



NORTHERN PULP
NOVA SCOTIA CORPORATION
A PAPER EXCELLENCE COMPANY

Submission to
Law Amendments Committee
By
Terri Fraser, Technical Manager
Northern Pulp Nova Scotia Corporation
About
Bill No. 89 – Boat Harbour Act
April 27, 2015

Thank you for the opportunity to present to Committee today. I'm Terri Fraser, Technical Manager, Northern Pulp and with me is John Roberts representing McInnes Cooper, our legal counsel.

Northern Pulp Nova Scotia Corporation, a Paper Excellence Company, is located in Pictou County and manufactures Kraft pulp, primarily for export. We supply customers around the world with pulp to manufacture common household products such as tissue. This growing sector, primarily in Asia, has allowed Northern Pulp to secure a strong foothold in what has become a very demanding marketplace.

Northern Pulp has earned a reputation as one of North America's leading manufacturers of northern bleached Kraft pulp. As a result of the province's strong wood fibre we are seen in the marketplace as a 'supplier of choice.'

With nearly 300 dedicated employees working on site, we inject \$231 million annually into the Nova Scotia economy and partner with sawmills and forestry contractors throughout the province. We spend \$16 million annually just to get our product out of the Port of Halifax. In fact, we are the largest single exporter

through that port. Northern Pulp and predecessor companies have been a cornerstone business in this province for 48 years and we look forward to being a global exporter for a long time to come. Paper Excellence Canada is planning for a long term future in Pictou County. The company has made huge investments at the mill since it was acquired in 2011.

Northern Pulp is regulated environmentally by both the Province of Nova Scotia and the Federal Government of Canada. One major key to environmental responsibility is a wastewater treatment system. The wastewater treatment process that discharges into Boat Harbour is a natural biological process similar to almost half of the Kraft mills across North America.

The Province of Nova Scotia established the wastewater treatment facility in 1967 to attract industry to Pictou County to address high unemployment. The system has been used by the mill since 1967. The system was also used by Canso Chemicals from 1971-1992. The Province operated the facility until the end of 1995 at which time the mill, the only company still using the facility, began operating the facility through a long-term lease with the Province. This lease is in place until the end of 2030. A substantial improvement project was undertaken in 1995 to make the facility far more effective, resulting in improved effluent quality.

Today, the wastewater treatment facility does the job it is designed to do and comfortably meets Federal regulations. The problem with the wastewater treatment system is not its ability to operate efficiently, but rather its location and its legacy.

While the Province leases the facility to Northern Pulp, the mill is responsible for total operating costs, which exceed \$3 million annually. Without a proper wastewater treatment system the mill simply cannot operate.

Northern Pulp and the Province are parties to a number of agreements in respect of the operation of the mill including:

- Memorandum of Understanding dated December 1, 1995
- Lease dated December 31, 1995

- License Agreement dated December 31, 1995
- Indemnity Agreement dated December 31, 1995
- Water Supply Agreement dated June 30, 1995
- Lease Extension Agreement dated October 22, 2002
- Acknowledgement Agreement by the Province dated May 12, 2008

In the Acknowledgement Agreement, the Province confirmed that each of the Agreements and understandings between the Province and the mill's prior owner, Scott Maritimes Limited, are in good standing and will continue in full force for the benefit of Northern Pulp. Northern Pulp has substantially invested in the mill on the understanding that the Province could and would comply with its obligations under these agreements. It is reasonable to anticipate and expect that government will comply with the contracts which it has entered into.

Northern Pulp would like to work cooperatively with the Province but to date, despite repeated efforts by Northern Pulp, the Province has not engaged in any meaningful discussions on a path forward, especially as it relates to Boat Harbour. We believe the timelines as outlined in the Bill are entirely unrealistic. Our serious concerns around the timelines in the Bill include:

1. The very fact a proposed new facility would be commissioned in mid-winter 2020 poses serious concerns as the facility is a natural biological process which is not conducive to cold weather start-up. A dead of winter January start-up is unreasonable, inferring the project must be pushed ahead by six months into the summer of 2019.
2. Regulatory responsibility for the project falls jointly between provincial and federal authorities. The marine portion of the outfall will involve four federal ministries—Environment Canada, Fisheries and Oceans Canada, Transport Canada, and Aboriginal Affairs and Northern Development Canada. The process, including public hearings, field studies and engineering will likely require 30 months before detailed engineering or construction of the outfall could begin. KSH Solutions Inc., a consulting firm

with significant experience in dealing with large projects, has provided correspondence in the Appendix that clearly outlines their concerns with the project deadlines and explains the process in greater detail.

3. Under the terms of the new Industrial Approval (IA) for the mill, a Receiving Water Study must be completed after a new outfall location has been chosen. After that study is completed, Nova Scotia Environment will then develop new discharge limits based on the Receiving Water Study for inclusion in the IA. The Environmental Assessment process, as well as the design of the treatment facility, cannot proceed until these steps are completed and the project can demonstrate that the system is designed to meet these, yet to be determined, discharge limits.

Starting almost immediately, major capital improvements will have to be undertaken within the mill to prepare for this new facility and to meet the new, aggressive IA requirements. This brings with it huge investment with no clear path forward. As an example, the conditions of the new IA require the mill to build an Oxygen Delignification System to improve wastewater quality. Such a system requires a very large capital investment, but it is difficult to make such an investment when there is no operational certainty that the timeline for the replacement of the wastewater treatment facility set out in the Bill can be met, such that the mill can continue operating after January 31, 2020. I refer you to the conclusion in KSH's correspondence. I quote, "In our experience from other projects and given the current climate, there is a 50 – 50 chance of successful completion in order to meet the deadlines presented in this report."

Section 4 of the Act is an attempt by the Province to preclude Northern Pulp from suing the Province for breach of its contractual obligations as a result of the Act. Without Section 4, Northern Pulp would be entitled to claim, on the date the Boat Harbour Act passes in the legislature and comes into force, that the Province has repudiated or anticipatorily repudiated the Lease. In Section 4(2), the Province seeks to deem that no such repudiation or anticipatory repudiation has taken place, despite the clear fact that the Act does just that. Section 4 (1) is intended to

be a broad immunity or “non-suit” clause precluding any action by Northern Pulp against the Province based on Northern Pulp ceasing as a result of the Act to use the wastewater treatment facility for the reception and treatment of wastewater from the mill.

Courts have recognized that “in Canada we anticipate and expect that government will stand behind and comply with the contracts which it has entered into.” They have acknowledged that “it should not be a common or simple matter for the Crown to breach its agreements with impunity” and that “while on rare occasions the Crown may feel compelled by considerations of public policy to break a contractual undertaking, the Crown should generally be required to negotiate with the other party for a variation or a release, or to pay damages for its breach of contract; that is, the public purse should bear the cost of the change of public policy.”

The government has not done that in this case. They have done the opposite. They have ignored repeated requests by Northern Pulp to work cooperatively to find a solution.

Section 4 of this Bill sends a very chilling message to any investor that is contemplating investing in this Province. Section 4 should be deleted and government should work with Northern Pulp to reach a solution that respects the rights of all parties.

In closing, Northern Pulp is committed to working cooperatively with the Province and Pictou Landing First Nation on a meaningful path forward for this well-intentioned, but deeply flawed Bill. Fixing Boat Harbour is a good thing but in doing so the Province must also respect its contractual obligations and afford Northern Pulp and the Forest Products sector the opportunity to stay in business.

I firmly believe that if all interested parties are willing to work together in a spirit of mutual cooperation and openness that proper science-based solutions can be implemented to achieve our common goals.

Thank you for the opportunity to present to you today.

Appendix: KSH Solutions Inc. dated April 23, 2015

April 23, 2015

Mrs. Terri Fraser, P. Eng
Technical Manager
Northern Pulp Nova Scotia Corporation
P.O. Box 649, Station Main,
New Glasgow, Nova Scotia
B2H 5E8

**Subject: Proposed Provincial Legislation to Close the Effluent Treatment Centre in
January, 2020
KSH Project: 11 1024C**

Dear Mrs. Fraser,

The Nova Scotia Legislature is planning to table legislation forcing the closure of the mill's effluent treatment system, with a permanent closing date of January 31st, 2020. The following is KSH's opinion of what would be required in order for the mill to adapt to this legislation and still meet all provincial and federal effluent discharge regulations in the timeframe suggested by the legislation, keeping in mind that the effluent treatment plant is the property of the Nova Scotia Government.

The single most important issue that needs clarification in this situation is one of jurisdictional responsibility in the design and implementation of a new effluent treatment system. There are two distinct projects within any project that would be aimed at replacing the existing treatment system: the treatment facility itself and the new outfall, which would be required to discharge the treated effluent away from Boat Harbour.

Jurisdictional responsibility for the implementation of the new wastewater treatment system would fall to provincial authorities. The mill would have to demonstrate that the new treatment system would meet new, yet to be determined effluent discharge limits imposed on it by the Industrial Approval (IA) document prior to commencing construction of the system. Specifically, Section 7b) of the IA indicates that if a new treatment system is required, then the conditions set forth in Table 6A of the appendix shall come into force. The problem is that there are many unknown values in that table since both the location of the treatment plant (and more importantly, where the effluent will discharge) and the discharge limits are to be based on receiving water studies. Therefore, time must be allocated at the outset of this project to determine where the proposed effluent system will discharge and then carry out a receiving water study at that unknown location. The iterative nature of this process will require time (months) to answer prior to any other steps taking place.

Federal approval, from Environment Canada, would also be required, as the mill is also subject to the Federal Pulp and Paper Effluent Regulations, but this is not seen as a hindrance to approving the project, as the effluent limits included in the IA are more stringent than the Federal regulations.

Jurisdictional responsibility for the construction of a new outfall falls to both provincial and federal authorities. As is the case for the effluent treatment plant, approval for the land portion of the outfall is under the authority of Nova Scotia Environment. It is unclear at this point what other authorities or jurisdictions would be involved since the pipeline routing has yet to be selected.

In the case of the marine portion of the outfall, this portion of the project would be subject to approval by the Canadian Environmental Assessment Agency (CEAA)¹. Reporting to the Federal Minister of the Environment, this agency oversees the approval of all projects that, among other things, have the possibility to impact Canadian waterways as well as federally regulated resources such as fisheries and marine navigation. The process is well defined, with several in-depth studies required on the possible impact of such a discharge on the various uses of waterways in different conditions and public hearings throughout the process to ensure stakeholder participation and input in the final assessment of the project.

Several federal ministries will be involved throughout the assessment and approval process of the marine portion of the outfall:

- Environment Canada: general oversight and assessment of potential impact on fish and wildlife at the point of discharge;
- Fisheries and Oceans Canada: impact of the construction of the outfall, and of the actual point of discharge, on potential fishery and fish hatching sites, fish and crustacean migration and other similar issues;
- Transport Canada: potential impact of the outfall on the navigability of the waterways, both on a commercial and a leisure point of view; and
- Aboriginal Affairs and Northern Development Canada: potential impact of the project on the Pictou Landing First Nation community.

This process, including public hearings, field studies and accounting for the number of project proponents already identified, would take a minimum of 18 months to complete, but is likely going to take approximately 30 months, considering the relative position of all proponents in this project and the efforts that would be required to find both a scientific understanding of the impact of this new outfall and a consensus between all parties involved that would allow the project to be approved.


Assuming that the Legislative Assembly passes this bill within the next 2 months (prior to the summer recess), this would give the project 54 months (or 4½ years) to complete all required studies, obtain the required approvals for the construction of both the outfall and the treatment system, as well build, commission and start-up the process. Past experience has shown that the start-up of an activated

¹ <http://ceaa-acee.gc.ca/default.asp?lang=en&n=D75FB358-1>

sludge wastewater treatment system at a facility that has no experience operating such a system would take approximately 4 to 6 months. When taking into consideration the fact that a start-up in the dead of winter is not a possibility, this would effectively reduce the implementation schedule for the project by a corresponding amount, placing the start-up date of the new treatment system sometime in June 2019.

Given that approval for the outfall will be complex and, to a certain extent, controversial, a time frame of 18 months for the completion of the project, based on a 30-month federal approval period, leaves very little room for contingencies to allow for the proper start-up of the new wastewater treatment plant, while maintaining full compliance with the terms and conditions of the IA.

Should the Nova Scotia Legislature insist on forcing the closure of the existing effluent treatment center ahead of the scheduled end-of-lease date of December 30th, 2030, it is KSH's opinion that the timelines must reflect a 30-month outfall environmental assessment process to ensure that the environmental impact assessment for the construction of the outfall is carried out thoroughly and addresses the concerns of all parties concerned and that the design of the wastewater treatment system is done efficiently, minimizing the environmental footprint associated with its operations, is well integrated to mill operations and that effluent regulations are met at all times.



In our experience from other projects and given the current climate, there is a 50-50 chance of successful completion in order to meet the deadlines presented in this report.

Please let me know if you have any questions.

Sincerely,

KSH Solutions Inc.



Guy Martin
Principal Consultant, Process and Environment

Clean the Mill Comments on Northern Pulp IA Appeal 'Fact Sheet'

March 28, 2015

Recently, the Forest Products Association of Nova Scotia circulated a so-called 'Fact Sheet' about Northern Pulp's IA. While this document contained many opinions of Northern Pulp, it was **short on facts**. In particular, there remains much uncertainty about which specific aspects of the IA Northern Pulp, and/or the Forest Products Association, is particularly concerned. Given the number of statements being circulated as fact, Clean the Mill would like to add the following information supported by named, independent third-party studies, Northern Pulp's own comments, and a well-documented public history of negligence:

Statements from Forest Products Association Fact Sheet		Clean the Mill Comments
INTRODUCTION		
Paper Excellence of Canada (PEC) purchased the mill 3.5 years ago with plans to invest and modernize the plant.	Industry sources revealed that pulp mills require \$50 million/year of capital investment to stay current. Notably, Irving Pulp announced a \$450+ million capital investment in their plant last year to double capacity, improve efficiency and achieve positive environmental improvements. NP and its predecessors have only spent \$80 million on upgrades since 1971 (see attached NP Q&A). <u>NP is CLEARLY lagging in its capital investments and commitments to improvement.</u> It has not been keeping pace with industry and relies too much on government funding.	
Since its initial start-up in 1967 Northern Pulp has earned a reputation as one of North America's leading manufacturers of northern bleached Kraft pulp. Today the Pictou County mill is the cornerstone of the local economy.	We would agree NP has earned a reputation as widely reported in many media outlets, however, <u>we have not seen any objective reports praising them as a leading edge manufacturer in their industry.</u> NP would certainly be an important contributor to the local economy, but until objective evidence to support this point is provided, the argument of 'cornerstone' cannot continue to be accepted at face value. Furthermore, the lost opportunities (lost investments due to poor air quality, deteriorating tourism, declining property values, etc) associated with the mill have not been factored into this determination.	
GENERAL		
The new I.A. places a pulp production cap on the mill limiting the potential for financial stability and the ability to attract capital. Northern Pulp feels the mill should have the ability to increase production while being able to meet its environmental responsibilities.	Northern Pulp has repeatedly failed to meet its environmental responsibilities. And, NP increased production at a time the company knew pollution reduction equipment was failing (Summer 2014). <u>These are not the actions of a socially responsible organization.</u> Therefore, until the company can prove that it can indeed meet its environmental responsibilities, it would be irresponsible for a regulator (NSE) to permit greater production. Once the facility is completely in compliance and has shown that no further environmental degradation will result from increased production, then the company should be permitted to increase capacity, but not BEFORE these important benchmarks have been met.	
The new I.A. requires additional annual testing in excess of the norm. The estimated additional cost of this requirement is in excess of \$1 million dollars.	There are two additional air emission stack tests required in the IA. According to NP, these should have a cost of \$60,000-\$80,000 per year (see attached NP Q&A). There are also additional studies required in this IA. The inclusion of study requirements is not unusual; the last IA also required additional studies and should, therefore, be an expected cost of NP's business.	

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March 28, 2015

It's the mill's position that this additional testing does not improve the mill's environmental footprint. [sic]	The tests and studies themselves will not improve the environmental footprint, but test results will permit accountability and study results will indicate the best course of action for NP's investments in modernization. If the studies are not undertaken, how will NP know how to proceed in this direction? It is the position of Clean the Mill that the information demands set forth in the IA are warranted.
WATER CONSUMPTION/WATER TREATMENT IMPACT	
Based on an independent 3 rd party survey of chemical pulp mills in Canada in 2013 Northern Pulp is ranked middle of the pack when it comes to water usage.	We have not seen this study and no details are provided to locate it.
The new I.A. has a new daily use limit of 63,000m ³ of water/day. It's the company's position the new requirements are too dramatic a change in a short period of time and could lead to negative changes in the treated wastewater.	<p>This is the target for 2020 and the first water use reduction milestone is technically not required by NP until Jan 30, 2018. In addition, the extent of the change appears to have been exaggerated as NP reported that it current uses 78,000m³ of water/day now (see attached NP Q&A) and Nova Scotia Internal Services has confirmed that NP water use is as follows:</p> <ul style="list-style-type: none"> The mill's average monthly usage over the last several years has been in the range of 16 million gallons per day (60,566 cubic meters) during the season from October to April, ranging upwards to a range of 21 million gallons (79,493 cubic meters) during the warmer season when the mill requires more cooling water. <p>Therefore, the water reduction targets are neither too dramatic, nor too fast.</p>
There's concern the smell could get worse as the effluent concentrate and temperature increases.	It could. However, the IA accounts for this potential complication. The IA requires new monitoring in order to determine the impacts of decreased water usage and allows for the possibility for changes in the event of adverse observations. Therefore, the IA adequately addresses NP's concern in this regard
While reducing waste water is a good thing very few jurisdictions in Canada have water flow limits.	<p>There are Canadian jurisdictions that have water flow limits. And, there is a movement worldwide to regulate water use in pulp mills. In fact, a recent review concludes that "the North American pulp and paper industry is highly regulated with respect to water use and effluent quality" and that "the main drivers for responsible water management are regulations, the marketplace and drought" (Sappi (2012). Water Use and Treatment in the Pulp and Paper Industry. eQ Insights, 5). Furthermore, water use reduction "can result in water and/or energy savings of hundreds of thousands to millions of dollars per year per mill site" (Sappi 2012).</p> <p>Thus, including water flow limits is becoming more common in the pulp industry, including Canadian jurisdictions and can have positive financial benefit to the company. Therefore, water use limits are win-win for the public and the company.</p>
The mill's current waste water treatment facility operates well below federal regulatory levels-60-80% below permitted levels.	<p>We have seen no evidence to support this point. Perhaps NP is referring to its daily/weekly tests, but this information is not publicly available.</p> <p>It should also be noted that federal regulatory limits of pulp mill effluent set the upper bound. Provinces are entitled to identify what specific limits they will tolerate within their region. And, Canada's federal limits are recognized as being</p>

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	<p>weak relative to the rest of the globe, BUT there are provinces (Alberta) that operate closer to effluent parameters internationally. (Alberta Environment (2005). Technology-based standards for pulp and paper mill wastewater releases. Pub. No: T/805, ISBN No. 0-7785-4032-4 (On-line Edition)).</p> <p>In addition, a recent Stanlec report identified that metal concentrations at the sludge disposal cell underdrain exceed CCME-FAL guidelines. No data is collected to know if these concentrations are exceeded at the aeration stabilization basin. Stanlec also identifies that there are a number of other criteria that should be tested that are not. Therefore, there is evidence that regulatory limits might be exceeded if they were tested. Not testing for something does not mean it does not exist.</p> <p>Therefore, NSE is well within its rights to set effluent regulatory limits and should consider going even further than those contained in the IA given evidence from other jurisdictions and independent tests conducted at the Boat Harbour site.</p>
<p>The new I.A. requires total reduced sulphur (TRS) be measured and reduced in wastewater-a new requirement. In Ontario this is a brand new (optional) regulation. It is the company's position that before committing to reductions it is necessary to fully understand what the impacts are of implementing this.</p>	<p>To this point, it is a regulation in Ontario.</p> <p>Therefore, there is a basis for regulatory intervention by NSE.</p>
<p>Chemical Oxygen Demand (COD) is commonly tested, but not a regulated parameter in any jurisdiction in North America. The new I.A. has imposed COD as an indirect measurement of organic pollutants in the wastewater.</p>	<p>A study completed by AMEC in 2010 revealed that NP is in the 100th percentile of Canadian mills' average waste water COD levels. This means that NP was in the highest percentile of waste water COD levels, or, that <u>no other Canadian mill had higher levels of COD in waste water effluent.</u> (The AMEC report identified NP had a COD level of 78.5 kg/admt; The Canadian median COD level was 25.8 kg/admt.) This suggests that COD is a problem for NP and something must be done to bring NP's COD levels closer to the Canadian average. Furthermore, whereas other mills own their own treatment facilities, this facility is OWNED by the province of Nova Scotia.</p> <p>Therefore, regulatory intervention is definitely warranted as NP is the worst of the worst.</p>
<p>AIR EMISSIONS</p> <p>The new I.A. requires a particulate limit on the Recovery Boiler of 77mg/m³ which is a concern as this represents an 80% reduction. Setting a regulated limit so close to the expected operating level is unusual</p>	<p>Yes, it is an 80% reduction, but the limit is 220% higher than what NP promised it could do.</p> <p>The previous limit of 375 mg/m³ was an outdated standard, far beyond what other mills were permitted. The reduction to 77 mg/m³ is well within the capabilities of the equipment. The manufacturer guarantee on the recovery boiler precipitator is that the new equipment will reduce PM to far less than the current limit of 77 mg/m³.</p> <p>"The guarantee from the supplier is that we should be between 30 and 50 milligrams per reference cubic metre,"</p>

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<p>and sets Northern Pulp up for failure. The limit in the previous I.A. was 375mg/m³.</p>	<p>said MacKenzie, adding that the current standard is 375 milligrams." (http://metronews.ca/news/halifax/1132609/nova-scotia-government-sells-may-deadline-for-pulp-mill-to-fix-emissions-problems/, Aug 21, 2014)</p> <p>In fact, 77 mg/m³ is not the most aggressive particulate matter target in Canada. Since NP will have the most current technology available (new electrostatic precipitator) to reach the new target, it should have no trouble meeting the standard.</p> <p>In addition, the new IA does not reduce the limit on particulate matter from other plant equipment, despite more aggressive capabilities and expectations elsewhere (see Bruce and Van der Vooren (2003), Trends in air emission limits for world class mills, <i>Pulp & Paper Canada</i>, 104:7). Notably, the power boiler upgrades completed in 2012 with a federal Green Transformation Fund grant were required to be able to meet a new in-stack standard of 90 mg/m³ (https://www.scribd.com/doc/90047740/Northern-Pulp-mill-permit, p. 17). The particulate matter limit on power boiler emissions remains at 150 mg/m³ in the new IA.</p> <p>The new IA also requires that annual facility emissions of total particulate matter from main facility sources be limited to 2.0 kilograms of total particulate matter (TPM)/tonne of production. A comparison of several other Canadian kraft pulp mills revealed that PM emissions of 2.0 kg/tonne production is still far above the sampled Canadian average of 1.51kg/tonne production. Therefore, the only particulate matter emission reduction requirement in this IA is NOT an unrealistic expectation and should have been more aggressive.</p>
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Clean The Mill comments on Bill No. 89 - Boat Harbour Act

Boat Harbour was once one of the most pristine areas in Nova Scotia and in 1925 made the shortlist to become a National Park. But instead in the 1960's it was offered as an industrial treatment lagoon for a bleached kraft pulp mill by the government of the day. Every 24 hours, 90 million litres of fresh clean water gets pumped from Middle River, to the pulp mill and is deposited as industrial effluent into Boat Harbour. To gain a perspective on this, this is close to the same daily water requirements for the HRM. So imagine this amount of water being polluted each day, every day! And that this has been happening for almost 50 years now.

When we look at a piece of bright white paper we've mostly been programmed into thinking that white means clean and new. Since learning more about the process of a bleached kraft mill, white paper now makes me think of Boat Harbour and the amount of chemicals that it must take to turn wood from its natural colour to bright white. Although modern, state of the art facilities exist elsewhere in the Country and the rest of the World, our mill in Pictou County has fallen far behind the pack. On Environment Canada's website, there is information showing that in 2012 Northern Pulp was the 5th highest emitter of PM2.5. That is out of all industries of all types in the Country. Out of all the pulp mills in the Country, Northern Pulp was number one for releasing the most PM2.5. According to the World Health Organization, PM2.5 is the most carcinogenic form of air pollution and is linked to various forms of cancer, pulmonary diseases and other respiratory illnesses. In 2012, 63% of all industrial PM2.5 emitted in the Province of NS came from Northern Pulp alone. That's more than all of our coal fired power plants combined, and the situation is visibly worse now than it was in 2012.

I want to offer sincere thank you to the Government and to the Pictou Landing First Nation. Most people in Pictou County have never been to Boat Harbour. Most mill employees have never seen it and most governments have ignored it. I want to take this opportunity to say thank you to this Government for facing an extremely complex and difficult situation head on for the first time in its almost 50 year history. I also want to thank the members of all parties who support this Bill. I also want to congratulate and offer our sincere gratitude for the hard work of Chief Andrea Paul and her Band Council. There's no question that they've been the ones most affected by this issue alongside their neighbouring residents in Pictou Landing. I very much look forward to watching the whole community rise stronger through this and become vibrant and successful again. They deserve nothing but the best.

So personally speaking I've lived in Pictou County my whole life. I'm very fortunate to have a job that allows me to travel the World but I'm happiest when I'm back home with my family in good old Pictou County. There are many families including mine who are concerned about the long-term health impacts of living near this mill and Boat Harbour. My wife and I have talked many times about selling our house and moving away because of the concerns with the non-functioning filtration equipment at the mill. It's been bad. It's a serious worry and some of you have may have seen recent pictures or witnessed it firsthand but there's nothing like living in it that keeps you motivated and wanting to see things cleaned up. The mill has been here my whole life but I've never seen it as bad as it's been over the last few years. There are many days when you can't see through the smog from the Pictou Causeway to Green Hill or from the town of Pictou to the mill itself. When it lands heavy in the yard we turn off the air exchanger and make sure the kids aren't playing outside. Whenever I drive by a school yard or a soccer field and see kids out running and playing in the smog from the mill it makes me furious. They should have a choice not to inhale the toxins.

Many call this an emotional issue which is true, but it's an emotional issue that is based on facts. The mill has been operating with non-functioning filtration components since at least 2006 and this is totally unacceptable. As a husband and father of three young children I feel that my most important job in life is to keep my family safe. Air that you can't see through cannot be safe to breathe, especially the unfiltered emissions from an old and worn-down bleached kraft pulp mill that's being pushed to record breaking production levels. And on top of all this, it's been extremely frustrating that a group of volunteers has had to fight the government to do something that the government should have been doing in the first place. Now we really need the Government to stand up strong and be accountable to the people of Pictou County. With this file it is also extremely important to us that partisan politics to be placed aside in the interest of doing what's right and we hope to see more cooperation between all of the parties. All political parties played a role in creating the mess and all political parties should play a role in helping clean up the mess.

We are however encouraged by all the recent activity on this file. This is a very exciting time. The remediation of Boat Harbour will be a huge step forward for Pictou County and to say that it's long overdue would be an understatement. There will be challenges ahead but if Paper Excellence steps up to the plate financially, meeting their environmental obligations and are held accountable for the health and safety of the community and their employees, good things will most definitely

happen. The clean-up of Boat Harbour, the construction of a new industrial effluent treatment facility along with infrastructure improvements at the mill could potentially create a lot of jobs. Pictou County desperately needs Northern Pulp to shape up. We also need to work to attract new and sustainable business opportunities that are a true reflection of what we are capable of. If we remove the negative stigma we can raise the ceiling for our real economic growth potential. This whole movement to clean up Boat Harbour is being seen as a very positive step and will not only entice former residents to retire back home from out West but will also help attract new residents to the area along with new ~~and~~ business opportunities.

Although we are very optimistic about this Boat Harbour Bill, as Chief Andrea Paul stated it, "we remain cautiously optimistic". There has been a long history of non-compliance and lack of enforcement by the Department of Environment. It's been the lack of accountability by mill operators and governments that has gotten us into this mess. This is why strict enforcement of the new IA will be necessary to provide the goal posts along the way that need to be met. But again, we are encouraged and all of this is new and long overdue

There will obviously be a great concern about the industrial out-flow from a new treatment facility and where it might go. It's going to be extremely important to protect and preserve our lobster fishery and avoid creating another environmental disaster that could haunt us in the future.

Another big question is whether or not Nova Scotia tax payers will be giving any more money to Northern Pulp. Since 2009 the mill has received over \$139 million in financial assistance. And it hasn't yet been determined what it will cost to bring this mill into compliance with standards being met elsewhere in the World. All that we can really do at this point is assume that Northern Pulp's comments to the media are sincere and that they plan on being here for the long haul. If they decide to not invest in their own mill then in the words of a popular man in this house, "if it's not a good investment for private enterprise, then it's not a good investment for the government either."

No one wants to see people out of work. But we've also only ever really heard the success stories from the good end of the pipe. The stories from the bad end of the pipe are much different and have been ignored for a long time. I'm not just talking about the obvious environmental disaster, there are other local jobs and locally owned businesses at risk if we continue to support and maintain the status quo. Why did we lose 80 jobs last month, between the hardwood flooring place in Antigonish and the hardwood mill in Westville because neither place can get hardwood logs? Meanwhile logs of all types are being chipped and burned in Northern Pulp's biomass boiler for power generation. They need the equivalent of 40 truckloads per day just to keep the power on. The net job loss for business as usual has never been determined. All things need to be considered and we hope that the economic impact assessment portion of the process is fair, balanced and comprehensively accounts for the both positive and negative outcomes.

So again a big thanks for this positive first step. We are very hopeful and encouraged by this Bill and the support it has received from all parties. As we move down the road to the remediation of Boat Harbour and dealing with the air emissions problem at Northern Pulp, we remain hopeful that standards will be enforced. It's hard to look back and really blame previous generations for the mess that we find ourselves in now because so much about the negative health and environmental impacts was unknown and unimaginable back then. But in this day and age we know better and therefore we have to do better. It seems that we're now finally on the road to righting some wrongs so again thanks to everyone who supports this monumental Boat Harbour Bill. You should all sleep very well tonight.

Thank you,
Dave Gunning

Halifax Regional Municipality
Nova Scotia

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**IN THE MATTER OF AN APPLICATION BY
NORTHERN PULP NOVA SCOTIA CORPORATION
FOR RENEWAL OF INDUSTRIAL APPROVAL
NUMBER 2011-076657 PURSUANT TO THE
ENVIRONMENT ACT AND REGULATIONS**

**SUBMISSIONS OF PICTOU
LANDING FIRST NATION**

March 21, 2013

VOLUME I

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L A W Y E R S

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March 21, 2014

File No. 8364-003

Justin Huston
Director of Consultation
Aboriginal Affairs
Province of Nova Scotia
P.O. Box 1617
Halifax, NS
B3J 2Y3

Dear Mr. Huston,

***Re: Consultation with Pictou Landing First Nation — Northern Pulp Nova Scotia Corporation
— Application for Industrial Approval 2013***

Introduction

Please accept the following as the response of the Pictou Landing First Nation ("Pictou Landing") to the application by Northern Pulp Nova Scotia Corporation ("Northern Pulp") for renewal of an industrial approval for the operation of its pulp mill at Abercrombie Point and its wastewater facility at Boat Harbour pursuant to the Nova Scotia *Environment Act* and the *Approval and Notification Procedures Regulations* (the "Industrial Approval").

Approval Discretionary

We note that the Minister has a broad discretion to renew an industrial approval under section 10(3) of the *Approval and Notification Procedures Regulations* which includes the discretion to change the terms of the approval or refuse to renew it altogether.

Honour of the Crown

In all dealings between the Province and Pictou Landing the Province is under a legal and constitutional duty to act honourably. This duty was articulated in *Taku River Tlingit First Nation v. British Columbia (Project Assessment Director)*, 2004 S.C.C. 74, at para. 24:

The duty of honour derives from the Crown's assertion of sovereignty in the face of prior Aboriginal occupation. It has been enshrined in s. 35(1) of the *Constitution Act, 1982*, which recognizes and affirms existing Aboriginal rights and titles. Section 35(1) has, as one of its purposes, negotiation of just settlement of Aboriginal claims. In all its dealings with Aboriginal peoples, the

Crown must act honourably, in accordance with its historical and future relationship with the Aboriginal peoples in question. The Crown's honour cannot be interpreted narrowly or technically, but must be given full effect in order to promote the process of reconciliation mandated by s. 35(1).

Duty to Consult

The Supreme Court of Canada first articulated a constitutional duty on the part of the Crown to consult with Aboriginal groups in 1997 in *Delgamuukw v. British Columbia*, [1997] 3 S.C.R. 1010, at para. 168:

There is always a duty of consultation. . . . The nature and scope of the duty of consultation will vary with the circumstances. In occasional cases, when the breach is less serious or relatively minor, it will be no more than a duty to discuss important decisions that will be taken with respect to lands held pursuant to aboriginal title. Of course, even in these rare cases when the minimum acceptable standard is consultation, this consultation must be in good faith, and with the intention of substantially addressing the concerns of the aboriginal peoples whose lands are at issue. In most cases, it will be significantly deeper than mere consultation. Some cases may even require the full consent of an aboriginal nation, particularly when provinces enact hunting and fishing regulations in relation to aboriginal lands.

The duty to consult arises whenever the Province has knowledge, real or constructive, that a pending government decision could adversely impact the exercise of Aboriginal rights. The Supreme Court of Canada made this clear in *Haida Nation v. British Columbia (Minister of Forests)*, 2004 S.C.C. 73, 2004 CarswellBC 2656 at para 35:

The foundation of the duty is the Crown's honour and the goal of reconciliation suggest that the duty arises when the Crown has knowledge, real or constructive, of the potential existence of the Aboriginal right or title and contemplates conduct that might adversely affect it

As noted above, in *Delgamuukw, supra*, at para 168, the Supreme Court of Canada insisted that "consultation must be in good faith, and with the intention of substantially addressing the concerns of the aboriginal peoples whose lands are at issue."

Duty to Identify Adverse Impacts

We submit that the duty to consult requires the Province to advise Pictou Landing at the outset of the consultation process of any potential adverse impacts that the Province has identified as flowing from the pending decision. This is a logical and practical extension of the principles underlying the duty to consult. Since the Province is under an obligation to take potential adverse impacts of which it has real or constructive knowledge into account in its decision

making process, it will of necessity have done a preliminary screening process to identify adverse impacts within its knowledge.

The preliminary screening process will have taken into account all of the information available. This includes information obtained by the Province independently as well as information provided by Pictou Landing during the course of previous consultations. It does not matter how the information came to the Province's attention. It must be taken into account

The importance of this will be obvious in the present renewal application as the Minister has access to a substantial volume of information maintained by the various Provincial government departments that have been involved in one way or another with the pulp mill at Abercrombie Point, the wastewater facility at Boat Harbour or both since 1967. The Minister will also have access to information provided by Pictou Landing First Nation in connection with an earlier application for renewal of the industrial approval.

Withholding the results of that initial screening process would be inconsistent with the discharge the Province's duty to act in good faith. Further, since Pictou Landing First Nation resources are limited disclosure of the results of the Province's preliminary screening will help avoid unnecessary duplication of effort. If the Province has identified a potential adverse impact, then Pictou Landing will not need to investigate it independently.

We note in the present consultation, the Minister has not notified Pictou Landing of any identified potential adverse impacts arising from the pending decision. This could be because the Minister is of the view that the decision does not give rise to potential adverse impacts and there is nothing to report or because the Minister takes the position that he has no duty to advise Pictou Landing of the adverse impacts identified by the Province at this time. We ask that you address this by advising whether the Minister has identified adverse impacts or not and if so, by disclosing same.

Duty to Accommodate

Once a potential adverse impact has been identified by the Province either from information available to it independently or from information provided by the affected Aboriginal group during the consultation process, the Honour of the Crown requires the Province to genuinely consider and accommodate the interests of the affected Aboriginal group as appropriate in the circumstances.

In determining what accommodation, if any, is required in the circumstances of the decision being made, the Minister is required to take into account all relevant information including the history of the activities being approved and previous dealings between the Crown, the proponent and the Aboriginal group.

In the present case, we are convinced that when the Minister reviews the historical record of the dealings between the Crown, Northern Pulp and its predecessors and the Pictou Landing

First Nation regarding the wastewater facility at Boat Harbour, the Minister will agree that the application for renewal of the industrial approval in this case must be denied or in the alternative must require provision for the closure of the treatment facility within 24 months.

Evidence

We submit with this letter copies of various documents which we submit are relevant to the Minister's decision insofar as it requires him to carry out the Crown's duty to consult and accommodate the interest of Pictou Landing in considering the present application for renewal. These documents have been bound in two volumes and tabbed for convenience of reference and we will reference them by tab number below as we review the relevant history of this matter.

1966 Federal Order-in-Council

Scott Maritimes would need a place to discharge wastewater from its proposed pulp mill at Abercrombie Point. The Province decided that place would be Boat Harbour. However, there were landowners adjacent to Boat Harbour that had to be dealt with. The Province acquired title from private landowners by purchase. However, the Pictou Landing Reserve also bounded Boat Harbour but acquiring title to Reserve lands was not so simple. The Province could only get title to Reserve land in two ways: (1) by surrender under section 38 of the *Indian Act* or (2) by transfer in lieu of expropriation under section 35 of the *Indian Act*. The first would have required the affirmative vote of a majority of the electors of the Band at a duly called meeting or in a formal referendum. There is no evidence that such a meeting or referendum took place. The second required a Provincial enactment authorizing the expropriation. No such enactment existed.

Instead of acquiring full title, however, the Province decided to acquire the riparian rights associated with the Reserve only. This resulted in a September 2, 1966 Federal Order-in-Council purporting to transfer the riparian rights associated with the Reserve to the Province (Tab 1). However, being an interest in land, riparian rights could not be transferred except by the two means discussed above: surrender under section 38 or transfer in lieu of expropriation under section 35 of the *Indian Act*. Again, there is no evidence that either took place. While Chief and Council passed a band council resolution around October 22, 1995 consenting to the transfer, this fell short of the requirements of a valid surrender (Tab 2).

Accordingly, the 1966 Federal Order-in-Council was ineffective in transferring riparian rights to the Province. This has never been corrected by either a proper surrender or transfer in lieu of expropriation since. The Honour of the Crown requires the Minister to take this into account in deciding the current application.

Misrepresentations as to expected condition of Boat Harbour

In the course of seeking the consent of the Pictou Landing First Nation to the use of Boat Harbour as a wastewater facility, Mr. A. F. Wigglesworth, a representative of the Nova Scotia Water Authority, met with members of Pictou Landing First Nation at a public meeting held on the Reserve on August 25, 1965. The meeting was chaired by a representative of Indian Affairs (Tabs 3 and 4).

At the meeting, which took place before the facility was built, community members expressed concern about the adverse impacts of the proposed project and all members present were against it. In particular members were upset about: (a) the loss of clams, quahogs, eels, smelt, lobster and trout; (b) the loss of feeding grounds for ducks and geese; (c) the loss of a safe anchorage for their boats; (d) the loss of the use of the water for swimming and recreational sport; (e) odors blowing off the water onto residential areas of the Reserve less than a quarter of a mile away; (f) loss of future building lots along the Boat Harbour shoreline; and (g) lack of consideration for the feelings of members over the ruination of land which they considered their own.

It was pointed out to Mr. Wigglesworth at the meeting that other Mi'kmaq from across Nova Scotia would travel to the Reserve to relax and enjoy the sport of fishing in Boat Harbour. It was further pointed out by the Chief that he felt that there was an historical treaty which gave the First Nation the exclusive right to fish in Boat Harbour. Some non-Native residents of Pictou Landing were present at the meeting and it came out that non-Natives had respected the use of Boat Harbour by the First Nation over the years.

Mr. Wigglesworth told those present at the meeting that Boat Harbour would be dammed and the water levels maintained at the high water mark creating a lake. He said that no salt water fish would survive but he believed that the water may be suitable for freshwater fish. He also gave the opinion there would be no odor from the treatment facility except in the Spring when the ice broke up.

Similar representations were made by representatives of the Nova Scotia Water Authority to non-Native residents in the area that Boat Harbour. They were told that Boat Harbour would become a beautiful fresh water lake suitable for boating and waterskiing and that a skid way would be installed to accommodate boats going in and out of Boat Harbour (Tab 5).

After hearing the objections of members of the Pictou Landing First Nation, the Province began to consider a cash payment to Pictou Landing First Nation if they could be "bought off" that way (Tab 6).

Mr. Wigglesworth took Chief Louis Francis and Councillor Martin Sapier to Renforth, New Brunswick and showed them a domestic sewage disposal system on the weekend of October 10, 1965. Mr. Wigglesworth told them that the system was similar to the industrial wastewater facility proposed for Boat Harbour. The Chief and the Councillor were impressed that the Renforth system had no odor (Tab 7). They signed a handwritten agreement in principle on Sunday, October 10, 1965 in Saint John, New Brunswick expressing their consent to the project

motivated in part by the belief that the new pulp mill would be good for the entire area of Pictou County (Tab 8).

Clearly, the representations made as to the future conditions in Boat Harbour, and in particular as to the lack of odor, were incorrect and misleading. Had the true state of affairs been disclosed even the ineffectual consent of the Chief and Council would not have been forthcoming.

Terms of the 1966 Order in Council Ignored

Several conditions were attached to the 1966 Order-in-Council which purported to transfer the riparian rights to the Province, including: (a) that the Province take remedial action should the water in Boat Harbour become septic, (b) that the Province build a slipway to allow boats to go in and out of Boat Harbour, and (c) that the Province pay \$60,000 as compensation (Tab 1).

The Province did pay the compensation. However, it did not build a slipway to allow boats to go in and out of Boat Harbour. As for septic conditions, the increased oxygen demand from the organic material in the wastewater rendered Boat Harbour devoid of life almost immediately.

Submissions by local citizens to an engineering consulting firm hired to study the problem at the time shows that conditions in and around Boat Harbour deteriorated almost immediately after the wastewater began to flow from the pulp mill in 1967 (Tabs 9, 10, 11).

A 1970 Health Canada investigation revealed that Boat Harbour had lost all of its original characteristics and was merely a retention pond and that oxygen demand caused by the wastewater exceeded the available oxygen in the system (Tab 12). Also in 1970 the Department of Fisheries and Forestry (Canada) reported that results of investigations conducted since 1967 showed a progressive concentration of pollutants in Boat Harbour (Tab 12).

While the Province took some measures to alleviate the conditions in Boat Harbour in the 1970's, the odors caused by airborne sulphur compounds from the wastewater continued to adversely impact the use and enjoyment of Reserve land and the Province refused to do anything further about it (Tabs 13, 14, 15).

Adverse Health Effects

The odors from the wastewater treatment facility are caused by sulphur compounds and mercaptins (Tab 16). In addition to being annoying, as early as 1970 a local physician, Dr. MacDonald raised concerns about the health effects of the sulphur gasses on residents in the area. Dr. MacDonald's concerns were validated by later studies which showed that people living near pulp mills and exposed to airborne sulphur compounds have a higher incidence of adverse health effects. These studies are reviewed in a journal article, The Science of Odor as a Potential Health Issue by Susan S. Schiffman and C. M. Williams, *J. Environ. Qual.*, Vol. 34, January 2005 (Tab 17).

Flooding Reserve Land

Contrary to the representations made to members of the Pictou Landing First Nation in 1965, the Province did not maintain water levels in Boat Harbour at the ordinary high water mark, but instead exceeded those levels thereby flooding Reserve land without authority. This was later admitted by the Province in 1991 (Tab 18).

Operation of the Treatment Facility – 1970-1995

It is not clear what the initial arrangements were between the Province and Scott Maritimes, the owner of the mill. However, in September 1970 the Province and Scott Maritimes entered into a 25 year agreement whereby the Province agreed to operate the wastewater facility at Boat Harbour and receive wastewater from the mill.

1991 Promise to Decommission the Wastewater Facility and remediate Boat Harbour

In 1986 Pictou Landing First Nation launched a lawsuit against Canada for breach of fiduciary duty surrounding the Boat Harbour treatment facility. By 1990 Canada and Pictou Landing First Nation were discussing settlement of the lawsuit. Canada apparently threatened to take legal action against the Province.

This prompted a letter dated February 12, 1991 letter from the Nova Scotia Minister of Environment to the Minister of Indian Affairs (Canada) (Tab 18) confirming that the Province had committed to Canada and to Pictou Landing First Nation to remove the wastewater treatment facility from Boat Harbour within 5 years and return Boat Harbour to a tidal estuary. The Minister stated that the Province intended to keep that commitment but that Canada's threat to bring a lawsuit against the Province could cause the Province to renege on its commitment.

Settlement with Canada

Based in part on the commitment from the Province to close the wastewater treatment facility within 5 years, in 1992 Pictou Landing First Nation agreed in principle to settle the lawsuit against Canada. This led to a settlement agreement between Canada and Pictou Landing First Nation dated July 20, 1993 (Tab 19). Neither the Province nor the owners of the mill were parties to the settlement agreement.

The settlement agreement did not purport to surrender Reserve lands or any interest therein. The term surrender is not to be found in the agreement. Further, section 2.2.1 of the settlement agreement explicitly provided that settlement funds were not being paid for the taking of an interest in land pursuant to s. 35 of the *Indian Act*.

Nor did the settlement agreement expressly or impliedly provide for the continuation indefinitely of the discharge of wastewater into Boat Harbour or provide for a release of any claims by Pictou Landing First Nation or its members against the Province or the owners of the mill. It did in section 12 provide for an assignment by Pictou Landing First Nation to Canada of certain causes of action against the Province and the owners of the mill. Pictou Landing First Nation disputes the validity of those assignments in the current lawsuit against the Province and the owner of the mill, however even if valid the assignments do not extinguish any claims against the Province or the mill owners, they simply transfer the right to take legal action to Canada. Canada would still have a fiduciary duty to protect the Reserve.

It is not surprising that the closure of the wastewater facility was not addressed in the settlement agreement since the Province had promised in 1991 to decommission the facility within 5 years. Closure of the facility was a provincial responsibility and the Province was not a part to the agreement.

In short, in determining the present application to renew the Minister cannot accept the 1993 settlement agreement as authority or consent of the Pictou Landing First Nation for the continued discharge of wastewater into Boat Harbour since the 1993 agreement was entered into on the strength of the Province's commitment to decommission the wastewater facility within 5 years from 1991.

1995 Promise to Decommission the Wastewater Facility and remediate Boat Harbour

In September 1995, just as the original 25 year wastewater agreement between the Province and Scott Maritimes was about to expire and just before the Province was to decommission the wastewater facility, the Province reached an agreement with Pictou Landing First Nation which would postpone the decommissioning of the wastewater facility for another 10 years to December 31, 2005 (Tab 20).

Under this agreement, Pictou Landing agreed to forgo any legal action or other interference with the wastewater facility for 10 years to December 31, 2005. In exchange the Province agreed to completely remove the wastewater facility after the 10 years had expired and in the meantime to transfer certain land around Boat Harbour to Pictou Landing First Nation with more to come later after the wastewater facility was decommissioned – including lands upon which the facility itself was located. The Province also committed to cleaning up Boat Harbour at the end of the 10 year period.

This agreement with Pictou Landing First Nation allowed the Province to enter into a memorandum of understanding with Scott Maritimes (Tab 21) in which the Province agreed to: (1) lease the wastewater facility to Scott Maritimes for the 10 year period ending December 31, 2005; (2) licence Scott Maritimes to discharge wastewater into Boat Harbour for the same 10 year period; and (3) indemnify Scott Maritimes from any costs associated with claims arising from the use of Boat Harbour as a wastewater facility and from any costs arising from the forced relocation of the wastewater facility (Tab 21, Schedule 5).

By Provincial Order-in-Council 96-621 of August 14, 1996 (Tab 22) the Province approved the arrangements with Scott Maritimes and the transfer of land to Pictou Landing First Nation as contemplated in the 1995 agreement (Tab 20).

In 1997 the arrangements between the Province and Pictou Landing First Nation were again set out and confirmed in an exchange of correspondence between lawyers for the Province and the Pictou Landing First Nation (Tabs 23 and 24).

The forgoing is conclusive proof that the Province had agreed to close the treatment facility by December 31, 2005 in exchange for a promise by Pictou Landing First Nation not to interfere with the operations of the wastewater facility. Pictou Landing First Nation fulfilled its side of the agreement. This fact cannot be ignored by the Minister in deciding the current application to renew the industrial approval.

2000 Agra Simons Report on Cost of Relocating Wastewater Facility

In anticipation of decommissioning the wastewater facility in 2005, Scott Maritimes retained engineering firm Agra Simons to report on the costs of relocating the wastewater facility. In its report Agra Simons utilized the mill site itself as a potential location of an alternative wastewater facility (Tab 25, p. 41). This alternative would require either a shorter pipeline into Pictou Harbour or a longer pipeline to an area near Lighthouse Beach to discharge effluent. The cost of the relocation and the longer pipeline to Lighthouse Beach was estimated by Agra Simons at \$60 million (Tab 25, p. 49).

2001 Memorandum of Understanding

Sometime after the Agra Simons report (the results of which were not disclosed to Pictou Landing First Nation) Kimberly Clarke Inc., successor in title to Scott Maritimes, and the Province proposed an alternative to decommissioning the entire wastewater facility by the promised date of December 31, 2005 (Tab 26).

Under this alternative, Kimberly Clarke proposed that those parts of the wastewater treatment facility known as the "settling basin", the "emergency spill basin" and the "aerated stabilization basin" or "ASB" would remain in operation until December 31, 2030. Kimberly Clark would build a new pipeline through Boat Harbour so that wastewater leaving the ASB at what is known as point "C" could by-pass the larger part of Boat Harbour known as the "stabilization lagoon" and be discharged from the new pipeline at point "D" directly into a channel leading to the Northumberland Strait. Tab 27 contains an aerial photograph of the treatment facility showing points "C" and "D" and identifying the ASB, the stabilization lagoon and other parts of the wastewater treatment facility, as well as the proposed by-pass pipeline.

Kimberly Clark proposed that the new pipeline would be in place by December 31, 2005 allowing the Province to clean up the stabilization lagoon and remove the dam located at point

"D" so as to return the stabilization lagoon to a tidal estuary as promised in 1991, 1995 and 1997. After 2030 the remainder of the wastewater facility would be decommissioned and the lands promised in 1995 transferred to Pictou Landing First Nation by the Province. In other words the decommissioning promised by the Province would now be done in two stages: the first after the pipeline scheduled for December 31, 2005 was built and the second after December 31, 2030.

A memorandum of understanding setting out the agreement was approved at the community referendum and on September 27, 2001 Pictou Landing First Nation entered into the memorandum of understanding with Kimberly Clark (Tab 28).

Under the memorandum of understanding Kimberly Clark also agreed to make modest annual payments to Pictou Landing First Nation until the year 2030 beginning at \$200,000 per year and increasing to \$280,000 per year by 2030. Kimberly Clark also agreed to transfer certain forest land to Pictou Landing First Nation once the pipeline was built. This seemed like a modest price to pay for deferring \$60 million in capital costs to the year 2030.

Without waiting to see if Kimberly Clark would carry out the terms of the memorandum of understanding, in 2002 the Province extended the term of the lease for the treatment facility from December 31, 2005 to December 31, 2030 (Tab 29).

The Province subsequently took steps to prepare for the remediation of Boat Harbour including retaining an engineering firm to conduct tests of the sediments in Boat Harbour. The report of the engineers confirmed the existence of several contaminants in the sediments at the bottom of Boat Harbour including heavy metals, dioxins and furans (Tab 30).

December 31, 2005 – No Closure

However, by December 31, 2005 neither Kimberly Clark nor its successor in title to the pulp mill, Neenah Paper Company of Canada ("Neenah Paper"), had completed the new pipeline. The mill owner cited the opinion of its consulting engineers that eutrophication would occur as wastewater discharged at Point D was be pushed back into Boat Harbour with the incoming tide. As a result the Province and the mill owner decided not to submit the proposed pipeline project and cleanup of Boat Harbour for federal environmental review and to instead look for an alternative solution (Tab 31, page 1, Section F).

Extension of time

The Province and Kimberly Clark asked Pictou Landing First Nation for more time to study the problem and find an alternative to the proposed pipeline which would allow the primary settling ponds and the ASB to remain in place until 2030 as contemplated in the September 27, 2001 memorandum of understanding and still allow the Province to return Boat Harbour to a tidal estuary.

By amending agreement dated January 2, 2006, Pictou Landing First Nation and Neenah Paper agreed to extend the deadline for building the pipeline under the September 27, 2001 memorandum of understanding from December 31, 2005 to December 31, 2008 (Tab 31).

No alternative to pipeline

However, by October 2008 engineers hired by the Province to find an alternative to the proposed pipeline reported that they could find none.

"No more extensions"

On November 19, 2008 Chief Anne Francis-Muise wrote to the Hon. Murray Scott, Minister of Transportation and Public Works and the Hon. David Morse, Minister of Natural Resources advising that Pictou Landing First Nation would not agree to a further extension of the 2001 memorandum of understanding beyond December 31, 2008. In the letter she detailed the adverse impacts of the wastewater facility on Pictou Landing First Nation and insisted that the Province close the facility within a reasonable period of time and remediate Boat Harbour as promised in 1991, 1995 and 1997 (Tab 32).

December 4, 2008 Commitment

In response, Chief Francis-Muise was invited to meet in Halifax with the Hon. Murray Scott, the Hon. David Morse and the Hon. Michael Baker, Minister of Justice and Minister of Aboriginal Affairs, which she did on December 2, 2008. At the meeting she was advised that the Province would close the wastewater facility. This commitment was later confirmed in a letter dated December 4, 2008 from the Hon. Murray Scott to Chief Francis-Muise (Tab 33).

The December 4, 2008 letter acknowledged the adverse impacts on Pictou Landing First Nation members and confirmed the Province's commitment to find another location to discharge the wastewater and to clean up Boat Harbour:

We welcomed the opportunity to confirm, in a face to face meeting, among leaders of both governments the Province's intention to end the negative impacts on your community caused by the Boat Harbour Effluent Treatment Facility.

As Minister Baker so graphically stated: "To say that the Band has been long suffering would be a masterful understatement of the obvious." It is our unwavering intention to end that suffering as quickly as possible. It should have been done a long time ago.

Our first step will be to find another discharge location that does not involve Boat Harbour. We will then clean the harbour and return it to a tidal state."

The Province appointed a negotiator shortly after December 4, 2008 to work out the details of the relocation. However, on June 9, 2009 the New Democratic Party formed the government after a provincial General Election and discussions were put on hold and the new government said it was studying the matter.

Costs of Relocation

After many months the Province agreed to update the costs estimates contained in the 2000 Agra Simons report (Tab 25). The Province hired AMEC, a consulting engineering firm, to prepare a report which it delivered on April 21, 2010 (Tab 34). The AMC report estimated the costs of relocating the facility to the mill site and discharging wastewater by pipeline to Lighthouse Beach at \$94 million (Tab 34, p. 77).

After receiving the AMEC report, Pictou Landing First Nation retained ADI Inc., a consulting engineering firm, to provide cost estimates for adding a tertiary treatment system to the proposed wastewater facility which would remove more contamination from the wastewater so that it would meet the Canadian standards for discharging municipal sewage into the ocean waters. This would allow the wastewater to be discharged into Pictou Harbour resulting in a shorter pipeline. The ADI report showed that the tertiary treatment would result in cleaner wastewater and could be built for as little as \$7.8 million but would save \$12 million in pipeline costs because the cleaner wastewater could be discharged into Pictou Harbour (Tab 35, p. 43-46).

Despite the enormous amount of time and energy expended on this matter, the wastewater facility remains operational with no sign of change.

Impact on community

The impact of the wastewater facility on the Pictou Landing First Nation has been immeasurable. Chief Andrea Paul, the current Chief of the Pictou Landing First Nation, described this in an affidavit filed with the Nova Scotia Supreme Court in a lawsuit against the Province:

The wastewater treatment facility has been like a heavy weight dragging down the community – physically, emotionally, spiritually, culturally, socially and economically - for decades. The community has lost hope and trust after decades of broken promises by the Province and the owners of the mill.

Current Plans

Based on the material provided to the Department by Northern Pulp in support of its renewal application, there is no plan to improve the conditions at the wastewater facility during the term of the requested industrial approval. Accordingly, renewal of the industrial approval in its

present form will perpetuate the adverse impacts on the wastewater facility on the Pictou Landing First Nation.

Honour of the Crown

We believe that the Honour of the Crown requires the Minister to honour the commitment made to Pictou Landing by his predecessor in 1991 to decommission the wastewater facility and remediate Boat Harbour. This earlier commitment itself arose out of constitutional duty to accommodate Pictou Landing First Nation at an earlier stage in the life of the mill when the 25 year wastewater agreement was about to expire. The measures promised at that time were designed to protect the Aboriginal rights of Pictou Landing First Nation. They were not mere political overtures. However, they were never implemented because of a series of arrangements between Pictou Landing First Nation, the Province and the owners of the mill over a 13 year period.

It is clear that the latest arrangement, a two stage decommissioning set out in the 2001 memorandum of understanding, was contingent upon the installation of a pipeline from Point C to Point D so that wastewater could by-pass the stabilization lagoon allowing it to be cleaned up. When that was shown not to be feasible from an environmental point of view an extension of time was agreed upon giving the Province and the mill owner to December 31, 2008 to find a solution.

When no solution was found within that time, Pictou Landing First Nation insisted on the Province implementing the original agreement – decommissioning the wastewater facility as soon as it could be organized.

The Province agreed to this at the meeting of December 2, 2008 and confirmed it in the letter of December 4, 2008. The Province acknowledged the adverse impacts on Pictou Landing First Nation. It is very difficult to see how the Minister can ignore this in the context of deciding the current application for renewal and uphold the Honour of the Crown.

It must always be recalled that the wastewater facility only exists because of the initial misrepresentations and illegal use of Reserve lands by the Province dating back to 1967. That illegal use continues.

It must also be recalled that the 1966 Order-in-Council which purported to transfer the riparian rights in Boat Harbour to the Province expressly required the Province to take remedial action if septic conditions arose, a term to which the Province agreed in 1966. There is no doubt that septic conditions arose and continue to exist in Boat Harbour.

Present Decision

The present decision before the Minister is whether to renew the industrial approval or not. If granted Northern Pulp will be permitted to continue to discharge wastewater into Boat

Harbour causing continued harm to the people of Pictou Landing First Nation. If the approval is not renewed, Northern Pulp will need to find another location for the wastewater facility or cease operations. In either case, the adverse impacts on Pictou Landing First Nation will cease.

The choices before the Minister then are either to countenance continued adverse impacts or prevent them. This is not the same as the situation that existed in the case of *Carrier Sekani Tribal Council v. British Columbia (Utilities Commission)*, 2010 S.C.C. 43, 2010 CarswellBC 2867 in which the court found there was no duty to consult as the decision under review would not have an impact on the water use at issue in that case. *Carrier Sekani* was distinguished in *West Moberly First Nations v. British Columbia (Chief Inspector of Mines)*, 2011 BCCA 247, 2011 CarswellBC 1238 at para 237:

237 *Rio Tinto [Carrier Sekani]* is distinguishable from this case because in *Rio Tinto* there was a finding that the sale of excess power would have no adverse effect on the Nechako River fishery. Here, there is a link between the adverse impacts under review and the "past wrongs". However, *Rio Tinto* is applicable for the more general proposition that *there must be a causative relationship between the proposed government conduct and the alleged threat to the species from that conduct*. It is fair to say that decisions, such as those under review in this case, are not made in a vacuum. Their impact on Aboriginal rights will necessarily depend on what happened in the past and what will likely happen in the future. Here it could not be ignored that this caribou herd was fragile and vulnerable to any further incursions by development in its habitat. Thus, although past impacts were not specifically "reeled" into the consultation process, neither could the result of past incursions into caribou habitat be ignored.

In the present case, the Minister cannot ignore the fact that his decision will make a difference and accordingly triggers the duty to consult and accommodate.

No impact on viability of the mill

In balancing the interests of Pictou Landing First Nation with the interests of the Province in supporting the pulp mill as a viable business operation, it must be kept in mind that the pulp mill was built in 1967 and the initial agreement between the Province and the mill owner was to provide wastewater treatment to December 31, 1995. Presumably this reflected a sufficient period to provide the return on capital required to make the pulp mill feasible at the time.

In 1995 the Province granted the mill owner a 10 year lease of the wastewater facility and a total decommissioning of the facility was contemplated at the time. Again it must be assumed that the mill owner was satisfied with the return on capital over that 10 year period.

The extension of the lease to 2030 was predicated on the successful installation of a pipeline by the mill owner. The mill owner has not incurred the costs of the pipeline as it was never built.

The wastewater facility has been operating for 8 years more than contemplated without modification resulting in an economic benefit to the mill owner. In the meantime, the mill owner has not even paid the modest payments provided for in the 2001 memorandum of understanding since the deadline under that agreement expired on December 31, 2008. Further payments have been made under subsequent agreements, but none since 2001. The mill owners have been getting a "free ride" since then at the expense of the adverse impacts on Pictou Landing First Nation.

The Minister must also take into account the indemnity agreement between the Province and the mill owner under which the Province has a legal obligation to indemnify the mill owner if the wastewater facility must be relocated. The Province is required to indemnify the mill owner from the costs of relocating the treatment facility as well as any lost profits in the meantime.

Accordingly, under its current agreement with the Province, Northern Pulp will not suffer economically should the Minister decide not to renew the industrial approval.

Position of Pictou Landing First Nation

Pictou Landing First Nation respectfully requests for the reasons set out above that the Minister deny Northern Pulp's application to renew the industrial approval.

Alternative Position

Should the Minister decide issue an industrial approval, Pictou Landing First Nation proposes that the approval be renewed for 24 months with a condition that Northern Pulp relocate the wastewater facility within that time.

Further, since Northern Pulp has saved and continues to save an estimated \$3.5 million per year on the cost of borrowing the capital required to relocate the facility at current provincial government bond rates, should the renewal be granted it should be subject to a condition that Northern Pulp make accommodation payments to Pictou Landing First Nation in the amount of \$3.5 million per year.

Comments on Past Performance of Northern Pulp

Communication Strategy

Under the current industrial approval, Northern Pulp was required to file a Mi'kmaq communication strategy. While this was apparently done, the report simply provided that communications would be sent to the Band office on the Reserve. Nothing was ever sent to the Band office. The Band office has been abandoned. Further the strategy was not developed in consultation with Pictou Landing First Nation.

Pictou Landing First Nation had requested during the consultation process in 2010 which lead to the current industrial approval, that the approval, if granted, contain terms which required Northern Pulp to provide funding to Pictou Landing First Nation sufficient to allow it to have environmental communications, including data, analyzed by an environmental professional and restated, if necessary, in a way that the information was accessible to the members of the Pictou Landing First Nation and circulated.

Pictou Landing requests this once again if the industrial approval is granted for any length of time. It is anticipated that the amount of \$50,000 annually would be sufficient for those purposes.

Pictou Landing also requests that Northern Pulp be required to revised its communication strategy in consultation with Pictou Landing First Nation and provide \$10,000 in funding up front to cover the costs of Pictou Landing's participation in the process.

Air Quality Monitoring

The current air quality monitoring plan does not provide enough data to distinguish between contaminants coming from the stacks at the mill itself from those emanating from the wastewater facility. Pictou Landing requests that if an industrial approval is approved it contain terms to require the plan to modified in consultation with Pictou Landing First Nation and that the costs of Pictou Landing First Nation's participation be paid by Northern Pulp.

Odor Issues

Pictou Landing First Nation once again requests that any renewal of the industrial approval provide for periodic testing of air quality on and around the Pictou Landing First Nation Reserve by means of odor juries or similar methods in consultation with Pictou Landing First Nation and that the costs of Pictou Landing First Nation's participation be paid by Northern Pulp.

Base Line Health Monitoring

Pictou Landing First Nation requests that any renewal of the industrial approval provide for the funding by Northern Pulp of a community health assessment and baseline health monitoring to better monitor the health of Pictou Landing First Nation residents on the Reserve in light of the exposures and potential exposures to contaminants emanating from the wastewater facility.

I look forward to hearing from you.

Yours very truly,



Brian Hebert

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1965
10 October 1965
St. John, N.B.

We the undersigned, speaking for our
board at Fisher's Grant in Pictou County, Nova Scotia
agree in principle to the use of Beatt Harbour
a lagoon for the reception and treatment of pla.
effluent from the Scott Paper Co. at Abernethy
Point. This decision has been reached as we feel
that it is in the best interests of the entire area.

This is an agreement in principle only and
the following points are to be resolved by further
negotiation:-

1. Compensation for loss of fishing rights and
recreation privileges in Beatt Harbour
2. Provision of skidway
3. Provision of a dam or obstruction at
channel at upper end of Beatt Harbour
4. At the proper timing, and when it is proposed
to direct human sewage from New Glasgow
Stellarton, etc.

2.

It is also agreed that right of way will be granted if necessary over Indian lands.

Lewis J. Francis
CHIEF

Witness To Signatures:

A. W. [Signature]

Councillor

[Signature]

Science of Odor as a Potential Health Issue

Susan S. Schiffman* and C. M. Williams

ABSTRACT

Historically, unpleasant odors have been considered warning signs or indicators of potential risks to human health but not necessarily direct triggers of health effects. However, citizen complaints to public health agencies suggest that odors may not simply serve as a warning of potential risks but that odor sensations themselves may cause health symptoms. Malodors emitted from large animal production facilities and wastewater treatment plants, for example, elicit complaints of eye, nose, and throat irritation, headache, nausea, diarrhea, hoarseness, sore throat, cough, chest tightness, nasal congestion, palpitations, shortness of breath, stress, drowsiness, and alterations in mood. There are at least three mechanisms by which ambient odors may produce health symptoms. First, symptoms can be induced by exposure to odorants (compounds with odor properties) at levels that also cause irritation or other toxicological effects. That is, irritation—rather than the odor—is the cause of the health symptoms, and odor (the sensation) simply serves as an exposure marker. Second, health symptoms from odorants at nonirritant concentrations can be due to innate (genetically coded) or learned aversions. Third, symptoms may be due to a copollutant (such as endotoxin) that is part of an odorant mixture. Objective biomarkers of health symptoms must be obtained, however, to determine if health complaints constitute health effects. One industry that is receiving much attention, worldwide, related to this subject is concentrated animal production agriculture. Sustainability of this industry will likely necessitate the development of new technologies to mitigate odorous aerial emissions. Examples of such “environmentally superior technologies” (EST) developed under the initiative sponsored through agreements between the Attorney General of North Carolina and Smithfield Foods and Premium Standard Farms are described.

the breath that can be used for diagnosis of medical conditions include: pentane (liver disease; Moscarella et al., 1984), acetone (acute destructive pancreatitis; Zenskov et al., 1992). C2–C5 hydrocarbons (lipid peroxidation; Frank and Durk, 1983; Sedghi et al., 1994), acetaldehyde (alcoholic intoxication; Jones, 1995), dimethyl sulfide (cirrhosis of the liver; Tangerman et al., 1983; Chen et al., 1970), dimethylamine, trimethylamine (uremia; Simenhoff et al., 1977), pyridines (periodontitis; Kostelc et al., 1980), and carbon disulfide (disulfiram/Antibuse therapy; Phillips et al., 1986). Odors from urine (Najarian, 1980), stools (Poulton and Tarlow, 1987; Hausner and Hausnerova, 1979), and vaginal secretions (Majeroni, 1991) have also been shown to have diagnostic value. Characteristic odors in urine have been associated with urinary tract infections (Ditchburn and Ditchburn, 1990), isovaleric acidemia (Burke et al., 1983), phenylketonuria (Burke et al., 1983), maple syrup urine disease (Burke et al., 1983), trimethylaminuria (Burke et al., 1983), *Escherichia coli* (Jenum, 1985), and exposure to cyclohexane vapor (Yasugi et al., 1994). Characteristic smells in stools are clinical features of rotavirus (Poulton and Tarlow, 1987) and urease-negative strains of *Yersinia enterocolitica* (Hausner and Hausnerova, 1979). Vaginal infections are also associated with characteristic odors (Majeroni, 1991; Hillier et al., 1992).

HEALTH COMPLAINTS FROM ODOROUS AIR POLLUTION

Recently, there have been increased public health concerns that odors may not simply serve as a warning of potential health risks, but that odor sensations themselves may cause health symptoms. Malodors emitted from smokestacks of large factories, wastewater treatment plants, and large animal production facilities elicit far more citizen complaints than odorless air pollutants such as nitrogen dioxide. In a typical air pollution control district in California, between 70 and 80% of citizen-initiated calls were concerned with environmental odors (Shusterman, 1992). This is due both to their offensive sensory properties as well as the association by the affected individuals of the odors with their health symptoms. Furthermore, retrospective studies indicate that symptom prevalence near polluted sites can increase significantly when the ambient air is odorous (Shusterman et al., 1991). For example, headaches showed an odds ratio of 5.0 when respondents who reported perceiving frequent environmental odors from municipal and sewage industries and petroleum sludge were compared with those reporting no odors. Odors have also been shown to exacerbate chronic respiratory problems such as asthma (Beach et al., 1997; Shim and Williams, 1986; Herbert et al., 1967; Eriksson et al., 1987; Millqvist and Lowhagen, 1996; Subiza et al., 1992; Horesh, 1966). Examples

PEOPLE ARE EXPOSED to odors every day in crowded buses and restrooms, at petting zoos, or at garbage collection sites. Complaints from brief encounters with these odors tend to focus on their unpleasant quality rather than on health symptoms. Historically, unpleasant odors have been considered warning signs or indicators of potential risks to human health, but not necessarily direct triggers of health effects (Phillips, 1992; Gardner et al., 2000; Persaud et al., 2003). Malodors provide warnings of microbial growth in food, chemical oxidation of lipids (for example, rancidity of oils that hasten the atherogenic process), gas leaks, fires, and unsanitary conditions such as fecal and urinary incontinence (Kalantar et al., 2002; Nakai et al., 1999; Pearce et al., 2003). Medical practitioners have used odor cues from human breath and body fluids to diagnose a variety of diseases. Examples of odorous compounds found in

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Table 1. Examples of odor sources in indoor and outdoor air that frequently elicit health complaints (Schiffman, 1998; Shusterman, 1992; Schiffman et al., 2000).

Air	Example
Indoor	Tobacco smoke, ammonia, perfume or cologne, bathroom tile cleaners, bleach, fresh paint, magic marker, nail polish remover, bathroom cleaners, pesticide treatment, mothballs, solvents (for example, turpentine), hair spray, potpourri, animal odors, restroom deodorizer, nail polish, adhesives, bed linens washed with odorous detergents, dry-cleaned clothes, scented candles, gas stove and oven, mold, formaldehyde (from particle board, tobacco smoke), new carpeting, building materials, detergent aisle in grocery store, beauty salon, dry cleaners, garden store, swimming pool, fabric store, motor vehicle body shops, photo-processing stores.
Outdoor	<p>Stationary sources: Confined animal feeding operations (for example, swine and poultry), livestock feed lots, rendering plants, sewage treatment plants, composting and other biomass operations, fertilizer factories, pesticide operations, industrial and hazardous waste sites, storm drain systems, sanitary landfills, paper mills, geothermal steam plants, petroleum refineries, foundries, chemical (plastics, adhesives, solvents) and food (bread, coffee, confectionery, oils) manufacturing factories, tanneries, metalworks.</p> <p>Smaller area sources: Fumes from roof and road tar, metal degreasing and painting operations, bakeries, breweries, fresh paint, gasoline, animal odors, burning leaves, molds, pesticide treatment.</p> <p>Mobile sources: Diesel exhaust, general traffic exhaust (cars, buses, planes, trucks, trains, construction equipment, lawn mower).</p> <p>Naturally occurring sources: Volcanoes, wildfires, wind-blown dust from agricultural fields.</p>

of odors in both indoor and outdoor air that have been reported to elicit health complaints are given in Table 1.

In agricultural communities, health complaints associated with odorous air pollution have escalated dramatically with the proliferation of large-scale animal feeding operations (AFOs) that house thousands of animals at a single facility (Schiffman et al., 2000). The focus of this concern has been potential human health effects for workers and neighbors in adjacent communities who breathe odorous air emissions that emanate from confinement barns (animal houses) and waste storage systems (including multiacre manure lagoons), and during land application of waste (Donham et al., 1977; Schiffman et al., 1995; Thu et al., 1997; Wing and Wolf, 2000). Malodorous aerial emissions from AFOs consist of a mixture of volatile organic compounds (VOCs), hydrogen sulfide, ammonia, and particulates (including bioaerosols) that arise during microbial decomposition of manure (Schiffman et al., 2001; Schiffman, 1998). Occupational studies of workers who care for hogs at AFOs indicate that airway disease is common in this group with progressive decreases in lung function occurring over a period of years (Donham, 1993). Common health complaints among workers at animal production facilities include asthma-like syndrome, exacerbation of preexisting asthma, sinusitis, chronic bronchitis, nasal mucous membrane inflammation, nasal and throat irritation, headaches, and muscle aches and pains (Iowa State University and the University of Iowa Study Group, 2002; Von Essen and Romberger, 2003). Objective measurements of lung function using spirometry have found acute (cross-shift) and chronic respiratory impairment in workers at both swine and poultry feeding operations (Don-

ham et al., 1977, 1986, 2000; Donham, 1993; Schwartz et al., 1992, 1995). Furthermore, acute exposures to elevated levels of hydrogen sulfide from agitated manure (when handling animal waste) can cause reactive airway distress syndrome (RADS), permanent neurological damage, and even death (Schiffman et al., 2001).

Several controlled epidemiological studies in North Carolina and Iowa have shown that health complaints are also elevated in neighbors living in the proximity of swine operations. A field study in Iowa found that a random sample of 18 persons residing within a 3.2-km (2-mile) radius of a 4000-head swine facility experienced significantly higher rates of symptoms associated with respiratory inflammation than a demographically comparable control group of 18 individuals living distant from intensive livestock operations (Thu et al., 1997). Residents of a rural North Carolina community with a 6000-head hog operation ($n = 55$) reported increased symptoms of headache, runny nose, sore throat, excessive coughing, diarrhea, burning eyes, and reduced quality of life compared with residents in rural communities with intensive cattle operations ($n = 50$) or without livestock facilities ($n = 50$) (Wing and Wolf, 2000). In another epidemiological study in North Carolina, neighbors ($n = 44$) of swine facilities reported significantly more tension, depression, anger, fatigue, and confusion at the time when the odors were present compared with a control group ($n = 44$) of unexposed persons (Schiffman et al., 1995). Furthermore, a controlled human exposure study has just been completed by the first author of this paper in an environmental chamber designed to simulate exposure to air emissions that could occur at 225 to 300 m downwind from a confined animal feeding operation (CAFO). The exposure levels to swine air were hydrogen sulfide (24 ppb [v/v]), ammonia (817 ppb [v/v]), and odor (57 times above odor threshold). Exposure levels of particulates and endotoxin were very low. The main finding was that headaches, eye irritation, and nausea were significantly higher in the swine air (experimental) condition than in a control (clean air) condition.

MECHANISMS BY WHICH ODORS MAY PRODUCE HEALTH SYMPTOMS

Due to increasing concerns about odorous air pollution, the USEPA and the National Institute on Deafness and Other Communication Disorders (NIDCD) co-sponsored a workshop at Duke University in 1998 to assess our current state of knowledge regarding the health effects of ambient odors (see Schiffman et al., 2000). Special emphasis was placed on potential health issues associated with odorous emissions from animal manures and other biosolids. To address this issue, workshop participants defined levels of odor exposure to clarify the intensities associated with potential health effects (see Table 2). Participants concluded that at least three mechanisms exist by which ambient odors may produce health symptoms in communities with odorous manures and biosolids. In Mechanism 1, symptoms can be induced by exposure to odorants (compounds with odor properties) at levels that also cause irritation or other toxicological

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effects. That is, irritation—rather than the odor—is the cause of the health symptoms, and odor (the sensation) simply serves as an exposure marker. An example is ammonia with an odor threshold of 0.8 ppm (v/v) and an irritation threshold of 4 to 8 ppm (v/v). At concentrations of 4 to 8 ppm and above, odor is merely coincident with the more relevant irritative process, and health symptoms are more likely caused by irritation rather than “odor-induced.” In Mechanism 2, health symptoms can occur at odorant concentrations that are above odor thresholds but are not irritating, which typically occur with exposure to certain odorant classes such as sulfur-containing compounds (for example, hydrogen sulfide, H_2S). The odor threshold for H_2S ranges from 0.5 to 30 ppb (v/v) for 83% of the population while the irritant threshold ranges from 2.5 to 20 ppm (v/v). Six community studies (Jaakkola et al., 1990, 1991; Haahtela et al., 1992; Kilburn and Warshaw, 1995; Legator et al., 2001; Campagna et al., 2000) have reported that exposure to H_2S at nonirritant concentrations is associated with health symptoms. In Mechanism 3, the odorant is part of a mixture that contains a copollutant (such as a pesticide or bacterial endotoxin) that is fundamentally responsible for the reported health symptom. Workshop participants emphasized the importance of using objective biomarkers to determine if health complaints constitute health effects. In addition, participants also concluded that far better technologies for mitigating odor are necessary to reduce any potential health effects.

Evidence for Mechanism 1: Irritation Rather than the Odor Causes the Health Symptoms

To understand Mechanism 1, it is necessary to describe the basics of odor physiology. Odors are sensations that occur when compounds (called odorants) stimulate receptors in the nasal cavity. Odorants can induce sensations in two ways: (i) interaction with odorant receptors in the olfactory epithelium in the top of the nasal cavity and (ii) stimulation of free nerve endings in the nose, throat, and lungs at elevated concentrations. When volatile compounds activate odorant receptors, signals are transmitted via the olfactory nerve (first cranial nerve) to the olfactory bulb and ultimately to the brain. The odor sensations that are induced by this process are described by adjectives such as floral, fruity, earthy, fishy, fecal, and urinous. When odorous compounds also activate free nerve endings in the upper and lower respiratory system (via the trigeminal and vagus nerves respectively), sensations such as irritation, tickling, burning, stinging, scratching, prickling, and itching are induced. For Mechanism 1, irritancy occurs at a concentration above—but within an order of magnitude of—the odor threshold. That is, concentration at which irritancy is first detected is between 3 and 10 times higher than the concentration at which odor is first detected. Examples of odorous compounds in the home or office that become irritants at concentrations somewhat above their odor thresholds include ammonia, chlorine, camphor, menthol, alcohol, and formaldehyde (for example, from building products) as well as acrolein, acetaldehyde, and

Table 2. Levels of odor exposure (adapted from Schiffman et al., 2000).

Level	Description
(1) Odor detection	The level of odor that can first be differentiated from ambient air.
(2) Odor recognition	The level of odor at which the odor quality can first be characterized (for example, the level at which a person can first detect that an odor is apple or manure).
(3) Odor annoyance	The level at which a person is annoyed by an odor but does not show or perceive a physical reaction. Note: Health symptoms are not expected at these first three levels unless the odor occurs with a copollutant such as dust as in Mechanism 3 or the level of annoyance is intense or prolonged.
(4) Odor intolerance (causing somatic symptoms)	The level at which an individual may show or perceive physical (somatic) symptoms to an odor. Note: This level corresponds to Mechanism 2 in which the odor induces symptoms even though the odorant concentration is lower than that known to cause irritation.
(5) Perceived irritant	The level at which a person reports irritation or physical symptoms as a result of stimulation of nerve endings in the respiratory tract.
(6) Somatic irritant	The level at which an odorant (not an odor) results in a negative physical reaction regardless of an individual's predisposition. This can occur when an odorous compound (for example, chlorine) damages tissue. Note: Perceived and somatic irritation correspond to Mechanism 1.
(7) Chronic toxicity	The level at which an odorant can result in a long-term health effect.
(8) Acute toxicity	The level at which an immediate toxic effect is experienced (for example, a single event may evoke an acute health effect). Note: In the case of chronic or acute toxicity, the compound should not be considered an odorant but rather a compound with toxic effects that happens to have an odor.

organic acids (for example, from cigarettes). Thus, at concentrations at or above the irritant threshold, both odor and irritant sensations occur simultaneously. Odor is merely coincident with the more relevant irritative process, and health symptoms are more likely caused by irritation rather than “odor-induced.” Odor sensations are simply a warning that potential health symptoms can occur at elevated concentrations.

Sensory irritation can be induced by a single odorous compound above its irritant threshold or by the aggregate effect of low concentrations of compounds (although each individual chemical constituent is below its irritant threshold concentration) (Cometto-Muñiz and Cain, 1992; Cometto-Muñiz et al., 1997, 1999; Korpi et al., 1999). Agonistic effects can even occur when subthreshold concentrations of multiple individual volatile organic compounds (VOCs) combine to produce odor and noticeable sensory irritation. When irritant compounds or mixtures come in contact with the upper and/or lower airway, many systemic responses can occur including: (i) altered respiratory rate, depending on the primary level of irritation (upper versus lower); (ii) reduced respiratory volume; (iii) increased duration of expiration; (iv) contraction of the larynx and bronchi and increased bronchial tone; (v) increased nasal secretion, inflammation, and nasal airflow resistance; (vi) lacrimation or tearing; (vii) alterations in spontaneous body movements; (viii) increased epinephrine secretion; (ix) peripheral vasoconstriction

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and increased blood pressure; and (x) sneezing (Allison and Powis, 1976; Angell and Daly, 1969; Alarie, 1973; Nielsen, 1991).

Repeated exposure to odorous irritants can induce chronic respiratory disorders including asthma (Andersson et al., 2003; Tarlo and Liss, 2003; Luo et al., 2003; Yang et al., 2003). The potential induction of asthma is of special concern because its prevalence has increased 75% in the entire population (and 160% in children under the age of five) from 1980 to 1994 (Mannino et al., 1998). Asthma prevalence in rural children is comparable with that found in large cities of the U.S. Midwest (Chrischilles et al., 2004). The elevated vulnerability to environmental exposures in young children is due to the fact that they breathe more air per pound of body weight than adults (Etzel, 2003; American Academy of Pediatrics, 1993). Older adults are also vulnerable to air pollution exposures due to age-related impaired function of the lung (Kelly et al., 2003; National Academy of Sciences, 2002). Direct health care costs for asthma in the United States total more than \$8.1 billion annually; indirect costs (lost productivity) add another \$4.6 billion for a total of \$12.7 billion (American Lung Association, 2002).

Evidence for Mechanism 2: Health Symptoms Occur at Odorant Concentrations that Are Not Irritating

Health complaints frequently occur from odorous emissions that are below irritant thresholds, especially when the odor is unpleasant (Schiffman et al., 2000, 2001). An example is the gas H_2S , which smells like "rotten eggs" at low concentrations. The odor threshold for H_2S ranges from 0.5 to 30 ppb (v/v) for 83% of the population while the irritant threshold ranges from 2.5 to 20 ppm (v/v). Thus, the mean odor threshold for H_2S (and other sulfur-containing compounds and organic amines) tends to be three to four orders of magnitude (that is, 10^3 and 10^4 times) below the level that causes irritation or classical toxicological symptoms. Yet six community investigations have found that exposure to low levels of H_2S or other reduced sulfur compounds cause health effects: (i) two studies in communities near paper mills in South Karelia, the southeastern part of Finland (Jaakkola et al., 1990; Haahtela et al., 1992); (ii) northern Finland studies of respiratory infections in children (Jaakkola et al., 1991); (iii) neurobehavioral studies near a refinery (Kilburn and Warshaw, 1995); (iv) studies in Odessa, Texas, and Puna, Hawaii (Legator et al., 2001); and (v) studies near the IBP meat packing plant in Nebraska (Campagna et al., 2000). Furthermore, two of these community studies (Jaakkola et al., 1990; Kilburn and Warshaw, 1995) reported health effects from an average daily exposure to 10 (to 11) ppb H_2S (v/v).

The mechanisms responsible for health complaints to an unpleasant odor in the absence of irritation are not well understood, but several factors appear to be involved. First, humans are genetically coded such that pleasant and unpleasant (for example, H_2S) odors activate different parts of the brain. Noninvasive functional neuro-

imaging techniques including positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) have shown that there is regional specialization in the brain based on odorant hedonic values (Fulbright et al., 1998; Zald and Pardo, 1997; Birbaumer et al., 1998). Brain structures that are activated by unpleasant experiences are preferentially stimulated when smelling H_2S . Thus, aversion to unpleasant odors for the human species appears to have an evolutionary basis and is hence biologically developmentally driven. That is, there appears to be a biological imperative based on anatomy of the nervous system that alerts humans to avoid certain unpleasant odors associated with potentially unsafe food and air (similar to the gag reflex from tasting something excessively sour or bitter, or the reflex action of withdrawing the hand after accidentally touching something hot). Second, exquisite sensitivity of the nose to hydrogen sulfide gas (H_2S) may be a protective mechanism to prevent dysregulation of normal H_2S metabolism. Hydrogen sulfide gas is produced endogenously during metabolism of sulfur-containing amino acids, and it functions as a neuromodulator in the brain as well as a regulator of the tone in smooth muscle (Kinura, 2000; Hosoki et al., 1997). A small increase in sulfide levels less than twofold greater than endogenous values is lethal (Warenycia et al., 1989). Even small changes in the brain may affect behavior (see Reiffenstein et al., 1992). Third, unpleasant odors can modulate breathing patterns and thus can potentially affect health and well-being. The RD50 values (concentrations that induce a 50% decrease in respiratory rate) for a random sample of unpleasant smelling compounds were much lower than for pleasant smelling compounds (Gift and Fourman, 1998, as reported by Schiffman et al., 2000). Furthermore, if the odors are strong, shallow and irregular breathing can occur due in part to the fact that sniff volume is inversely proportional to the concentration of the odorant (Laing, 1983; Schiffman et al., 2000). Fourth, exposure to malodors may cause or exacerbate illnesses because they impair mood and induce stress. Many studies have shown that unpleasant odors including H_2S impair mood (Ehrlichman and Bastone, 1992; Schiffman et al., 1995; Kilburn and Warshaw, 1995). For example, residents living near large-scale hog operations were found to have increased levels of tension, depression, anger, fatigue, and confusion as measured by the profile of mood states (POMS) when malodors were present (Schiffman et al., 1995). This mood impairment may be due in part to the fact that the exposure to malodor was involuntary. Mood impairment and stress have been associated with development of coronary artery disease, chronic hypertension, and structural changes of the heart in some studies (Karasek et al., 1981; Johnson and Hall, 1988; Schnall et al., 1990). Finally, conditioned or learned associations may play a role in perceptions and health symptoms induced by malodors (Shusterman, 1992; Simon et al., 1990; Dalton and Wysocki, 1996; Karol, 1991). For example, if an unpleasant odor has previously been associated with flu or allergic symptoms, the odor alone may subsequently recreate these symptoms in the absence of flu virus or allergy.

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Evidence for Mechanism 3: A Copollutant in an Odorous Mixture Is Responsible for the Reported Health Symptom

Odorant mixtures may contain (i) nonodorous copollutants such as nitrogen dioxide (NO₂) and/or carbon monoxide (CO), (ii) particulates, or (iii) toxicants from mold that are the actual cause of health effects. Odors can arise from incomplete combustion of fuel with oxygen (Schiffman et al., 2000). However, the harmful effects of the combustion may be due to odorless components such as NO₂ and/or CO. Particulate exposure also elevates the incidence of respiratory symptoms and can increase the risk of respiratory and cardiovascular morbidity including increased hospital admissions or emergency room visits for asthma or other respiratory problems. Health effects can begin to occur when ambient particles smaller than a 10 µm fall between 30 and 150 µg m⁻³ (Committee of the Environmental and Occupational Health Assembly of the American Thoracic Society, 1996). Particulates in indoor air can arise from stoves, fireplaces, chimneys, tobacco smoke, hair, skin, molds, and pollen. Sources of particulates in outdoor air can arise from motor vehicles, industrial facilities, residential wood burning, and outdoor burning. In rural communities, particulates are also emitted from intensive animal operations and include manure, molds, pollen, grains, feathers, endotoxin, and feed dust. A recent study suggests that adverse effects of particulates are augmented by the presence of an odorous compound (Donham and Cumro, 1999).

Sustainable Agriculture Necessitates Mitigation of Odorous Aerial Emissions

One of the main conclusions from the workshop at Duke University sponsored by the USEPA and National Institute on Deafness and Other Communication Disorders (NIDCD) (see above) was that sustainable animal agriculture necessitates the development of technologies for reducing odorous emissions to blunt potential human health effects. During the past decade, trends in animal production agriculture have been toward intensive industrial systems in which less than 10% of the feed for the animals is produced within the production (or farm) unit. While intensive systems are effective at addressing the world's escalating demand for affordable meat products, their effect on both human health and the environment will determine the future of animal agribusiness in many parts of the world. The environmental issues are often geographically specific but, in general, include animal manure management; production-associated consumption of limited water resources; and aerial emissions including ammonia, hydrogen sulfide, methane, nitric oxide, nitrous oxide, volatile organic compounds (VOCs), endotoxins, exotoxins, particulate matter, and odorants (Williams, 2002). Particulates and odor emissions are of particular importance, especially because of the potential effects that these components have on human health (Schiffman et al., 2000).

North Carolina represents a state in the United States in which much activity has occurred over the past decade

relative to pork production agriculture and serves as a model for the rapid growth of the industry, associated environmental issues, and efforts to develop new technology to address the issues. Between 1991 and 1997 the swine inventory in the state increased by approximately 300% from 2.7 million head to approximately 10 million head. However, since 1997 the number of facilities and the number of animals has remained stable due, in part, to a state-mandated moratorium on development of new facilities that use traditional waste management treatment processes. Expansion or new facilities can only occur with the implementation of "innovative" or "environmentally superior" technologies.

Technologies for Mitigating Aerial Emissions

In North Carolina a research, development, and demonstration initiative is underway to identify technologies capable of addressing aerial emission concerns and other environmental effects associated with concentrated swine production operations. The initiative is sponsored through agreements between the Attorney General of North Carolina and Smithfield Foods and Premium Standard Farms to develop "environmentally superior technologies" (EST) for implementation onto farms located in North Carolina that are owned by these companies (Williams, 2002, 2003a, 2003b). Swine waste treatment technology development under these agreements includes a covered in-ground anaerobic digester, a sequencing batch reactor, an upflow biological aerated filter system, mesophilic and thermophilic anaerobic digesters, energy recovery systems, greenhouse vegetable production system, solid separations systems, constructed wetlands system, nitrification-denitrification systems, soluble phosphorus removal systems, belt manure removal systems, gasification system to thermally convert dry manure to a combustible gas stream for liquid fuel recovery, ultrasonic plasma resonator system, manure solids conversion to insect biomass for value-added processing into animal feed protein meal and oil system, reciprocating water technology system, and a dewatering-drying-desalination system.

Technology Descriptions

Descriptions and process flow diagrams for most of these systems have been published elsewhere (Williams, 2002, 2003a, 2003b; Havenstein, 2003). General mechanisms of how these technology processes may reduce odor emissions are enumerated in Table 3. Environmental performance analysis for these technologies includes an integrated program approach in which each is systematically analyzed for emissions of odor (Schiffman et al., 2003). Following are overview summaries for some of the candidate EST technologies in which odor remediation data have been procured to date.

Covered In-Ground Anaerobic Digester and Nitrification Biofilter

This system, located on the Julian Barham Farm in Johnson County, North Carolina, is comprised of an

Table 3. Technology processes that may affect the management of odor emissions.

Odor remediation technology process	Potential mechanism
Covered or enclosed anaerobic digesters	Physical containment during biological anaerobic decomposition.
Nitrification and denitrification	Biological aerobic catabolism of ammonia and organic odorants.
Solids separation (belt and screen systems)	Reduced organic load of liquid manure requiring treatment. Enhanced drying of solids and reduced mixing of manure solids with urine (belt system).
Aerobic biofiltration	Biological catabolism of organic odorants under aerobic conditions.
Phosphorus precipitation	Removal of nutrient (and bacteria) that can contribute to biological production of odorants.
Biosolids gasification	Heat and pressure destruction of bioactive compounds and odorant generating bacteria.
Biosolids combustion	Heat and pressure destruction of bioactive compounds and odorant generating bacteria.
Biosolids conversion to insect biomass	Rapid decomposition of manure biosolids in contained environment.
Semipermeable cover	Reduced dispersion and biological oxidation of odorant compounds.
Wetlands (constructed and reciprocating)	Biological catabolism of organic odorants under aerobic conditions.
Drying and dewatering manure effluent	Reduced liquid medium for biological decomposition.
Disinfection	Reduction in the number of bacteria that produce odorant compounds during microbial decomposition.
Ultrasonic energy and mechanical cavitation	Gas (oxidant), heat, and pressure destruction of bioactive compounds and odorant generating bacteria.

impermeable high-density polyethylene cover over an earthen lined digester that operates under ambient temperature conditions. Liquid manure from approximately 4000 sows housed in six buildings is conveyed to the digester. Biogas that is produced during the anaerobic digestion is extracted and conveyed to a generator where electricity is produced for use on the farm. Treated effluent from the digester flows into a storage pond, some of which is further treated in trickling nitrification biofilters. The nitrified effluent from the biofilters is used to flush the six swine buildings or for fertilization of tomato plants in greenhouses located on the farm. An aerial view of the treatment system is shown in Fig. 1.

Solids Separation and Reciprocating Wetland

This technology is located on the Corbett Farm 2 in Duplin County, North Carolina. The reciprocating wetland component represents a wastewater treatment process developed by the Tennessee Valley Authority's (TVA) Environmental Research Center. The reciprocating wetlands are comprised of two cells (basins), filled with aggregate media, which alternately drain and fill on a recurrent basis. The draining and filling cycles create aerobic, anaerobic, and anoxic conditions within the cells, providing both biotic and abiotic treatment processes to provide nitrification, denitrification, and phosphorus removal. The liquid manure entering the cells is previously processed through a belowground settling tank for solids separation. An aerial view of the treatment system is shown in Fig. 2.

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Upflow Biological Aerated Filter System

This technology system, designed and operated by Ekokan LLC, was housed on Murphy-Brown Farm 93, located in Bladen County, North Carolina. The system treated wastewater from five hog buildings containing approximately 800 finishing pigs each. The wastewater was initially processed through a solids separation unit to remove coarse solids. Subsequently, the wastewater was treated through first- and second-stage aerated up-

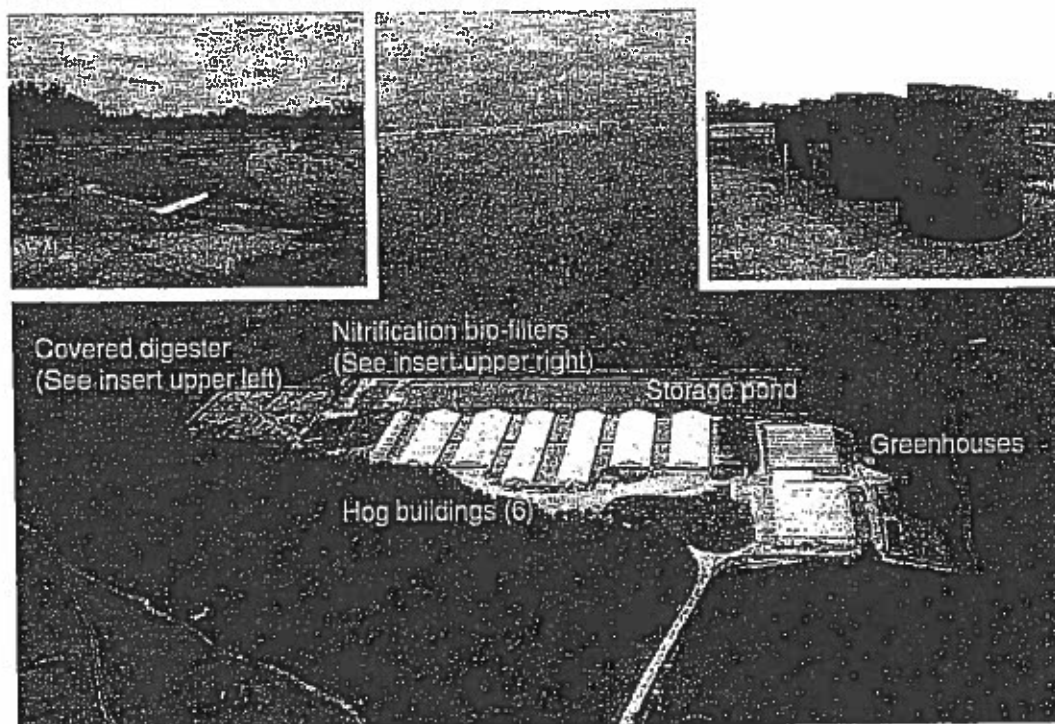


Fig. 1. Aerial view of the ambient temperature covered anaerobic digester and nitrification denitrification system.

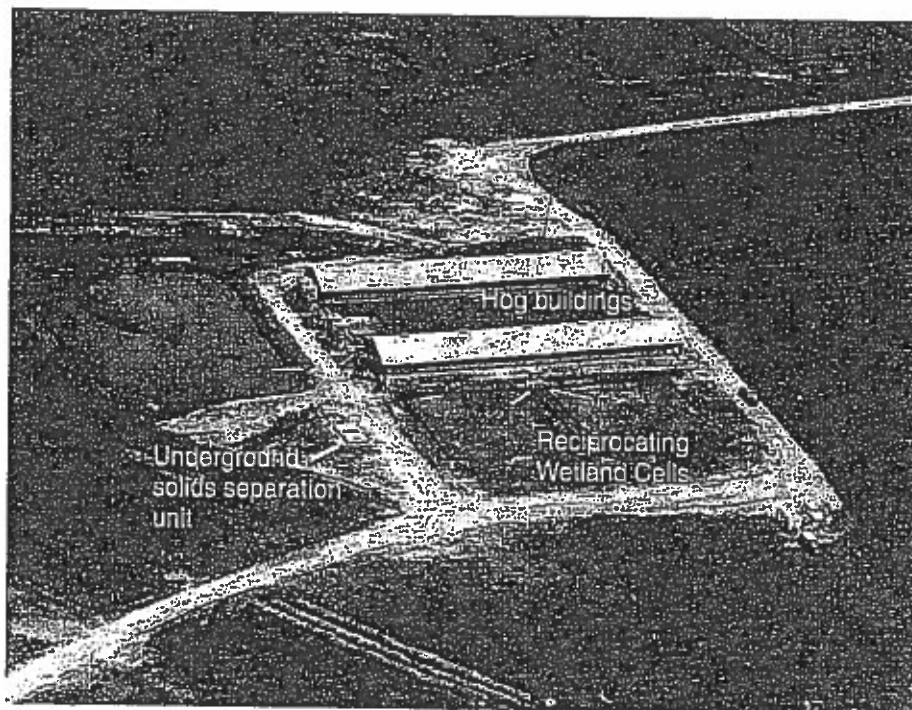


Fig. 2. Aerial view of the reciprocating wetlands system.

flow biofilters connected in series (two units, four biofilters total). Each biofilter contained plastic fixed media providing surface area for a biofilm of microorganisms. Under aerobic conditions the bacteria catabolized the organic compounds in the wastewater resulting in reduced biological oxygen demand (BOD) and odorants as well as conversion of ammonia to nitrate nitrogen

(nitrification). An aerial view of the treatment system is shown in Fig. 3.

FUTURE PERSPECTIVE

Sustainable agriculture requires production and distribution systems that minimize adverse effects on health,

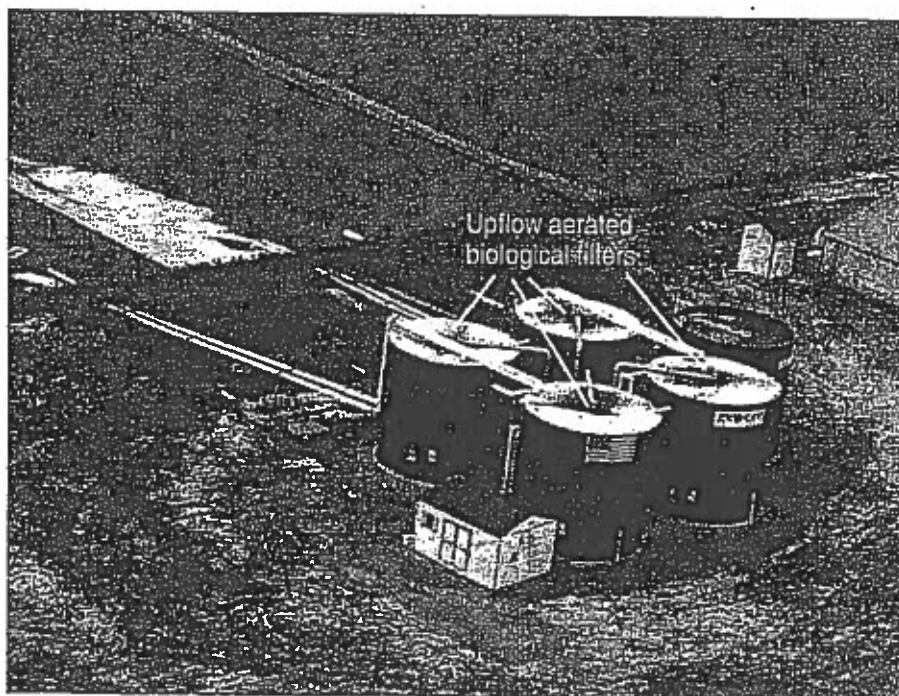


Fig. 3. Aerial view of the upflow aerated biological filter system.

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safety, and the environment. Practices must be economically viable, environmentally sound, and socially responsible. This includes reduction or elimination of odoriferous aerial pollution that evokes health complaints and impairs quality of life in neighboring communities. Using the swine industry as a model, the continued sustainability of this industry in North Carolina represents a model of scientific, social, and political challenges regarding environmental and health effects associated with odor emissions. The technologies described in this text represent a work in progress incorporating models of coordinated research and development to address salient issues that may influence the future of animal agriculture not only in North Carolina but also in many parts of the world.

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Nova Scotia

**Department of
the Environment**

Office of the Minister

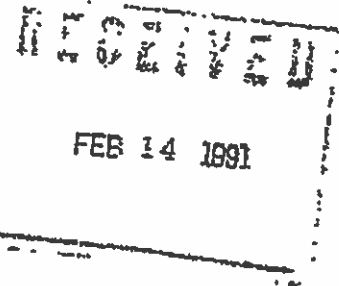
PO Box 2107
Halifax, Nova Scotia
B3J 3B7

Our file no:

COPY

FEB 12 1991

The Honourable Thomas Siddon
Minister
Indian Affairs and Northern Development
Room #121
House of Commons
East Block
Ottawa, Ontario
K1A 0A6



Dear Mr. Siddon:

RE: PICTOU LANDING INDIAN BAND/BOAT HARBOUR

As a result of arrangements negotiated between your Department and the Nova Scotia Water Authority, a predecessor of this Department, the inlet of Boat Harbour was developed into a wastewater treatment facility for effluent from the Scott Maritimes Limited craft mill located at Abercrombie Point, Pictou County.

Three parcels of Indian Reservation Land border on Boat Harbour. With the development of the wastewater treatment facility, the waters of Boat Harbour were elevated by approximately nine feet. As such, an encroachment has occurred on the Reservation Lands.

This Department was made aware of the encroachment in September, 1990, when we were so advised by Mr. Don Goodwin of your Department and Mr. Robert Anderson of the Department of Justice, acting for your Department. Supporting documentation was forwarded to us by Mr. Anderson during September and October, 1990.

A careful review of these documents was carried out and in November, 1990, this Department made the following commitments:

- (a) Subject to clause (d), the use of the waters at Boat Harbour as a wastewater treatment facility would be discontinued;
- (b) The waters of Boat Harbour would be returned to their naturally tidal fluctuating regime;

- (c) The then exposed shore line and alterations previously made within Boat Harbour would be returned to their original condition or as close thereto as can reasonably be made possible; and
- (d) The approximate time frame in which the above noted activities are to take place is five years.

The reason for the five year time frame is to allow for the design, assessment, and construction of an alternative facility to handle the wastewater from the mill without the need for a shut down and a resultant lay-off involving as many as 2,100 persons employed and contracted by Scott Maritimes Limited.

In November, 1990, these commitments were made on behalf of the Department by Mr. Robert Porter to Mr. Robert Anderson and Mr. Tony Ross, who acts on behalf of the Pictou Landing Indian Band. Both, Mr. Anderson and Mr. Ross were pleased and satisfied with the commitments made at the time they were made.

The Department, with the co-operation of ACOA and Scott Maritimes Limited, has since in good faith begun taking steps to honour these commitments.

On January 29, 1991, Mr. Porter was advised by Mr. Goodwin during a meeting at this office that it is now the intention of your Department to proceed with further action against Nova Scotia. This presents a very serious problem in our efforts to resolve a matter which was created and approved many years ago by both orders of government.

I am writing to confirm to you that this Department fully intends to honour the above noted commitments. In return, I expect that the need perceived by your Department and by the Pictou Landing Indian Band to proceed with further action will be put to rest, thus allowing the necessary remedial measures to continue.

I look forward to your early confirmation of the foregoing.

Sincerely yours,

Original Signed by
JOHN G. LEEFE

John G. Leefe
Minister

cc: Donald Goodwin
Anthony Ross
Robert Anderson

AUG 15 1996

(34)

Executive
Council

*Certified to be a true copy of an Order of His Honour the
Lieutenant Governor of Nova Scotia in Council made
August 14, 1996.*

96-621

The Governor in Council on the report and recommendation of the Minister of Transportation and Public Works dated July 17, 1996, pursuant to Section 11 of Chapter 452 of the Revised Statutes of Nova Scotia, 1989, the Surplus Crown Property Disposal Act, and to all other powers vested in him by virtue of his office, is pleased to:

(a) ratify and confirm the agreements entered into with Scott Maritimes Limited, now Kimberly-Clark Canada Limited, for the transfer of all operating responsibility for the Boat Harbour effluent treatment facility from the Province to Kimberly-Clark for a maximum period of 10 years, and the renewal for a further period of 25 years of the agreement between the Province and Kimberly-Clark for the supply of water to the Kimberly-Clark Abercrombie Point Pulp Mill, on the terms and conditions attached to and forming part of this report and recommendation as Schedule "A" to this agreement; and

(b) authorize the Minister of Transportation and Public Works to transfer such portion of the Boat Harbour effluent treatment facility lands as the Minister deems appropriate at no charge to the Pictou Landing Mi'kmaq Band, or to the federal Department of Indian Affairs and Northern Development for the benefit of the Band, when the lands are no longer required for the operation of the effluent treatment facility, or at such sooner time as the Minister deems appropriate so long as any earlier transfer is on such terms and conditions as do not interfere with the continued operation of the effluent treatment facility for the duration of the operating agreement with Kimberly-Clark Canada Limited, and such additional time as is required to perform clean up operations.

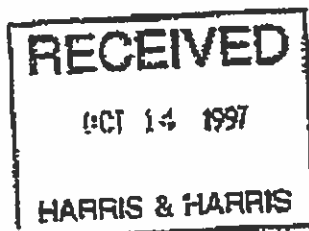

BRENDA SHANNON
CLERK OF THE EXECUTIVE COUNCIL

35

Gregory Evans
Senior Solicitor

File No.: 96-2582

October 6, 1997



Mr. E. Anthony Ross
Harris & Harris
Suite 400, 190 Attwell Drive
Etobicoke, Ont. M9W 6H8

Dear Mr. Ross:

RE: Boat Harbour - Land Transfer

Further to your October 1, 1997 letter on this subject, Denis Rushton and I agree it might very well be appropriate to transfer the bulk of the land, "forthwith", to use your expression. In order to accomplish this, there are several important considerations we need to get together and settle, such as:

1. The exact boundaries of the land.
2. The precise wording of the easement or lease the Province will require for continued operation and clean up.
3. Some sort of "comfort letter" indicating the Band will continue its present level of cooperation and not require us to make unnecessary expenditures.
4. Governor in Council approval.

None of these points should pose any real difficulty. They are nothing new.

As discussed in previous meetings, the land transfer has evolved to be something different from what we contemplated in the original Order of the Governor in Council years ago. Think about the railway right-of-way, and the transfer of land to private individuals, as two examples of the change. Therefore, we need a new Order of the Governor in Council. Personally, I don't expect that to be a problem.

We also need to deal with long-term ownership of the water control structures, although I suppose it can be done separately from the land transfer, if that is your desire.

Now, onto the points raised in page two of your letter that you wish confirmed.

Mr. E. Anthony Ross
October 6, 1997
Page 2

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I hereby confirm that the lease for the operation of these effluent treatment facilities between the Province and Kimberly-Clark ceases absolutely on December 31, 2005 and there is no provision for, or intention by the parties to use the facility for effluent treatment after that date. To use your words "there will be an absolute shut-down". Should replacement facilities be constructed and in use before that date, the closure of the Boat Harbour facility may take place sooner than December 31, 2005. However, I have no reason to suspect an earlier closing date.

I confirm my advice from Arun Kumbhare and Denis Rushton that clean up is well in hand and, if anything, going better than expected. We will begin lowering the water level in a controlled manner within days. I am told the cell has been successfully drained, with at least a meter of free-board, and will be hydro-seeded.

I further confirm that the Province intends to clean up the facility so that it will be capable of becoming tidal. Our current proposal is to leave the control structures in place and give them to the Band, so the Band will have a choice of a tidal estuary or a controlled lagoon. If the Band do not want the control facilities, we can remove them, but I strongly suggest that would not be in the Band's long-term best interests.

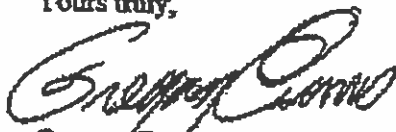
I have addressed the land transfer issue earlier in this letter. I confirm that Dennis and I are prepared to recommend a transfer of the bulk of the lands "forthwith" provided we can arrange satisfactory terms, and we think we can. Note, however, our unwavering position going back to our earliest discussions. We have offered to transfer the land to the Band. We leave all discussions with DIAND entirely in the Band's capable hands.

Since this letter is in part a confirmation of our position as it has evolved over many discussions, let me take this opportunity to re-state our fundamental and consistent position with regard to the Boat Harbour effluent treatment facility.

CLOSURE, CLEAN UP, and LAND

I confirm this is still the Province's intention. We have come a long way, both in physical results and our cooperative approach to resolving the issues. I expect we can continue to a cooperative and satisfactory resolution.

Yours truly,



Gregory Evans

cc: Denis Rushton

000564

(37)

THIS LEASE EXTENSION AGREEMENT made this 72 day of October August, 2002.

BETWEEN:

PICOU COUNTY REGISTRY OF DEEDS	1955	1458	5104-5106
I certify that this document was registered as shown here.	Document #	Book	Page
C. Darlene Dixon	MAY 16 2003		10:42am
Registrar	MM DD YYYY		Time

HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF NOVA SCOTIA, as represented by the Minister of Transportation and Public Works

(the "Landlord")

- and -

KIMBERLY-CLARK INC., a body corporate carrying on business in Nova Scotia under the name and style Kimberly Clark Nova Scotia

(the "Tenant")

WHEREAS pursuant to a lease made the 31st day of December, 1995 (the "Lease") the Landlord leased to Scott Maritimes Limited certain lands and premises known as the Boat Harbour Effluent Treatment Facility (defined therein as the Facility), for a term of ten (10) years commencing on the 31st day of December, 1995 (the "Initial Term");

AND WHEREAS the Tenant is the lawful successor to Scott Maritimes Limited;

AND WHEREAS a Notice of Lease and License made the 6th day of May, 1996 was registered at the Registry of Deeds office at Pictou, in the County of Pictou (the "Registry") on the 6th day of May, 1996 in Book 1203 at pages 483 to 487 as Document 2281 to give notice of, *inter alia*, the Lease (The Notice incorrectly identified the tenant, Kimberly-Clark Inc. as Kimberly Clark Nova Scotia Inc.);

AND WHEREAS the parties have agreed to amend the lease to extend the term for a further twenty five (25) years after the Initial Term;

AND WHEREAS the Tenant proposes to install a pipeline to form part of the Facility and the parties have agreed to provide for the grant of an easement in connection therewith.

NOW THEREFORE in consideration of the Premises and the sum of one dollar (\$1.00) now paid by the Tenant to the Landlord (the receipt and sufficiency of which is hereby acknowledged), the parties hereby agree as follows:

1. Extension of Term of Lease

1.01 Article 3 of the Lease is hereby deleted and replaced with the following:

"Term: to hold the Lands, the Facility, and all buildings, fixtures and improvements from time to time upon or appurtenant thereto for a term of thirty five (35) years commencing on the 31st day of December, 1995."

2. Agreement to Grant Easement for Pipeline through Boat Harbour

- 2.01 The Landlord agrees to grant to the Tenant an easement for the remaining term of the Lease to enable the Tenant to install and operate a pipeline for the transmission of effluent from that point designated as point C on the plan attached to the Lease to a point in the vicinity of point D as designated on the said plan. The final location of the easement will be determined when the Tenant completes its detailed engineering design of the pipeline and the Landlord hereby agrees to provide a formal easement suitable for registration at the Registry when the location of the pipeline is finally determined after the detailed engineering plans are developed.

3. General Matters

- 3.01 **Governing law:** This Agreement shall be governed by and construed in accordance with the laws of Nova Scotia and the laws of Canada applicable therein.
- 3.02 **Assignment:** This Agreement shall enure to the benefit of and be binding upon the parties hereto and their respective successors and assigns.
- 3.03 **Further Assurances:** The parties hereto shall do such further acts, execute and deliver such further documents and give such further assurances as may be necessary or desirable to give full effect to this Agreement and the Lease.
- 3.04 **Confirmation of Recitals:** The Parties hereto confirm the truth and accuracy of the recitals set out herein.

IN WITNESS WHEREOF the Parties hereto have set their hands and affixed their seals on the day and year first written above.

SIGNED SEALED AND DELIVERED
in the presence of:

HER MAJESTY THE QUEEN IN RIGHT
OF THE PROVINCE OF NOVA SCOTIA
as represented by the Minister of
Transportation and Public Works

Norris Futhers
Witness
[Signature]
Witness

Per: [Signature]

[Signature]
Witness
[Signature]
Witness

KIMBERLY-CLARK INC.

Per: [Signature]
Per: [Signature]

PROVINCE OF NEW BRUNSWICK

ON THIS 17 day of April, 2003, before me the subscriber personally came and appeared, BERNARD F. MILLER, a subscribing witness to the foregoing Indenture, who having been by me duly sworn, made oath and said that KIMBERLY-CLARK INC., one of the parties thereto, caused the same in to be executed in its name and on its behalf by its proper officer(s) duly authorized in that behalf, his/her presence.


A Notary Public in and for
the Province of New Brunswick





(40)

Transportation and Infrastructure Renewal
Office of the Minister

PO Box 186, Halifax, Nova Scotia, Canada B3J 2N2

December 4, 2008

Chief Anne Francis-Muise
Pictou Landing Band Council
RR #2, Site 6 Box 55
TRENTON, NS B0K 1X0

Dear Chief Anne Francis-Muise:

Re: Boat Harbour Effluent Treatment Facility

Thank you for coming to Halifax on December 2, 2008, to meet Ministers Morse, Baker and myself, with members of our staff, to discuss returning Boat Harbour to a tidal state and closing the Boat Harbour Treatment Facility.

We welcomed the opportunity to confirm, in a face to face meeting, among the leaders of both governments the Province's intention to end negative impacts on your community caused by the Boat Harbour Effluent Treatment Facility.

As Minister Baker so graphically stated: "To say that the Band has been long suffering would be a masterful understatement of the obvious." It is our unwavering intention to end that suffering as quickly as possible. It should have been done long ago.

Our first step will be to find another discharge location for mill effluent that does not involve Boat Harbour. We will then clean the harbour and return it to a tidal state.

Achieving our mutual goal of relocating the Boat Harbour Effluent Treatment Facility will take time to complete as there is a massive amount of work involved. The band has been incredibly patient with time expended on attempts so far.

In grateful response to the band's cooperative spirit we wish to make a contribution to the community recognizing the negative impact of delay in closing the facility from the intended completion date of December 31, 2008, to the final completion of this major task.

We have agreed that a committee consisting of the Chief of the Band and a Minister of the Province shall be created, with a first meeting in early January and to oversee the work necessary to achieve our mutual objective. You have expressed a willingness to consider what form this contribution might take before our first meeting.

(41)

Chief Anne Francis-Muise
Page 2

Prior to that meeting, our respective staff will work together to draft a Memorandum of Understanding (MOU) to lay out the objectives and terms of this plan. I propose that we also address the issue of timing in the MOU.

Let me make our government's position perfectly clear. We believe your community has suffered from the negative effects of the Boat Harbour Treatment Facility for far too long. We are fully committed to ending that suffering as quickly as it is practical to do so.

Your patience and cooperation in achieving this common goal are truly appreciated.

Sincerely,



Murray K. Scott
Minister

cc: Honourable David Morse, Minister of Natural Resources
Honourable Michael Baker, Minister of Aboriginal Affairs
Twila Gaudet, Consultation Liason Officer
Kwilmu'kw Maw'klusagun, Mi'kmaq Rights Initiative
Northern Pulp Nova Scotia Corporation
Department of Indian and Northern Affairs, Canada

**Bill #89
Boat Harbour Act**

CHANGES RECOMMENDED TO THE LAW AMENDMENTS COMMITTEE

PAGE 1, Clause 2 -

- (a) **paragraph (c), last line** - delete the period and substitute a semicolon;
- (b) **add:**
 - (d) “Minister” means the Minister of Internal Services;
 - (e) “post-2020 Plan” means a plan for Boat Harbour for after the cessation of the use of the Facility for the reception and treatment of effluent from the Mill.

PAGE 1 - add immediately after Clause 4 the following Clauses:

5 (1) The Minister shall prepare or cause to be prepared by August 31, 2016, a plan for Boat Harbour that recognizes the public interest in the economic and environmental outcomes resulting from the cessation on or before January 31, 2020, of the use of the Facility for the reception and treatment of effluent from the Mill.

(2) The post-2020 Plan must include environmental assessment requirements, economic impacts and a construction timeline.

(3) The post-2020 Plan must be made public.

6 (1) The Minister shall appoint a review panel of independent experts to conduct a thorough assessment for the purpose of the post-2020 Plan.

(2) The members of the panel are to be selected on the basis of their knowledge, experience and expertise, and must be free from bias or conflict of interest relative to the post-2020 Plan.

(3) The panel shall hold public hearings to allow interested parties, including, but not limited to, aboriginal groups, forest producer associations, industry representatives, and environmental groups and communities of interest, to present evidence, concerns and comments regarding the potential environmental and economic impacts of any projects that may be included in the post-2020 Plan.

(4) The panel shall prepare a report for the Minister that includes its rationale, conclusions and recommendations.

(5) The report must contain any proposed mitigation measures and suggestions for follow-up.

(6) The report must be made public one month prior to the public release of the post-2020 Plan.

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