

GENERAL REVIEW STATEMENT

IRVING OIL LIMITED LIQUEFIED NATURAL GAS (LNG) MARINE TERMINAL AND MULTI- PURPOSE PIER PROJECT

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Prepared by:
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New
Nouveau  Brunswick

Environment and Local Government

1. INTRODUCTION

This General Review Statement represents the opinions of the Technical Review Committee (TRC) regarding the Environmental Impact Assessment (EIA) of a proposal by Irving Oil Limited (Irving) to build a Liquefied Natural Gas (LNG) Marine Terminal and Multi-Purpose Pier (“the Project”) at the Irving Canaport facility in Saint John, New Brunswick. The Irving Canaport facility is located off the Red Head Road in Saint John on the banks of the Bay of Fundy.

The Project facilities include the necessary infrastructure to receive, store and regassify LNG that is unloaded from marine tankers at a multi-purpose pier and transport the natural gas through a pipeline to the existing Irving Refinery in Saint John. The terminal would be expected to operate continuously, with a design capacity of 28.3 million cubic meters of natural gas per day (1,000 million standard cubic feet per day -MMSCFD).

The pier would also serve to unload emulsified bitumen or Orimulsion[®] from tankers and deliver it to storage tanks at the Canaport facility. NB Power had received a New Brunswick Cabinet EIA approval to unload Orimulsion[®] at the Canaport monouoy as part of the Coleson Cove Refurbishment Project. Since that approval, NB Power requested that the fuel delivery location should be changed. The Irving LNG and Multi-Purpose Pier Project includes the assessment of the impacts associated with this change in fuel delivery for Orimulsion[®].

An EIA report, entitled “Liquefied Natural Gas Marine Terminal & Multi-Purpose Pier” Environmental Impact Statement (EIS) was prepared pursuant to the *Environmental Impact Assessment Regulation (87-83)* of the Clean Environment Act and to meet the requirements of a Comprehensive Study Report under the Canadian Environmental Assessment Act (CEAA). The EIS was based on Terms of Reference developed by Irving, which were reviewed by the TRC and provided by Irving to the public for input. The EIS must fulfil the Final Guidelines, issued by the Minister of the Environment and Local Government on March 25, 2002. The first draft EIS was submitted by Irving on November 4, 2003 for review by the TRC. As a result of deficiencies noted, clarifications sought and additional work identified by the TRC, the Report has been revised in order to satisfy the Guidelines.

The Technical Review Committee (TRC) for this project consists of representatives from the following agencies:

NB Department of the Environment and Local Government
NB Department of Natural Resources
NB Department of Energy
NB Department of Health and Wellness
NB Department of Transportation
NB Department of Public Safety
NB Culture and Sport Secretariat
NB Workers Health, Safety and Compensation Commission
City of Saint John
Saint John Port Authority
Canadian Environmental Assessment Agency
Environment Canada
Fisheries and Oceans Canada
Transport Canada

Atlantic Pilotage Authority
Saint John Harbour Pilots Association
Natural Resources Canada

The principle objective of the EIS is to predict the environmental effects, which could be expected should the project proceed and to ensure adequate mitigation is developed.

If, in consideration of the advice of the TRC, the federal Responsible Authorities under CEAA and the provincial Environment Minister are satisfied that the EIS is complete, the next step is, through consultation, to 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.

This General Review Statement 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, which 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 "Criteria for Establishing Threshold of Significance" and is presented for each of the VECs in Section 5.0 of the EIS. The effects analysis, mitigation and follow-up and monitoring proposed for each of the VECs are also documented in Section 5 and are summarized in a stand-alone Section of the EIS in Appendix G.

2. REVIEW OF THE STUDY

In general, the EIS is considered acceptable as having addressed the issues outlined in the Final Guidelines.

2.1 PROJECT ALTERNATIVES

The Guidelines required that an analysis of alternatives be conducted as part of the EIA study. The null or "do nothing" alternative, alternative sites, alternative route selection for the natural gas pipeline, alternative transportation, handling and vapourization of the LNG, electrical energy supplies, shipping corridors and anchorages and alternative dispersion models were examined by the Proponent. It was anticipated that this analysis would contribute to a further understanding of the project. The TRC is generally satisfied that the information presented provides an adequate basis for comparison.

2.2 POTENTIAL IMPACTS

Air Quality and Noise: The TRC is generally satisfied with the information presented in the air quality section and generally agrees with the findings of the EIA report.

This Project is expected to result in an increase in greenhouse gas emissions of 386 411 tonnes per year during operation as a result primarily of the submerged combustion vaporizer used to regasify the LNG to natural gas for pipeline transport.

Unlike many air and particulate emissions, the TRC acknowledges that identifying

significance threshold criteria for project-specific greenhouse gas emissions represents a certain challenge. Carbon dioxide is immediately and completely mixed with the other atmospheric gases upon emission and so can only properly be dealt with in a “global” fashion. Current science has advanced to the point of addressing climate change impacts on ecosystems on a regional level but not at a project-specific level. As such, the TRC required the proponent to focus the EIS on identifying best available and economically viable technologies to minimize greenhouse gas emissions and establishing an adaptive management approach to managing greenhouse gas emissions during the operating life of the facility. Additionally, this project would be considered subject to the Large Final Emitters (LFE) Regime currently being developed pursuant to Canada’s *Climate Change Plan* and will be called upon to negotiate legally-binding greenhouse gas emission (GHG) reduction covenants (agreements) for the first commitment period pursuant to the Kyoto Protocol, or have their emissions regulated through legislation. The GHG emission reduction targets for LFEs will be established in terms of emissions intensity (emissions per unit of output). As a Large Final Emitter, Irving will be required to comply with these intensity targets.

An assessment of the impacts of vehicle traffic emissions was requested and dispersion modelling was undertaken to determine the impacts of particulate matter, hydrocarbons (e.g. VOCs), carbon monoxide and sulphur dioxide at five receptors along Red Head Road from Ocean Drive to the Canaport Access Road and to Mispic Beach. The TRC members agreed that the maximum ground level concentrations predicted along the road-side are well below provincial ambient standards.

Noise would be generated during the construction from vehicle traffic and construction activities and equipment and during the operation phase of the project. Baseline sound pressure level monitoring was conducted at eight sites from Grandview Avenue along the Red Head Road to Canaport and modelling was undertaken to determine the impacts of noise during construction and operation of the facility. The modelling indicated that during operation, daytime noise would increase slightly from the highest daytime 1-hour equivalent. The rural nature of the area resulted in very low sound levels measured over night. The increase in sound pressure levels during operation at night would be noticeable in comparison to current background levels, but the anticipated sound pressure would be less than a widely used 55 dBA limit. Mitigation such as the tree buffer and a substantial rock wall between the facility and the nearest residences as proposed by Irving would further reduce sound emissions for the residential receptors on Red Head Road.

While it is recognized that construction will be of relatively short duration, the issue of pile driving possibly outside of normal work hours and during quiet nighttime hours without additional mitigation was not acceptable to the TRC. The proponent has committed to plan this activity, where possible, during the daytime and at times of the year when windows would not be open. Additionally, a sound emission mitigation plan would have to be developed in advance of construction to the satisfaction of the TRC. The sound emission mitigation plan would include noise control measures and Irving’s plan to work with area landowners and those at Mispic Beach in the event that a noise nuisance is identified.

Groundwater: Irving has committed to implementing a contingency plan to provide temporary water during construction and to repair or replace any wells found to be permanently damaged, in the events that wells are adversely affected by the Project. The TRC requested specifics for pre-construction well monitoring and itemized actions to be taken by Irving in the event of complaints. Irving has committed to these measures and they are identified in the EIS. The TRC agrees that with the mitigation identified during construction of the pipelines and the LNG terminal, water supplies in proximity to the Project will be adequately protected.

Impacts on the Marine Environment: The conceptual design and construction methodology for the pier changed from the original project description and will likely require

the alteration of the seabed. This alteration will encompass an area approximately 9,375 square meters of the bottom and require the side casting of approximately 25,000 cubic meters of seabed material. In consideration of the magnitude of the alteration it would require an authorization for a harmful alteration, disruption or destruction (HADD) of fish habitat from DFO. Prior to issuance of the HADD authorization, pursuant subsection 35.2 of the Fisheries Act the proponent must prepare a fish habitat compensation for the review and approval of DFO. A Disposal at Sea Permit, under the Canadian Environmental Protection Act will also likely be required from Environment Canada. The Fisheries Act authorization will likely require monitoring and follow-up to verify the predicted effects of the alteration of the seabed and evaluate the effectiveness of mitigation. An analysis of the physical and chemical characteristics of the sediment will be used to determine if any monitoring is required for the Disposal at Sea Permit.

As part of the requirements for the EIA for NB Power's Coleson Cove Refurbishment Project, a comparative ecological risk assessment (CERA) of spills of Orimulsion® vs. fuel oil # 6 in the Bay of Fundy was undertaken. The CERA concluded that due to the behaviour, the biological effect and the reduced toxicological properties of Orimulsion®, the ecological risks to the Bay of Fundy ecosystems were found to be lower than the existing risks of spills from fuel oil #6. Based on these ecological consequences and the reduced probability of spills because of the preventative measures planned (including shipping of Orimulsion® in only double-hulled vessels), the CERA further concluded that the transportation spills of Orimulsion® in the Bay of Fundy present a lower ecological risk to aquatic resources than that which presently exists from shipments of fuel oil #6. NB Power commissioned an addendum to the CERA for the change in fuel delivery from the Canaport monobuoy to the proposed multi-purpose pier. This document was assessed by the TRC during the LNG project EIS review and is referenced in the EIS.

Although a substantial release of LNG in the marine environment has never occurred, the TRC requested the effects of a spill from a marine accident to be assessed. The TRC agreed with the conclusions that during normal operations, no significant adverse environmental effects are likely. The effect of a large volume spill of Orimulsion® and LNG in the event of an accident, malfunction and unplanned event would be significant but, based on the safety record of LNG and Orimulsion® would be very unlikely. The EIS commitments to the safety components of ship navigation and cargo transfers, as well as spill prevention are important mitigation measures.

The Federal Energy Regulatory Commission (FERC), in conjunction with the United States Coast Guard, are currently conducting research to better understand the behaviour of LNG when it is released in the marine environment. As mentioned in the Health and Safety Section below, the proponent will be required to track and review this information with applicable members of the TRC and, where appropriate incorporate it into the Emergency Response Plan and other applicable aspects of facility management.

Freshwater Fish and Fish Habitat: As the details of the project were refined, it was determined the layout of LNG facility would result in the diversion of a section of a watercourse; the Canaport Pond Stream. The watercourse supports fish habitats and the diversion will likely require an authorization for the harmful alteration, disruption or destruction of fish habitat pursuant subsection 35.2 of the Fisheries Act. Prior to issuance of the HADD authorization, the proponent must prepare a fish habitat compensation for the review and approval by DFO. The Fisheries Act authorization will also likely require monitoring and follow-up to assess the effectiveness of mitigation and fish habitat compensation. In addition details have not yet been provided for watercourse crossings associated with pipeline construction. The proponent would be required to submit Site

Specific Environmental Protection Plans for these crossings, which would have to be approved prior to construction.

Terrestrial and Wetland Environments: Wetlands have been avoided where possible in the site selection process. Two wetlands are located within 30 m of the proposed new natural gas pipeline route. The TRC is satisfied with the proposed mitigation, monitoring and follow-up for wetlands and herpetile species.

Migratory Birds: The TRC is satisfied with the proposed mitigation for migratory birds. The EIS states that lighting for LNG storage tanks and the pier will be designed as much as possible to minimize attraction of birds and collisions. In addition to the Follow Up provided in the Chapter 5 of the EIS, the TRC required that Irving would note any bird mortalities that appear to be caused by attraction to lighting or structures and would consult with the Canadian Wildlife Service of EC to discuss other design opportunities or diversion techniques. Updated follow-up is provided in Appendix G of the EIS.

Additionally, it should be noted that the NB Power Coleson Cove Refurbishment EIA approval required that a study would be conducted on the chronic effects of Orimulsion® on adult seabirds and their eggs. The results of that study should be used to update spill response plans, as applicable in the future.

Commercial Fisheries: For safety reasons, Irving has requested a vessel exclusion zone, including commercial fishing activities, from waters near the proposed marine terminal during the construction and operation phases. Irving has had ongoing consultations with local fishermen potentially impacted by this project. A monitoring and follow up program will be required to document any changes in fishing activity in the project area and any unforeseen damage to fishing gear outside the exclusion zones and vessel traffic lanes.

Public Health and Safety: As part of the siting criteria for an LNG facility, provisions must be made for an exclusion zone that takes into account the effects of a fire or vapour dispersion resulting from a malfunction or unplanned event. The exclusion zones are established by modeling the extent of vapour dispersion and thermal radiation based on the proposed facility layout and local environmental conditions. Specific malfunctions and unplanned events that are required to be modeled and the approved modeling techniques are stipulated in *CSA-Z276 Liquefied Natural Gas (LNG) – Production, Storage, and Handling*.

Additionally, the TRC and the public (through the drafting of the Guidelines) requested additional modeling be undertaken. Specifically, it was requested to determine the effects of a worst-case spill scenario situation which was modeled as 1) a ten-minute spill from a 5 cm diameter hole in a process line, 2) a ten-minute spill at the tanker unloading dock via one 41 cm loading arm both onto land and onto water, 3) a 25 000 m³ instantaneous spill of LNG from one LNG tanker compartment into the marine environment, and a 5 m² opening at the waterline in one LNG tanker compartment and 4) a fire in the nearest crude oil storage tank.

The TRC undertook a detailed analysis of the modeling results and is satisfied that the exclusion zones meet the thermal radiation protection distance and flammable mixture dispersion distance requirements of CSA-Z276. It should be noted that one of the thermal flux levels extends on land beyond the Irving owned property. This is the 5 kw/m² value (where a person can experience 2nd degree burns within 30 seconds) from a fire involving the entire LNG storage tank dyke. The Code requires that no area used for outdoor assembly by groups of 50 or more be allowed within this thermal flux level at the time of facility siting. This requirement has been met.

Additionally, the modeling results of the crude oil storage tank fire indicated that there is adequate buffer between the LNG storage tanks and the crude tanks. The non-Code catastrophic, worst-case scenario results of 3) above indicate that the lower flammable limit vapour cloud from such a release could drift downwind over water without ignition for up to 4, 142 m. Although such a marine spill has never occurred in the history of LNG shipments, if such an instantaneous spill were to occur, it would likely be accompanied by an ignition source. This fire would pose an extreme hazard to the crew of the vessels involved, but it would have limited impact on the general public. As mentioned, it is recognized that there is very limited “real world” experience regarding the behaviour and potential impacts of a release of LNG in the marine environment in particular. The TRC has identified research on the behaviour of LNG in the marine environment soon to be released by the United States Coast Guard and the Federal Energy Regulatory Commission (FERC). The TRC has established contacts with the FERC in order to follow the results of this and other emerging research. The proponent will also be required to track and review this information with applicable members of the TRC and, where appropriate incorporate it into the Emergency Response Plan and other applicable aspects of facility management. The TRC has also noted that an alternate access road on the Irving Canaport property should be provided for access in the event of an emergency.

All aspects of the facility design and construction are required to conform to several codes and regulations including the Canadian Standards Association, the National Fire Protection Association, the Society of International Gas Tanker and Terminal Operators, the American Society of Mechanical Engineers, the American Petroleum Institute, and many others. The LNG facility is also subject to the Environmental Emergency Regulations under the *Canadian Environmental Protection Act*.

As a member of the TRC, the City of Saint John Fire Chief has ensured that the proponent has committed to initial and annual training sessions for First Responders, the provision of on-site specialized equipment, and the involvement of the Saint John Fire Department, NB EMO, SJ EMO and the provincial Fire Marshall’s office for all aspects of the development of the Emergency Response Plan. The Plan would include many components including communications procedures, fire emergency protocols and command and control structures. Along with the Emergency Response Plan, the proponent will be developing and implementing the Irving Worker Health and Safety Plan, the Health, Environment and Safety management system, and the Marine Terminal Manual. A number of health and safety issues related to the marine aspects of the LNG facility are discussed in Vessel Navigation.

Land Use: The proposed site for the LNG facility is designated as I-2, Heavy Industrial and the Canaport facility is already zoned to permit construction of a LNG terminal. The TRC will ensure that project mitigation and follow-up monitoring programs will be designed, refined and delivered in concert with area-wide policies, programs, plans and initiatives including, as applicable, municipal land-use plans and the *Coastal Areas Protection Policy for New Brunswick*.

Archaeological and Heritage Resources: Archaeological field-testing was conducted in areas of elevated potential for archaeological resources and underwater video and photographs were examined to determine the existence of shipwrecks. There is the potential that palaeontological resources may be encountered during the pipeline construction and unknown archaeological resources may be identified during the construction of the Project. The report recommends a number of mitigation measures including having a Palaeontologist examine excavated bedrock encountered during construction in an area of high potential, additional archaeological testing or buffers, as appropriate, monitoring of construction activity in areas of elevated potential and development of an EPP which would describe protocol to be undertaken is archaeological/heritage resources are encountered. The

TRC member (Archaeological Services Unit) identified the need to produce mapping and a photographic essay of the World War II military bunker on Mispic Point since the heritage resource may become inaccessible for security reasons if the LNG facility is built. Irving committed to this mitigation measure in the EIS. The TRC is satisfied with the mitigation measures.

Aboriginal Land and Resource Use: - The proponent has undertaken initial consultations with the Union of New Brunswick First Indians. Consultations are ongoing and the proponent will report on the progress to the Responsible Authorities.

Road Transportation Network: A study was undertaken to determine the effects on the existing transportation network from the increased traffic associated with the construction and operation of the Project as part of the EIS. The TRC has no major concerns with the proposed project with regards to traffic safety and road surface damage. The levels of service (LOS) determined for the construction phase of the project at the Bayside Drive/Red Head Road and Red Head Road/Canaport Access Road Intersections appear reasonable. Although the LOS has not been provided for the Red Head Road and only for the intersections along the Red Head Road, the findings that the road network would continue to operate efficiently in consideration of the planned mitigation during the peak construction phase appear sound and reasonable. The mitigation proposed car pooling, staggered shift hours, bussing, marine transport for heavy material and equipment where practical and employee awareness of speed limits.

A section of the Red Head Bluffs located on the south side of the Red Head Road has a long history of slope failures and has threatened adjacent land use (residential). The public has made it clear during the development of the Guidelines for this project and in meetings held since 2001 that there are concerns with additional heavy traffic on the road and fears that this would lead to faster slope failures. The TRC members indicated that they did not have the expertise to evaluate the assertion in the EIS that no additional impact to the road instability would be caused by the construction or operation traffic associated with the project.

The Department of the Environment and Local engaged an independent consultant to undertake this review. The Red Head Road slopes were inspected and an independent stability analysis was carried out based on previous borehole logs and sections. The results of the stability analysis concurred with the proponent's review that the factor of safety of existing slopes is close to 1.00 meaning that the zone is inherently unstable. This means that natural erosion at the toe of the slopes combined with or without heavy precipitation will result in slope instability. The independent consultant further considered a hypothetical traffic load on the edge of the slope to investigate how close to the road the natural erosion could progress before the traffic load would render the road unstable. The results of the investigation confirmed the EIS statement that "...the loading by vehicles is negligible as compared to the static load of soil comprising the land between the road and the shore". The independent analysis showed that this is true even if the slope were eroded as far as to the shoulder of the road.

Labour and Economy: The TRC is in agreement that the economic stimulus and employment generated by the Project will benefit local area residents, provincial unions, the construction industry, the business community and the Province of New Brunswick in accordance with the *N.B. Energy Policy*.

Vessel Navigation: The members of the TRC with a mandate for the marine environment and shipping have, during the EIS review, required a number of important additional elements be included in the EIS and others would be forthcoming if the facility were approved. The potential for marine accidents and spill scenarios were required for inclusion in the EIS. A Marine Terminal Manual would be prepared to outline the specific procedures

to be used to manage marine vessel traffic associated with the Project in Saint John Harbour and at the pier and to ensure all applicable navigation rules and regulations are met. An underkeel survey would also be completed as part of the development of the Marine Terminal Manual and marine safety procedures. The issue of available tug capacity was raised as a concern both publicly and by the TRC. Irving has advised that larger capacity tugs would be available and that the number and size of tugs required would be finalized during the development of the Manual. The draft of the Marine Terminal Manual would be submitted no later than six months in advance of pier operation for the review and approval of a number of federal agencies. It should be noted that Irving provided design inputs for the multi-purpose pier to Transport Canada Marine Safety during the review of the EIS. For the purposes of the EIS review, a LNG vessel exclusion zone of 200 metres was accepted for when the LNG ships travel through the Bay of Fundy, as well as around the pier during unloading of LNG or Orimulsion. Further consultation would have to occur to determine the exact size of these exclusion zones.

Dense fog, rain, snow and high winds in the Bay of Fundy would have an effect on the project operations. The Atlantic Pilotage Authority/Saint John Harbour Pilots want to ensure procedures would be in place to ensure safe navigation of vessels to and from the pier under varying weather and sea conditions, including consideration of externalities including the proximity of a Very Large Crude Carrier (VLCC) at the monobuoy. As such, they requested that the proponent undertake a simulation exercise for the proposed pier. A simulator of the jetty area would be built using local input (e.g. weather, currents, tides), which would allow the Pilots to physically simulate the navigation of virtual ships to and from the proposed pier. This simulation exercise would help to finalize the marine terminal and navigational procedures, such as when vessels can safely berth and depart including well defined wind, visibility and sea conditions that must be observed. The TRC members have indicated that this simulation exercise must be completed in advance of development of the Marine Terminal Manual so that any concerns with the movement of vessels, in and around the proposed pier and the monobuoy terminal can be addressed. If the project is approved, the TRC has indicated that the simulation exercise must be completed before the issuance of the Navigable Waters Protection Act Approval.

Prior to any shipments of Orimulsion[®] or LNG into the Bay of Fundy, there are also other elements which would need to be submitted and approved by various federal agencies. A spill response plan to conduct the initial response in the event of an incident at the pier would be required from Irving as the operator of the Oil Handling Facility. Additionally, Irving would have to ensure that the Certified Response Organization, the Atlantic Emergency Response Team (ALERT) has a Response Plan in order to respond to a spill. These plans are requirements under the Canada Shipping Act.

Transport Canada-Marine Safety administers the Termopol Review Process (publication TP743E), which enables an in-depth assessment of shipping, navigation and transshipment aspects of marine terminal systems for the bulk handling of oil, chemicals and liquefied gases. The establishment of effective mitigating action and contingency planning to protect the environment are required. It is noted that the review of the marine transportation components of this EIA was done in accordance with the standards of the Termopol Review Process.

Effects of Environment on the Project: Irving has committed to building the LNG facility to nationally accepted guidelines for construction. Natural Resources Canada (NR Canada) has indicated that more stringent design standards may be required for the LNG terminal with respect to earthquakes and may be recommending additional conditions if the facility is

approved. NR Canada further recommends that site instrumentation for seismic ground motions be a condition to allow quick engineering evaluation of the shaking in the event of a strong earthquake. This instrumentation is required by US and Canadian Standards.

3. SUMMARY

It is concluded that the EIA Report is a satisfactory document on which to base a public discussion of the Project and its impacts.