

October 23, 2019
Northern Pulp Nova Scotia Limited

Notes concerning the Northern Pulp Nova Scotia Limited Focus Report, September 2019 (Revised/Requested process information for Northern Pulp Nova Scotia Limited,) as required for the Minister of the Environment, Nova Scotia for consideration of the waste water pipeline and effluent treatment facility to replace the Boat Harbour Effluent Treatment facility.

1.) The proposed pipeline crosses Pictou Harbour, will this section of the pipeline be buried in the floor of the harbour? It is not specifically stated. The pipeline on the land segment, crossing from Pictou Harbour, the Rotary along highway 106 (Pictou town areas) to the Caribou Wharf and pipeline extension into the Northumberland Strait will be buried as described in the document. (Page 42 Project Description, paragraphs 2 & 3).

It is important that the entire pipeline be buried so it will not flex with tidal changes and ice scour during the winter months both within Pictou Harbour and the Northumberland Strait. The pipeline made of HDPE can suffer fatigue cracking which cannot be predicted. Fatigue cracking could cause the pipeline failure in months after installation. (Page 60, 3.5.1 second paragraph, second sentence "PE4710 resin was.... as a result slow crack growths uncommon." (Slow crack growth is fatigue cracking.)

The Pictou Harbour silts contained heavy metals and is the site of the largest bird population. What can be done by Northern Pulp Nova Scotia Limited (The Mill) to address this difficult issue.

2.) The pipeline will be high density polyethylene plastic piping, which is a good product for the application. Will The Mill require the contractors to pressure test all fusions/welded connections? It appears the Northumberland Strait and the Pictou watershed lands may have product verification. It is unclear as to the entire pipeline length. Nondestructive testing, fusion/weld verification quality assurance is essential for the long term life of the pipeline. Verification testing, must be by certified inspection having a CSA accreditation for the inspection process.

3.) The October 2019 Kraft Pulping Process diagram does not depict both the Recovery Boiler and the Power Boiler. Both types of boilers are common to Kraft Pulp plants.

4.) The October 2019 Kraft Pulping Process diagram nor the text throughout the 100 plus pages does not address the quantities of hydroxide salts, caustics, sulfur compounds or any other industrial chemicals added to the digestion of the wood to create pulp. The volume of industrial chemicals is significant and this is totally ignored in the environmental description of the process.

5.) Benchmarking The Mill, NPNS is the sixth worst kraft pulp mill in the country based upon the Chemical Oxygen Demand (COD) levels for the waste waters leaving NPNS... Shame. (Page xxvii of the project overview)

6.) Annual waste volume from The Mill is reported to be 62,000 cubic metres of liquid waste per day on average. Maximum wastewater should not exceed 85,000 cubic metres per day. A volume of 62,000 cubic metres is 22,630,000,000 litres of liquid waste per year. 22.63 billion litres of industrial waste into the Northumberland Strait. Because the 22.6 billion litres of waste water is at 35 degrees Celsius, it will require 5 times this volume in marine waters to reduce the thermal loading from 35 degrees C to ambient temperatures. The Mill waste waters will impact 100 billion litres of the marine waters, due to temperature alone. The three diffusers described in the text are not significantly described. One can only assume that each diffuser pipe would be very close to 350 centimeters, or 0.35 meters or 12 inches, given the pipeline is 900 centimeters in diameter. The heat affected zone for each of the three diffusion pipes at a flow

of 0.3 cubic meters per second is well beyond 10 meters in the downstream direction... It is not possible to diffuse rapid flowing water, and the jet description imagined for air distribution is simply not possible with moving water

7.) Management of the settling pond/tanks on The Mill site: The oxides of sulphur, sulphur dioxide, hydrogen sulphide and other compounds pose a occupational health and safety risk to employees. The NS department of Labour requires no employee to be exposed to more than 0.5 parts per million of hydrogen sulphide in accordance with ACGIH threshold limit values (TLVs) for workplace employees.

The pipeline construction...

8.) The fusion of the high density polyethylene pipeline is not sufficiently considered by Northern Pulp Nova Scotia Limited. They (NPNS Ltd) stated the pipeline will be pressure tested before burial in the Northumberland Strait. There is no statement of quality control for the land buried pipeline or for the segment under Pictou Harbour running adjacent to the Highway 106 causeway. The proposed pipeline must be pressure tested the entire length of the 15 kilometres.

9.) The Pipeline must also be buried in the Pictou Harbour zone to prevent the pipeline from suffering fatigue cracking. This is not addressed within the Northern Pulp Nova Scotia Limited Focus Report of September 2019.

10.) The diffuser assembly as described and depicted in the Focus Report by NPNS Ltd., page 61 suggested flanged connections. The flanges of stainless steel (depicted page 86, Figure 4.2-2.) would most likely be selected with stainless steel bolts. Stainless steel which is buried in the marine environment does not have access to oxygen to maintain the passivation / corrosion resistance. Chromium in stainless steel needs oxygen to create a rust resistant layer. Stainless steel that is buried in seawater will rust and corrode.

11.) The flow rate of the hot waste water of 700 to 950 litres per second will cause pitting corrosion of the flanged connectors. The diffuser pipes will break off due to the corrosion of these stainless steel flanges. The diffusers will have a very short service life. No mention by Northern Pulp Nova Scotia Ltd., is provided on the maintenance of the pipeline diffusers, a mission critical part of the effluent dispersion system... (I am a corrosion and materials chemist and speak from experience.)

Northern Pulp's Environmental History

Paper Excellence and Northern Pulp Nova Scotia operated the kraft pulp mill without an electrostatic preceptor for more than a year without reporting its failure to the community or its regulator.

Northern Pulp's Power Boiler has failed emissions testing.

The Northern Pulp's Recovery Boiler failed emissions testing.

Regardless of failed airborne pollution testing, the Mill operations continued until appropriate shutdowns could be scheduled well after directions/Minister's Orders were given to the Mill management.

The proposed size of the first and second stage clarifiers and the "BAS" technology may appear interesting to the environmental assessment decision makers. However, there is only a four or five hour residency of waste waters to remain in effluent treatment holding system. Waste waters flowing between 700 - 950 litres per second, entering each of the first and second stage clarifiers, this flow rate will cause extreme turbulence. The magnitude of the waste water flow rate limits the capacity of the clarifiers. Furthermore the off-gasing of hydrogen sulphide from the clarifiers will create a process that is difficult to understand and control as well as potentially deadly to workers exposed to the open clarifiers.

The recent Mill Management, while perhaps willing to invest in operator training, most likely will under resource this waste treatment system as previously demonstrated.

The waste treatment proposal only addresses the BOD/COD, pH attributes of the waste waters. The off-gasing from sulphites/sulphides/oxides of sulphur, wear metals, inorganic chemical (iron, nickel, chromium, cadmium, sodium sulphide, sodium sulphates) pollution, and the huge thermal pollution issues are not addressed by the proposed plan of action.

The high density polyethylene piping system to transport the waste water effluent to the final marine site will effectively insulate the waste waters and prevent heat loss. The daily loss of 62,000,000 to 82,500,000 litres hot water (35 to 40 degree Celsius) into the environment is "criminal".

Conclusions:

The proposed effluent treatment system is undersized for the clarifiers and the current daily waste water volumes.

Once effluents have passed the clarifier system, there is little opportunity for subsequent remediation should BOD testing indicate non-compliance, this is an issue. BOD testing requires an hour to complete in an onsite laboratory test, which only provides three hours to stop production of the Mill should a compliance issue arise.

6.6 million kilograms of waste solids will be piped into the Northumberland Strait, if the proposed effluent treatment facility works as well as stated by Northern Pulp Nova Scotia Limited.

Waste effluent at 35 degrees C. (or more) will enter the Northumberland Strait killing marine life. This effluent thermal loading alone is deadly, regardless of BOD/COD/ heavy metals, total suspended solids, etc... The projected waste water path via the diffusers, does not accurately address the thermal toxicity to marine life, the foul smelling oxides of sulphur by-products, the chronic heavy metals contamination (from the Mill's equipment, piping, pumps, chromium electroplated rollers, presses etc.) which will enter the Northumberland Strait.

The waste waters are out of the visual sight of the Mill Management, its response teams, and could have days of non compliant waste disposal before regulatory processes would require immediate shutdown of the proposed waste treatment system. This would be at the expense of fisherman, marine life, and a valuable coastal zone area for tourists, residents and endangered marine mammals.

Lastly

An Industrial Approval should not be considered by the Province of Nova Scotia for the continuing operations of the Northern Pulp Nova Scotia Limited (the Mill) until the Mill replaces

the existing kraft caustic digestion technology and implements a closed loop water pulping process: such that there is little or no waste management issue, no need to dump waste process chemicals and spent waters into the marine environment of Pictou County, the Pictou Landing First Nations or the Strait of Northumberland.

Sincerely

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