GENERAL REVIEW STATEMENT

IRVING OIL COMPANY, LIMITED
EIDER ROCK PETROLEUM REFINERY & MARINE TERMINAL

August 2009

Prepared by:
NB Department of Environment

New Nouveau Brunswick
CANADA

1. INTRODUCTION

This General Review Statement summarizes the opinions of the Technical Review Committee (TRC) regarding the Environmental Impact Assessment (EIA) of a proposal by Irving Oil Company, Limited (the proponent) to construct and operate a proposed petroleum refinery and marine terminal (Eider Rock; the Project) in the Red Head/Mispec area, near east Saint John, NB.

1.1 EIDER ROCK PROJECT SUMMARY

The proposed Project consists of a marine terminal and a petroleum refinery designed with a rated capacity of up to 40,000 m3/d (250,000 bbl/d) of crude oil. It is anticipated by the proponent that over time, and with increases in efficiencies and optimization, the refinery could process up to 48,000 m3/d (300,000 bbl/d) of crude oil on a daily basis. In addition, the refinery could also process intermediate petroleum products from other sources, such as from the existing Saint John refinery.

The marine terminal will be located in the Port of Saint John, at the existing marine terminal currently operated by Canaport Limited, an affiliate of the Proponent. Major marine terminal components/details, include:

- a jetty (with up to five integrated ship berths on a common trestle for the transfer of crude oil, intermediate feedstocks, refined products, and coke to and from vessel berths at the terminal);
- barge landing facility (for unloading large equipment modules during construction);
- seawater cooling intake structure, and effluent outfall (located in Mispec Bay along the shores where the existing Canaport marine terminal is located);
- limited dredging, cleaning and/or levelling of the sea floor may be required during construction of the jetty and trestle;
- the existing single buoy mooring (SBM; monobuoy) at Canaport will continue to be used for crude oil tanker unloading for the existing Saint John refinery as well as for the Eider Rock refinery;
- supporting structures to connect the marine terminal to the sea floor (i.e., either a jacket and pile system or a caisson structure); and
- vessels will use the established shipping lanes and existing anchorages in the Bay of Fundy. Approximately 30-35 very large crude carriers (VLCCs), 25-45 Suezmax tankers, and 3-15 Aframax tankers are expected/year to supply crude oil and intermediate feedstocks. Approximately 280 product tankers and 22-30 coke vessels will be required to transport finished products to markets/year. In total, an average of 7-8 ships per week are expected to visit the marine terminal.

Major components of the petroleum refinery complex, include:

- a crude oil and intermediate feedstock processing complex;
- tanks for storage of crude oil, intermediate feedstocks, intermediate and refined products, chemicals, and water;
- a coker, coke storage and handling facility; and
- ancillary facilities, including flare system, hydrogen plant, steam and power generation, electrical supply, a cooling system (seawater cooling and/or cooling tower system), a freshwater supply system, a wastewater handling and treatment system, administrative facilities, and maintenance facilities.

It is estimated that the Project's land-based components will require a total of 325 ha of land. Rights-of-way (RoWs) for pipelines, electrical power transmission, coke conveying, a rail line, and access roads to the facility will also be required (the proponent has looked at a variety of potential alignments, and has selected a preferred linear facilities corridor connecting the Project to the existing Saint John refinery). The main access route to the Project site is anticipated to be via Bayside Drive and Proud Road.

The proponent is proposing to construct the Project in two phases over a 6-8 year period. Phasing the pace and sequence of construction should allow for the economic benefits, construction-related expenditures, and economic spin-offs of the Project to be realized in the Saint John region over a greater period of time – this should help to minimize the potential for labour shortages of skilled workers and tradespersons in the region, and the potential strain on community services and public infrastructure.

The proposed operating design life of the Project is 30 years. However, the life of the Project will be extended by active maintenance programs, refurbishment, and/or equipment replacement, as appropriate. An updated assessment of the potential environmental impacts of decommissioning/abandonment of the Project will required by the proponent prior to decommissioning (Based on the uncertainty associated with predicting the environmental conditions and regulatory requirements that far in the future).

1.2 BACKGROUND & ENVIRONMENTAL ASSESSMENT CONTEXT

An EIA report, entitled "Environmental Impact Assessment Report – Project Eider Rock" was prepared pursuant to the *Environmental Impact Assessment Regulation (87-83)* of the Clean Environment Act. The Final EIA Report (dated April 30, 2009) was based on Terms of Reference developed by the proponent in consideration of the Final EIA Guidelines issued by the Minister of Environment on June 4, 2007. A Preliminary Draft EIA Report was received on August 18, 2008 for review by the TRC. As a result of deficiencies noted, clarifications sought and additional work identified by the TRC, the Report was revised, and a Final EIA Report satisfying the Final EIA Guidelines was received from the proponent on April 30, 2009. Thirty copies of the Final EIA Report (or Environmental Impact Statement, EIS) in both official languages were received on August 4, 2009.

The Technical Review Committee (TRC) established for the provincial Comprehensive Review of the proposed Eider Rock Project, includes representatives from the following agencies:

- NB Department of Environment (DENV);
- NB Department of Natural Resources (DNR);
- NB Department of Health (DH);
- NB Department of Transportation (DOT);
- NB Department of Local Government (LG);
- NB Archaeological Services Unit - Wellness, Culture & Sport (ASU);
- NB Department of Energy (DOE);
- NB Department of Agriculture & Aquaculture (DAA);
- NB Department of Fisheries (DOF);
- NB Department of Public Safety (DPS);
- NB Department of Tourism & Parks (TAP);
- NB Aboriginal Affairs Secretariat (AAS);
- Royal District Planning Commission (RDPC);
- City of Saint John (City);
- Saint John Port Authority;
- NB Museum;
- Canadian Environmental Assessment Agency (the Agency);
- Environment Canada (EC);
- Fisheries and Oceans Canada (DFO);
- Health Canada (HC);
- Transport Canada (TC);
- Natural Resources Canada (NRCan); and
- Indian and Northern Affairs Canada (INAC).

In addition, an international refining expert was added to the TRC for the review of the proposed Eider Rock Project.

The principle objective of the EIA Report or EIS is to predict the environmental effects that could be expected should the Project proceed and to ensure adequate mitigation is developed. If, in consideration of the advice of the TRC, the Minister is satisfied that the EIS is complete, the next step in the process is to consult/involve the public in evaluating the potential environmental effects anticipated from this Project and their significance.

The General Review Statement summarizes the opinions of the TRC regarding the EIS at a general level, and identifies potential impacts that should be brought to the attention of the Minister and the public. Most projects have the potential to produce some level of impact on one or more Valued Environmental Components (VECs). The information in the EIS must identify areas or actions that have impacts that are considered significant, as well as those that are considered insignificant. Thus, a scale of reference is required for determining the significance of environmental impacts in order to compare their relative importance. This is called “Thresholds for Determining the Significance of

Residual Environmental Effects" (Section 5.0) and is presented for each of the VECs in Sections 7 – 23 of the EIS. The effects analysis, mitigation and follow-up and monitoring proposed for each of the VECs are also presented in Sections 7 – 23 of the EIS.

In addition, please note that the marine terminal component of the proposed Project is subject to an environmental assessment under the Canadian Environmental Assessment Act (CEAA). A Comprehensive Study Report (CSR) has also been developed and submitted by the proponent to meet the requirements of a Comprehensive Study level of assessment under CEAA. For the federal CSR completed for the marine terminal component of the Project, DFO, TC and EC were identified as Responsible Authorities, and HC, NRCan and INAC were identified as Federal Authorities as a result of their expert knowledge. As noted above, the scope of the federal CSR focussed on the marine components of the Project, although federal departments have provided input to NB on all aspects of the Project.

2. REVIEW OF THE STUDY

Overall, the Final EIA Report (EIS) is considered acceptable as having addressed the issues outlined in the Final EIA Guidelines (dated June 4, 2007). It should be noted that the Eider Rock Project is the largest development project ever proposed in New Brunswick's history, and the comprehensive environmental assessment conducted has been unique and technically challenging, taking approximately 3 years to complete. Twenty detailed technical reports including the EIA Report have been completed and submitted by the proponent in support of the assessment and have been reviewed by the TRC. Currently, the proponent is still only at approximately the 5 - 10% design stage of the proposal and has indicated that given the overall magnitude of a project of this size, the final decision to proceed with the Project (feasibility) will be made following EIA approval, if obtained (i.e., requires EIA approval of the Project concept before the proponent is prepared to invest the significant financial resources to move ahead with the detailed design process and ultimately finalize decision-making related to Project implementation).

As identified above, given the early design stage of the proposal, this General Review Statement for this Project is somewhat unique in that it includes proposed potential conditions to address specific technical issues identified during the EIA review requiring further work during the Project detailed design phase (please refer to Section 2.2, below). **The following context must be emphasized during public review of the General Review Statement:**

- The proponent recently announced that they will not proceed with the proposed Eider Rock Project at this time, however they do wish to continue with the EIA process until completion – based on that the EIA process is significantly completed, and that a change in economic

circumstances could result in the Project being pursued at some point in the future;

- That all mitigative measure outlined in the Final EIA Report and all commitments made by the proponent during the EIA review would become conditions of any EIA approval, if obtained by the proponent and if the proponent were to proceed with the Project; and
- That potential conditions included in this General Review Statement only relate to technical issues identified during the EIA review that require further work during the Project detailed design phase (i.e., that additional conditions may be imposed by the Minister, and that all potential conditions may be modified, based on input received during public review of the General Review Statement, Final EIA Report and EIA Summary, as deemed appropriate by the Minister.

2.1 PROJECT ALTERNATIVES

The Guidelines required that an analysis of alternatives be conducted as part of the EIA study, including alternatives to the Project (e.g., the null or "do nothing" alternative, alternative siting, and alternative energy supplies), and alternative means of carrying out the Project (e.g., alternative technologies, systems, components and linear corridor alignments). It was anticipated that this analysis would contribute to a further understanding of the Project, and the Technical Review Committee (TRC) is generally satisfied that the information presented provides an adequate basis for comparison. A brief summary list of alternatives examined by the proponent is provided below:

- Alternative siting (3 locations within east Saint John (Grandview Ave; Black Point; and Red Head Mountain);
- Alternative methods for process cooling (seawater cooling; and cooling towers);
- Alternative supporting structures to connect the marine terminal to the sea floor (jacket and pile system; and caisson type structure); and
- Alternative alignments for the linear facilities corridor connecting the Project to the existing Saint John refinery (to contain RoWs for pipelines, power transmission and rail/road access).

In addition, the proponent has committed to further evaluating alternatives, prior to Project implementation, including: alternative sources of water supply, wastewater treatment, energy generation (tidal and wind power), and alternative locations/design of tanks for storage of crude oil, intermediate feedstocks, intermediate and refined products, chemicals, and water.

2.2 POTENTIAL IMPACTS

Background:

The EIA Report predicts, and the TRC generally agrees, that the Project's proposed construction and operation activities will not result in any significant environmental effects due to the planned and proven mitigation that will be implemented. While a significant adverse environmental effect could result from a large scale accidental event, the likelihood of such an event occurring is low given the design measures and mitigation aimed at prevention, and timely and effective response should an accident occur.

The Eider Rock environmental assessment concludes that Project implementation will result in significant positive environmental effects being realized (e.g., substantial economic benefits), while potentially adverse environmental effects can be mitigated to levels that are considered not significant or significant but unlikely (i.e., accidental events). The proponent has committed to ensuring that mitigation will evolve over the life of the Project in concert with environmental management initiatives, continuous improvement, and adaptive management.

The following sections summarize the environmental effects analysis of the proposed Project, focusing on specific significant impacts to VECs predicted in the Final EIA Report and the opinions of the TRC. **Please note that for clarity, potential draft conditions relating to technical issues identified during the EIA review that require further work during the Project detailed design phase, are presented together in Section 2.3 below.**

Atmospheric Environment/Air Quality: The EIA Report predicts that the Project will have several sources of air contaminants (including odour), greenhouse gases (GHGs), and sound emissions. These include but are not limited to the refinery complex operations, petroleum storage facilities, loading activities at the marine terminal, and intermittent emissions from Project-related vehicles and vessels. The quantities of emissions from these activities will vary and appropriate environmental controls and mitigation measures will be implemented to reduce emissions of air contaminants, GHGs, sound, and odour.

The proposed high conversion refinery configuration, the anticipated heavier oil to be processed, and increasingly stringent product specifications will result in higher GHG emissions from the refinery compared to a standard topping or mid-conversion refinery that produces unconverted residues as a product (e.g., bunker fuel oil, asphalt). Emissions from the Project have been identified as a key issue by regulatory agencies, the public, and stakeholders. Consequently, from the outset, initiatives and technologies to mitigate these emissions have been incorporated into the Project design, including but not limited to: the use of dust suppressants, implementation of an idling policy, an energy efficiency program, the use of Best Available Proven Technology that is economically viable to control emissions from specific processes, the burning of refinery fuel gas or natural gas for heat production, cogeneration of steam and electricity, treatment of the tail gas from the sulphur plant, low-NOx burners, smokeless flares, floating roofs on tanks, vapour recovery systems to capture volatile organic compound (VOC) emissions, and enclosures to control noise.

Detailed characterization of emissions from various aspects of the Project during its construction and operation was conducted to develop an emissions inventory for the Project. Emissions were modelled extensively using the CALPUFF modelling system to predict the ground-level concentrations of air contaminants resulting from the Project, alone as well as in combination with other identified projects and activities that have been or will be conducted. The assessment of air contaminant emissions predicted that it was extremely unlikely for a Project-related air contaminant emission to cause an ambient objective, guideline or standard to be exceeded. These predictions are considered conservative (i.e., worst-case) as the estimates of GHG and air contaminant emissions used were higher than they are likely to be during actual construction or operation activities, the estimated background values for the air contaminants are higher than they are likely to be in the Project area, and the maximum emissions rates during operation were used to predict the downwind concentrations of contaminants at all times.

Dispersion modelling using CALPUFF was used to predict air quality conditions at select transboundary locations, including the closest point in Nova Scotia to the Project, the closest point in PEI, the closest point in Maine, at Roosevelt-Campobello International Park, and at The Brothers 18 First Nations reserve located to the north of the City of Saint John. Overall, the predicted Project contribution to air quality on federal lands, in other provinces, and in other countries is not expected to be substantive and is not expected to cause significant transboundary environmental effects.

It was also considered very unlikely for a Project-related noise emission to cause an ambient objective, guideline or standard to be exceeded, mainly because the distances between sources and noise sensitive receptors are relatively large. Project-related sound emissions during construction and operation were rated not significant, in consideration of existing background levels, planned mitigation, and other future development in the area.

Global emissions of GHGs and consequent changes to global climate are recognized as a significant cumulative environmental effect currently occurring globally. Project-related GHG emissions will contribute to these significant cumulative environmental effects, but their contribution will be relatively small in a global context and will be compliant with the eventual regulations and policies that are expected to be implemented by the Government of Canada. A GHG Management Plan will be developed by the Proponent specifically for the Project. Innovative approaches to reduce energy use and minimize GHG emissions have been identified and will be further developed during the detailed design phase.

Based on the above, the EIA Report concludes that the environmental effects of the Project to air quality or sound quality during construction, operation, and decommissioning/abandonment are rated not significant. In respect of GHG emissions, the EIA Report concludes that the Project is not likely to add appreciably to significant cumulative environmental effects that currently exist on global climate. Follow-up and monitoring would include continuous emissions

monitors (CEM) on several primary sources of emissions, to monitor and quantify key air contaminant emissions.

The TRC is satisfied with the information presented in the atmospheric environment section and generally agrees with the findings of the Final EIA Report.

Water Resources: Water Resources include freshwater sources that have been or could be developed to provide potable water for consumption or for other industrial, commercial, institutional or residential uses. The Project has the potential to affect water resources because the substantial quantity of freshwater required by the Project may reduce the availability of surface water to other existing or future municipal and industrial users. A variety of options are under consideration to reduce the water requirements of the Project, including recycling or reusing water within the refinery, minimizing the water requirements through plant design, making use of storm water, and using recycled treated wastewater from the wastewater treatment facility. The use of groundwater is not currently planned to support the Project.

The EIA Report states that using raw (untreated) freshwater sourced from the City of Saint John municipal water supply is the most technically and economically feasible means of reliably supplying the estimated 5600 US gal/minute of freshwater to the Project, with any excess beyond this amount that may be required being supplied through reuse, recycling, or conservation means. A small amount of treated water could also be supplied as potable water. Water would be supplied through a new water main that would be built and operated by the City and would connect the Project to by the municipal water supply. Subject to confirmation, the overall capacity of the City water system appears to be sufficient to supply the Project, although some infrastructure upgrades may be required. The requirements for water supply to the Project will be the subject of detailed negotiations between the Proponent and the City to determine the best means of supplying the required freshwater for the Project, under what conditions, from which source, using which infrastructure, at whose cost, and under what acceptable commercial terms.

Discussions have been initiated with the City and will continue throughout the design phase of the Project to resolve the technical challenges regarding the water supply. As part of the groundwater and surface water protection strategy, a program of surface water and groundwater monitoring will be implemented to provide surveillance of ambient reservoir and groundwater levels, and groundwater chemistry on and down-gradient of the Project facilities.

The TRC is satisfied with the information presented in the water resources section of the report and generally agrees with the findings of the Final EIA Report.

Human Health and Safety: The assessment of potential environmental effects on Health and Safety is based in part on the air emissions modelling conducted for the Project, but also relies on data gathered to characterize Water Resources,

the Freshwater Environment, and the Terrestrial Environment. The potential risks to public health resulting from the environmental effects of exposure to chemicals were assessed for existing (baseline) conditions and for construction, operation, and decommissioning/abandonment. The Human Health Risk Assessment (HHRA) focused on quantitatively evaluating potential changes in health due to short-term chemical exposures (e.g., changes in asthma rates, changes in the occurrence of eye/throat irritations), and changes in health due to long-term chemical exposures (e.g., changes in cancer incidence rates, changes in rates of neurological disorders) primarily during operation of the Project. Health risks associated with existing (baseline) concentrations of a number of chemicals of potential concern (COPC) in the Saint John area (i.e., acrolein, arsenic, manganese, and vanadium) were determined to be high in relation to accepted benchmarks (even in absence of the Project), thus potentially contributing to risks to human receptors in the Saint John area. However, further examination of these data determined that concentrations of these COPC were similar to other communities in New Brunswick or the rest of urban Canada.

The results of the HHRA indicate that the potential environmental effects of Project-related releases of COPC, when they were evaluated in isolation of existing concentrations of chemicals in the environment in the Saint John area, are not significant. However, because the health risks associated with the existing baseline levels of certain contaminants present in the environment are already in excess of regulatory benchmarks, the cumulative environmental effects of the Project, in combination with existing conditions and other future planned projects and activities that will be carried out, have been rated significant, although this would only be the case for four of the over 90 COPCs evaluated through the HHRA. As a precautionary measure, even though the health risks associated with the existing concentrations of most COPCs in the environment are within accepted benchmark levels, the cumulative environmental effects of the Project and other future projects and activities that will be carried out have been rated significant. Regardless, the contribution of the Project to these cumulative environmental effects is not significant. The Project's environmental effects will be minimized by the application of best available proven technology economically viable and other mitigation and environmental management practices and procedures. Project-related emissions and wastes will be controlled to an extent that they do not exceed air quality or health-based standards, and as such, the Project is not anticipated to significantly affect the existing health status of residents of the Saint John and surrounding areas.

With respect to public safety, all phases of the Project as currently planned will be carried out in compliance with the applicable occupational health and safety, as well as public safety legislation of the Province of New Brunswick and the Government of Canada. Extensive mitigation, planning, and environmental management measures developed in support of the Project will assist in minimizing the risks of accidents, malfunctions or unplanned events that could otherwise be a cause for concern with regard to public safety. The construction, operation, and decommissioning/ abandonment of the Project will not cause significant environmental effects to public safety as the activities during these phases will be carried out in full compliance with the laws that exist to protect the safety of workers and the public, and because considerable care has been, and will continue to be, taken by the Proponent to plan,

prepare for, and respond to unplanned events that could lead to public safety concerns.

The TRC is satisfied with the information presented in the human health & safety section of the report and generally agrees with the findings of the Final EIA Report.

Freshwater Aquatic Environment (Fish & Fish Habitat): The Freshwater Aquatic Environment includes watercourses (rivers, lakes, and streams) that provide habitat for fish and other freshwater aquatic species. The Project has the potential to affect the Freshwater Aquatic Environment due to: the unplanned or accidental release of deleterious substances or sediments into watercourses, direct mortality of fish, changes in drainage area, or the deposition of air contaminant emissions. However, effective Project planning, design, avoidance, and the application of known and proven mitigation measures has led to the conclusion that the residual adverse environmental effects of the Project, including cumulative environmental effects, on the Freshwater Aquatic Environment will not be significant. Mitigation measures include the avoidance of in-stream work and the minimization of near-stream work, implementation of well established and proven erosion and sedimentation control measures, and proper storage of hazardous materials. A further mitigation measure is the implementation of a storm water management system to maintain a supply of surface water run-off to watersheds containing fish-bearing watercourses that experience a loss of drainage area that would adversely affect fish habitat.

Monitoring will focus on the Mispec River and tributaries where drainage area has been changed, with a focus on wetted perimeters and minimum flows. It will also include Bean Brook and Calvert Lake. Sampling sites will be determined based on fish-bearing watersheds that will experience Project-related drainage area loss.

The TRC is satisfied with the information presented in the freshwater aquatic environment section of the report and generally agrees with the findings of the Final EIA Report.

Terrestrial Environment: The Terrestrial Environment includes many components of the landscape that are valued (i.e., wildlife, migratory birds, vegetation, and natural resources). The Project has the potential to affect the Terrestrial Environment by changing terrestrial populations of plants and/or animals that are important in a socio-economic or environmental context, including Species at Risk (SAR) or Species of Conservation Concern (SOCC). Potential interactions with terrestrial populations will be limited to populations that are accustomed to or adapted to human disturbance and environments, because of the nearby existing industrial developments and land uses. The landscape within and surrounding the Project has been substantially fragmented by roads and forest resource harvesting for more than a century. Climax old growth forest, considered to be important habitat, is limited near the Project but exists elsewhere in the Fundy Coastal Ecoregion. The Project will not encroach on areas within the Fundy Coastal Ecoregion that have been designated for protection or management (e.g., the Red Head Marsh). The potential

environmental effects on terrestrial populations of Species at Risk or Species of Conservation Concern that are present will be mitigated with standard construction practices and scheduling of Project components (e.g., scheduling clearing to occur during winter to avoid interaction with bird species nesting season). Known locations of rare plants or other Species at Risk or Species of Conservation Concern will be avoided. The locations of mature forest habitat and interior forest will be avoided where necessary to prevent the disturbance of critical terrestrial habitat for Species at Risk or important habitat for Species of Conservation Concern. The residual environmental effects that result from interactions between the Project and the Terrestrial Environment are rated not significant for all Project phases. The potential cumulative environmental effects are also rated as not significant. Follow-up programs with respect to potential effects of lighting on birds will be developed in the event that monitoring during construction and operation indicates an elevated risk or evidence of avian collisions with lights and/or flares.

The TRC is satisfied with the information presented in the terrestrial environment section of the report and generally agrees with the findings of the Final EIA Report.

Wetland Environment: Given the size of the Project footprint and the fact that wetlands are a common feature in the ecoregion, complete avoidance of wetlands is not possible. Project activities will result in the direct loss of wetland area and have the potential for indirect environmental effects, such as alteration of drainage patterns. Project activities are not anticipated to have significant environmental effects on wetlands in the Red Head/Mispec areas. The amount and quality of wetland loss associated with the Project is not problematic in the Fundy Coastal Ecoregion or locally because of the large amount of wetland of these types that exist (and in particular locally to the northeast), and their relatively low function, even within small, local watersheds. Furthermore, compensation for loss of wetland function will be negotiated with regulatory authorities. Further compensation may be required and will be determined by monitoring for changes in wetlands that may result from local changes in drainage patterns. The Project will also not contribute substantively to cumulative environmental effects because of the planned compensation, and mitigation for loss of some functions (e.g., storm water management). Following construction, the success of wetland restoration within the linear facilities RoWs will be monitored as will the function of potentially indirectly affected wetlands upstream and downstream.

The TRC is satisfied with the information presented in the wetland environment section of the report and generally agrees with the findings of the Final EIA Report.

Marine Environment: The Project has the potential to affect the Marine Environment primarily during construction of the marine terminal and other marine-based infrastructure. These environmental effects are largely localized, limited to the physical footprint of these structures, and are short-term (within one to two years). They are likely to result in harmful alteration, disruption or destruction (HADD) of fish habitat on the sea bed. Mitigation measures to limit these environmental effects will include the avoidance of biologically sensitive

periods; appropriate disposal of dredged material (e.g., in the nearby established Black Point ocean disposal site, etc.); implementation of DFO's guidelines for the use of underwater explosives where applicable; and fish habitat HADD compensation measures to be developed in consultation with DFO. Some positive environmental effects are likely to occur after construction and during operation of the Project as a result of the reef effect and attraction of marine species to the jetty and other marine-based infrastructure by colonizing hard surfaces and creating new fish habitat. During operation and if seawater cooling is selected for the refinery, potential adverse environmental effects include direct mortality of fish eggs and larval fish withdrawn into the seawater cooling intake and the release of heated seawater and treated effluent through the marine outfall. Other potential adverse environmental effects on the Marine Environment include the increase of sound in the acoustic marine environment during construction and operation as a result of undersea dredging and blasting and increased vessel traffic. The environmental effects assessment, however, concluded that these environmental effects are not significant as a result of effective Project design, avoidance, and the application of known and proven mitigation measures

Mitigation measures for the seawater cooling intake will include barriers and fish screens to minimize impingement and entrainment of fish. The strong tidal currents in the area of Mispec Point, and the use of a diffuser or similar technology at the outfall location, will be effective in mixing and dispersing both the heated seawater and effluent from the wastewater treatment plant. The Marine Ecological Risk Assessment concluded no significant chronic exposure to the water, sediment and marine biota in the long-term as a result of this outfall.

In the case of sound emissions to the marine environment, fish and marine mammals and birds will likely avoid the footprint of the jetty and other marine-based infrastructure during construction. The cumulative environmental effect from the Project on the acoustic environment during operation was also rated as not significant on the North Atlantic right whale, a Species at Risk. These whales exhibit very limited avoidance behaviour of sound generated by Project-related vessel traffic and are not likely to avoid their feeding habitat in the Grand Manan area due to increased vessel traffic within the shipping lanes. There are few marine species of special status (SOCC and SAR) that have been reported during field investigations for this Project or other recent projects that are known to use the area near Mispec Point (where the Project facilities will be located) as foraging habitat during a portion of the year; these are limited to the harbour porpoise and harlequin duck. The potential environmental effects on those marine populations that are present are rated as not significant because Mispec Bay and other areas where the Project facilities will be physically located do not represent important populations or foraging habitat in comparison to other populations and areas within the entire Bay of Fundy.

Monitoring in the marine environment will include monitoring of contaminant levels from land-based effluent, sediments quality and abundance and re-colonization of benthic habitat in Mispec Bay during early operation, and effectiveness of fish screens on the seawater cooling intake.

The TRC is satisfied with the information presented in the marine environment section of the report and generally agrees with the findings of the Final EIA Report.

Commercial Fisheries: Commercial Fisheries are important to the local and regional economy, and are a valued way of life for some residents of southeastern New Brunswick. As Project-related marine infrastructure and activities, such as vessel traffic are planned close to an area where commercial fishing is known to occur, there is the potential for environmental effects to occur on Commercial Fisheries as a result of the Project. Recommended mitigation includes active participation on the Port of Saint John Traffic Committee and continued discussion and resolution of concerns via that committee, in consultation with stakeholders. Establishing clear practices and procedures for marine terminal operations in a Marine Terminal Manual, delineating Project vessel zones of operation during construction, and encouraging use of established approaches by Project-related vessels will further mitigate potentially adverse environmental effects.

The Proponent will continue to work through the Port of Saint John Traffic Committee as a formal line of communication between fishermen and operators of the Project. With proposed mitigation and recognizing that the majority of Project activities will occur within the Proponent's water lot and within the Saint John Harbour as administered by the Saint John Port Authority on behalf of the Government of Canada, it is predicted that the residual environmental effects of the Project on Commercial Fisheries, including cumulative environmental effects, will be not significant. With the exception of continued active participation on the Port of Saint John Traffic Committee as a forum for discussion and resolution of issues, no further follow-up or monitoring is recommended.

The TRC is satisfied with the information presented in the commercial fisheries section of the report and generally agrees with the findings of the Final EIA Report.

Labour & Economy: The Project is expected to create substantial opportunities for business and industry in a number of sectors as a result of direct Project expenditures and employment, and indirectly due to expenditures and employment by suppliers to the Project, and from workers/employees spending their incomes. With respect to labour, the residual environmental effects are anticipated to be both positive and adverse. A residual adverse environmental effect is expected on the supply and cost of labour, particularly during construction, as shortages of labour within certain trades are predicted. This will require other projects to be proactive and innovative in attracting and retaining workers. The phasing of the pace and sequence of construction over a longer duration will lessen the potential for residual adverse environmental effects on labour and extend the economic benefits and spin-offs to the region over a longer period. The residual adverse environmental effects of the Project on Labour and Economy, including cumulative environmental effects, are predicted to be not significant.

The Project is predicted to result in the further positive development of labour force capabilities and incomes within the Saint John area and the Province of New Brunswick. The Project will attract and retain new workers to the region, which will contribute to the overall growth of the local economy. Through the Project and in partnership with the Benefits Blueprint Initiative, the Proponent will participate in the development of strategies to engage women, visible minorities, and those living in poverty to participate in the economic benefits of the Project. A Procurement and Supply Strategy will maximize benefits to the Saint John area and provincial economies. A Labour Relations Strategy will help avoid or minimize adverse environmental effects on labour by focusing on initiatives to enhance the available workforce and increase retention rates, particularly during construction. Project employment and procurement will be monitored to confirm predictions and inform adaptive management. This will include documentation of workers by trade/occupation and location of permanent residence, as well as expenditures on suppliers by type and location of supplier.

The TRC is satisfied with the information presented in the labour & economy section of the report and generally agrees with the findings of the Final EIA Report.

Municipal Infrastructure/Community Services: The Project will create a large number of employment opportunities during construction and operation. While some of the workforce may be local, many workers are expected to enter the Saint John area, both on a temporary and permanent basis. This influx of workers and their families may place certain strains and challenges on the current level of services provided by Community Services and Infrastructure. The Project will also place additional demands on local emergency response services and on-going support services (e.g., health and social services, and public education). The Project may also affect availability of both short-term and long-term accommodations, which could result in displacement of low income individuals and families due to increases in housing costs. Existing programs and space offered by entertainment and recreation facilities may also be insufficient to meet the needs of an increasing population, particularly where these facilities are already insufficient. The phasing of the pace and sequence of construction activities over a longer duration will lessen the demands placed by workers on Community Services and Infrastructure. It is also expected that some non-emergency health care will be provided by the proponent to individuals employed for the Project (e.g., a nurse on-site), that an Employee Assistance Program will be offered by the proponent to its employees, and that Project health and safety policies will be enforced. Other mitigation includes Project accommodations built specifically to house non-local workers during construction, particularly for foreign workers that may experience social and cultural adaptation issues and/or lack the support of local family. A key component of mitigation will be the continuation of a participatory process among stakeholders (community, government, developers, and social service NGOs) to further develop specific measures to address environmental effects on social services, including a focus on vulnerable groups within the community. The EIA Report predicts that the environmental effects on Community Services and Infrastructure, including cumulative environmental effects, will be not significant. With mitigation in place, overall levels of services are expected to be maintained.

The TRC is satisfied with the information presented in the municipal infrastructure & community services section of the report and generally agrees with the findings of the Final EIA Report.

Land Use: The potential for the Project to affect Land Use is a particular concern for the public, stakeholders, and individuals that own or use properties adjacent to the Project. The Project could result in changes to the physical environment (noise, dust, odour, and light emissions) and related potential changes to residential property values. The Project will also result in visual changes to the landscape and in reduced access to and use of land for recreational activities. The assessment has concluded that while the Project will result in the loss of recreational land use, other lands for similar recreational uses are readily available in the area. Further restriction of recreational land use is expected to have only minor environmental effects as the adjacent land is not an important recreational destination or trail travel route. Nuisance environmental effects on adjacent recreational and residential land uses are predicted to be low in magnitude, and restricted to sites adjacent to the Project. The residual environmental effects on property values due to the Project is also expected to be low in magnitude and localized, although actual changes to property value are difficult to predict because of the multiple contributing factors such as local market conditions, economic conditions, and the social and cultural context

Residual environmental effects as a result of the change in the visual environment are anticipated to be low in magnitude because, although the Project does represent a change to the visual aesthetics of the area, other land use activities can continue largely unaffected. The industrial landscape is currently a part of the visual fabric of the area. With mitigation, the residual environmental effects of the Project on Land Use, including cumulative environmental effects, are rated not significant. Mitigation includes changes in land use designation and zoning to allow for heavy industry within the proposed areas where the refinery and related infrastructure will be built, the purchasing by the Proponent of select properties adjacent to the proposed refinery location, communication with land owners and recreation user groups to inform them of Project activities and schedules, restricted site access, and reduction of nuisance-related environmental effects (including best available proven technology economically viable for air contaminant, odour and noise emissions). Based on the results of public consultation, the Proponent is also expected to incorporate a number of customized measures in Project design to further mitigate effects on existing land use (e.g., lighting design).

The TRC is satisfied with the information presented in the land use section of the report and generally agrees with the findings of the Final EIA Report.

Aboriginal Land & Resource Use: Although the lands between east Saint John and Mispec may have been used in past centuries by Aboriginal persons for traditional hunting, fishing, trapping, gathering, and subsistence purposes, there is no documented current use of land and resources for traditional purposes by Aboriginal persons on land in the specific areas proposed for development by the

Project or in the area between the Project and east Saint John. The proponent conducted a Current Use Study and confirmed that there is a known Aboriginal fishery in the Bay of Fundy, farther towards the Outer Bay. Despite potential interactions between the Project and the Aboriginal fishery in the Bay of Fundy, the residual environmental effects of the Project on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, including cumulative environmental effects, have been rated not significant. There are currently no documented Aboriginal fishing activities in the near shore environment where the marine-based components of the Project will be built. While there is the potential for residual environmental effects to the existing Aboriginal fishery in the Bay of Fundy due to Project-related vessel traffic, these will not be significant because Project-related vessel traffic is small relative to the physical capacity of the established shipping lanes.

The TRC is satisfied with the information presented in the Aboriginal land & resource use section of the report and generally agrees with the findings of the Final EIA Report.

Archaeological & Heritage Resources: Construction represents the greatest potential for Project interaction with Heritage and Archaeological Resources. As noted anecdotally by some stakeholders during consultation, there is potential for the existence of shipwrecks in the marine environment, although none have been documented in the areas proposed for development by the Project. The only known Heritage and Archaeological features in the areas proposed for development for the Project are the archaeological site BhDl-2 (Pre-contact site period site located above a cobble beach near Mispec Bay), the linear stone features (LSFs) near Anthony's Cove (BhDl-3), and the existing remaining Fort Mispec structures. Planned mitigation includes excavation of site BhDl-2, archaeological surveillance during the removal of LSFs, and planned avoidance of Fort Mispec physical structures. Based on the limited potential for further discovery of currently undiscovered heritage or archaeological resources as demonstrated from field surveys, the residual environmental effects of the Project on Heritage and Archaeological Resources, including cumulative environmental effects, will be not significant. Mitigation in the form of specific contingency procedures will also be in place in the unlikely event that unknown Heritage and Archaeological Resources are encountered during Project activities.

The TRC is satisfied with the information presented in the archaeological and heritage resources section of the report and generally agrees with the findings of the Final EIA Report.

Land-Based Transportation: Road systems are required for access and mobility, the ability to maintain timely emergency response, and for the safe transportation of workers and supplies to and from the Project. The rail network in Saint John and Southern New Brunswick is under-used and well below capacity, and will continue to be even with the predicted Project-related increase in rail traffic. Vehicles will carry both workers and supplies during all phases of the Project, which is likely to result in increased traffic volumes on roads leading to and from the Project location. Increased traffic volumes have the potential to

cause traffic delays by reducing the level of service and/or damaging road infrastructure, and to increase the likelihood of accidents or collisions. A new rail line between the Project and the Grandview Industrial Park or the McAllister Industrial Park will have at least two level crossings, which may result in further delays to traffic. Increases in traffic are mainly of concern along the Principal Project Access Route (i.e., Bayside Drive/Proud Road) and other areas of the City would not be expected to experience substantive increases in traffic.

The phasing of the pace and sequence of construction over a longer duration will lessen potential environmental effects on Land-Based Transportation, as the number of construction workers and vehicles travelling to and from the Project site each day will be lower than if the Project were carried out over a shorter period. The off-site construction of large refinery modules and their delivery to the site by barge also mitigates the potential environmental effects that could otherwise result to Land-Based Transportation. Additional mitigation proposed, if determined to be necessary by the City of Saint John, includes improvements and upgrades to road network infrastructure, the provision of bussing for construction workers to and from the Project site, as well as from remote parking lots located along major highways or common collection areas, and scheduling the use of level train crossings to occur outside of peak traffic times. Given this mitigation, the environmental effects of the Project on Land-Based Transportation, including cumulative environmental effects, are not predicted to be significant. On-going monitoring will be implemented as necessary throughout the Project, and periodic monitoring of traffic flows along the Principal Project Access Route during peak travel periods may also be required during construction and operation.

The TRC is satisfied with the information presented in the land-based transportation section of the report and generally agrees with the findings of the Final EIA Report.

Marine Vessel Traffic/Navigation: Project-related vessel traffic will occur in the Bay of Fundy and Saint John Harbour as a result of deliveries of pre-fabricated units and construction materials during construction as well as for the receipt of crude oil and intermediate feedstocks, and shipping of finished products during operation. Various vessels currently operate in the marine waters of the Harbour, and their effective and safe operation is essential to the economic success of the individuals and industries in the Saint John region. The Project will result in higher traffic levels in the Bay of Fundy and Saint John Harbour, and in the area between the existing shipping lanes in the Bay of Fundy and the Project's marine terminal, particularly during operation. This will result in increased economic activity for the Port in addition to added demand on Port resources, such as tug boats, Harbour Pilots, and anchorage areas. The EIA concludes that the existing shipping lanes in the Bay of Fundy and the capacity of the Harbour will be able to effectively handle the increased shipping traffic, and the responsible authorities will be able to safely and effectively accommodate the Project vessels with the use of existing or additional resources and by adapting practices and procedures as required. Given this mitigation, the residual environmental effects of the Project on Marine Vessel Traffic and Navigation, including cumulative

environmental effects, are rated not significant and will be balanced by increased economic opportunities for the Port of Saint John.

The TRC is satisfied with the information presented in the marine vessel & navigation section of the report and generally agrees with the findings of the Final EIA Report.

Effects of the Environment on the Project: Typically, potential effects of the environment on any project are a function of project or infrastructure design and the risks of natural hazards and influences of nature. In general, environmental conditions that can affect project construction, infrastructure, or operational performance are addressed through engineering design and industry standards. Standard engineering design involves the consideration of environmental effects and loadings or stresses (from the environment) on a project. Mitigation strategies for minimizing the likelihood of a significant effect of the environment on the Project occurring are inherent in the planning process, engineering design codes, construction practices, and monitoring. Thus, the potential effects of the environment on the Project are rated not significant.

The TRC is satisfied with the information presented in the effects of the environment on the Project section of the report and generally agrees with the findings of the Final EIA Report.

Accidents, Malfunctions, and Unplanned Events: Accidents, Malfunctions, and Unplanned Events are occurrences that are not planned as a part of routine Project activities. Even with the best planning and application of mitigation, these events could occur during any phase of the Project as a result of abnormal operating conditions, process upsets, wear and tear, acts of nature (including extreme weather events), human error, equipment failure, and other possible causes.

Most accidents, malfunctions, and unplanned events are preventable and can be readily addressed or prevented by good planning, design, equipment selection, hazards analysis and corrective action, emergency response planning, and mitigation. Principles and practices inherent in the Project design that will help prevent and mitigate the potential effects of Accidents, Malfunctions, and Unplanned Events include use of best available proven technology that is economically viable for controlling releases to the environment; incorporation of safety and reliability by design, and application of principles and practices of process safety management; implementation of effective emergency planning and preparedness; and development and application of procedures and training aimed at safe operation of the facilities. Various potential accidents, malfunctions, and unplanned events were evaluated as part of the environmental assessment and included in the Final EIA Report.

Project components will be inherently safe by design and will follow strict codes and standards. A Quality Assurance system will be implemented to ensure that final design is in accordance with safety standards. Hazards and Operability Analysis (HAZOP), Layers of Protection Analysis (LOPA), and other process

safety management initiatives of the design and operation will provide an additional level of assurance in minimizing the potential for upsets or unintentional releases or hazardous conditions.

In the unlikely event of an accident, malfunction, or unplanned event, emergency response plans and procedures would be implemented to minimize the resulting environmental effects. The Project will have safety measures built in to mitigate or manage potential upsets should they occur. Employees will be trained in operational procedures and environmental emergency response procedures, including safety measures to prevent and respond to Accidents, Malfunctions, and Unplanned Events. Some accident scenarios (e.g., a large spill of crude oil or diesel in the marine environment) may result in significant environmental effects, although they are very unlikely to occur because of safety by design, the use of best available proven technology that is economically viable, and compliance with safety and environmental standards, codes, and based practices. With mitigation, including controls, response procedures, and safety by design, most accident scenarios, in the very unlikely event they were to occur, would not result in significant environmental effects.

The TRC is satisfied with the information presented in the accidents, malfunctions & unplanned events section of the report and generally agrees with the findings of the Final EIA Report.

2.3 POTENTIAL DRAFT CONDITIONS

As identified previously, the following potential draft conditions are intended to address specific technical issues identified during the EIA review requiring further work during the Project detailed design phase. Please note that all mitigative measures outlined in the Final EIA Report and all commitments made by the proponent during the EIA review would become conditions of any EIA approval, if obtained by the proponent and if the proponent were to proceed with the Project. In addition, these potential conditions may be modified, and additional conditions added based on public input, as deemed appropriate by the Minister:

- The Project will require an *Approval to Construct/Operate* as per the NB *Air and Water Quality Regulations*. This Approval will serve as a framework to ensure appropriate environmental protection measures are properly designed and implemented, and compliance with environmental protection commitments made by the proponent during the EIA review process. During the Project detailed design phase, the proponent must apply for an *Approval to Construct/Operate*, and satisfy the requirements of the approval process.
- The proponent shall develop a Greenhouse Gas (GHG) Management Plan and submit this plan for review/approval by the appropriate members of the Technical Review Committee (TRC) prior to the onset of operation.
- The proponent must submit a *Public Consultation Plan* for review/approval by the appropriate members of the TRC, covering any proposed modifications to the Project that may occur during the detailed design phase. Following approval, the proponent will be required to implement

the plan to obtain public input/feedback on the finalized Project design prior to the initiation of construction.

- The proponent must develop site-specific environmental protection plans (SSEPPs) as appropriate, and obtain a *Watercourse/Wetland Alteration Permit* for any activities to be conducted within 30 m of any watercourse or wetland. Further, once detailed facility design is completed, a compensation plan for any unavoidable loss or alteration of wetland habitat due to the Project must be developed and submitted for review/approval by the appropriate members of the TRC. The compensation plan must take into consideration any altered wetland habitat, and any opportunities for the potential restoration of habitat in proximity to the Project area. Compensation will be required for any wetland area that is shown to have residual impacts as indicated by follow-up wetland monitoring. In addition, to minimize the spread of invasive plant species such as purple loosestrife, machinery must be cleaned of mud and vegetation prior to entering and leaving construction areas in proximity to wetland habitat.
- The proponent must submit a *Water Management Plan* during the detailed design for review/approval by the appropriate members of the TRC prior to the onset of construction. Supporting documentation may be requested prior to receiving approval.
- Should a water treatment plant be required for potable water supply as part of the Project, it may be considered a private water supply and a request for an *Approval to Operate* must be made with the Department of Environment.
- The proponent must submit an overall *Project Waste Management Plan* during the detailed design phase which must be submitted for review/approval by the appropriate members of the TRC prior to the onset of construction.
- The proponent must submit for review/approval by the appropriate members of the TRC, the details of all physical works required in or near the water. Additionally, final designs must be reviewed by Fisheries and Oceans Canada (DFO) to determine Fisheries Act requirements/authorizations.
- Prior to the initiation of construction, the proponent must demonstrate how the potential effects of the environment on the Project have been addressed/incorporated into the Project detailed design. The analysis must include the most up to date information available at the time of detailed design with respect to storm surges, current and wave measurements, and detailed site-specific wave modelling at the Marine Terminal.
- An updated assessment of potential Project-related impacts to species at risk must be conducted during the detailed design phase and submitted for review/approval by the appropriate members of the TRC. In addition, all species at risk field data results must be provided to the Atlantic Canada Conservation Data Centre (AC CDC) for inclusion in the Species at Risk Database within 1 year following the start of operation of the facility.
- The proponent must initiate and complete a TERMPOL assessment for the Project.

- The proponent must submit an overall *Emergency Management/Response Plan* and additional contingency/operational plans during the detailed design phase for review/approval by the appropriate members of the TRC prior to the onset of operation.
- The proponent must submit a comprehensive *Environmental Management Plan* (EMP) for review/approval by the appropriate members of the TRC prior to the start of construction. The EMP must include: an Environmental Protection Plan (EPP), linking mitigation to locations, a monitoring plan (compliance and environmental effects monitoring), and contingency plans. The EMP must also define and identify roles and responsibilities, accountability and reporting procedures during each phase of the Project. Commencement of activities related to the implementation for each stage of construction cannot be undertaken prior to approval of the specific phase EMP by appropriate members of the TRC.
- Any impact within 100 m of the recorded archaeological site (BhDl-2) will require the completion of mitigation of the site by a licensed archaeologist, with submission of a final analytical report (subject to approval by Archaeological Services) upon completion of the mitigation of the site. If it is suspected that remains of archaeological significance are discovered elsewhere within the assessment area during construction or operation, all activity shall be stopped within 50 m of the find and Archaeological Services shall be contacted immediately for direction.
- The Project construction schedule must be submitted for review/approval by the appropriate members of the TRC, taking into consideration a variety of factors, including transportation and noise (nuisance) considerations, etc. In addition the local public must be notified of the finalized Project construction schedule, prior to the commencement of construction activities.
- The proponent shall update Project-related technical documents as deemed appropriate by the TRC prior to the initiation of construction of the Marine Terminal and/or the Refinery Complex.
- The Proponent shall adhere to, and ensure adherence by all developers, contractors, sub-contractors, agents and workers for this Project, to all conditions determined appropriate by the Minister, and to all obligations, commitments, monitoring and proposed mitigation measures identified during the EIA review.

3. CONCLUSION

Overall, based on the results of the environmental assessment, it is concluded that with the proposed mitigation, monitoring and contingency planning, the residual environmental effects of the Project are rated not significant, except in the event of certain worse case accident scenarios that would be very unlikely to occur. Further, it is concluded that the Final EIA Report is a satisfactory document on which to base a public discussion of the Project and its potential impacts.