasing the efficiency of existing petrochemical use, recycling of petrochemicals and reducing petrochemical demands, alternatives to construction of a highway, alternatives to LNG importation and on site electrical generation.

6.0 OTHER METHODS FOR CARRYING OUT THE PROJECT

The EA Report shall discuss other methods for meeting the need for the Project, including but not limited to, alternatives to LNG as a petrochemical feedstock or energy source, shipment of petrochemicals by rail or road rather than ship, and alternative highway alignments or use of existing roads. This section shall also discuss alternate locations for the Project which would allow the use of alternate water supplies and existing roads/highways.

The rationale for rejecting other described methods of carrying out the Project must be provided, including a discussion of how environmental sustain ability, and impact avoidance criteria were applied.

7.0 ASSESSMENT METHODOLOGY

This section shall include the study strategy, methodology and boundaries, used for preparing the EA Report . The following must be clearly defined:

a) The temporal boundaries (i.e., duration of specific project activities and potential impacts) for construction and operation through decommissioning and operation.

b) The study boundaries or project area and all space that will be potentially impacted, by the Project as proposed, or subject to subsequent modifications, and the methodology used to identify the study boundaries.

c) The Valued Ecosystem Components[1] (VECs) within the study boundaries and the methodology used to identify the VECs. The methodology used for VEC identification shall include input from members of the public, government departments and agencies, other experts, and other interested parties, as well as direct consultation with Aboriginal Peoples.

   Where appropriate the EA Report shall identify environmental protection objectives (including those contained in applicable legislation or guidelines) associated with each VEC.

d) Strategy for investigating the interactions between the Project and each VEC and how that strategy was used to coordinate the individual studies undertaken.

e) Method for predicting and evaluating project impacts upon the environment; determining necessary avoidance, mitigation, remediation and/or compensation (in this order of consideration); and determining the significance[2] of any residual impacts.

The following sections outline specific concerns and requirements related to the existing environment, adverse effects and environmental effects assessment, proposed mitigation, residual environmental impacts, proposed compliance and effects monitoring and the public information program that are to be addressed in the EA Report for the proposed project.

8.0 EXISTING ENVIRONMENT

This section of the EA Report shall identify the study area and shall describe the existing environment in the study area over four seasons, where appropriate, through the use of original baseline studies.

The EA Report shall clearly indicate baseline data/information which is not available or where existing data cannot accurately represent environmental conditions in the Project area over four seasons. If the background data have been extrapolated or otherwise manipulated to depict environmental conditions in the project area, modeling methods

[1] For the purpose of this Environmental Assessment, Valued Ecosystem Components are interpreted as environmental; socio-economic; human health; reasonable enjoyment of life and property; and cultural, historical, archaeological, paleontological and architectural features that may be impacted, whether positive or negative, by the proposed project.

[2] Under the *Environmental Assessment Regulations* significant means, with respect to an environmental effect, an adverse impact in the context of its magnitude, geographic extent, duration, frequency, degree of reversibility, possibility of occurrence or any combination of the foregoing.

and equations shall be described and shall include calculations of margins of error.

The components of the environment to be discussed shall include identified VECs and the following:

8.1 Area Geography

Describe the study area geography and topography including features such as lakes, streams, and wetlands.

8.2 Existing and Planned Land Uses

Describe the patterns of current and planned land use and settlement in the study area including residential, industrial, agricultural, parks and protected areas, as well as any current land use by Aboriginal Peoples. Provide details of areas under existing mineral exploration licenses as well as areas licensed for pulpwood harvesting. Identify locations of abandoned mine workings, mine tailings and waste rock disposal areas as well as contaminated sites. This section shall include map(s) to illustrate land uses and provide distances to significant settlements.

8.3 Socio-Economic Conditions

Describe the current socio-economic conditions of the area including population demographics and economic conditions (including Aboriginal Peoples). Provide details of employment rates and trends at the municipal and regional level. The spatial boundaries of this analysis should include areas within which employees of the Project are expected to reside.

Identify key industries in the region (both land based and marine based), and describe their contribution to the local and regional economies. Provide details of residential and commercial property values.

Describe any local and regional economic development goals and objectives identified through community consultation, or existing economic development plans and strategies.

8.4 Atmospheric Conditions

For the study area, provide a review of baseline ambient air quality and meteorological data, including annual and seasonal climatic conditions for the region.

Provide a description of existing ambient air quality conditions for the study area, with particular attention to ambient and peak levels of nitrogen oxides (NO_x), sulfur oxides

(SO_x), carbon monoxide (CO), ozone (O_3), particulate matter (total suspended particulate (TSP), $PM_{2.5}$ and PM_{10}), and volatile organic compounds (VOCs) levels. Discuss the influence of local and regional emission sources and the influence of climate and weather conditions. The data should be used for the development of an appropriate model(s) for the study area to be provided in the EA Report. Also describe any potentially sensitive receptors or locations.

8.5 Ambient Noise and Light Levels

Describe the existing ambient acoustical environment at the project site (including highway corridor) and offshore, and in any other areas where project activities could be expected to have an environmental effect. Provide the spatial boundaries of existing noise and vibration levels, as well as locations of recording stations and length of record for any acoustic or vibration data presented. Consider the effects of different meteorological conditions on noise propagation. Provide information on any existing relevant standards, guidelines or objectives with respect to noise and vibration levels.

Describe existing ambient light levels at the project site and at any other areas where project activities could have an environmental effect on light levels. Describe night-time illumination levels during different weather conditions and seasons.

8.6 Surface Water

Provide a general hydrologic, hydraulic and water quality description of all surface water bodies in the vicinity, including upstream and downstream to all project components. Existing uses, withdrawal capacities, and users of the watercourses shall be identified.

8.7 Groundwater

Provide a description of the regional and local hydrogeology of the study area, including a discussion of both groundwater quantity and quality. The direction of groundwater flow at the site should be discussed and potential receptors of groundwater should be identified. Also discuss groundwater use in the area, including both current and likely potential future uses.

Discuss the approximate location of existing water wells in the vicinity (within a 1 km radius) of all project components (including the highway). Show approximate well locations on a map.

8.8 Flora, Fauna and Terrestrial Habitat

Identify the following types of flora, fauna, and habitat. Appropriate field surveys agreed to by the Nova Scotia Department of Natural Resources (DNR), Wildlife Division, shall

be conducted as part of the evaluation. Surveys should be described by results, methodology, and temporal framework.

8.8.1 Identify typical species of flora, sensitive flora, flora species-at-risk, and potential habitat for flora species-at-risk in the study area. Identify areas of old growth forest. Current information shall be obtained from the DNR, Wildlife Division; the Atlantic Canada Conservation Data Center; Environment Canada; the Nova Scotia Museum of Natural History and local naturalists and relevant interest groups. Field surveys and investigations required to supplement the available data shall be completed in a manner that is acceptable to the DNR, Wildlife Division. Available data, survey results, and detailed mitigation measures that demonstrate a special emphasis on avoidance of impacts shall be included in the EA Report.

8.8.2 Identify any existing or planned wildlife management areas, ecological reserves or wilderness areas as well as managed wetlands and significant wildlife habitat. Identify and delineate on a map 'roadless areas' and discuss their potential value to Nova Scotia's protected areas network. Include areas with high wildlife concentrations, wildlife corridors or habitats rare to Nova Scotia.

8.8.3 Identify typical species of fauna (including invertebrate species), sensitive fauna, fauna species-at-risk, and potential habitat for fauna species-at-risk in the study area. Current information shall be obtained from the DNR, Wildlife Division; the Atlantic Canada Conservation Data Center; Environment Canada; the Nova Scotia Museum of Natural History; the latest Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list; the Atlas of Breeding Birds of the Maritime Provinces; and local naturalists and relevant interest groups. Field surveys and investigations required to supplement the available data shall be completed by professional biologists in a manner that is acceptable to the DNR, Wildlife Division and Canadian Wildlife Service. When surveys are necessary to supplement the available data and adequately describe the use of the area by migratory birds during different times of the year (breeding season, migration, winter), emphasis will be placed on determining whether any bird species-at-risk, colonial nesting species, species particularly vulnerable to habitat fragmentation, etcetera, occur or breed in or near the study area.

8.9 Wetland Resources

Identify the location, size and class (based on the Canadian Wetland Classification System) of any wetland within the predicted zone of influence and conduct a wetland evaluation. The true ecosystem value of each wetland shall be examined through on-site investigations using comprehensive valuation methodology that assesses component, functional and attribute values.

Field surveys and investigations required to supplement the available data shall be completed in a manner that is acceptable to the DNR, Wildlife Division and Nova Scotia Department of Environment and Labour (NSEL).

8.10 Fishery, Aquaculture and Harvesting Resources

Describe any commercial, recreational and Aboriginal Peoples fisheries, aquaculture, and harvesting (eg. marine plants, shellfish) in the study area. Describe the commercial and recreational species, caught, grown or harvested, and their economic importance. Identify fishing, aquaculture and harvesting locations, the amount caught, and methods used.

8.11 Aquatic Species and Habitat

Identify any freshwater fish or fish habitat that exists in any identified watercourse or any other receiving watercourse that may be impacted by the development. Describe the marine habitat and species of fish, including pelagic and demersal finfish, shellfish, crustaceans and marine mammals, likely to be present in the area. The description of these species and habitat should identify any species-at-risk and ecologically sensitive or critical habitat and migratory routes of fish and marine mammals.

Describe the relative distribution and abundance of valued fish resource components within the predicted zone of influence. Fish species, age, health and diversity shall be described. Electrofishing shall be carried out as per Fisheries and Oceans Canada's permits and requirements.

A description of any seasonal variation in the location, abundance and activities of aquatic species should be included. Describe and identify key habitat features, such as spawning, rearing, nursery, feeding, migration and overwintering areas, as they occur within the project area. Also describe the criteria utilized for determining the zone of influence this project has on the fish habitat.

8.12 Agriculture

Identify and describe agricultural resources in the study area. Identify agricultural

operations in the study area and describe crop types, growing seasons and growing methods.

8.13 Bedrock and Surficial Geology

Provide a general description of the bedrock and surficial geology of the study area. Identify potential sources of acidic rock (sulphide values >0.4%).

8.14 Archaeological Resources

Identify any areas containing features of historical, paleontological, cultural or archaeological importance in a manner acceptable to the Nova Scotia Department of Tourism and Culture, Heritage Division. Describe the nature of the features located in those areas. Particular attention shall be given to Aboriginal Peoples archaeological sites and burial sites, and Afro-Canadian cultural and historical resources. All heritage research permits acquired, and consultation with Aboriginal Peoples during this analysis should be identified in the document.

8.15 Pre-Blast Survey

Discuss plans for a survey of structures (including water wells) within 800 metres of any proposed blasting for the construction of all project components and associated infrastructure. The survey shall include any structures and buildings which may experience damage or impact due to seismic vibration or air concussion.

9.0 ADVERSE EFFECTS AND ENVIRONMENTAL EFFECTS ASSESSMENT

The EA Report shall identify and predict the magnitude and importance of project impacts, both positive and negative, on the environment. This discussion should demonstrate an ecosystem approach and a commitment to avoiding and minimizing effects. This section shall address impacts on identified VECs, as well as, but not limited to, the following socio-economic, community, and bio-physical environmental impacts. This section shall specifically address the environmental effects of malfunctions or accidents using risk modeling where appropriate.

This section shall also address impacts of the environment (including weather and climate) on the Project, including a discussion of how potential climate change will impact all components of the Project.

9.1 Impacts from Existing and Planned Land Uses

The EA Report shall include a description of the potential impacts from existing or

planned land uses in the study area. This shall include a discussion of project interactions with any contaminated sites, former mine workings, and mine disposal areas.

9.2 Impacts on Socio-economic Conditions and Recreational Opportunities

9.2.1 Discuss the potential impacts of the Project on economic conditions, population and employment.

9.2.2 Discuss the potential impacts of the proposed project on residential property values and property demand (including temporary accommodation required during construction) during all phases.

9.2.3 Discuss the effect of the proposed project on present and future commercial, residential, institutional, recreational and resource land uses within the study area, including impacts to areas under mineral exploration licenses or forestry licenses.

9.2.4 Discuss the potential impact on recreational opportunities, including the effects on aesthetics from areas surrounding the LNG and petrochemical facilities. This analysis should be supported by visual impact assessments from both the land and water.

9.2.5 Discuss the potential impact on Aboriginal Peoples' current use of land and resources for traditional purposes and any specific land claims within the study area.

9.2.6 Discuss the potential socio-economic benefits of the proposed project.

9.3 Impacts on Air Quality

Describe and quantify the impacts on air quality during construction including transportation related activities.

Describe the sources, types and estimated quantities of air emissions (including fugitive emissions and flaring) under routine conditions and in the case of malfunctions and accidental events on a seasonal and annual basis. Discuss the impact of stack emissions from natural gas and other fuels, including but not limited to, impacts of $NO_{x,}$ SO_x, CO, O_3, TSP, $PM_{2.5}$ and PM_{10}, and VOCs. Describe and quantify the sources, types, estimated quantities and impacts of transportation related (highway and marine) air emissions on ambient levels and receptors under projected routine operating conditions. Discuss the potential for micro-climate modifications in the vicinity of the Project, including the impacts of increased water vapour in the study area. The

description shall include appropriate models based on known or measured atmospheric conditions throughout the year.

Discuss the predicted GhG (GhG) emissions providing an inventory of GhG emissions from all project components, including carbon dioxide (CO_2), methane (CH_4), chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), sulfur hexafluoride (SF_6) and conversion of these emissions to an equivalent amount of CO_2. Also include an inventory of the precursors or tropospheric ozone (CO, NO_x, and VOCs). This section shall include a discussion of GhG emissions in the context of the Proponent's operations and of its Voluntary Challenge and Registry (VCR) commitment, if any. Where possible, the EA Report shall include a comparison of the above information with estimates of total GhG contributions from Nova Scotia, and from similar facilities in Canada. Include a discussion of measures that have been considered and/or are proposed to reduce or offset GhG emissions and report those emissions.

Obtain current information from the Nova Scotia Department of Energy regarding requirements to satisfy Canada's commitments to addressing climate change. This information and how the Proponent plans to meet these requirements shall be provided in the EA Report.

Obtain current information from the NSEL, EA Branch regarding current guidance on incorporating climate change considerations in the EA Report. This information and how the Proponent has implemented the guidance shall be provided in EA Report.

This section shall also include a discussion of the use of best available technologies for reducing air emissions and if they will or will not be incorporated into the Project, including the rationale for the decisions.

9.4 Noise and Lighting Impacts

Discuss the potential impacts of predicted increases in noise and light levels from construction, operation and maintenance activities, on surrounding residential, commercial, recreational and institutional areas, and marine and terrestrial habitats.

9.5 Impacts on Surface Water

Identify any source water bodies and anticipated withdrawal rates, and discuss all associated impacts to surface water quality and quantity, fish habitat and wetlands including potential malfunctions and accidents. Similarly, identify any receiving waters which may be impacted from project related activities during all construction and operational phases, and discuss all associated impacts to surface water and wetlands. The Canadian Environmental Water Quality Guidelines (CCME, 2004) in conjunction with background water quality, shall be used to ensure the protection of relevant water

uses (aquatic life, recreational use, agricultural use, drinking water supply) and shall be used as the basis for addressing the magnitude and importance of the predicted impacts.

Indicate the nearest watercourses to the Project area and provide a description of the potential impacts, including sources, characteristics and estimated quantities of contaminates (i.e. acid rock, hydrocarbons, suspended solids). Discuss the potential impact of contaminated run-off on aquatic habitat, including the accidental release of a hazardous substance (including fuel oil). Discuss the potential for acid rain production from air emissions and how it may impact regional surface water.

Identify all receiving waters from operations (i.e. cooling water, cooling tower spray, etc.), including receiving waters for municipal sewage systems used for the disposal of process water and potential impacts to those receiving water systems.

9.6 Impacts on Groundwater

Predict any anticipated changes to groundwater quality and quantity and the significance of the anticipated changes. Discuss potential changes in groundwater quality or quantity on users of groundwater, fish, fish habitat, surface water quality and quantity, and wetlands. Discuss any potential impact to groundwater from the accidental release of a hazardous substance (including fuel oil).

9.7 Impacts on Flora, Fauna and Terrestrial Habitat

Predict the impacts of the Project on flora, including a full account of impacts on species of concern, significant habitat and protected areas or areas of potential value to Nova Scotia's protected areas network.

Predict the impacts of construction and operation of the Project on terrestrial fauna and avifauna, and include a full account of impacts on species of concern and significant habitats. Discuss predicted impacts to flora and fauna associated with landscape fragmentation due to the proposed road construction. Consider cumulative effects and potential mitigative measures.

Predict the impacts of the Project on flora, fauna, habitat and access to harvesting areas by Aboriginal Peoples.

9.8 Impacts on Forestry

Predict the impacts on any forestry resources within the project area.

9.9 Impacts on Wetlands

Predict the direct and indirect impacts to all wetlands which may be impacted by the proposed project.

9.10 Impacts on Fisheries, Aquaculture and Harvesting

Predict the impacts on commercial, recreational and Aboriginal Peoples fishing, aquaculture or other marine harvesting which may be impacted by the proposed project.

9.11 Impacts on Aquatic Species and Habitat

Predict the impacts that the Project will have on freshwater and marine species, including a full account of impacts on species of concern and habitat. Include potential impacts to marine species from blasting, dredging and other marine construction, as well as vessel traffic and terminal operation.

9.12 Impacts on Agriculture

Predict the impacts of the Project on existing and future agriculture activity within the study area.

9.13 Geological Impacts

Discuss the potential for the impact of acidic water run-off from bedrock disturbed by project construction on VECs. Emphasis should be placed on avoidance of these areas.

9.14 Impacts on Archaeological Resources

Predict the impacts to all archaeological resources that will be affected by the Project.

9.15 Transportation Impacts

Discuss the anticipated changes in traffic density and patterns associated with the Project construction and operation (i.e. delivery of fuel oil and service vehicles) in adjacent residential and commercial areas.

9.16 Blasting Impacts

Discuss the potential for the impact on structures (including water wells) from proposed blasting.

10.0 PROPOSED MITIGATION

The EA Report shall describe all measures that have or will be taken to avoid or mitigate negative impacts, and maximize the positive environmental effects of the Project (as described in Section 9.0, Adverse Effects and Environmental Effects Assessment). Mitigation includes the elimination, reduction or control of the adverse effects or the significant environmental effects of the Project, and may include restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

Describe proposed compensation that will be provided when environmental damage is unavoidable or cannot be adequately mitigated by any other means. This section shall address the following:

10.1 Regulatory Compliance

Describe any legislation, regulations, guidelines, policies, BMPs and specifications that will be adhered to during construction and operation of the facility that will lead to mitigation of environmental impacts.

10.2 Existing and Planned Land Uses

Describe the measures planned to minimize the potential impacts to the Project from existing and planned land uses. Careful attention shall be given to mitigating impacts resulting from the Project's interaction with existing contaminated sites, mine waste/tailings sites, and other former mine related works.

10.3 Socio-Economic Impacts

Describe actions that will be taken to mitigate adverse impacts on private and commercial property, existing industry and businesses, planned land use, recreation and other human activities, including Aboriginal Peoples activities and land uses.

Provide a dispute resolution policy for addressing project related complaints and concerns that may be received from nearby land owners or residents.

10.4 Air Quality Impacts

Describe measures that will be taken to control emissions including but not limited to NO_x, SO_x, CO, TSP, $PM_{2.5}$ and PM_{10}, and VOCs. Describe any GhG mitigation plans.

10.5 Noise and Lighting

Describe measures that will be taken to mitigate any potential increase in noise and light levels during construction and operation.

10.6 Surface Water Quality and Quantity

Describe all mitigation measures that will be used in construction, operation and decommissioning phases of the Project to reduce impacts to surface water resources, including but not limited to erosion and run-off control features and storm drainage management.

If contaminated soils are to be disturbed, discuss methods to minimize adverse impacts. Discuss all mitigation measures planned to prevent the release of hazardous substances, including fuel oil, into local surface waters.

Discuss commitments to provide contingency and remediation plans for any impact to surface water resources, including decrease of water quality or quantity.

10.7 Groundwater Quality and Quantity

Describe actions that will be taken to moderate any negative impacts on groundwater quality and quantity.

Describe measures to be employed in the event of accidental dewatering of any domestic water supply wells through construction activity, including compensation for loss or degradation of domestic water supplies. Describe mitigation measures planned to prevent contamination of groundwater from the accidental release of a hazardous substance (including fuel oil).

Discuss commitments to provide contingency and remediation plans for any contamination of groundwater resources, including decrease of water quality.

10.8 Flora, Fauna and Terrestrial Habitat

Discuss measures that will be taken to minimize the impacts of the Project construction and operation on flora species. Include any landscaping plans for preservation of existing vegetation.

Describe the measures that will be taken to minimize the impacts of the Project construction and operation on terrestrial fauna, aquatic fauna and avifauna. Include any plans for preservation of existing habitat and compensation for loss or degradation of terrestrial habitat (i.e. habitat rehabilitation/replacement).

Describe the measures that will be taken to minimize the introduction of non-native species to the area.

Discuss commitments to provide contingency and remediation plans for drainage to terrestrial habitat as a result of accidental events.

10.9 Wetland Resources

Discuss avoidance of wetland de-watering and mitigation measures to maintain ecological and hydrological integrity of any wetlands in the area. Where avoidance is not possible, provide details of proposed compensations plans.

10.10 Fishery, Aquaculture, and Harvesting Impacts

Discuss measures that will be taken to minimize the impacts of the Project on fishing, aquaculture and marine harvesting.

10.11 Aquatic Species and Habitat Impacts

Discuss measures that will be taken to minimize the impacts of the Project construction and operation on marine and freshwater aquatic species and their habitat. Include any plans for preservation of existing habitat and compensation for loss or degradation of aquatic habitat.

Describe the measures that will be taken to minimize the introduction of non-native species to the area.

Discuss commitments to provide contingency and remediation plans for drainage to aquatic habitat as a result of accidental events.

10.12 Agriculture Impacts

Discuss measures that will be taken to minimize the impacts of the Project on agricultural production.

10.13 Geological Impacts

Describe alternatives to disrupting net acid producing bedrock. When no practical alternative to exposing acid producing bedrock exists, mitigation plans shall be developed for minimizing the impacts on the aquatic environment.

Discuss commitments to provide contingency and remediation plans for watercourses that have been degraded due to the disturbance of net acid producing bedrock or tills.

10.14 Archaeological Resources

Describe mitigation measures to preserve, protect, or recover any resources of cultural, or archaeological value that are identified in the study area.

10.15 Transportation Impacts

Discuss the mitigation measures planned to address anticipated impacts from any predicted changes in traffic speed, traffic routes, and density in adjacent residential and commercial areas.

10.16 Blasting Impacts

Discuss the plans for mitigating potential impacts on built structures (including water wells) in the study area where blasting is planned.

11.0 RESIDUAL ADVERSE EFFECTS AND ENVIRONMENTAL EFFECTS

This section of EA Report shall list and contain a detailed discussion and evaluation of the residual impacts for each VEC, including the criteria for determining significance[3]. Residual impacts are those adverse effects or significant environmental effects which cannot or will not be avoided or mitigated through the application of environmental control technologies or other acceptable means. Those impacts that cannot be mitigated or avoided shall be clearly distinguished from those impacts that will not be mitigated or avoided.

These impacts become important in the evaluation of a proposed project as they represent the environmental cost of the Project.

12.0 EVALUATION OF THE ADVANTAGES AND DISADVANTAGES TO THE ENVIRONMENT

This section shall present an overall evaluation of the advantages and disadvantages to the environment, including the VECs, during the construction, operation and

[3] Under the *Environmental Assessment Regulations* "significant" means, with respect to an environmental effect, an adverse impact in the context of its magnitude, geographic extent, duration, frequency, degree of reversibility, possibility of occurrence or any combination of the foregoing

decommissioning phases of the Project. The evaluation of the disadvantages shall include an examination and justification of each disadvantage.

13.0 PROPOSED COMPLIANCE AND EFFECTS MONITORING PROGRAMS

The EA Report shall include a framework upon which compliance and effects monitoring will be based throughout the life of the proposed project, including decommissioning. Monitoring programs must be designed to determine the effectiveness of the implemented mitigation measures. The EA Report shall describe the compliance reporting methods to be used, including reporting frequency, duration, methods, format and receiving agencies.

Recognizing that the effectiveness of compliance and effects monitoring depends on a workforce that can identify and address potential impacts during construction and operation of the facility, the framework shall include procedures for providing training and orientation to on site employees during construction and operation of the facility.

The description of the compliance and effects monitoring program shall also include any procedures/plans for addressing potential exceedances of environmental protection standards, guidelines or approvals.

The discussion of compliance monitoring shall include, but not be limited to:

13.1 Air Quality Monitoring

Describe plans and procedures for air quality emissions and compliance testing and monitoring, especially for NO_x, SO_x, CO, TSP, $PM_{2.5}$ and PM_{10}, and VOCs, during operation. Identify the methods that will be used to determine the monitoring locations. Describe plans to provide real-time air monitoring data to NSEL.

Describe plans for GhG monitoring, reduction targets and reduction plans.

13.2 Noise Monitoring

Discuss the plans for monitoring baseline, construction and operational noise levels at the site, and at any residential or commercial areas near the Project.

13.3 Surface Water Monitoring

Discuss any surface water monitoring plans for the construction, operation and decommissioning phases of the Project, including both water quality and quantity aspects.

13.4 Pre-Blast Survey

Discuss plans for a survey of structures if blasting is planned, to include wells, building foundations, etcetera, which may experience damage or impact due to seismic vibrations or air concussion.

13.5 Groundwater and Water Well Survey

Discuss plans for periodic monitoring of water quality and quantity of springs (if used as a water supply), and any wells (if blasting operations are proposed). Discuss any groundwater monitoring plans for the construction and operational phases of the Project.

13.6 Community Involvement

Include any plans for ongoing community consultation during construction, operation and decommissioning.

13.7 Other Monitoring Plans

Include any other monitoring plan which may include an Environmental Protection Plan (EPP) or other guidelines, polices or plans, proposed for the construction, operation and decommissioning of the facility.

14.0 PUBLIC INFORMATION PROGRAM

This section of the EA Report shall detail the public information program initiated by the Proponent. The Proponent shall describe in detail the opportunities that have been, or will be provided to allow the public to express their concerns and receive information on the various phases of project development. Phases should include planning design, EA review, operation, abandonment, site rehabilitation, post abandonment and monitoring. This section shall include a description of the various stakeholders for this project and how they were identified and informed of the Project.

The results of public consultation and information sessions shall detail what comments were raised, and how they were addressed, including any commitments made by the Proponent.

15.0 ASSESSMENT SUMMARY AND CONCLUSION

This section of the EA Report shall summarize the overall findings of the EA with emphasis on the main environmental issues identified.