

To Whom It May Concern,

I am writing with regards to the plan for the bleached kraft pulp mill in Pictou County, Nova Scotia to pump many (60-90) millions of litres of effluent into the Northumberland Strait on a daily basis. I have read the Replacement Effluent Treatment Facility Project Description and Appendices in their entirety and I have grave concerns.

The issue I have chosen to address in this letter is that of toxic chemicals being released into the Northumberland Strait. Using the numbers presented in the Project Proposal and Appendices, I calculate a total of approximately half a tonne of Adsorbable Organic Halides (AOX) per day will be released into the Strait. Appendix E3 (1) reports that the maximum AOX in the effluent is 7.8mg/L. If we are conservative and assume only 60 million litres of effluent are discharged per day this would equate to **468 kg** of AOX **per day** into the Northumberland Strait. Below I outline why I recommend the proposal be rejected.

Appendix I1-B, panel 9 (2) roughly outlines the effluent composition and percentage removal of chlorinated compounds by the treatment facility. I use the word “roughly” because the categories listed are very general (organics, metals, chlorinated organics, etc) and do not contain the actual chemical composition of each category. The mill has stated they cannot predict the chemical composition of the effluent because it is “determined by the make-up of the wood being processed on any given day.” (3)

Paid advertisements by the mill emphasize the effluent will be treated, however, the new facility is expected to remove only 45-65% of the chlorinated compounds. Many of the chlorinated (and non-chlorinated) organic compounds produced during the pulp bleaching process are toxic and are not readily degraded. For example, the highly toxic polychlorinated dioxins and furans are reported below the detection threshold stated by the laboratory performing the tests, and it has been deemed no longer necessary to test for them. It should be noted that “not detected” does not mean the substance is not present. They are known to be generated during the pulping process. Furthermore, many of these compounds bio-accumulate in fatty tissue, which means they are not cleared by an organism, but continue to accumulate and, as a result, the concentration is increased higher up the food chain. Given that the proposed treatment facility only removes about half of the organic chemicals that will be released into the Northumberland Strait, we need further investigation into the long-term health effects.

It is important to note not all of the chemicals present in the effluent are tested nor are the chemical components of the effluent fully understood. The following statement is from the Canadian Environmental Protection Act (4):

“Although approximately 250 individual compounds have been characterized in bleachery effluents, they have been estimated to represent only 10 to 40% of the total low molecular weight materials present.”

I am not confident that we truly know the effect of the chemical mixture on biological systems.

Some may argue the toxins are within the allowable limit (or there are no established limits). Stantec consultants in Appendix E3 (5) state *“There are no CCME or provincial guidelines for AOX for marine or freshwater environments.”* In Appendix I1-B, panel 23 (2), the AOX is predicted to be below the World Bank Group Guidelines (6) within 2 metres of the diffuser. These guidelines should not be used to justify acceptable limits of AOX as the concentrations listed in the guidelines vary based on the technology used for pulp and paper. For example the limit of AOX for bleached kraft pulp mill is 0.25kg/ADt while the limit for sulfite pulp and paper is 0.005 kg/ADt (6). This implies the limits are not set based on the effect they have on health or environment, but rather on the concentrations produced by the methodology employed in the paper industry. If the concern were truly about AOX exposure, the limits of allowable amounts would be the same for all processes. Based on this information I conclude it is not an acceptable set of guidelines to be used for establishing concentration limits of AOX in the effluent.

The experiments used to determine the effect of stress (toxins, temperature, salinity, pH, turbidity, etc.) on an organism have come a long way since the early 1990's therefore an LC50 experiment should no longer be considered sufficient. Sub lethal exposure may still affect the physiology and gene expression of the fish and/or shellfish and this is something we need to understand. We know many of the halogenated organic compounds affect the reproductive and immune systems, and can lead to developmental disorders or cause cancer. In addition, gene expression experiments help gain a better understanding of the exposure effects on protein and enzyme production which gives us an idea of how the effluent will influence the function of biological processes. I request gene expression profiling experiments be performed on fish and shellfish that are exposed to the effluent at concentrations consistent with what will exit at the diffuser (final effluent – NOT once it is diluted) and compared to the same species that has not been exposed.

In Appendix H, it is stated *“To address the concern, NPNS will commission toxicity testing to determine both potential acute and sublethal effects on immature stages of lobster and herring. Standardized toxicity testing protocols are not available for lobster and herring; however, custom tests have been developed that can be completed using larval lobster and herring embryos. The tests will include Stage I-IV larval lobster and include a live-dead (acute) assessment of the various stages, as well as the assessment of sublethal effects on moulting time and growth. Herring tests on embryos would be similar in that they would assess acute toxicity to eggs, as well as the growth post-hatch for a number of days.”*

These tests are not sufficient to assess long-term effects of toxic effluent exposure and do not examine multiple biological processes.

Below is an excerpt from the Canadian Environmental Protection Act (4)

“Some chlorinated organic compounds can be biologically degraded or transformed and transformation may lead to more persistent and bio accumulative compounds.

Chloroveratroles, for example, transformation products of chloroguaiacols which are unique to bleached pulp mill effluents, are capable of accumulating in fish up to 25 000 times the concentration in water. Some other chlorinated organic compounds detected in biological tissues downstream of bleached pulp mills reflect repeated or long-term exposure rather than high bio accumulative potentials.”

And

“Laboratory studies using individual chlorinated organic compounds that are commonly discharged from bleached pulp mills have demonstrated such chronic effects as deformities, and embryo and larval mortalities in fish. These chronic effects include significant irreversible factors which jeopardize the continuance of the species and the integrity of the ecosystem.”

My confidence in the proposal is further undermined by the following disclaimer from KSH consultants in Appendix C regarding the “Preliminary Engineering for Effluent Treatment Plant Replacement”

“This report and any or all associated estimates included herein are indicative only and should not be viewed as definitive. KSH does not guarantee the accuracy of such estimates and shall bear no responsibility for any reliance on such estimates by the authorized recipient. KSH is making no representation or warranty as to the contents of this report, including, without limitation, with regards to capacity, quality, production or any other eventual project outcome, and KSH hereby disclaims all warranties whatsoever, including, without limitation, any warranty of merchantability, quality, suitability, performance or fitness for a particular or intended purpose. Any representations and warranties provided by KSH to the recipient in connection with the proposed project shall be limited only to those set forth in a definitive agreement to be entered into between the parties.”

This statement implies we cannot take the numbers seriously and they are not to be held accountable if any of the assumptions are incorrect.

Over the past year and a half I have seen the county divided. It is divided because the currency for the discussion is “jobs”. Politically, I understand why. However, I think it is incredibly short sighted on our part. We need to understand what the volume and composition of waste will do to the local ecosystem and what will be the long reaching effects. Half a tonne of toxic AOX chemicals along with the rest of the substances in the effluent every day into the Northumberland Strait is unconscionable.

I have added an appendix to this letter that contains several other points that came to mind while reading through the literature for the proposal. Please consider these points as well.

Thank you for taking the time to read this letter and please consider that we could potentially be destroying the sensitive aquatic ecosystem of the Northumberland Strait and rendering it uninviting for aquatic species and human recreation if the current proposal is granted. We could also be poisoning and/or killing the fish and thereby poisoning ourselves. I beg you to ensure the proper and current experiments are performed before pulp effluent is pumped into the strait. It is my opinion that the limits of allowable toxins and effects of said toxins are not well established. Please copy me on the environmental assessment report once your office has made their decision.

Sincerely,

Lynn Cameron, BSc, MSc, PhD (organic chemistry)

Retired scientist, concerned citizen and resident of Pictou County.

1. Appendix E3 Stantec Receiving Water Study Effluent Treatment Plant Replacement p3.66
2. Appendix I1-B Project Launch Materials at Open Houses and Engagement Sessions
3. Appendix I4 Meeting of Fishers of Northumberland Strait (Fishers) & Northern Pulp (NPNS) Re: Proposed Effluent Treatment Facility Replacement (ETF) February 8, 2018 section 2.3
4. Canadian Environmental Protection Act Priority Substances List Assessment Report No. 2 Effluents from Pulp Mills Using Bleaching
5. Appendix E3 Stantec Receiving Water Study Effluent Treatment Plant Replacement 3.3.2.1 Adsorbable Organic Halides
6. World Bank Group Guidelines
<https://www.ifc.org/wps/wcm/connect/6f13e78048855398afb4ff6a6515bb18/Final%2B-%2BPulp%2Band%2BPaper%2BMills.pdf?MOD=AJPERES>
7. <https://vancouver.sun.com/business/local-business/nanaimo-pulp-mill-to-pay-135000-penalty>

Appendix of additional questions/concerns:

- A. It will affect more than fish. See Appendix N in the Project proposal for rare, threatened or endangered flora and fauna. There are many listed within less than 5 km from the project site.
- B. Effluent composition is different if the mill is undergoing maintenance. Have levels of contaminants been taken into account during this scenario? I have not read anything regarding that in the proposal.
- C. One of the risks identified by the mill is that plastic from the MBBR (moving bed biofilm reactor) could end up in the receiving water. How is this addressed?
- D. Power outage caused Harmac mill in BC to pump untreated effluent into the ocean. (7) What would prevent that from happening here?

E. If we assume the regulations are acceptable for environmental health, the allowable concentration (or pH, salinity, temperature, etc.) limit does not mean 2 metres, or 8 metres, or 100 metres from the diffuser. Allowable concentration means the effluent should be at or below the legislated concentration prior to exit from the diffuser. Dilution into the receiving water should not be used for justification.