October 22, 2019

To: Environmental Assessment Branch
Nova Scotia Environment
P.O. Box 442
Halifax, NS, B3J 2P8

Re: Focus Report for the Replacement Effluent Treatment Facility Project (Northern Pulp)

Submitted by: Linda Irving, MPH

Via email: EA@novascotia.ca

Please find my personal comments below regarding the following deficiencies in the Focus Report for the Replacement Effluent Treatment Facility Project (Northern Pulp):

1. Lack of comprehensive evaluation of effluent temperature, and its effects on ocean warming and Northumberland Strait ecosystem (Sections 2.4, 7.2, 7.3, and 7.5);

2. HHRA fails to address human health risks associated with the project (Appendix 9.2);

3. Reliance on approximations and assumptions, not scientific inquiry.

The United Nations Intergovernmental Panel on Climate Change (IPCC) recently released their report on the global climate crisis. This report includes scientific updates on the state of the oceans at Chapter 5: "Changing Ocean, Marine Ecosystems, and Dependent Communities". Seventy-five authors of scientific studies from around the globe contributed to this chapter, that concludes with a 65-page reference list. Some key points:

- It is very likely that the majority of coastal regions will experience statistically significant changes in tidal amplitudes over the course of the 21st century. The sign and amplitude of local changes to tides are very likely to be impacted by both human coastal adaptation measures and climate drivers
- By 2100 the ocean is very likely to warm by 2 to 4 times as much for low emissions (RCP2.6) and 5 to 7 times as much for the high emissions scenario (RCP8.5) compared with the observed changes since 1970
- Oxygen is projected to decline further
- Simulated ocean warming and changes in net primary production during the 21st century are projected to alter community structure of marine organisms (high confidence), reduce global

marine animal biomass (medium confidence) and the maximum potential catches of fish stocks (medium confidence) with regional differences in the direction and magnitude of changes (high confidence)

- Projected decreases in global marine animal biomass and fish catch potential could elevate the risk of impacts on income, livelihood and food security of the dependent human communities (medium confidence)
- Structure and functions of all types of coastal ecosystems will continue to be at moderate to high risk under the RCP2.6 scenario (medium confidence) and will face high to very high risk under the RCP8.5 scenario (high confidence) by 2100.
  https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_Chapter5.pdf

Each of these findings, and others, are relevant to the EA that is the subject of the Focus Report, particularly Sections 2.4, 7.2, 7.3, and 7.5.

Nova Scotia Environment publishes a document on their website titled "Guide to Considering Climate Change in Environmental Assessments in Nova Scotia" (2011). Section 1.0 Introduction:

> "**The importance of an EA process as an effective tool for climate change mitigation and adaptation planning and management has been identified by the United Nations Framework Convention on Climate Change (UNFCCC) as well as by the World Bank, United Nations and other international development agencies. As such, climate change is increasingly becoming a key part of the EA process worldwide. This is because in the context of global climate change, it has been recognized that EAs should consider not only energy use/conservation and effects of emissions or sequestration of greenhouse gases, i.e. a project's contribution to climate change, but also the impacts of climate change on a project."**
> https://novascotia.ca/nse/ea/docs/EA.Climate.Change.Guide.pdf

While scientists and citizens worldwide are grappling with the impending climate catastrophe, Northern Pulp (NP) is charging forward with their proposal to install a pipeline to dispose of hot, "treated" pulp effluent into the shallow waters of the Northumberland Strait.

We the citizens are tasked with reviewing and commenting on the absurdly voluminous Focus Report document. The lengthy report belies the actual absence of valid data and conclusions. It is also devoid of any discussion of the project's contribution to the warming of ocean waters, with respect to climate change.

The findings/conclusions in the Focus Report fail to adhere to standard scientific methodology. The report is yet another compilation of unsupported data and conclusions. None of the conclusions articulate statistical significance or confidence intervals. The reader must comb through copious data that culminates in sweeping, and invalid conclusions about the potential for significant harm. The leap from data to conclusions simply does not make the mark:

At Section 3.1 the report discusses the deleterious effects of temperature increases on biological processes:

> "A biological treatment system contains many microorganisms that provide treatment. **The types of organisms working change because of the constantly changing composition and quality of the effluent. As the temperature changes in the effluent, one group of**

> **microorganisms will slow down, even die off, and another group will perform the treatment needs. Variations in temperature affect all biological processes.** " Focus Report, p. 46

At Section 7, the report states "Effluent temperature is expected to fall within the range of 25-37ºC at the outfall location, as discussed in detail in Section 3.1 of the Focus Report..." Focus Report, p. 152. And,

> "Over the course of day-to-day operations with designed temperature control, the large inherent capacity of effluent in the replacement ETF, and the small zone of influence around the diffuser (See Section 4.2 of the Focus Report), **thermal shock to the receiving environment and marine life at the effluent discharge are unlikely to occur."** Focus Report, p. 152

This conclusion essentially contradicts the statements found in Section 3.1. To repeat, "**Variations in temperature affect all biological processes.**" Variations in temperature WILL affect lobster, rock crab, seaweed, scallops, herring, clams, cod, hake, plaice, halibut, flounder, mackerel, tuna, eels, seals, whales, dolphins, porpoises, phytoplankton etc. In other words, biological organisms that are part of the diverse Northumberland Strait ecosystem.

As with microorganisms discussed in Section 3.1, every organism has its own temperature tolerance range. And, geographical range. The arbitrary "mixing zone" will be high in temperature and toxins, relative to background waters. The arbitrary mixing zone itself is nothing more than a theoretical construct, yet to be **scientifically** tested.

"Increased temperature can also have an adverse effect when combined synergistically with pollutants. With increasing temperature, toxicities for some contaminants are increased and the resistance to disease lowered." *Environmental effects assessment of freshwater thermal discha*rge; Environment Canada, 2014.
https://ec.gc.ca/ee-ea/e8fbacca-2e85-4e76-978b-5a1d45aacd82/1617_finalthermalguidance_e_07.pdf

As noted in the Focus Report at Section 3.1, **in the summer, organisms will be subjected to effluent that is 20.2ºC warmer than the receiving environment, and in winter the effluent will be 24ºC warmer than the receiving environment.** Those are significant temperature increases! The focus report fails to discuss how the high effluent temperature will dissipate in the receiving waters in summer or winter, or the potential long-range, gradual effects on organisms in the Strait. Nor does the Focus Report, or the original undertaking contemplate the effects of warming seawater on local or global climate. This is an unequivocal deficiency in the original undertaking, and in the Focus Report re: Sections 2.4, 7.2, 7.3, and 7.5.

APPENDIX 9.2 – HUMAN HEALTH RISK ASSESSMENT

"9.2 Commence a Human Health Risk Assessment (HHRA) to assess potential project-related impacts on human health."

The scope of a human health risk assessment required by Nova Scotia Environment is limited by the requirement to "commence" an assessment. No explanation or documentation of a projected timeline for completion of the HHRA is found in the terms of reference or the Focus Report. Section

9.2 of the Focus Report has insufficient information to inform the potential for human health risks associated with the undertaking.

In addition to the HHRA being incomplete, the content is based almost entirely upon estimation and approximation, or, is "under consideration". The Focus Report requirements appear to stem from advisory comments by Allison Denning of Health Canada, submitted in response to the original undertaking submission:

> "...the conduct of a more formalized human health risk assessment (HHRA) for baseline health risks and also for health risks related to future effluent releases, using the information collected as per the previous three bullets...**Health Canada acknowledges that it has no enforceable regulatory requirement for the project (e.g. permits, authorizations), however, given the lack of information provided in the Human Health Evaluation (HHE), and the unknown chemical composition of the future effluent, any advice provided would be speculative and may not adequately ensure the protection of human health...The information requested in Health Canada's comment 1) above should be used to inform the lack of current data and should be collected prior to the commencement of effluent discharge fro the new pipeline to the Northumberland Strait."** Denning, Allsion (Health Canada). Letter to: Helen Yeh (Nova Scotia Environment), March 4, 2019.

The Focus Report Appendix 9.2 HHRA fails to provide a baseline description of the population at risk that includes the size, composition, health status or behavioural patterns. The only information about the human population characteristics is seen at 2.4.5 Receptor Characteristics "The characteristics of each of the critical receptors, apart from the food ingestion rates, will be obtained from Health Canada (HC, 2010b)." Appendix 9.2, p. 2.13. The Health Canada document cited is described as follows:

> "The purpose of this guidance document is to prescribe, to the degree possible, standard exposure pathways, receptor characteristics, TRVs, and other parameters required to quantitatively and consistently assess the potential chemical exposures and human health risks **at federal contaminated sites**. **The primary purpose for PQRA is to rank the potential human health risks posed by federal contaminated sites relative to one another...**"

https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/contaminated-sites/federal-contaminated-site-risk-assessment-canada-part-guidance-human-health-preliminary-quantitative-risk-assessment-pqra-version-2-0.html

No population baseline data has been established, and no timeframe for obtaining baseline information is mentioned. The four authors of the Ecometrix report have combined credentials in aquatic toxicology, the mining industry, environmental studies in air, lake water, and earthworms, environmental effects monitoring, invasive species etc. None of the four authors appear to have a background in human health sciences, public health, environmental health, biostatistics or epidemiology.

NP and its predecessors have been operating the Abercrombie mill for 52 years. Data for morbidity and mortality in humans who live in proximity to the mill should have been collected to establish the baseline for the target population (i.e. "receptor characteristics"), for the purposes of the present EA.

By the authors' own admission, the Focus Report is lacking in key information necessary to form reliable or valid conclusions of any kind. For example, Section 2.2 Study Area at pp. 2.1 – 2.2 states:

"**An air dispersion model is currently being finalized to support the Focus Report (Stantec, 2019a). When available, this model will be relied upon for the HHRA to define the areas potentially influenced by atmospheric emissions from the new ETF."**

Section 2.7 Uncertainties summarizes the deficiencies in the HHRA. "**...assumptions must be made due to a lack of absolute scientific knowledge.**" Appendix 9.2 p. 2.16. In an attempt to assuage concern about the abject lack of scientific basis, the authors state the following:

"**Therefore, when all of the assumptions are combined, the actual risks, if any, are overestimated rather than underestimated."** Appendix 9.2 p. 2.16

The reliance upon **assumptions** is likely the result of a lack of expertise in health sciences, lack of effort to gather and analyze health data, hubris, and the hope that reviewers will turn a blind eye to the flimsy attempt to "commence" a human health risk assessment as required in the Focus Report.

A stunning example of the inadequacy of this HHRA is seen in Appendix B Local Seafood Intake Survey. Here, the survey instrument is presented for review. However, it is without any rationale for, or description of the methodology; description of how the survey was implemented; or, information about the timeline for ultimate analysis and completion of the survey. The survey instrument is presented in a virtual vacuum. It is devoid of any information that would inform the reader about potential effects on the future health of any consumer of seafood in the local area, or beyond.

If the final completion of a valid HHRA were to be achieved after the effluent treatment project is commenced, it is impossible to imagine how the train could be turned around to bring the treatment facility and pipe within the realm of "safe" after it is finally determined that human health will be at risk. Ultimately, the HHRA concludes with Section 3.0 Next Steps: "The following information is needed to support the HHRA" Appendix 9.2 p. 3.1. Quintessential cart before the horse.

Simply requiring that an HHRA be commenced, as an afterthought, has no practical application. The HHRA at Appendix 9.2 of the Focus Report is lacking in useful information about the local at-risk human population, human health studies, epidemiological data, projected dispersion of pollutants in the air, and Local Seafood Intake Survey data and analysis. The HHRA relies entirely upon assumptions that have no scientific value to inform the safety of the NP replacement effluent treatment facility.

Approving this project, based upon blind assumptions that human health, and the ecosystem of the Northumberland Strait will be protected, would be the most egregious act that this government could possibly undertake.

Despite the confines of regulations and processes that govern this environmental assessment, common sense must prevail. Listen to the wisdom of young people who are leading the way in their attempts to stop the destruction of their future and our planet. The madness must stop here....

Because, underneath all of this is the real truth we have been avoiding: climate change isn't an "issue" to add to the list of things to worry about, next to health care and taxes. It is a civilizational wake-up call. A powerful message—spoken in the language of fires, floods, droughts, and extinctions —telling us that we need an entirely new economic model and a new way of sharing this planet. Telling us that we need to evolve."
Naomi Klein