

Air Quality Council Meeting: March 16th, 2017

Notes from the meeting held on Thursday March 16th, 2017 at 2:00 pm in the
ACRD Board Room, 3008 Fifth Avenue, Port Alberni, BC

Present:	Chris Alemany (City of Port Alberni) Dave Jarrett (Community at large) Earle Plain (MOE) Sarah Thomas (Chair) Andrew McGifford (ACRD Environmental Services) Gary Swann (Community member) Stephanie Bruvall (Island Health) Kelly Gilday (Fire Department) Larry Cross (Catalyst Paper) Keith Wyton (ACRD) Keith Hunter (Tseshahat)
Regrets:	Cynthia Dick (Tseshahat First Nation) Ashley Popovich (Catalyst Paper) Patty Edwards (MLA's Office) Judy Carlson (Community at large) Pat Deakin (City of Port Alberni)

Introductions & Check in

It was moved and seconded that the agenda be approved.

The minutes from January 19th meeting of the Air Quality Council were accepted as distributed. Moved and seconded. Carried.

1. Updates

OBSCR open for comment	The provincial Open Burning Smoke Control Regulation is still open for comment. The link is below.
AQ Trends to the end of 2016	Earle presented updated PM2.5 data for 2016. Attached to the bottom of the meeting minutes.
Wood Stove Research Project	Door to door component complete. Went to 800 homes. Have about 400+ completed surveys. These will be analysed by Vancouver Island University over the next few weeks. Thanks to all of the volunteers who participated in the door campaign and helped make this possible.

Wood Stove Exchange 2017	The program launched on January 31, 2017. To date, 10 vouchers have been distributed out of 44 possible this year. 4 of those stoves have already been replaced.
ACRD open burning flyer	An ACRD open burning educational flyer is in process. Please send any ideas or comments to Andrew McGifford by March 24.
Website	<p>We are looking to update the AQ Web directory. Site statistics show that the page “sources of air pollution” is the second most frequented page on the ACRD website. Feb 1 – March 12 saw 1429 page views.</p> <p>The site is here: http://www.acrd.bc.ca/air-quality-council-web-directory</p> <p>If you have ideas or pieces you would like to see added please let Sarah know by the end of March.</p>

2. PM Sensors & Monitoring Technology

Discussion of Pros and Cons of different PM sensor technology	<p>Regulatory PM monitors routinely calibrated against standards to confirm accuracy and monitor performance.</p> <p>Hard to know where emissions are coming from without continuous ambient data and meteorological conditions.</p> <p>Flood of inexpensive sensors on market</p> <ul style="list-style-type: none"> • Hourly values generally follow regulatory monitor patterns (e.g. lows and highs) but data not accurate (can be 3x higher than regulatory) • Cannot calibrate once deployed; no way to maintain sensors; life-span ~1.5 years (e.g. Purple Air) • Limitations in a regulatory setting (no way to know if values are correct) • Conducive to community, citizen science • Some sensor data reported as USAQ index values - not compatible with BC standards; also applied inappropriately to all time averaging scales <p>Cheap sensors will generate numbers; just unknown how good the numbers are. BC currently evaluating Purple Air sensors in different areas of the province (different source mixes and meteorological conditions)</p>
Small Sensor Technology web links	<p>Aretas Sensors: http://www.aretas.ca/</p>

Ongoing Research

Purple Air Map:

<https://map.purpleair.org/map?zoom=16&lat=49.32052651326415&lng=-124.33015263116455&selected=210499&orderby=L&latr=0.009217225297987852&lng=0.027379989624023438>

Ongoing Research:

<http://www.aqmd.gov/docs/default-source/aq-spec/laboratory-evaluations/purple-air-pa-i---lab-evaluation.pdf?sfvrsn=2>

<https://www.epa.gov/air-sensor-toolbox/what-do-my-sensor-readings-mean-sensor-scale-pilot-project>

3. Cantimber & The Like

Bernadette Wyton Report

Bernadette Wyton produced a report “The Cantimber Controversy, Post Golder Report” which reflects on the development process and highlights some remaining concerns and recommendations regarding Cantimber.

Four primary recommendations put forward with the report were:
1. That PAPA and Cantimber answer the questions highlighted in the report.

2. That Cantimber cease operations at its current location and be relocated away from populated areas due to operational and public health risks.

3. That the federal government and Environment Canada be accountable and take an active role in overseeing environmental regulation, compliance assessment, and enforcement issues on Port Authority land. This could be done in cooperation with the MOE, as is already the case for some regulation and emissions oversight at the Catalyst paper mill.

4. That a moratorium be put on Cantimber operations and any other industrial development on Port Authority land until this very serious jurisdictional issue is resolved.

Motion.

It was moved and seconded:

That the report ‘The Cantimber Controversy, Post Golder Report’ from Bernadette Wyton be received.

That the Air Quality Council supports the questions brought forward in the report, believes that the outcomes of the issues raised have an impact on air quality in Port Alberni, and the questions outlined in the report deserve answers.

<p>What are the next steps coming out of the report?</p>	<p>Carried.</p> <p>It was moved and seconded: <i>That the Air Quality Council request that PAPA and Cantimber answer the questions highlighted in the report.</i></p> <p><i>That the Air Quality Council request that the federal government and Environment Canada be accountable and take an active role in overseeing environmental regulation, compliance assessment, and enforcement issues on Port Authority land. This could be done in cooperation with the MOE, as is already the case for some regulation and emissions oversight at the Catalyst paper mill.</i></p>
<p>Overarching framework and protocol to prevent repetition</p>	<p>Carried.</p> <p>It was raised that there could be a role for a public meeting to report out on the findings in the Golder Report.</p> <p>There is interest in considering some sort of framework that could be used going forward to allow for greater assessment before projects start to ensure that projects meets best practices and that environmental and air quality criteria are met.</p> <p>Idea of pursuing an airshed management plan in the near future. This could also address the question of what large scale PM issues we should be focusing on. Need to seek funding.</p> <p>Conversation postponed to the next meeting given the hour.</p>

Next Meeting – May 11th, 2017, 2pm, ACRD Board Room.

Adjourn – Meeting adjourned at 5:04 pm.

PM2.5 trends Port Alberni Elementary School

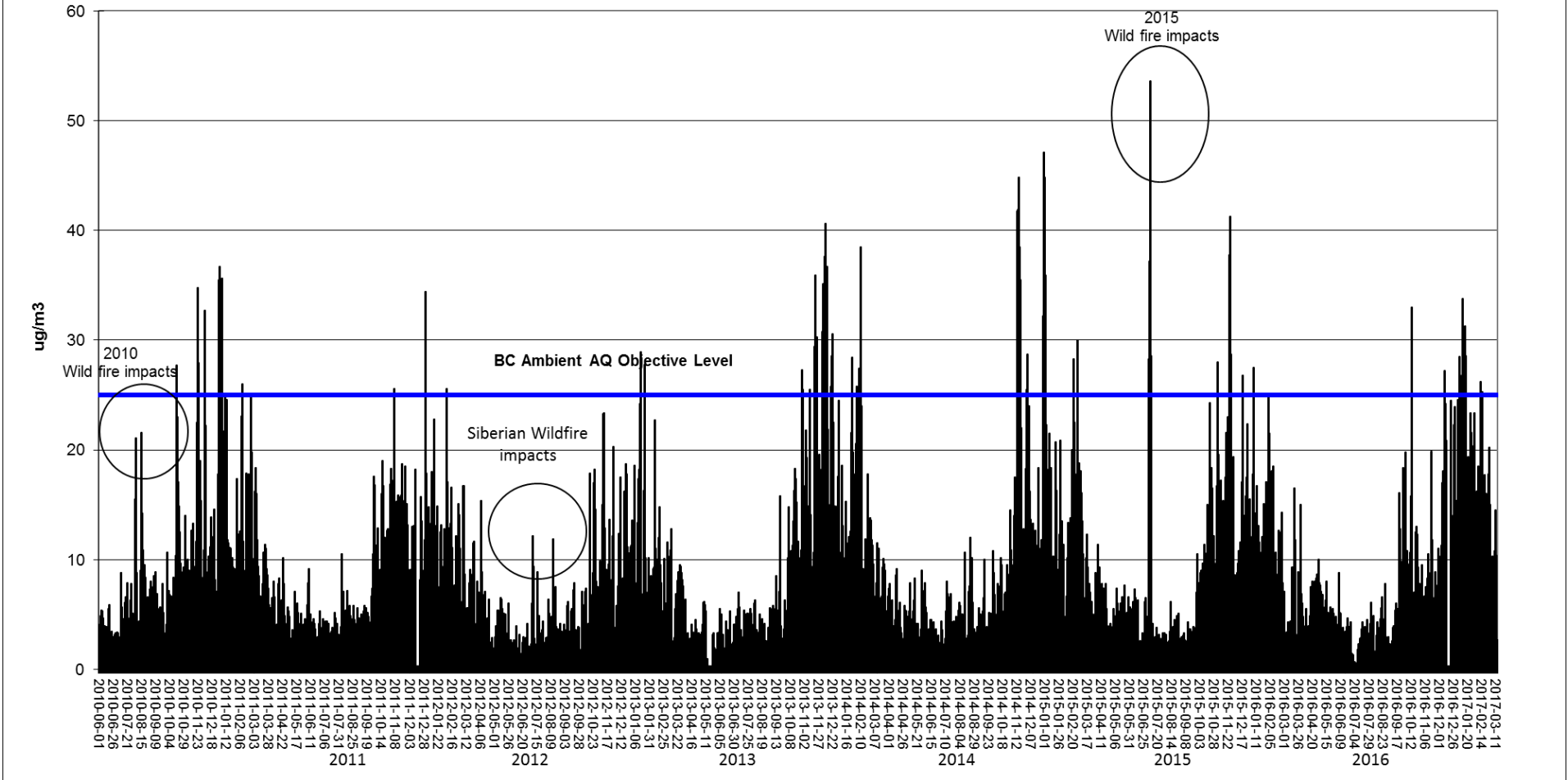
Year	Annual Average ug/m3	# of daily values	Annual 98 th %ile of daily ug/m3	Max daily value ug/m3	# of Daily values > 25 ug/m3	% of time > 25 ug/m3
2011	7.95	354	24.9	36.7	6	1.7
2012	6.2	354	17.9	25.6	1	0.3
2013	8.1	353	30.6	40.6	20	5.7
2014	8.1	362	34.8	47.1	15	4.1
2015*	8.6	361	29.7	53.6	14	3.9
2015	8.2	356	27.9	44.8	9	2.5
2016	7.1	350	22.3	33	3	0.9

Provincial Air Quality Objectives for PM2.5:

- 8 ug/m3 – Annual
- 6 ug/m3 – Annual Planning Goal
- 25 ug/m3 – 98th percentile 24-hour value annually

*includes wildfire smoke impacts

Daily PM2.5 Levels at Port Alberni Elementary School June 2010 - March 2017



THE CANTIMBER CONTROVERSY

POST GOLDER REPORT

By
Bernadette Wyton

Submitted
March 2, 2017

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INTRODUCTION

On June 17, 2015, the Port Alberni Port Authority (PAPA) announced the establishment of Cantimber Biotech within its terminal facilities. The project was advertised as a non-polluting, job-creating, activated charcoal industry with environmental benefits. However, it was launched into controversy due to episodes of noxious emissions.¹ Key aspects of the controversy include:

1. The poor location provided for Cantimber trials, operation, and expansion
2. A lack of precaution and due diligence at the outset
3. Jurisdictional immunity
4. A lack of public and stakeholder consultation at the outset
5. Confusing/misleading information
6. Not observing best practices
7. Inherent problems with the batch carbonization process
8. A loss of public trust through a series of unsatisfactory experiences
9. Occupational health and safety concerns
10. Undermining ‘Continuous Improvement’ and ‘Keeping Clean Areas Clean’
11. High background PM 2.5 levels
12. Decisions resting on one hour of sampling.

When pollution problems persisted during commissioning trials in June 2016, Cantimber operations were shut down until a review of those operations could be conducted. PAPA selected Golder Associates to oversee this work. The resulting “Operations and Emissions Evaluation” (Golder Report) was posted to the PAPA website in mid-December 2016.

Many residents and agencies are now trying to assess what just happened and where we should go from here. Following are some aspects of that assessment, post Golder Report.

Some of the questions that remain have been underlined.

¹ See AV News article, June 9 2016 “More Growing Pains, Smoke for Cantimber”

KEY ASPECTS OF THE CONTROVERSY

1. LOCATION

Cantimber is located on the waterfront in the middle of the City of Port Alberni, directly below and in front of a densely populated neighbourhood. Emissions from its carbonization and activation stacks can, therefore, result in exposures, especially to nearby residents. This problem is compounded by the relatively low stack height, temperature, and gas velocity, all of which decrease the dispersion of pollutants. The following quotation recommends siting biochar operations far from populations:

Biochar production units are usually located far from populated areas due to the smoke they produce. Kiln smoke naturally settles and travels near the ground at atmospheric pressures. Therefore, it is preferable to construct a site on high ground so the prevailing winds will carry the smoke into the upper air strata. In order for biochar to be produced in the United States non-polluting technology must be developed (Toole, 1961). ("Methods for Producing Biochar and Advanced Biofuels in Washington State, Part 1: Literature Review of Pyrolysis Reactors," Washington State Department of Ecology)

Regardless of best intentions and protocols that might minimize pollution events, those events will, no doubt, continue to occur due to problems with, for example, equipment malfunctions (i.e., syngas valves, etc), human error, and challenges of the batch process that Cantimber has chosen which is characterized by continually starting and stopping production cycles. (see Batch Process, below). Further, risks of fire and explosion are inherent in pyrolysis operations.

Most accidents occur in combustion and pyrolysis plants during start-up and shut-down, but it is important to remain vigilant during all phases of the production process. ("Guidelines for the Development and Testing of Pyrolysis Plants to Produce Biochar, International Biochar Initiative," Jane Lynch, Stephen Joseph)

The location of this kind of industry in the heart of the city remains a serious problem. The concern is heightened when considering that expansion has always been central to Cantimber's planning. The following excerpt highlights how serious the decision is to dedicate land and resources to the industrial production of activated charcoal:

*A decision of this kind cannot be undertaken lightly since in order that the investment may have a chance of being recovered, the **resource area must be committed for twenty to thirty years into the future.** The resource must also be managed in such a way that the needs of the charcoal retort system are adequately serviced. **This precludes other uses for the land, a difficult decision where populations are rising and pressure on the land increasing.** The use of complex retort systems **introduces a degree of inflexibility in resource allocation which governments may find difficult to live with.** (FAO Forestry Paper 63, Food and Agriculture Organization of the United Nations, 1983)*

According to Cantimber, there is no necessity or advantage for them to be on the waterfront.

2. PRECAUTION, DUE DILIGENCE

PAPA advertised Cantimber as a completely pollution-free operation and apparently was not prepared for the typical pollution and safety problems related to the production of activated charcoal. None of the most common and well-known hazards of biochar operations, including carbon monoxide (CO) poisoning, explosion, fire, and air pollution were divulged.

During all phases of the process – loading, start-up, operation, shutdown, unloading and storage – the following risks for operators and the public should be considered, and any relevant regulations adhered to:

- *Fire and explosion (including dust explosion on hot surfaces, combustion during storage)*
- *Particulate and gaseous emissions*
- *Gas leakage (particularly CO)*
- *Noise pollution*

(“Guidelines for the Development and Testing of Pyrolysis Plants to Produce Biochar, International Biochar Initiative,” Jane Lynch, Stephen Joseph)

There also seemed to be little testing, precautionary measures or other acknowledgement of potential pollution problems due to pyrolysis itself:

Because pyrolysis kilns are designed to only partially combust wood, gases harmful to the environment, such as methane, carbon monoxide, alkanes, oxygenated compounds, and particulate matter, as well as organic compounds such as ethane, ethanol, and polycyclic organic matter (POM) are released directly into the atmosphere. Additionally, if tars remain uncombusted, they may solidify and form emissions of particulate matter (PM), pyroacids, and aerosol. The gases that are released have a much greater impact on climate change than carbon dioxide. Studies show that producing biochar releases more emissions than actual combustion of biochar in a stove. (“Methods for Producing Biochar and Advanced Biofuels in Washington State, Part 1: Literature Review of Pyrolysis Reactors”, Washington State Department of Ecology)

3. JURISDICTION

Overseeing the manufacture of activated charcoal through pyrolysis is clearly outside the normal mandate and expertise of a port authority. The controversies and complexities that have arisen with regard to the Cantimber project may have put PAPA at odds with some aspects of their own mission and value statements.²

PAPA is a federal entity and operates outside of provincial jurisdiction. However, they have publicly stated that when seeking federal assistance to help resolve Cantimber operations and

² Mission Statement: To be an economic driver that facilitates maritime trade and marine commerce by providing professional service that respects the environment, the community and the port users.

Value Statement: 1. Accountability – Ensure the decisions and actions of the PA are made according to applicable acts, regulations and best practices. 2. Integrity – Conduct the business of the PA with commitment, respect, honesty and sincerity. 3. Professionalism – Commit to safely and efficiently meeting the mandate, regulations and mission of the PA. 4. Sustainability – Manage the affairs of the PA that ensures financial viability of the PA, economic benefit(s) to the community and the health of the environment.

emissions problems they were denied, purportedly because the project was too small to warrant any.

As a result the BC Ministry of Environment (MOE), through its Nanaimo branch, has been put in the precarious position of having to provide information, expertise, and advice to a federal port agency and a private corporation without any official authority or binding basis for future relations, decisions, or compliance issues.

Although Cantimber emissions are generated on federal land, they migrate into provincial and residential territory posing some very difficult legal and jurisdictional problems.

In the case of Catalyst, emissions permitting, compliance and enforcement are open processes conducted by trained professionals working for the MOE. It would be best to consistently apply this model for other industries operating within the Alberni airshed.

Instead, PAPA has emerged as the self-appointed lead agency to create and enforce emission permit levels for Cantimber operations. This is an unsatisfactory arrangement, especially for the public, for a number of reasons, not the least of which is the inherent conflict of interest, especially with relation to regulation setting, compliance and enforcement, where industry proponents are left watching themselves.³

Instead of using emission rates as, for example, established by Metro Vancouver in their “Boilers and Process Heaters Emission Regulation Bylaw”, PAPA attempted to establish their own. The ‘license levels’ they originally included in their license agreement with Cantimber were estimates used by Levelton as a basis for the dispersion modelling assessment they completed in 2015. However, when Golder did their emissions review, it was discovered that the results and conclusions of Levelton’s modelling were not representative of the facility. This demonstrates how difficult and unsatisfactory license levels and agreements can be.

4. CONSULTATION, TRANSPARENCY

The decision to establish Cantimber on the waterfront was made with no opportunity for the public or third parties, such as the Air Quality Council (AQC), to review the project or register concerns.

The AQC is a multi-stakeholder agency in the Alberni Basin dedicated to airshed management and air quality monitoring, research, and education. They were not included in discussions or consultations with PAPA through most of 2016 and were not invited to review the Golder Report with other stakeholders at the end of the year.

Information including emissions modelling, impact assessment, and license permit levels (Levelton), engagement contracts (Golder, Cantimber), and basic operations is not accessible.

³ PAPA is not an unbiased agency but, due to its financial relationship with Cantimber, is considered a project proponent and, therefore, is compromised as a regulatory body.

Further, content of discussions with the Ministry of Environment (MOE) and Island Health (IH) (recommendations, negotiations) are not publicly accessible and, therefore, performance requirements and claims of compliance are unverifiable.

Proprietary protection, including the claim of patent pending, has been used as a reason to withhold information.

Also, parts of the Golder report posted on the PAPA website have been removed due to being commercially sensitive.

The public has not been treated as a stakeholder. This runs counter to the sustainability principles that apply to biochar:

Biochar production processes should always be able to demonstrate a genuine “community licence to operate” in addition to any statutory approvals necessary from the prevailing jurisdictions. (Australian New Zealand Biochar Researcher Network, 2009)

There have been persistent PAPA and Cantimber public relation problems related to a lack of information, confusing or misleading information (examples below), and inadequate protocols for listening and responding to outside agencies, including the public.

For example, even after the October 13th public meeting about Cantimber (Public Meeting) where people passionately registered their health concerns, PAPA and Golder neglected to have public health concerns even nominally addressed in the Golder Report.

It should be noted that residents in PAPA’s immediate neighbourhood have just emerged from the prolonged controversy related to the Raven Coal project and PAPA’s desire to establish Port Alberni as a coal port. Both the Raven Coal and Cantimber projects failed to recognize the public’s desire to revitalize the waterfront and make it more accessible and enjoyable for citizens and visitors.⁴

There has been no official follow up with the public to discuss the Golder Report and how it relates to their concerns.

5. CONFUSING/MISLEADING INFORMATION

On a number of occasions PAPA and Cantimber have publicly claimed that they are complying with MOE and the Air Quality Council, as if those agencies had control over and were in approval of Cantimber operations, neither of which is the case. The video posted on the Cantimber website concludes that Cantimber submits regular “air quality tests to the MOE and the Air Quality Council”. This is incorrect and has caused a great deal of confusion for the public.

⁴ That direction was embodied in the Alberni Outlook 20/20 initiative that conducted extensive public and stakeholder consultations. It is also evident in the Canal Beach project and the recent development of organized kite boarding and other water sports.

During the Public Meeting, PAPA claimed, as in other public venues, that Cantimber was meeting all of the MOE's requirements (MOE can't make requirements in this case), leaving the public to believe that the MOE was the responsible, regulating agency. At the same time, contrary to advice sought from the MOE, the company announced they would continue to use firewood for start-up during their November testing period, manually adding charcoal for combustion efficiencies. This choice was counter to industry best practice and the long-standing recommendations of both the MOE and the AQC to start-up using natural gas.⁵

Cantimber has publicly made some questionable statements about specific emissions. For example, they claimed that by using waste wood from logging that would otherwise be burned they would reduce annual carbon monoxide (CO) emissions in the valley by 229 tonnes (AV Times, June 26, 2015). This assumes that the logging refuse is burned within the valley. However, most logging burn piles are outside of the Alberni airshed and none of them are fully burned.

More importantly, Cantimber's actual emission rate for CO was found to be **263 times** higher than that estimated by Levelton for the basis of modelling and license levels. According to the Golder Report, Cantimber would annually discharge 335 tonnes of CO directly into the city's air. This huge discrepancy indicates a lack of understanding by project proponents of basic operational dynamics. The Golder Report provides no comment or analysis regarding the discrepancy or possible implications.

Cantimber has repeatedly tried to minimize concerns about the toxic nature of their emissions by calling them "natural." For example, on their website under "News, Smoke and odour emission incident and response:" ***The smoke and odour are natural compounds that originate from the woody raw material...*** Pyrolysis is not a natural process. The smoke from Cantimber that many people were exposed to would include emission products such as volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) that if considered natural, like arsenic or cigarette smoke, is hardly a reason to allay concern.

At the Public Meeting, a resident claimed there was no patent application registered for Cantimber. The Cantimber spokesperson, uncharacteristically, offered no response. As patent pending has been used many times by Cantimber to defend withholding information, the question of its legitimacy is important. Therefore, the following question remains:

During the 2016 Port Days, when people visiting Cantimber were told not to take photos due to patent pending, was there a patent registered in Canada for any Cantimber operation?

The same resident asked about WCB oversight at Cantimber. The response was that WCB had recently been in to inspect. It was noted that the plant had been closed since June and that WCB does not inspect closed facilities. Cantimber was not able to clarify the discrepancy. Therefore, the following question remains:

When did WCB do on-site inspection(s) during 2016?

⁵ Cantimber was later convinced to use propane instead of firewood for start-up for the November test period.

6. BEST PRACTICES

After repeatedly being asked to observe best practices and pre-heat with natural gas, Cantimber insisted on using cordwood in their combustion chambers to heat the retorts. Even as late as the Public Meeting, they announced they would still be using firewood for the November test period, with the manual addition of charcoal to increase combustion efficiency. At the same time, they expressed their surprise that wet firewood had contributed to emissions problems, unlike the bamboo they were familiar with in other countries. After all the work that has been done in Port Alberni to reduce smoke emissions through the woodstove exchange program, and especially to reduce needless smoke emissions from using wet firewood and inefficient appliances, this lack of understanding by project leaders indicates a disturbing lack of insight.

Also, contrary to industry best practice, Cantimber announced they would be adding charcoal dust to the secondary burn chamber to try and manage stack emissions instead of using calibrated equipment with standardized performance. Their insistence on using manual, uncertified methods at both ends of their operation for a test period following some grave pollution events remains surprising as this option could increase the risk of further pollution and exposures to workers and citizens of the immediate neighbourhood.

During 2016 there was no requirement, for public health and employee safety considerations, that Cantimber provide any kind of continuous monitoring, including for any of the common hazardous gaseous emissions of pyrolysis (for example, carbon monoxide, a dangerous pollutant for employees directly exposed).

Currently there is no formal process, procedure or instrumentation available at the facility to check for equipment leaks and monitor the relative magnitude of fugitive emissions from various sources at the facility. (Golder Report, p.4)

It is not clear if Cantimber had any kind of health and safety risk assessment or HAZOP (hazard and operability analysis) prior to the November 2016 test period as *should be conducted as an essential part of the design phase of the project.* (Guidelines for the Development and Testing of Pyrolysis Plants to Produce Biochar, International Biochar Initiative, Jane Lynch, Stephen Joseph)

7. BATCH PROCESS

By their nature, batch processes and their emissions are difficult to regulate:

The carbonization process is not a steady state process due to the batch nature of bringing different vessels in/out of the process, and syngas line. (Golder Report)

Continuous production of biochar is more amenable to emissions control than batch production, because the composition and flow rate of emissions are relatively constant. After burners and cyclones control the emissions from continuous multiple hearth kilns. They are also used for product recovery and to reduce PM, CO, and volatile organic compounds (VOC) (by at least 80%). It is difficult to control emissions from batch type kilns because the process and consequently the emissions are cyclical. Some batch kilns have after burners to help control emissions but most do not. ("Methods for Producing Biochar and Advanced Biofuels in Washington State, Part 1 – Literature Review of Pyrolysis Reactors," Washington State Department of Ecology)

8. LOSS OF PUBLIC TRUST

Due to a lack of precaution and best practices, the resulting Cantimber pollution events put the public's health at risk causing them to lose trust in Cantimber's operations and PAPA's decisions and claims.

At no time has the public been assured of standards, levels, or limits above which would trigger a shut-down or other non-compliance measures.

One of the greatest oversights of the Golder report is a complete lack of reference to public health. After the October 13th Public Meeting where people were assured that their health concerns would be addressed, this is a disappointment that further erodes public trust.

In their "Proposal to Conduct an Operations and Emissions Evaluation Cantimber Biotech" (Golder Proposal), Golder states:

Golder understands that the Port Authority is seeking a third party consultant that can review the process and assess the source of the emissions, the type of emissions, the potential health impacts... Golder's human health risk specialist will assist in assessing the potential for health concerns. Golder assumes that a qualitative discussion of potential health concerns is adequate at this time. Quantitative dispersion modelling or human health risk assessment is not included in the current scope of work.

It was surprising to discover that "a qualitative discussion of potential health concerns" was the only deliverable proposed by Golder with regard to public health, and more surprising that they did not even deliver that.

The Golder Proposal included a list of recommendations (p. 6) they would make, including an *evaluation of potential health concerns, if any*. The last two words are disturbing as they potentially suggest there may be no health-related (or any) concerns. Given Cantimber's previous pollution events and the amount of related public unrest, it should be clear that an evaluation of health concerns is imperative. The following questions remain:

What are the potential health impacts Golder "understood" PAPA was looking for?

Where is the assessment of potential for health concerns that Golder's human health risk specialists were to assist in delivering?

Where is the qualitative discussion of potential health concerns that Golder assumed would be adequate in lieu of a quantitative assessment?

Will there be a human health risk assessment done?

Are PAPA and Golder assuming there are no health concerns?

If not, why didn't they identify or summarize the health concerns?

9. OCCUPATIONAL HEALTH AND SAFETY

4.2. Industrial safety in carbonization

Carbonization produces substances which can prove harmful and simple precautions should be taken to reduce risks.

The gas produced by carbonization has a high content of carbon monoxide which is poisonous when breathed. Therefore, when working around the kiln or pit during operation and when the kiln is opened for unloading, care must be taken that proper ventilation is provided to allow the carbon monoxide, which is also produced during unloading through spontaneous ignition of the hot charcoal, to be dispersed.

The tars and smoke produced from carbonization, although not directly poisonous, may have long-term damaging effects on the respiratory system. Housing areas should, where possible, be located so that prevailing winds carry smoke from charcoal operations away from them **and batteries of kilns should not be located in close proximity to housing areas.**

Wood tars and pyroligneous acid can be irritant to skin and care should be taken to avoid prolonged skin contact by providing protective clothing and adopting working procedures which minimize exposure.

The tars and pyroligneous liquors can also seriously contaminate streams and affect drinking water supplies for humans and animals. Fish may also be adversely affected. Liquid effluents and waste water from medium and large scale charcoal operations should be trapped in large settling ponds and allowed to evaporate so that this water does not pass into the local drainage system and contaminate streams.

9.1. Unit operations in transport of charcoal

Important factors in charcoal transport are:

- Low bulk density requiring high volumes to be transported and handled.
- Fragility leading to **production of "fines"** at every stage of handling and transport
- **Tendency of fresh charcoal to spontaneous heating and ignition through adsorption of oxygen from the air.**

(FAO Forestry Paper 41, Food and Agriculture Organization of the United Nations, Reprinted 1987)

5.2 Explosions

The causes of such accidents are often not clear but are probably most often due to mixture of pyrolysis gases with air.

In a batch-wise operated retort the presence of gas in the retort is greatest at the end of the cycle, the admittance of air can form highly explosive gas mixtures. In a continuously operated converter, the admittance of more air than needed may cause first a sudden rise in temperature and then formation of explosive mixtures in the off-gas system.

5.3 Fires

Fire can result from the admission of large quantities of air to the retort, converter or off-gas system through cracks or badly closed doors. In other cases fire can result

*from explosions. Such events can arise through the operator's unfamiliarity with proper operating procedures or simple carelessness. In high temperature operations there is always the **danger of wall swelling and the occurrence of unnoticed air inlets.** The inflow of excessive amounts of air could easily change the temperature pattern. This may cause very high retort temperatures, either gradually or rapidly, creating a serious fire condition. The operator's familiarity with his equipment and necessary counter measures are the best insurance for safe practice and satisfactory production. Well established, periodic inspection of the industrial charcoal-making plant will determine the corrective measures necessary for proper control and reduce the possibilities of fire damage.*

Improper sealing or structural leakages of air in the charcoal cooling bins during the cooling period can also lead to considerably reduced yields production of poisonous carbon monoxide gas and equipment damage. Such conditions may occur even in a well established operating plant and the importance of inspecting and maintaining cooling bins during the cooling cycles, controlling operational conditions and following safe practices cannot be overemphasized.

5.4 Hazards to the public

***Fire and gas leaks whether controlled inside the retorts or converter or uncontrolled, constitute a potential hazard for the public.** Unauthorised persons should not be permitted in the plant unless guided. Safety helmets are a necessity for both workmen and visitors. Transport of wood, other raw material, charcoal handling and other essential work gives rise to operational hazards and safety measures and safe work habits must be considered of prime importance.*

(FAO Forestry Paper 63, Food and Agriculture Organization of the United Nations, 1983)

Activated Powdered Charcoal made from wood residues is a hazardous substance.

*Canadian companies that are in the hazardous materials supply chain (i.e. chemical manufacturer, distributor or employer) are required by WHMIS provisions to maintain safety data sheets for the chemicals made and/or used in their facility. **MSDSs provide employees and first responders with information needed to safely handle chemicals, especially during emergencies.***

*WHMIS stands for Workplace Hazardous Materials Information System and is Canada's national hazard communication standard. It outlines the obligations of each party in the chemical supply chain – from chemical suppliers, importers, and distributors who traffic in controlled products to the employers and workers who use them. **WHMIS is based upon the idea that workers have the right to know about the hazards of the materials they work with and steps they can take to protect themselves.** (Material Safety Data Sheets (MSDS) for Compliance with Canada's WHMIS www.msdsonline.com)*

Consider the following warnings from a typical MSDS for activated carbon, wood charcoal, in this case from Anachemia Canada:

Fire and Explosion Hazards

This material in powder form is capable of creating a dust explosion. Activated carbons are not highly flammable and burn slowly without producing smoke or flame. Spontaneous heating may occur on contact with combustible materials (ex., oil).

Storage and Handling

*Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe dust. Keep container tightly closed and dry. Manipulate in a well ventilated area or under an adequate fume hood. Avoid raising dust. **Take precautionary measures against electrostatic discharges.** Ground the container while dispensing. **Use explosion proof equipment.** Use non-sparking tools. Handle and open container with care. Minimize dust generation and exposure - use dust mask or appropriate protection. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. Protect from moisture.*

Special Precautions or comments

*Do not breathe dust. Avoid all contact with the product. Avoid prolonged or repeated exposure. Manipulate in a well ventilated area or under an adequate fume hood. Keep away from heat, sparks and flame. Handle and open container with care. Container should be opened only by a technically qualified person. **Wet activated carbon removes oxygen from air causing a severe hazard to workers inside enclosed or confined areas.** RTECS NO: FF5250100 (Charcoal)*

Given the earlier WCB discussion and public concern for Cantimber employees and other dock workers exposed to Cantimber emissions, it was disappointing that some personal samplers were not employed during Golder's emissions assessment.

The report makes no mention of Cantimber's HAZOP (hazard and operability analysis) or if they even had one. As the public was not made aware of safety considerations and potential hazards related to the production of activated charcoal, it does beg these questions:

In 2016, were employees made aware of the potential hazards related to the production of activated charcoal? Are they aware now?

Does Cantimber have Material Safety Data Sheets for their products?

Has PAPA and Cantimber alerted the public, Fire Department(s), Emergency and First Responders to the hazards of their products?

10. CONTINUOUS IMPROVEMENT

As described by the Canadian Council of Ministers of the Environment, federal, provincial, and territorial governments have adopted an air quality strategy called “continuous improvement”. This is part of a framework for airshed management embraced by the Air Quality Council, to ensure proactive measures are taken to protect air quality in accordance with the principles of continuous improvement (CI) and keeping clean areas clean (KCAC).

The broad vision for CI/KCAC is:

To ensure that, in the vast areas of Canada with air quality better than the CWS numerical targets for PM and ozone, air quality is not significantly degraded and is maintained or improved to the extent practicable, to minimize risk to human health and the environment for the benefit of future generations.

Using Ambient Air Quality Objectives (AAQO) as a limit that one entity can pollute up to is counter to the intention of the objective and of continuous improvement. In other words, it is not O.K. for any entity to diminish the achievement of low ambient air quality measures (clean air) by filling the space between that achievement and the objective.

Both the Golder Report and the recently released “Remodeling of Cantimber Emissions” done by WSP, appear to rely on an assumed permission to add to air quality background levels, as long as AAQO levels are not exceeded.

Polluting “Up to a Limit” is Not Acceptable

The overall objective of the CWS is to reduce the adverse health and environmental effects of PM and ozone. Therefore, allowing PM and ozone ambient levels to increase up to the current numerical CWS targets is counter productive, and unacceptable in light of the absence of any apparent lower threshold for adverse effects and the knowledge that the numerical CWS targets may not be fully protective. Proponents of development should not regard the current CWS numerical targets as a permissive maximum. The clear intent of CI/KCAC is to ensure air quality is not significantly degraded and to improve air quality whenever feasible.

Same Degree of Protection for All Canadians

All Canadians are entitled to the same level of protection from the adverse effects of PM and ozone, whether they live in large urban centers or small remote communities. The CI/KCAC provisions should apply to communities of all sizes. To the extent practicable, jurisdictions should strive through the application of a common set of principles to ensure that the same level of protection is afforded everywhere across Canada.

Jurisdictions may wish to include other air pollutants in their ambient air measurements such as sulphur dioxide (SO₂), nitrogen oxide (NO_x) volatile organic compounds (VOCs), and ammonia (NH₃). They may or may not have management targets for these pollutants. Jurisdictions may also wish to include specific components of fine particulate matter in ambient air such as sulphate (SO₄) nitrate (NO₃), elemental carbon and organic carbon for the purpose of identifying emissions sources.

(“Guidance Document on Continuous Improvement (CI) and Keeping-Clean-Areas-Clean (KCAC), Canada-wide Standards for Particulate Matter and Ozone” Canadian Council of Ministers of the Environment, 2007)

11. HIGH AMBIENT PM 2.5 LEVEL

As reported by WSP Canada Inc. in their report, “Remodeling (sic) of Emissions From Cantimber Charcoal Manufacturing Facility”(January 2017), the 24-hour average background concentration of PM 2.5 is 20.90 ug/m³. The B.C. ambient air quality objective is 25 ug/m³. This leaves very little room for any kind of additional pollution before the objective limit is reached.

The ambient air quality levels in this area are not conducive to additional, potentially polluting industrial development.

12. ONE-HOUR TEST

The emissions evaluation provided in the Golder Report is based on a single hour of testing for both the carbonization and activation stack. This is one hour out of many days where, at any given time, there are up to eight retort vessels at different stages between starting up and shutting down.

The results of the one-hour test were then used by WSP to produce a remodelling report. The two reports are now being used by project proponents to make decisions about the future of Cantimber. However, modelling and remodelling are only as good as the data used to produce them. The questions remain:

How good is this data?

How representative is this data of the entire variable batch process and the real pollution it will cause day after day and year after year?

One hour of testing is inadequate to answer these questions or provide the assurance necessary to proceed without risk.

GOLDER PROPOSAL/SCOPE OF WORK FOR THE CANTIMBER OPERATIONS AND EMISSION EVALUATION

QUESTIONS and CONCERNS

START-UP EMISSIONS

Combustion upsets, start-up, and shut-down are periods of incomplete combustion and, therefore, greater emissions. Obviously, a test period will not normally document a combustion upset as operators strive for perfect conditions. To understand real annual emissions for Cantimber, some measurement of emissions during start-up and shut-down are essential, especially as these periods are continual in the batch process.

Why didn't the Golder Report at least address *emissions characterization during start-up*, as initially requested by PAPA for Golder's scope of work?

LITERATURE REVIEW

The Golder Report does not mention their literature review of pyrolysis emissions, as proposed for Task 2 of the Scope of Work.

What documents were reviewed in detail as part of the Cantimber Operations and Emissions Evaluation?

ODOURS

Where is the qualitative assessment of odours and their sources, as proposed for Task 2 of the Scope of Work?

HUMAN HEALTH

Where is the assessment and qualitative discussion of potential health concerns by a Golder human health risk specialist, as proposed for Task 2 of the Scope of Work?

GOLDER REPORT

CANTIMBER OPERATIONS AND EMISSION EVALUATION

QUESTIONS AND CONCERNS

SCRUBBER SUMP DISCHARGES

Page 3 Where will scrubber sump discharges be removed to?

VOC LEAK

Page 4 It is disturbing that under the best conditions a VOC leak was detected from a syngas valve. Leaks and breaks will most likely continue to be a problem linked to the hazards of emission exposures and risk of explosion and fire.

LOWER FEED RATE – GREATER EMISSIONS?

Page 4 Is it possible that lower activation process feed rates may result in greater emissions?

For the carbonization process, do all of the retorts need to be filled and active?

How many vessels were used and how full were they for the November test period?

Page 6 How regular should the blow down of scrubber water and replacement with fresh makeup water be?

What is an adequate temperature for the cooling water before it is discharged?

CO EMISSIONS 263 TIMES HIGHER THAN ESTIMATED RATE

Page 7 The CO emissions for 2 activation trains in run 3 are 263 times Levelton's license level.

Why was no comment provided regarding the cause or implications of the huge CO emissions discrepancy?

NO2 DOUBLE LICENSE EMISSION LEVELS

Even during this testing phase and optimal operating conditions, NO2 levels are higher than expected and are an ongoing health concern.

LEVELTON

Would it be possible to get some feedback from Levelton and/or Golder regarding the initial modelling levels set for NO2 and CO; the high NO2 test levels; the excessively high CO test levels recorded in the Golder Report; and possible reasons for and implications of these discrepancies?

COMPARE TO CATALYST

Page 8 To provide better context, when comparing the relatively small Cantimber operation to the huge Catalyst operation, volume of feedstock should be included. This might make Cantimber CO emissions appear remarkably high instead of relatively good in comparison.
Also, for context, Cantimber's stack height, temperatures and volumetric flow are much lower than Catalyst's and, therefore, more conducive to ground level emission exposures. This is compounded by the geography with the stacks situated in front of and below a densely populated neighbourhood.

COMPARE RESULTS TO OTHER BIOCHAR REGULATION LIMITS

Could Golder provide pertinent results (i.e. Gravimetric Results) expressed in common measurements with and in comparison to other regulation limits relevant to biochar production? (i.e. Metro Vancouver's "Boilers and Process Heaters Emission Regulation Bylaw" OR regulation limits set in other areas with extensive biochar experience, such as Washington State, or California)⁶

INTENT OF WINTER SHUTDOWN

Page 8 If the intent of the Nov 10 to Jan 10 annual shutdown is to avoid operating under inversion conditions, should the company not also shut down when those conditions are actually happening? (For example, the conditions may start after January and persist into March.)

PAH TESTING BEFORE START UP

Page 8 Given the health concern and request to test further for specific VOC's prior to resuming Cantimber operations and given that one of them, Naphthalene, is also a PAH:

Shouldn't stack testing of speciated PAH's also be done before start-up and not some time in the future?

DUSTTRAK DATA INCOMPLETE FOR START UP PERIOD

Page 12 It is unfortunate that DustTrak-South Street/1 Ave. had poor to almost no data completeness during the critical start-up phase. On Nov 4 when the combustion chamber was warming up, it was only 7% complete. On Nov 4, both DustTraks recorded emission levels over the ambient air quality objective (see Fig 8, page 15) with the South St. unit reading over 60 ug/m³ and Stirling St. over the objective of 25 ug/m³. This was not the case for the partisol on 2nd or the bam on the Alberni Elementary School, both with very low readings. This could suggest start up emissions and exposures.

What was the problem with this DustTrak during the start-up period?

⁶ A previous request to compare emissions levels with related levels set by the GVRD was denied by Golder. See "COMMENTS REGARDING THE ADDENDUM TO THE GOLDER REPORT p. 21

Did it stop or is there other data during that period from the DustTrak that is not included in the report?

LICENSE AGREEMENTS PRIVATE

Page 16 *Current regulatory conditions relating to air quality, including air emission levels and monitoring requirements relating to the facility, are outlined in the license between PAPA and Cantimber Biotech Inc. dated 1 May 2015. (Golder Report)*

Unfortunately the license is a private document which is unsatisfactory for the public, individuals at risk, and the future of public health, especially considering that Golder had to suggest that the license *incorporate the main aspects of a typical air emissions permit* and that *conditions could be included in the permit that state the data/reports be interpreted by a suitably qualified person*. This suggestion could also be ignored, potentially, resulting in an unqualified person interpreting the data.

FEEDSTOCK SOURCES

Page 17 Burning wood that has been in contact with salt water can potentially result in air emissions of the very toxic duo, dioxins and furans. The recommendation to include permit restrictions around the source of wood chips to ensure they are not in contact with saltwater leads to the following questions with regards to Golder's evaluation:

Was Cantimber ever using wood from other sources than slash piles left from logging?

Did Cantimber ever use wood fibre that had been in the ocean?

Did Golder take feedstock samples for potential further analysis, as suggested in Task 2 of the Scope of Work?

If so, to help answer these and other questions, will they analyze them?

WHEN?

Page 18 In the summary of recommendations, unshaded areas do not have to be addressed before Cantimber resumes operations. Timelines for these need to be specified:

When should the fuel source for the combustion chambers be changed to natural gas and automated?

When should regular fugitive emission surveys be undertaken on the carbonization process using an analyzer so leaks can be identified and addressed immediately?

Given past valve issues, shouldn't an analyzer be put in place prior to commencement of operations?

When should the assessment of worker exposure take place?
Shouldn't this be done ASAP after resuming work to protect their health?

It is recommended that future stack sampling consider the high CO levels recorded in the Golder Report and *plan appropriate health and safety procedures and controls.*

Why don't the high CO levels reported trigger this immediately?

ADDENDUM TO THE GOLDER REPORT

COMMENTS AND QUESTIONS

Precipitation Levels and Impact on Ambient Monitoring Results

In this section of the Addendum, Golder states that during the stack test period (7 – 9 November) *that the residential area was not downwind of the facility*. As wind direction tends to change diurnally (from day to night) in the valley,

What percentage of time during the entire test period was the residential area downwind of the facility?

Using other meteorological data (MOE, Levelton) produced in Port Alberni, what percentage of time for the year would the residential community expect to be downwind of the facility?

Other Regulatory Considerations

In this section of the Addendum, Golder gives a number of reasons for denying the request to compare the Cantimber emissions results with limits set by the GVRD under their Boilers and Process Heaters Emission Regulation Bylaw. They note that air quality considerations in the larger urban area are different to those in less urban areas.

In the case of the City of Port Alberni, however, the concerns about Cantimber emissions are similar to related concerns in the City of Vancouver – namely concerns about industrial air pollution effecting a fairly dense resident population.

Another reason Golder gives for denying the request to compare is that the regulator for the GVRD is different than that of the rest of the province. This is unsatisfactory for two reasons:

1. The request was to compare emissions levels with limits set elsewhere, as Cantimber and PAPA have not set any limits here. This would simply require translating the unit measurements into those used by, for example, the GVRD.
The request was not to abide by the GVRD bylaw, but compare levels to help put them in context as Golder did, for example, by comparing Cantimber emissions to Catalyst emissions and to wood stove emissions.
2. The regulator argument is a very poor one, as it highlights the fact that Cantimber has no regulator other than their landlord.

If Golder will not compare Cantimber emission levels to relevant limits set by the GVRD,

Will Golder provide a comparison of Cantimber emissions to relevant emission levels and limits recorded and set in British Columbia, in other parts of Canada, and in other areas with pyrolysis experience such as Washington State?

This could be an extension of the literature review undertaken by Golder.

CONCLUSIONS

The experience of having a new and potentially polluting industry placed on the waterfront in Port Alberni has led to a number of concerns. Some of these have been addressed by the Golder Report but a number of them remain unresolved, including:

➤ **RELOCATION**

PAPA land is not a good site for combustion-related industry from an air quality and public health point of view. This is especially true given the assertion, from the beginning, of Cantimber's intention to expand operations in phases.

PAPA land is not a good site for the high-risk environment of pyrolysis operations, including the hazards of producing, storing, and transporting activated charcoal powder.

The safest option and best use of funds to resolve Cantimber problems is to move the operation to a less populated area, such as the link mill site.

Past experience and future risk should lead prudent planners to request a relocation.

➤ **RISK**

From a public health point of view, it is risky to establish a potentially polluting industry within a neighbourhood that already has compromised air quality. Given the high 24-hour average ambient PM 2.5 levels, as reported by WSP, the precautionary principle is in order as is prioritizing pollution reduction and prevention, especially for this area.

➤ **NO ASSURANCE**

After a clear demonstration of public health concerns and dissatisfaction with Cantimber performance, PAPA and Golder proceeded with testing and reporting that neglected to address potential public health impacts. At no time have either one of them defined specific emission levels above which would trigger a shut-down of operations to assure public safety.

The current regulatory process is unsatisfactory.

➤ **DECISIONS**

At the public meeting both PAPA and city representatives expressed their disappointment with regard to Cantimber pollution problems and indicated that if they weren't 'fixed', the company would be shut down. Unfortunately, their decisions to proceed or not will now be based primarily on only one hour of stack emissions sampling during perfect operating conditions. This is a start, however, as with the 2015 Levelton modelling, the 2016 modelling may not be representative of actual emissions over time from a complex batch process operation.

For many, the larger question remains:

Who gets to make decisions regarding the future of Cantimber based on what priorities, information, and limits?

➤ **CLEAN AIR ACHIEVEMENTS**

Air quality improvements in the Alberni valley have been made slowly through a tremendous amount of work and public education. There is no desire to go backwards.

Cantimber emissions for PM 2.5, NO₂, and CO alone, indicate a serious conflict with the AQC mission statement, and with their first goal:

The Air Quality Council serves to promote health by working to ensure the cleanest possible air for the Alberni Basin and its inhabitants.

Their first goal is *“To seek the co-operation of all agencies and stakeholders in promoting and protecting clean air.”*

Cantimber emissions run counter to the continuous improvement model. They also compromise local climate change initiatives and commitments as emissions from pyrolysis are particularly damaging from a climate change point of view.

➤ **DEVELOPMENT AND OVERSIGHT**

Policy development is needed to address industrial activity on federal PAPA lands that remain outside the normal avenues and strictures of democratic process and environmental oversight.

➤ **WHERE IS FEDERAL PARTICIPATION?**

This is the largest problem that has been raised by the Cantimber experience. The apparent complete lack of presence, input, and oversight from Environment Canada and the federal government with regard to the Cantimber controversy is unacceptable. This is an opportune time for all relevant stakeholders to collectively request a commitment from the federal government to take responsibility for operations on their lands, especially when they have environmental and human health implications.

A moratorium should be placed on Cantimber operations and any further economic development projects on PAPA land until this gap is addressed.

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