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April 28, 2015

The Honourable Leona Aglukkaq, M.P.
Minister of the Environment
Ottawa, Canada K1A 0H3
By email: Minister@ec.gc.ca

Dear Madam Minister:

Re: Woodfibre LNG Project and LNG Shipping in Howe Sound, B.C.

I represent *My Sea to Sky*, a volunteer organization of citizens opposed to the Howe Sound, B.C., location of the proposed Woodfibre LNG project and associated LNG shipping. I am writing to formally request that you reconsider and rescind your February 19, 2014 Substitution Decision under which the B.C. environmental assessment of the Project is substituted for federal environmental assessment under the *Canadian Environmental Assessment Act, 2012*.

The Substitution Decision requires the BC EA process to consider the environmental effects of the Project and associated LNG shipping, including the effects of accidents and malfunctions. The pre-eminent environmental issue that must be considered under *CEAA 2012* is whether Woodfibre in Howe Sound is an appropriate location given the fact that the LNG shipping lane is in extremely close proximity to heavily populated areas, such as West Vancouver and Bowen Island, and to major public transportation routes, such as the Sea to Sky Highway and BC Ferries to and from Horseshoe Bay. This crucial issue has not been – and will not be – examined properly or at all in the BC EA process.

The attached map shows the Woodfibre site and the LNG carrier route in Howe Sound. The red-shaded area, the solid red line, and the dotted red line show the recognized Hazard Zones 1, 2 and 3, respectively.

As detailed below, the B.C. environmental assessment of the Project is not meeting the basic legal conditions of the Substitution Decision and *CEAA 2012* in two main respects. First, the B.C. process is failing to address the well documented risk of catastrophic effects of an LNG spill due to an accident or malfunction regarding LNG shipping in Howe Sound. Second, the B.C. process is failing to provide public participation in this aspect of the assessment. In addition, the Substitution Decision itself violates *CEAA 2012* because it excludes assessment of LNG shipping between Howe Sound and the Pacific Ocean.

I. Outline

This letter begins in Part II with a description of the Woodfibre LNG Project, the Proponent, and the SIGTTO (industry association) siting criteria as they relate to the Project.

The extent of public opposition about the Project is discussed in Part III.

In Part IV, there is a discussion of the consequences of an LNG spill over water, and the hazard zones method of analysis applied to the siting of LNG facilities and shipping in the U.S.

The statutory framework and the Substitution Decision are outlined in Part V.

In Part VI, three grounds for the requested rescission are stated, and the argument is set out in detail.

Part VII is a brief conclusion.

II. The Woodfibre LNG Project

A. The Project

The proponent proposes¹ to construct and operate a liquefied natural gas production and export facility at a site (“Woodfibre”) on the west side of Howe Sound, approximately 7 km west-southwest of Squamish, B.C. The facility would have a permanently moored storage and offloading unit (comprised of two immobile LNG carriers) with a capacity of 250,000 m³ (171,000 tonnes) of LNG.² There would be a marine mooring facility for one LNG marine carrier, having a maximum capacity of 180,000 m³ (123,000 tonnes) of LNG.

The marine shipping component involves loaded LNG carriers leaving the Woodfibre terminal in Howe Sound, proceeding south adjacent to the Sea to Sky Highway, past communities such as Lions Bay, through Queen Charlotte Channel between Bowen Island and West Vancouver/Horseshoe Bay (community and ferry terminal),³ past Passage Island at the entrance to Howe Sound, into the Strait of Georgia adjacent to English Bay in Metro Vancouver, west through Boundary Pass and the Gulf Islands, through Haro Strait, through the Juan de Fuca Strait past Victoria (between Vancouver Island and the Olympic Peninsula), past Buoy J⁴ and into the Pacific Ocean. Incoming LNG carriers would thread the same route.

B. The Proponent

The Project proponent is Woodfibre LNG Limited, which is wholly owned by Pacific Oil & Gas Limited, an energy company within the RGE group of companies, headquartered in Singapore.⁵

¹ Woodfibre LNG Project Application and Supporting Studies (Application), http://a100.gov.bc.ca/appsdata/epic/html/deploy/epic_project_doc_list_408_r_app.html

² Future expansion of the proposed Woodfibre LNG Project and associated shipping is possible and this a concern of *My Sea to Sky*. However, terminal expansion is not the subject of the current environmental assessment.

³ As shown on the attached map, the proponent has also designated a Route B through Collingwood Channel on the east side of Bowen Island, between Bowen Island and Keats Island. However, the proponent says Route B will not be used.

⁴ Buoy J marks the western end of the shipping route that is included in the environmental assessment of the Kinder Morgan Trans Mountain Pipeline Expansion Project now being conducted by the National Energy Board under *CEAA 2012* and other statutes.

⁵ Application, Executive Summary, p.2.

Neither Woodfibre LNG Limited nor the RGE group of companies has ever built or operated an LNG terminal before.

Significantly, Woodfibre LNG Limited is *not* a member of the Society of International Gas Tanker and Terminal Operators (SIGTTO).⁶ SIGTTO is the well-respected international industry organisation whose members are responsible for most of the LNG terminals and shipping in the world. SIGTTO provides criteria for best practices and acceptable standards.

C. SIGTTO LNG Siting Criteria

Safety is a prerequisite for the viability of the LNG industry. SIGTTO states: “Bearing in mind the high commercial exposures within LNG projects, the need to maintain its [the LNG industry’s] good safety record is vital to all companies concerned.” SIGTTO credits “LNG’s excellent safety record” to LNG industry expertise and adherence to rigorous standards regarding terminal siting decisions, as well as terminal design and operations. Accordingly, SIGTTO has published site selection guidelines for LNG terminals, which it describes as, “important matters which should be dealt with when choosing the location of a new terminal.”⁷

Notably, the Woodfibre location does not meet many of the critical standards SIGTTO recommends for siting a new LNG terminal. For example:

- SIGTTO: “Short approach channels are preferable to long inshore routes which carry more numerous hazards.”⁸ The shipping route to and from Woodfibre is certainly a “long inshore route.”
- SIGTTO: “Essential design for a safe jetty: find a location suitably distant from centres of population.”⁹ The Woodfibre site and LNG shipping route is extremely close to populated areas, BC Ferries routes and the Sea to Sky Highway.
- SIGTTO: “Traffic separation schemes should be established in approach routes covering many miles.”¹⁰ The Woodfibre LNG proposal is to use the established commercial lane along with all other vessels.
- SIGTTO: “Anchorages should be established at the port entrance and inshore, for the safe segregation of LNG carriers and to provide lay-by facilities in case, at the last moment, the berth becomes unavailable.”¹¹ Howe Sound is generally a deep water area with no commercial anchorages.
- SIGTTO: “[P]ositioning an LNG terminal on the outside of a river bend raises the risk that a passing ship may strike the berthed carrier if the manoeuvre is not properly executed. This is possible because at some point on the bend, the manoeuvring ship must

⁶ <http://sigtto.org/>

⁷ “Site Selection and Design for LNG Ports and Jetties,” SIGTTO Information Paper No. 14, January 1997, reprinted August 2000, page 2. Accessible at <http://kitchenimage.typepad.com/files/sigtto-standards.pdf>

⁸ *Ibid.*, pdf p.26.

⁹ *Ibid.*, p.12.

¹⁰ *Ibid.*

¹¹ *Ibid.*

head directly at the berthed LNG carrier... It follows, therefore, that building a jetty in such locations is normally considered unsuitable.”¹² The Woodfibre site is on the outside of the bend in the shipping lane in Howe Sound to and from Squamish Terminals at the head of Howe Sound (see enclosed map).

The SIGTTO siting document makes clear that it may be impossible to create an effective contingency plan for a large LNG spill if the terminal or shipping lane is close to a populated area. After discussing the general desirability of contingency plans, SIGTTO states:

“But, in some circumstances, such as a large LNG release close to a populated area, it may be impossible to devise a realistic contingency plan because of the nature of the problem.”¹³

SIGTTO continues:

“Herein lies a conundrum which may only be resolved by further reducing the chance of a major release by designing-out the problem.”¹⁴

In other words, where the site is the problem, “designing-out the problem” means choosing a different site.

It would be one thing if the BC EA process was delving deeply into whether Woodfibre is or is not an acceptable site for a new LNG terminal. However, the key point for present purposes is that the B.C. environmental assessment process is *not* conducting an examination of whether the Woodfibre LNG Project does or does not meet the SIGTTO LNG terminal siting recommendations, U.S. Coast Guard criteria (discussed below), or any other LNG terminal siting criteria for that matter.

III. Public opposition

The environmental assessment of the proposed Woodfibre LNG Project occurs in the context of growing public controversy about the location of the proposed terminal and shipping route. It is understood that there have been more than 1700 written public comments to the BC EA Office on proposed Project, the vast majority expressing concern about the Project and about weaknesses and flaws in the environmental assessment of the Project.¹⁵

Reflecting this public concern, local governments have passed the following resolutions:

- District of West Vancouver, July 21, 2014: “to write to the federal government with a suggestion to ban the passage of LNG tankers in the waters of Howe Sound.”¹⁶
- District of West Vancouver, September 8, 2014: “City council reaffirms its earlier unanimous ban on tankers in Howe Sound.”¹⁷

¹² *Ibid.*, p.7.

¹³ *Ibid.*, p.5 (pdf p.8 of 28), underline added.

¹⁴ *Ibid.*, p.5 (pdf p.8 of 28), underline added.

¹⁵ For example, for the period January 22 to March 23, 2015, the B.C. Environmental Assessment Office website indicates receipt of some 820 pages of public comments.

¹⁶ <http://westvancouver.ca/news/council-briefs-july-21>

- Village of Lions Bay, May 20, 2014: “the Village of Lions Bay urges the federal government to ban the passage of LNG tankers in the waters of the Malaspina, Georgia, Juan de Fuca and Haro Straits, and Boundary Pass.”¹⁸
- Town of Gibsons, July 15, 2014: “Gibsons Council urge the federal government to ban the passage of LNG tankers in the waters of Howe Sound and the Georgia Strait, and to request the support of other communities around the Howe Sound to support this resolution.”¹⁹
- District of Squamish, January 20 2015: “Council votes no to LNG pipeline test drilling in Squamish estuary.”²⁰
- Bowen Island Municipality: February 23, 2015: “BIM Council write to the provincial government with a suggestion to ban the passage of LNG tankers in the waters of Howe Sound. Carried.”²¹

IV. LNG Terminal Siting, Risks and Criteria

A. Consequences of an LNG spill over water

Risk consists of the combination of event frequency and event consequence. In *siting* an LNG terminal and shipping route, one of the most important risks that must be examined is the risk of a large LNG spill over water causing injury to the public and damage to property. This is a risk characterized by low event frequency and severe event consequence. Each component of the risk (frequency and consequence) must be considered separately, and in combination with each other.

Concerning the *consequences* of a large LNG spill over water, the seminal scientific document is a 2004 report from Sandia National Laboratories (2004 Sandia Report),²² sponsored by the U.S. Department of Energy. The purpose of the report was to “develop guidance on a risk-based analysis approach to assess and quantify potential threats to an LNG ship, the potential hazards and consequences of a large spill from an LNG ship, and review prevention and mitigation

¹⁷ <http://westvancouver.ca/sites/default/files/dwv/council-minutes/2014/Sept/14sept08%20copy2.pdf>

¹⁸

<http://files.lionsbay.ca/2014%20Content/Council/Minutes/20140520%20Regular%20Meeting%20Minutes%20-%20signed.pdf>

¹⁹ <http://www.gibsons.ca/include/get.php?nodeid=811>

²⁰ <http://www.squamishchief.com/news/local-news/council-votes-no-to-fortis-drilling-1.1737742>

²¹ <http://bowenisland.civicweb.net/Documents/DocumentDisplay.aspx?Id=59416>
http://www.livestream.com/bowenislandmunicipalhall/video?clipId=flv_ce2d0178-0cb1-4a9f-a0fb-97cbf7324121

²² “Guidance on Risk Analysis and Safety Implications of a Large Liquefied Natural Gas (LNG) Spill Over Water,” Mike Hightower, Louis Gritzko, Anay Luketa-Hanlin, John Covan, Sheldon Tieszen, Gerry Wellman, Mike Irwin, Mike Kaneshige, Brian Melof, Charles Morrow, Don Ragland, Sandia Report, SAND2004-6258. http://www.energy.ca.gov/lng/documents/2004-12_SANDIA-DOE_RISK_ANALYSIS.PDF.

strategies that could be implemented to reduce both the potential for and the risks of an LNG spill over water.”²³

In storage, LNG is a cryogenically cold liquid (about -162°C) at atmospheric pressure. The Sandia Report states that “Following a tank breach or other spill event, depending on the size and location, LNG can be expected to spill onto or into the LNG ship itself, escape through a breach onto the water surface, or both.”²⁴ Spilled LNG (while still liquid) is more dense than air and lighter than water (i.e., it floats). The LNG disperses over the ocean surface, absorbing heat from the water and air, freezing the surface of the water.

To clarify, there is a myth that spilled LNG is not a safety hazard because LNG does not burn. This is dangerously incorrect. Spilled LNG does not burn when it is still in liquid form (though it will cause cryogenic burns and structural damage, discussed below). However, the LNG warms up as it spreads over the water’s frozen surface. When the LNG reaches its boiling point of approximately -160°C the liquid turns into a gas (natural gas). The natural gas mixes with air and absorbs water vapour, creating a low-hanging white vapour cloud with a density 1.5 times that of air. When natural gas forms a high proportion of the vapour cloud the cloud is not flammable. However, as the vapour cloud disperses the natural gas component declines and when the proportion of natural gas reaches 15% the vapour cloud is highly flammable. The vapour cloud remains flammable until the natural gas proportion dilutes to less than 5%. A vapour cloud from spilled LNG may disperse a significant distance (e.g., more than a mile) before encountering an ignition source. Hence the threat to West Vancouver, Bowen Island, Lions Bay and other communities, in the case of a spill from an LNG carrier from Woodfibre.

In the event of an LNG spill, there are three main potential physical outcomes:

- the LNG disperses without a fire;
- the LNG burns as a pool fire²⁵ (very intense heat in the location of the liquid/boiling LNG), and/or
- the LNG burns as a vapour fire (flash fire, typically burning back and causing a pool fire at the source).²⁶

The Sandia Report discusses the following types of hazards of an LNG spill over water.

Regarding “Asphyxiation,” the Report states that “If the vaporizing LNG does not ignite, the potential exists that the LNG vapor concentrations in the air might be high enough to present an asphyxiation hazard to the ship crew, pilot boat crews, emergency response personnel, or others that might be exposed to an expanding LNG vaporization plume.”²⁷

²³ *Ibid.*, p.13.

²⁴ *Ibid.*, p.37.

²⁵ No one disagrees that Liquefied Natural Gas does not burn when it is still cold enough to be liquefied. It is technically correct to say that LNG does not burn. However, it is common, even in the technical literature such as the Sandia Reports, to see references to LNG fires, LNG burning, LNG combustion, etc., which are understood in context to mean LNG that has warmed to become gaseous natural gas that burns.

²⁶ *Ibid.*, p.37.

²⁷ *Ibid.*

Regarding “Cryogenic Burns and Structural Damage,” the Report states:

“The very low temperature of LNG suggests that a breach of an LNG cargo tank that could cause the loss of a large volume of liquid LNG might have negative impacts on people and property near the spill, including crewmembers or emergency personnel. If LNG liquid contacts the skin, it can cause cryogenic burns. Potential degradation of the structural integrity of an LNG ship could occur, because LNG can have a very damaging impact on the integrity of many steels and common ship structural connections, such as welds. Both the ship itself and other LNG cargo tanks could be damaged from a large spill.”²⁸

Regarding “Combustion and Thermal Damage,” the Report provides a technical discussion of “thermal and/or pressure loading” from an LNG spill, noting that “heat flux levels approaching 35 kW/m² will cause significant damage to structures, equipment, and machinery.” The Report drily concludes: “combustion and thermal damage from a fire can have severe consequences and should be carefully and thoroughly analyzed.”²⁹

Regarding an LNG “fireball,” the Report explains that “Ignition of a vapor cloud will cause the vapor to burn back to the spill source.”³⁰ The Report says “This is generally referred to as a ‘fireball’,” which it distinguishes from an explosion.

In other circumstances, an LNG spill may lead to an “LNG air explosion.” The Report states:

“Certain conditions, however, might cause an increase in burn rate that does result in overpressure. If the fuel-air cloud is confined (e.g., trapped between ship hulls), is very turbulent as it progresses through or around obstacles, or encounters a high-pressure ignition source, a rapid acceleration in burn rate might occur [Benedick et al. 1987].”³¹

A “rapid phase transition” is another potential consequence of an LNG spill. The Report explains:

“Rapid Phase Transitions occur when the temperature difference between a hot liquid and a cold liquid is sufficient to drive the cold liquid rapidly to its superheat limit, resulting in spontaneous and explosive boiling of the cold liquid. When a cryogenic liquid such as LNG is suddenly heated by contacting a warm liquid such as water, explosive boiling of the LNG can occur, resulting in localized overpressure releases.”³²

The 2004 Sandia Report was updated in a 2008 Sandia Report³³ to take into account the larger sized LNG carriers and new technical information.

²⁸ *Ibid.*

²⁹ *Ibid.*

³⁰ *Ibid.*

³¹ *Ibid.*

³² *Ibid.*

³³ “Breach and Safety Analysis of Spills Over Water from Large Liquefied Natural Gas Carriers,” Anay Luketa, M. Michael Hightower, Steve Attaway, Sandia Report, SAND2008-3153, May 2008. Accessible at

B. Hazard Zones

One of the main contributions of the Sandia Reports of 2004 and 2008 is the identification of hazard zones for use in analyzing the LNG terminal and shipping risks. These hazard zones extend from the terminal itself and from the LNG carrier as it follows its defined route. The zones are concentric circles of 500 m, 1,600 m and 3,500 m.

The 2004 Sandia Report states:

“The most significant impacts to public safety and property exist within approximately 500 m of a spill, due to thermal hazards from fires, with lower public health and safety impacts at distances beyond approximately 1600 m.”³⁴

Perhaps surprisingly, the absence of an ignition source close to an LNG spill can actually exacerbate the problem because a cloud of vaporized natural gas can travel some distance before encountering a source of ignition. The 2004 Sandia Report states:

“Large, unignited LNG vapor releases are unlikely. If they do not ignite, vapor clouds could spread over distances greater than 1600 m from a spill.”³⁵

And:

“... a vapor cloud from an LNG spill could extend to 2,500 m, if an ignition source is not available. The potential thermal hazards within a vapor cloud could be high. Because vapor cloud dispersion is highly influenced by atmospheric conditions, hazards from this type of event will be very site-specific.”³⁶

For the Woodfibre LNG Project and shipping, a hazard range of 2500 m includes heavily populated areas of West Vancouver as well as populated areas of Bowen Island, Lions Bay, Bowyer Island, Anvil Island, large numbers of people using BC Ferries and the Sea to Sky Highway, well used campgrounds in Howe Sound, and populated areas of the Gulf Islands along the LNG carriers' route to the ocean.

The three Sandia zones of concern, as well as many other relevant criteria, have been adopted by the Department of Homeland Security and the United States Coast Guard. Proponents must conduct a “Waterway Suitability Assessment” (WSA) in determining the suitability of the location of any new waterfront LNG facility requiring Federal Energy Regulatory Commission (FERC) approval.³⁷ The Coast Guard's Guidance Document states:

http://www.energy.ca.gov/2Flng/2Fdocuments/2F2008-09-11_SANDIA_2008_Report.PDF

³⁴ 2004 Sandia Report, p.73, underline added.

³⁵ 2004 Sandia Report, p.15, underline added. In the nominal intentional spill the size of the assumed breach is larger than in the nominal accidental spill, resulting in a larger volume of LNG being spilled.

³⁶ *Ibid.*, p.20

³⁷ “Guidance Related to Waterfront Liquefied Natural Gas (LNG) Facilities,” Navigation and Vessel Inspection Circular (NVIC) NO. 01-2011, U.S. Department of Homeland Security and United States Coast Guard.

<https://www.uscg.mil/2Fhq/2Fcg5/2Fnvic/2Fpdf/2F2011/2FNVIC%252001->

“Zones of Concern... should be applied to the length of the transit to determine the main areas of concern along the waterway. The WSA should include graphics that depict the outer perimeter of the zones along the entire LNG vessel transit route, in order to assess what port and community features fall within them.”³⁸

Also to be considered in the WSA are waterfront community demographics³⁹ and population density.⁴⁰

It should also be noted that in addition to the ‘zones of concern’ analysis, the 2004 Sandia Report states that “Where analysis reveals that potential impacts on public safety and property could be high and where interactions with terrain or structures can occur, modern, validated computational fluid dynamics (CFD) models can be used to improve analysis of site-specific hazards, consequences, and risks.” Both these conditions – potential impacts on public safety and property, and significant terrain – apply in the Woodfibre LNG situation. However, the B.C. environmental assessment is apparently not using any CFD (plume dispersion) modeling.

V. CEAA 2012 and the Substitution Decision

A. Statutory Framework

Subsection 32(1) of *CEAA 2012* requires the Minister to approve substitution where the Minister is of the opinion that a provincial EA process “that has powers, duties or functions in relation to an assessment of the environmental effects of a designated project would be an appropriate substitute,” subject to section 33 (not relevant here) and section 34.

Subsection 34 of *CEAA 2012* provides an explicit limitation on the Minister’s statutory authority to approve a substitution. It states:

- 34.** (1) The Minister may only approve a substitution if he or she is satisfied that
- (a) the process to be substituted will include a consideration of the factors set out in subsection 19(1);
 - (b) the public will be given an opportunity to participate in the assessment;
 - (c) the public will have access to records in relation to the assessment to enable their meaningful participation;
 - (d) at the end of the assessment, a report will be submitted to the responsible authority;
 - (e) the report will be made available to the public; and
 - (f) any other conditions that the Minister establishes are or will be met.

[2011%2520Final.pdf&ei=FDkzVcqNM5W6ogSLv4D4Dg&usg=AFQjCNE_gq0koh75IUqcCOOfjh_CR2nleQ&sig=2=Du5ku_YoBzMcgL4u03LOcw&bvm=bv.91071109,d.cGU](#)

³⁸ *Ibid.*, pdf p.22.

³⁹ *Ibid.*, section 2(h), pdf p.22.

⁴⁰ *Ibid.*, section 2(i), pdf p.22.

My submission is that the B.C. environmental assessment of the proposed Woodfibre LNG Project violates several of the requirements of section 34 of *CEAA 2012* and therefore the Substitution Decision should be rescinded.

B. The Substitution Decision for EA of the Woodfibre LNG Project

The proposed Woodfibre LNG Project requires a federal environmental assessment under *CEAA 2012* because the Project activities exceed thresholds in *CEAA 2012 Regulations Designating Physical Activities* schedule section 14(d).⁴¹

The proposed Woodfibre LNG Project also requires environmental assessment under the B.C. *Environmental Assessment Act*.

By letter of November 27, 2013, an official of the B.C. Environmental Assessment Office (EAO) wrote to the President of the Canadian Environmental Assessment Agency (Agency). Pursuant to section 3 of the 2013 Memorandum of Understanding on Substitution of Environmental Assessments (MOU) between the EAO and the Agency,⁴² the EAO requested substitution under *CEAA 2012* of the environmental assessment of the proposed Woodfibre LNG Project. The request states B.C.'s commitment that "If substitution is approved by Minister Aglukkaq, British Columbia commits to fulfil the conditions for substitution under *CEAA 2012* in accordance with section 4 of the MOU."

On February 19, 2014, you, as the (federal) Minister of the Environment, wrote to B.C. Minister of Environment Mary Polak, informing her of your decision under *CEAA 2012* to approve substitution of the BC EA of the Project for the federal EA (Substitution Decision). The Substitution Decision sets out the following conditions:

"The Minister approves the substitution request given that B.C. has committed to meeting the following conditions:

- The designated project to be assessed is the construction, operation and decommissioning of a liquefied natural gas facility, marine terminal and any incidental physical activities, including marine shipping activities up to Passage Island.
- The substituted process will include a consideration of the factors set out in subsection 19(1) of *CEAA 2012*.
- B.C. will ensure that any Orders under sections 11, 13 and 14 or 15 of B.C.'s *Environmental Assessment Act* require the subsection 19(1) factors.
- The public will be given an opportunity to participate in the environmental assessment.

⁴¹ Specifically, the Project includes the construction, operation, and decommissioning of a new facility for the liquefaction, storage, or regasification of LNG, with an LNG processing capacity of 3,000 metric tonnes per day or more, or a LNG storage capacity of 55,000 metric tonnes or more. Source: Application, Executive Summary, p.14.

⁴² http://www.eao.gov.bc.ca/pdf/EAO_CEAA_Substitution_MOU.pdf

- The public will have access to records in relation to the environmental assessment to enable their meaningful participation.
- At the end of the environmental assessment, B.C. will submit a report to the Agency that includes the findings and conclusions of the environmental assessment with respect to the factors as set out in subsection 19(1) of CEAA 2012.
- The report will be made available to the public.”

The Minister has also established the following additional conditions for this project:

- B.C. will involve expert federal authorities in the B.C. process.
- B.C. will provide the environmental assessment report to the Agency within a time frame that will enable the Minister to make decisions under subsection 52(1) of CEAA 2012 within the time limits set out in CEAA 2012. ...”⁴³

On May 29, 2014, the Regional Director of the Canadian Environmental Assessment Agency, Pacific and Yukon Region, wrote to the BC EAO, stating:

“The Substitution Decision identifies that the designated project to be assessed is the construction, operation and decommissioning of a liquefied natural gas facility, marine terminal and any incidental activities, including marine shipping activities. In respect of marine shipping activities, and for the purposes of the federal Minister of the Environment’s EA Decision under CEAA 2012, I would like to clarify that the scope of this component includes marine shipping activities from the liquefied natural gas facility and marine terminal site to Passage Island at the entrance to Howe Sound.” [underline added]

Presumably, the purpose of this clarification is to specify that where the Substitution Decision states that for the purposes of EA the Project includes “marine shipping activities up to Passage Island” [underline added] it means marine shipping activities between the proposed LNG terminal and Passage Island; not between the open ocean and Passage Island.

In summary, key legal requirements of the Substitution Decision include:

- The environmental effects must include the effects of accidents and malfunctions concerning LNG storage and shipping.
- The public must have an opportunity to participate in the environmental assessment.
- The assessment must include the environmental effects of LNG shipping in Howe Sound, but excludes the environmental effects of LNG shipping between Howe Sound and the Pacific Ocean (i.e., Buoy J).

⁴³ The Substitution Decision also includes additional conditions regarding consultation with Aboriginal groups.

VI. Rescission of the Substitution Decision

A. Grounds

The B.C. environmental assessment of the proposed Woodfibre LNG Project fails to meet the requirements of section 34 of *CEAA 2012* in the following respects:

1. The BC EA process does not, properly or at all, examine the environmental effects of accidents and malfunctions regarding the LNG shipping component of the Project, contrary to *CEAA 2012*, s.34(1)(a) and s.19(1) and the Substitution Decision, second bullet.
2. The BC EA process excludes members of the public from the Working Group, which conducts the core of the assessment of the Application, contrary to the requirement of *CEAA 2012*, s.34(1)(b) and the Substitution Decision, fourth bullet, that the public will be given an opportunity to participate in the environmental assessment. And, the BC EA process delays public access to crucial assessment information (via Internet posting) being considered by the Working Group, contrary to the requirement of *CEAA 2012*, s.34(1)(c) and the Substitution Decision, fifth bullet, that the public will have access to records in relation to the environmental assessment to enable their meaningful participation.
3. The Substitution Decision violates *CEAA 2012*, s.34(1)(a) by excluding from the substituted process an assessment of the environmental effects of LNG shipping, associated with the Woodfibre LNG Project, between Howe Sound and the Pacific Ocean.

These points are elaborated upon in the paragraphs that follow.

B. Argument

1. Failure to address accidents and malfunctions

The BC EA process is fundamentally deficient in examining the environmental effects of accidents and malfunctions of the LNG storage and shipping aspects of the proposed Project, particularly in relation to determining whether Woodfibre is or is not a suitable site.

First, the Application, which is the information on which the assessment is supposed to be conducted, contains no systematic analysis of the suitability of the Woodfibre site and no mention of the world-recognized SIGTTO LNG siting criteria, the Department of Homeland Security/U.S. Coast Guard waterfront LNG siting criteria, or any other LNG siting criteria. Nor is the BC EA process using any form of ‘zone of concern’ analysis regarding the proposed terminal and LNG shipping lane. This is completely inconsistent with current best regulatory practices. For example, as discussed above, for LNG terminal siting processes under the U.S. Federal Energy Regulatory Commission, the Homeland Security/Coast Guard guidelines⁴⁴ utilize three concentric zones of concern⁴⁵ based on the 2004 Sandia Report.

The U.S. guidelines require a map depicting the outer perimeter of the zones along the entire LNG vessel transit route, in order to assess what port and community features fall within the zones. The map produced for *My Sea to Sky*, attached to this letter, shows that:

⁴⁴ NVIC-01-2001, www.uscg.mil/hq/cg5/nvic/pdf/2011/NVIC%2001-2011%20Final.pdf

⁴⁵ *Ibid.*, pdf p.22.

- Hazard Zone 1 (within 500 m) intersects the heavily utilized channel between the Horseshoe Bay Ferry Terminal and Bowen Island;
- Hazard Zone 2 (within 1,600 m) takes in a segment of the Sea to Sky Highway, the community of Furry Creek, the popular Porteau Cove Provincial Park campsite, Bowyer Island, parts of Bowen Island and parts of Keats Island (if Route B is used) and parts of the communities of Horseshoe Bay and West Vancouver; and
- Hazard Zone 3 (within 3,500 m) includes Murrin Provincial Park, Britannia Beach, most of the Furry Creek residential development, Anvil Island, most of the Village of Lions Bay, Halkett Bay Provincial Park, much of Bowen Island, and considerable portions of the District of West Vancouver.

I submit that by not using any form of ‘zone of concern’ analysis the BC EA process is in effect failing to conduct an assessment of the effects of accidents and malfunctions of the Project, contrary to *CEAA 2012* and the Substitution Decision.

Second, the Application’s purported *risk assessment* regarding accidents and malfunctions⁴⁶ is completely inadequate. After stating the truism that “The likelihood of LNG release is rare,”⁴⁷ the Application makes the absurd statement that: “The consequences [of an LNG spill] to humans or ecological receptors are anticipated to be negligible to minor, excluding fire [?!], which is addressed in Section 11.3.8”⁴⁸

In Section 11.3.8, the Application states:

“Fires and explosions could also be associated with an LNG carrier. Normally, such fires or explosions would not lead to loss of containment. However, should an explosion occur that leads to an LNG tank failure, it could result in an LNG release from one cargo tank, and in the worst case, all cargo tanks. In this scenario, the LNG would be ignited close to the vessel so dispersion of a flammable gas vapour cloud would not be anticipated.”⁴⁹

So, having nominally acknowledged that in a worst case scenario LNG would be released from *all* the cargo tanks on an LNG carrier (maximum capacity of 180,000 m³), the Application somehow finds comfort that “dispersion of a flammable gas vapour cloud would not be anticipated” – why? – because instead “the LNG would be ignited close to the vessel.” To state the obvious, either outcome – an immediate LNG pool fire, or a wind-blown vapour plume followed by a fireball followed by a pool fire – would have severely negative consequences “to humans or ecological receptors,” not the “negligible to minor” consequences the Application claims.

⁴⁶ Application, Section 11, Accidents and Malfunctions, at http://a100.gov.bc.ca/appsdata/epic/documents/p408/d38525/1421093684707_KQQVJ0PJSG1lcH9LDD8L1J0CQhQw7NgD32kZQsvpHsxWNdyq1qCg!1378338455!1421086505978.pdf; Appendix 11-1 Preliminary Quantitative Risk Assessment, at http://a100.gov.bc.ca/appsdata/epic/documents/p408/d38525/1421101345723_KQQVJ0PJSG1lcH9LDD8L1J0CQhQw7NgD32kZQsvpHsxWNdyq1qCg!1378338455!1421086505978.pdf.

⁴⁷ Is there a type of catastrophic event that is not rare?

⁴⁸ Application, p.11-38, underline added.

⁴⁹ Application, p.11-46, underline added.

Furthermore, the proponent's bald assumption that LNG spilled from a carrier would *necessarily* ignite close to the vessel is plainly wrong.⁵⁰ The Sandia Reports (discussed above), endorsed by the U.S. Coast Guard, are quite clear that LNG siting analysis must include the possibility that an LNG spill over water creates a vapour plume that could travel 2,500 m or more before ignition, the creation of a fireball, a flash back to the source, and then a pool fire at the spill site.

At a higher level of analysis, the crucial deficiency is that the BC EA process is working with an Application that brazenly dismisses a spill of the entire contents of an LNG carrier as being of "negligible to minor" consequence to humans (or "ecological receptors") and therefore makes no attempt whatsoever to address meaningfully whether the location of the Woodfibre site and LNG shipping route in proximity to populated areas and major passenger transportation routes is acceptable from a siting perspective. In contrast, SIGTTO, the Sandia Reports, and the U.S. Coast Guard criteria all make it abundantly clear that the proximity of people to a proposed LNG facility site and shipping route is a major factor that must certainly be examined. This is particularly so where, as in the Woodfibre LNG case, the proposed LNG carrier route places populated areas within the zones of concern identified for hazard analysis and public safety analysis by the Sandia reports.⁵¹

Clearly, the Application's risk assessment is not an adequate basis for determining the suitability of the Woodfibre site.

Third, in response to public comments that Woodfibre is the wrong location for an LNG terminal the proponent routinely cites the TERMPOL process, for example: "Additional information and confidence will be provided through the TERMPOL process."⁵² Significantly, however, the TERMPOL process will not be completed until after completion of the BC EA process in June 2015 (due to the 180-day time limit in the B.C. *Environmental Assessment Act*). As a result, the *status quo* is that the BC EA process will produce a final report for the (federal) Minister that does not include any consideration of the results of the TERMPOL process. This is in stark contrast with the prominent role of the TERMPOL reports within the environmental assessments under CEAA of the marine shipping components of the Enbridge Northern Gateway Pipeline Project and the Trans Mountain Pipeline Expansion Terminal Project.

The Federal Court of Canada provided relevant guidance in *Greenpeace Canada v. Canada (Attorney General)*, 2014 FC 463.⁵³ That case involved judicial review of the adequacy of a federal environmental assessment under CEAA of the Darlington New Nuclear Power Plant

⁵⁰ It is also inconsistent with a statement elsewhere in the same chapter of the Application that "fire is unlikely in the event of loss of containment of fuel or LNG from a collision, since an ignition source would have to be present." Application, p.11-29, underline added.

⁵¹ 2004 Sandia Report, p.19

⁵² Application, p. 11-39. The TERMPOL process is a voluntary Transport Canada technical review process and risk assessment of vessel transits from the terminal to the open ocean. Current information is that the proponent will not take the next steps in the TERMPOL process until at least August 2015. The Application itself states that risk assessment in the Application is preliminary and "will be assessed more comprehensively in the marine risk assessments for the TERMPOL process." Application, p.11-22.

⁵³ *Greenpeace Canada v. Canada (Attorney General)*, 2014 FC 463 (CanLII), <<http://canlii.ca/t/g6z5z>>

Project proposed by Ontario Power Generation. In lengthy reasons for decision, Mr. Justice Russell upheld many aspects of the EA in question. However, he did fault the review panel that conducted the environmental assessment for making a recommendation that prior to construction of the Project the Canadian Nuclear Safety Commission confirm that certain radiation dose acceptance criteria will be met.

Mr. Justice Russell begins by noting that the issue “seems to engage the realm of highly improbable, but possibility catastrophic, events.”⁵⁴ I submit that this characterization also applies to the issue of a large LNG spill event in the Woodfibre LNG EA context. The judge then states:

“On policy grounds, it is logical that such scenarios should be considered by political decision-makers, because once again they seem to engage mainly questions of “society’s chosen level of protection against risk” that will be difficult for a specialized regulator to assess with legitimacy.”⁵⁵

In the Woodfibre LNG context, this means that it is the *Minister of the Environment* (at the federal level) who can legitimately decide whether the Woodfibre site provides an acceptable level of risk; and that this should not be left to the specialized TERMPOL process after the completion of the EA.

Mr. Justice Russell continues:

“On this view, having found that such an analysis [engaging “society’s chosen level of protection against risk”] was required, it would seem more appropriate for the Panel to have insisted it be completed within the EA process, so that it could be considered in the s.37 context [i.e., by political decision-makers upon receipt of the Panel’s report].”⁵⁶

In the Woodfibre LNG context, this means, I submit, that the results of the TERMPOL process should be considered *within* the environmental assessment process so that the Minister has the benefit of the TERMPOL results in deciding whether the Woodfibre site is appropriate considering, among other factors, the risk of an LNG spill.

Fourth, a blatant inadequacy in the BC EA process vis-à-vis the requirements of the Substitution Decision is that the environmental assessment material expressly excludes consideration of the environmental effects of the project due to intentional acts (i.e., of war or terrorism) and even of “force majeure.”⁵⁷ With respect, this approach is grossly out of date. For more than ten years, the U.S. has included both accidental and intentional events within analyses of the threats, hazards, and consequences of an LNG spill over water, in order to help reduce the risks to public safety and property. This approach began with the 2004 Sandia Report, discussed above.

Furthermore, as the government of Canada has recently said:

⁵⁴ *Ibid.*, para.331.

⁵⁵ *Ibid.*, underline added.

⁵⁶ *Ibid.*, underline added.

⁵⁷ “Accidents and malfunctions resulting from intentional acts of terrorism or war, or force majeure are beyond the scope of this assessment.” Application, p.11-3. The stated exclusion of “force majeure” events illustrates both a misunderstanding of the term and a reluctance to acknowledge candidly the consequences of an LNG spill.

“The world is a dangerous place and Canada is not immune to the threat of terrorism. Terrorist attacks on our own soil demonstrate that our law enforcement and national security agencies require more tools to keep pace with evolving threats, and to better protect Canadians here at home.”⁵⁸

There is no valid rationale for excluding intentional acts from the assessment of the potential effects of the proposed Woodfibre LNG terminal and marine shipping. By excluding intentional acts from the assessment, the BC EA process is significantly failing to meet the requirements of *CEAA 2012* and the Substitution Decision.

In conclusion on this ground, I respectfully submit that the Substitution Decision should be rescinded because the EA process does not, properly or at all, examine the environmental effects of accidents and malfunctions regarding the LNG shipping component of the Project, contrary to *CEAA 2012*, s.34(1)(a) and s.19(1) and the Substitution Agreement, second bullet.

2. Failure to Provide Public Participation and Access to Information

Under the BC EA process, members of the public are only provided an opportunity to make comments at various stages, for example regarding the “valued components,” the Application as filed in January 2015, and the draft EA report when it is produced in June 2015. However, the core of the BC EA process is conducted by the “Working Group.” The Working Group receives oral and written presentations from experts including the proponent’s experts. The Working Group puts oral and written questions to the proponent and its experts, and receives the responses. Yet the Working Group is closed to members of the public. *My Sea to Sky*, the organization I represent, would very much like to have a representative serve on the Working Group. However, that is not allowed. *My Sea to Sky* would very much like even to *observe* the meetings of the Working Group. That too is not allowed.

The requirement of *CEAA 2012*, s.34(1)(b) and the Substitution Decision, fourth bullet, is that “the public will be given an opportunity to participate in the environmental assessment.” I submit that being allowed to make comments from time to time does not constitute an opportunity to participate in the environmental assessment. The Working Group is a closed body and does not allow the public an opportunity to participate in the assessment.

Furthermore, in the BC EA process there are routine delays in the Internet posting of crucial assessment information being considered by the Working Group. This is contrary to the requirement of *CEAA 2012*, s.34(1)(c) and the Substitution Decision, fifth bullet, that the public will have access to records in relation to the environmental assessment to enable their meaningful participation.

3. Exclusion of LNG Shipping between Howe Sound and Buoy J

The Substitution Decision, and the BC EA process, artificially excludes LNG shipping between Passage Island (at the entrance to Howe Sound) and Buoy J. This is inconsistent with the treatment of environmental effects from project-related shipping through the same shipping lanes (Georgia Strait, Boundary Pass, Haro Strait, Strait of Juan de Fuca) in the *CEAA 2012*

⁵⁸ http://www.canada.ca/en/campaign/antiterrorism/?utm_campaign=antiterrorism_20150130_pub-safety&utm_source=online_vanity-url&utm_medium=web-marketing

assessment of two other major B.C. projects: the Kinder Morgan Trans Mountain Pipeline Expansion Project, and the Roberts Bank Terminal 2 Project.

As recently as April 22, 2015, you, as Minister of the Environment, issued terms of reference⁵⁹ for the Roberts Bank Terminal 2 Project that require the EA to consider “the environmental effects of marine shipping associated with the project which is beyond the care and control of the proponent and within the 12 nautical mile limit of Canada’s territorial sea.”⁶⁰

Similarly, in the Trans Mountain Pipeline and Westridge Terminal Project EA, the National Energy Board issued a September 10, 2013 filing requirements letter confirming that “Trans Mountain’s application must consider inbound and outbound journeys to and from the [Westridge] Terminal out to the 12 nautical mile territorial sea limit.”⁶¹

The requirement under *CEAA 2012* for an assessment of the environmental effects of the proposed Woodfibre LNG Terminal necessarily includes the environmental effects of the associated LNG marine shipping. This is implicitly acknowledged by the Substitution Decision, as it requires assessment of the effects of LNG shipping *within Howe Sound*.

With respect, the exclusion of marine shipping between Howe Sound and the Pacific Ocean is unwarranted and arbitrary.

First, LNG carrier transit from Howe Sound to the Pacific Ocean is as associated with the Woodfibre Terminal as is LNG carrier transit within Howe Sound. Both segments are under exclusive federal jurisdiction. There is no less reason to care about the potential effects of LNG shipping on the humans and environmental features of the Howe Sound to the Pacific Ocean segment than of the Howe Sound segment. The potential for an LNG spill during the transit past Vancouver and through Georgia Strait, Boundary Pass, Haro Strait and Juan de Fuca Strait exists as much as it does within Howe Sound.

Second, the prospect of laden LNG carriers transiting Georgia Strait, Boundary Pass, Haro Strait and the Strait of Juan de Fuca warrants proper EA consideration no less than does the prospect of laden oil tankers and laden coal ships transiting exactly the same route.

In my respectful submission, the *Act* requires consideration of the environmental effects of the Project, defined to include the associated marine shipping within federal jurisdiction, and the Substitution Decision violates *CEAA 2012* s.34 in purporting to exclude the Howe Sound to the Pacific Ocean segment.

⁵⁹ FINAL Roberts Bank Terminal 2 Project Review Panel Terms of Reference, April 2015, <http://www.ceaa-acee.gc.ca/050/documents/p80054/101301E.pdf>.

⁶⁰ *Ibid.*, p.2, underline added. The requirement continues: “Consideration includes the environmental effects of malfunctions or accidents and any cumulative environmental effects, the significance of those effects, suggested mitigation measures and the possible requirements of any follow-up program that may be required.”

⁶¹ *Filing Requirements Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities* (Filing ID [A3K9I2](#)), underline added.

VII. Conclusion

For the reasons set out above, on behalf of *My Sea to Sky* I respectfully request that you reconsider and rescind the February 19, 2014 Substitution Decision under which the B.C. environmental assessment of the Woodfibre LNG Project is substituted for federal environmental assessment under the *Canadian Environmental Assessment Act, 2012*.

Yours truly,



William J. Andrews
Barrister & Solicitor

cc. Hon. Mary Polak, B.C. Minister of Environment, env.minister@gov.bc
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Enclosure: Map

Howe Sound - Atl'kítsem / Texwnéwets' LNG Tanker Hazard Zone Map

