Consultation Report

Atlantic Power Preferred Equity Ltd.
Williams Lake, BC Permit Amendment

Application File # 341684

Prepared by: Glenda Waddell, President Waddell Environmental Inc

UPDATED: May 4, 2016

Table of Contents

Consultation Report

Atlantic Power Preferred Equity Ltd.
Williams Lake, BC   Permit Amendment

The Amendment

1. Remove Silo Vent discharge
2. Raise limit on waste rail ties from 5% to 50% proportion of authorized fuel
3. Expand provision to burn non-hazardous waste
4. Remove requirement for the Continuous Emission Monitors to be subject to protocol designed for fossil fuel systems

Background

The Williams Lake Power Plant (WLPP), owned and operated by Atlantic Power Corporation has made an application to amend its Air Permit, PA 8808, issued by the BC Ministry of Environment (MoE) under the provisions of the BC Environmental Management Act (EMA).

The required changes have been deemed by the MoE, to constitute a significant Permit Amendment thereby invoking the Public Notification Regulation (under EMA).

This Consultation Report was generated to outline the communications program conducted by Atlantic Power and Glenda Waddell of Waddell Environmental Inc. on behalf of the WLPP.

Timeline

The following timeline is provided to convey the critical history of the WLPP Air Permit and of the current consultation process:

- Feb 20, 1991 – Permit 8808 was issued.
- 1993 - WLPP commenced operations consuming up to 600,000 tonnes of wood waste, primarily from area sawmills
- Dec 1992 to Dec 1996 - all beehive burners phased out.
- 2001 – Study compares emissions and ash from 100% rail way ties (RRT) versus untreated wood fuel.
- Jan 17, 2003 – Air Permit amendment allows for burning of wood residue treated with creosote or pentachlorophenol (PCP) with no restriction on percent of fuel feed.
- 2004 to 2010 – WLPP utilized 3% to 4% RRT in its biomass fuel; discontinued due to concerns about chipping RRT in the downtown.
- Nov 20, 2012 – Air Permit amendment allows burning of wood residue treated with creosote and/or a creosote-PCP blend up to 5% of the total biomass fuel supply.
- Jul 8, 2015 - meeting with MoE in Williams Lake to initiate the amendment application.
- Jul 10, 2015 - application submitted to Victoria EPD Permit Administration.
- Oct 16, 2015 – final step in public notification requirements completed and 30 day comment period begins.
- Nov 15, 2015 - completion of 30 day consultation period.
- February 21, 2016 - issue and delivery of this draft Consultation Report to Ministry of Environment at 1011 Fourth Avenue in Prince George to attention Peter Lawrie, Senior Environmental Protection Officer.
- May 4, 2016 – issue and delivery of this updated Consultation Report to Ministry of Environment at 1011 Fourth Avenue in Prince George to attention Peter Lawrie, Senior Environmental Protection Officer.

Permit Amendment Application

This Amendment is required primarily to allow for the use of waste railway ties up to a limit of 50% of the feed to the energy system.

Copies of the Amendment application and the Environmental Protection Notice are included here for reference:

Williams Lake Power Plant

Owned and operated by:
AtlanticPower Corporation

July 10, 2015

Victoria Permit Administration
Business Services Branch
Environmental Protection Division
Ministry of Environment
PO BOX 9377 Stn Prov Govt
Victoria BC V8W 9M1

PermitAdministration.VictoriaEPD@gov.bc.ca

Re: Application to Amend Atlantic Power Preferred Equity Ltd. Permit 8808

This letter, and the accompanying Environmental Protection Notice, are to request an amendment to the Atlantic Power Preferred Equity Ltd. Permit 8808. This Permit was last amended on November 20, 2012.

This application requests that limitations on alternate biomass fuels are amended. These, and other changes, are outlined in detail in the attached Application.

Thanks to Matthew Lamb-Yorski for your assistance with this amendment.

Sincerely,

for:

Mark Blezard, Plant Manager
Williams Lake Power Plant

Attachment: Application to Amend Air Permit 8808

Cc: Matthew Lamb-Yorski, Environmental Protection Officer

Bag Service 1000
Williams Lake, BC V2G 4R7

T 250 392 6394
F 250 392 6395

www.atlanticpower.com

Application to Amend Atlantic Power Williams Lake Air Permit 8808 Atlantic Power Preferred Equity Ltd. 4455 Mackenzie Avenue North Williams Lake, BC V2G 4R7		
Section	***Before***	***Proposed***
1.3	This section applies to the discharge of air contaminants from an ASH SILO VENT.	Delete
2.7	***Authorized Fuel***	
	The Authorized fuel is untreated wood residue unless authorized below or the approval of the Director is obtained and confirmed in writing.	The Authorized fuel is untreated wood residue unless authorized below or the approval of the Director is obtained and confirmed in writing. All fuels will be stored in on-site collection areas.
2.7.1	The incineration of wood residue treated with creosote and/or a creosote-pentachlorophenol blended preservative (treated wood) is authorized subject to the following conditions:	No change
	The treated wood component shall not exceed 5% of the total biomass fuel supply calculated on an annual basis;	The treated wood component shall not exceed 50% of the total biomass fuel supply on an annual basis;
	The treated wood waste shall be well mixed with untreated wood waste prior to incineration;	No change
	The incineration of wood residue treated with metal derived preservatives is prohibited;	No change
	The Permittee shall measure and record the weight of treated wood residue received. The source of treated wood shall be recorded.	No change
	The Permittee may request authorization to increase the proportion of treated wood residue incinerated by submitting a request in writing to the Director.	Delete

2.7.2	The incineration of hydrocarbon contaminated wood residues originating from accidental spills is authorized provided that written approval in accordance with section 52 of the Hazardous Waste Regulation has been received by the responsible party for disposal of the waste by incineration. The Permittee shall maintain a record of the quantity, date received, and identity of the responsible party of hydrocarbon contaminated wood residues originating from accidental spills.	The acceptance and incineration of hydrocarbon contaminated absorbent materials originating from accidental spills is authorized by the Director in accordance with section 52 of the Hazardous Waste Regulation up to a limited quantity of 872 L per day. The free liquid content of the spill material must meet the waste oil provisions of the Hazardous Waste Regulations and material must be handled and stored so as to not cause pollution. For amounts in excess of 872 L per day the Director's authorization is required. The Permittee shall maintain a record of the quantity, date received, and identity of the responsible party of hydrocarbon contaminated absorbent materials originating from accidental spills.
2.7.3	Vegetative residues (i.e. green foliage, invasive weeds, diseased plants, etc.), seedling boxes, and paper records are authorized as fuel provided such materials constitute less than 1% of the daily feed into the boiler. Non-biomass contaminants (e.g. plastic, glass metal) shall not exceed 1% of the daily feed into the boiler.	Non-hazardous biomass wastes originating within the Cariboo Regional District including vegetative residues (i.e. green foliage, invasive weeds, diseased plants, etc.), clean construction and demolition waste, seedling boxes, and paper records are authorized as fuel. Non-biomass contaminants (e.g. plastic, glass metal) shall not exceed 1% of the daily feed into the boiler.
3.2	***Operating Conditions***	
	"The Permittee shall sample the emissions from the boiler in section 1.1 under normal operating conditions. The Permittee shall record the operating conditions of the boiler in terms of steam load (lb/hr) for the sampling period and for the ninety day period prior to the sampling event."	"The Permittee shall sample the emissions from the boiler in section 1.1 under normal operating conditions. The Permittee shall record the operating conditions of the boiler in terms of steam load (lb/hr) for the sampling period and for the ninety operating days prior to the sampling event."
3.3	***Sampling Procedures***	
	"The continuous emission monitors shall be maintained and audited in accordance with Environment Canada's EPS 1/PG/7 Protocols and Performance Specifications for Continuous Monitoring of Emissions from Thermal Power Generation."	Delete These protocols are intended for fossil fuel burning systems. The continuous emission monitors are subject to Ministry of Environment audits and are also verified by regulatory stack testing.

Application No.341684

ENVIRONMENTAL PROTECTION NOTICE

Application for a ***Permit amendment*** under the Provisions of the *Environmental Management Act*

We/I, ***Mark Blezard, Atlantic Power Preferred Equity Ltd., 4455 Mackenzie Avenue North, Williams Lake, BC, V2G 4E8,*** intend to submit this amendment application to the Director to amend ***Permit 8808***, issued ***February 20, 1991 and last amended November 20, 2012*** which authorizes the ***discharge of air contaminants,*** from an ***electrical power generating plant.***

The land upon which the facility is situated ***and the discharge occurs*** is ***Lot B of District Lot 72, Cariboo District Plan PGP35292 (Parcel Identifier: 017-247-276)*** located at ***4455 Mackenzie Avenue North, Williams Lake, BC, V2G 4R7, within the Williams Lake airshed.***

The amendment requests that the following conditions be changed as outlined below:

1. Remove the section allowing discharges from the ash silo vent. This system is now fully enclosed.
2. Raise the limit on waste rail ties as a proportion of the authorized fuel from the current 5% to 50%
3. Expand the provision to burn non-hazardous woodwaste.
4. Remove the requirement that continuous emission monitors be maintained and audited in accordance with EPS 1/PG/7 as these protocols were designed for fossil fuel burning systems.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant, with a copy to the Director, Environmental Protection at 400 - 640 Borland Street, Williams Lake, BC, V2G 2T1 or via email to the Director, Environmental Protection authorizations.north@gov.bc.ca and referencing the applicant name, the location, and the authorization number PA-8808 in the subject line. The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Dated this 8th day of October, 2015.

(Signature)

Contact person Glenda Waddell

Email waddellenvironmental@gmail.com

Phone: 1-250-640-8088

Consultation

Letters of Referral

Letters of referral included the following:

- Cover letter
- Application to amend Permit
- Environmental Protection Notice
- Atlantic Power Williams Lake Renewal Project Fact Sheet.

All letters were sent via Canada Post Registered Mail on October 9, 2015 or hand-delivered by October 13, 2015.

Following is an example of this information package.

Copies of all subsequent communications are included in Appendix A.

A consolidated set of questions from those communications, and the corresponding answers are included in Appendix C.

Sample Information Package

9 pages total

Williams Lake Power Plant

Owned and operated by:

AtlanticPower Corporation

October 8, 2015

Cariboo Chilcotin Conservation Society
Unit 102, 197 2nd Avenue North
Williams Lake, BC
V2G 1Z5

Re: Application Pursuant to the Environmental Management Act on behalf of Atlantic Power Preferred Equity Limited

We enclose, for your information, a copy of the above referenced application for a Permit amendment under the provisions of the Environmental Management Act.

This amendment is required to allow Atlantic Power to supplement diminished sawmill residuals with a higher component of used rail ties. RWDI Air Inc. was hired to conduct a dispersion modelling study. The study design has benefited from input by the BC Ministry of Environment. The following items are made available at the Williams Lake Library:

- RWDI Dispersion Modeling Report
- Atlantic Power Williams Lake Renewal Project Fact Sheet
- Atlantic Power Preferred Equity Ltd. Current Permit 8808
- Amendment application for Permit 8808
- Environmental Protection Notice

In addition, all of the above items will be made available upon request (see page 2).

We are happy to answer any questions you may have. If you wish to comment or make recommendations with respect to this application, you are requested to do so within 30 days of the date of this letter. Please refer to the attached Environmental Protection Notice for instructions..

Our contact for this application is:
Glenda Waddell, Waddell Environmental Inc.
waddellenvironmental@gmail.com
250-640-8088

Yours truly,

Mark Blezard, P. Eng.
Plant Manager
Williams Lake Power Plant

Attachment: Application to Amend Air Permit 8808
Environmental Protection Notice

Cc: Matthew Lamb-Yorski, Environmental Protection Officer

Williams Lake Power Plant

Owned and operated by:

AtlanticPower Corporation

July 10, 2015

Victoria Permit Administration
Business Services Branch
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Ministry of Environment
PO BOX 9377 Stn Prov Govt
Victoria BC V8W 9M1

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Williams Lake, BC V2G 4R7
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Dated this 8th day of October, 2015.

(Signature)

Contact person Glenda Waddell

Email waddellenvironmental@gmail.com

Phone: 1-250-640-8088

AtlanticPower
Corporation

FACT SHEET

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

WHAT IS ATLANTIC POWER WILLIAMS LAKE?

Atlantic Power owns and operates the Williams Lake Power Plant, a 66 Megawatt biomass-fuelled electricity generation station. The plant has been operating since 1993. The Williams Lake Power Plant was developed in part to solve the significant air quality problems the City of Williams Lake was experiencing. A number of beehive burners operating in the valley were creating particulate emissions as a result of burning wood waste from local mills. When the power plant began operations, the region saw an almost immediate improvement in particulate emissions estimated at approximately 90% reduction. The plant consumes up to approximately 600,000 tonnes of biomass annually, primarily consisting of wood residues from local sawmills. It supplies power to BC Hydro under a long-term electricity purchase agreement (EPA). The amount of power which can be produced by the plant is enough to provide the electricity needs of 52,000 homes in British Columbia. The plant has 32 full-time employees, earning above average salaries. Atlantic Power is the single largest taxpayer in the City of Williams Lake at $1.3 million dollars in taxes annually. Atlantic Power also spends eight times that amount in the region through the purchase of goods and services.

THE ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

The current EPA with BC Hydro expires in 2018 with an option for renewal. Atlantic Power and BC Hydro are in discussions to extend the EPA for an additional ten years. Atlantic Power is considering the possibility of including shredded rail ties in the fibre it consumes in its Williams Lake Power Plant, in order to supplement the diminishing local fibre supply and to make the commitments necessary to be able to enter into a contract extension with BC Hydro. Other alternative fuels, such as roadside logging debris and other untreated waste wood, are also being considered.

WHY RAIL TIES?

Fibre constraints: The recent announcement by the provincial government of a reduction in the maximum timber harvest (Allowable Annual Cut), the ongoing impacts of the Mountain Pine Beetle infestation, and increasing competition for biomass fibre all diminishes the long-term availability of sawmill and forest residues for use by Atlantic Power. While traditional fibre sources are diminishing, the continued operation of the Williams Lake Power Plant is essential to the long term viability of the remaining sawmills by economically disposing of residues.

Economic stability: Not only will a diversified fuel supply secure a stable source of electricity for the BC Hydro grid, it will also guarantee long-term jobs and economic stability for our employees and the local economy.

Environmental benefits: The significant improvements in air quality as a result of the Williams Lake Power Plant's operations will continue to be enjoyed in the valley as a result of the clean-burning operations of the plant. The addition of rail ties to the fibre mix will not result in increased health or environmental risks to the employees or the


Williams Lake Power Plant

ATLANTICPOWER.COM/WILLIAMS-LAKE

citizens of Williams Lake and surrounding areas. In fact, the burning of rail ties will contribute additional environmental benefits by reducing the number of rail ties that accumulate along the rail tracks in Western Canada or find their way into landfills, which currently contributes to greenhouse gas emissions.

WHAT IS ATLANTIC POWER WILLIAMS LAKE PROPOSING?

Atlantic Power currently operates under an environmental permit that allows the burning of up to 5% rail ties. The Williams Lake Power Plant did burn an average of between 3% and 4% rail ties between 2004 and 2010. However, the plant has not burned any rail ties since 2010. We are considering making an application to increase the volume of rail ties we are allowed to burn under our environmental permit. We anticipate burning 15-25% rail ties on an average annual basis but if needed, the plant may need to burn a 50/50 mix of rail ties and traditional wood fibre on a periodic basis.

We are confident the mixture of rail ties with traditional fibre will not create adverse health, safety or environmental impacts in the community. The Williams Lake Power Plant did a test burn in 2001 using 100% rail ties. The results showed most pollutants were either destroyed at the high burn temperature in the boilers or removed using the plant's environmental controls and were well within provincial standards. We are in the process of further modeling the impacts of burning rail ties on the Williams Lake area air quality, the results of which will be shared with the Ministry of Environment and the public. Shredding of the rail ties will be tightly controlled to eliminate concerns from prior chipping operations. Storage of shredded ties will be minimized and stored in small volumes in order to avoid any possible issues.

NEXT STEPS

- The Atlantic Power Williams Lake Renewal Project is a key component of our long-term sustainability and the support of First Nations and the community is important to us.
- We want to ensure we consider our options in a respectful and transparent manner with all our partners such as neighbouring First Nations, the City of Williams Lake, the Cariboo Regional District and the members of the community. We are just in the beginning stages of what will be a full and open public consultation process.
- We will meet regularly with First Nations, local government and community leaders to further discuss our plans before we initiate our permit application process. We will host a public open house in June.
- Based on the feedback we receive, we will refine our project plan and expect to submit an application for an amendment to our Environmental Permit.
- We will continue to engage First Nations, local government and community stakeholders throughout the process, including entering into the required 30-day public consultation process, mandated by the Ministry of Environment. That process would likely take place during the Fall.

FACT BOX

- Williams Lake Power Plant commenced commercial operations in 1993
- Employs 32 people
- Contributes $1.3 million in taxes to Williams Lake
- Produces 66 MW of power, enough to meet electricity needs of approximately 52,000 homes
- Can consume up to 600,000 tonnes of wood waste, primarily from area sawmills
- Reduced particulate emissions from beehive burners by over 90%
- BC Hydro energy purchase agreement ends in 2018
- Atlantic Power is seeking a 10-year extension to the EPA
- Over one million rail ties are replaced in Western Canada each year
- Atlantic Power Williams Lake can consume all rail ties safely and efficiently

Williams Lake Power Plant

ATLANTICPOWER.COM/WILLIAMS-LAKE

Canada Post Tracking

(RN tracking numbers are identified in the following Consultation Outline)

CANADA POST POSTES CANADA

Managing Mail Sending Business Solutions Tools Shop Support

RN117069141CA	2015/10/29 / 09:10	Item has been returned and is enroute to the Sender	Lettermail
RN117068835CA	2015/10/19 / 14:38	Item successfully delivered	Lettermail
RN117069610CA	2015/10/13 / 13:18	Item successfully delivered	Lettermail
RN117068818CA	2015/10/13 / 13:11	Item successfully delivered	Lettermail
RN117069107CA	2015/10/13 / 12:43	Item successfully delivered	Lettermail
RN117069654CA	2015/10/13 / 12:25	Item successfully delivered	Lettermail
RN117068906CA	2015/10/13 / 11:59	Item successfully delivered	Lettermail
RN117068866CA	2015/10/13 / 11:36	Item successfully delivered	Lettermail
RN117068852CA	2015/10/13 / 10:41	Item successfully delivered	Lettermail
RN117068897CA	2015/10/13 / 10:39	Item successfully delivered	Lettermail
RN117068821CA	2015/10/09 / 19:50	Item in transit	Lettermail
RN117068849CA	2015/10/09 / 19:32	Item in transit	Lettermail

Consultation Outline

Atlantic Power Air Permit Amendment – Permit 8088			
Outline of Items Pertaining to Public Notification Regulation B.C. Reg. 202/94			
Item	**Address**	**Contact Info**	**Date of Publication, Mailing or Direct Communications**
Environmental Protection Notice published in BC Gazette 1	963 Superior St, PO Box 9452 Stn Prov Govt, Victoria, BC, V8W 9V7	1-800-663-6105	October 15, 2015 *All items pertaining to Public Notification Regulation are now complete.*
Environmental Protection Notice published in Williams Lake Tribune	188 North First Ave, Williams Lake, BC, V2G 1Y8	250-392-2331	October 14, 2015
Sign posted at Atlantic Power Entrance with copy Environmental Protection Notice			October 6, 2015
Environmental Protection Notice, RWDI Dispersion Modeling Report, current PA-8808, Permit Amendment application, Atlantic Power Williams Lake Renewal Project Fact sheet provided to the Williams Lake Library	180 3 Ave N, Williams Lake, BC V2G 2A4	250-392-3630	October 13, 2015
Draft Consultation Report and Draft Technical Assessment Report provided to the Williams Lake Library	180 3 Ave N, Williams Lake, BC V2G 2A4	250-392-3630	March 8, 2016
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	Mueller Electric Ltd. 4495 Cattle Dr, Williams Lake, BC V2G 5E8	250-398-8875	Hand-delivered Oct 13, 2015
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	Allteck Line Contractors Inc. 4575 Cattle Dr, Williams Lake, BC V2G 5E8	250-392-4102	Hand-delivered Oct 13, 2015
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	Animal Care Hospital of Williams Lake 4615 Cattle Dr, Williams Lake, BC V2G 5E8	250-392-5510	Hand-delivered Oct 13, 2015
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	Eldorado Log Hauling Ltd. and Newco Logging Ltd. 605 Marwick Dr, Williams Lake, BC V2G 2P3	250-392-4966	Hand-delivered Oct 13, 2015
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	Cattlemen's Choice Café 4665 Cattle Dr, Williams Lake, BC V2G 5E8	250-392-4400	Hand-delivered Oct 13, 2015
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	Total Ice Training Centre Ltd. 4535 Cattle Dr, Williams Lake, BC V2G 5E8	250-392-1819	Hand-delivered Oct 13, 2015
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	Tolko Industries Ltd. - Soda Creek Sawmill 925 2 Ave N, Williams Lake, BC V2G 4P7	250-305-3600	Hand-delivered Oct 13, 2015
Information packages hand delivered to neighbors: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet.	West Fraser - Williams Lake Plywood 4200 North MacKenzie Ave, Williams Lake, BC V2G 2V5	250-392-7731	Hand-delivered Oct 13, 2015

Registered Mail to Stakeholders: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet	City of Williams Lake 450 Mart St, Williams Lake, BC V2G 1N3	250-392-2311	Mailed Oct 9, 2015 RN117069107CA Delivered Oct 13, 2015
Registered Mail to Stakeholders: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet	Cariboo Regional District, Suite D, 180 North 3rd Ave, Williams Lake, BC V2G 2A4	250-392-3351	Mailed Oct 9, 2015 RN117068897CA Delivered Oct 13, 2015
Registered Mail to Stakeholders: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet	Interior Health Greg Baytalan, B.Sc., C.P.H.I.(C) Specialist Environmental Draft Consultation Report and Draft Technical Assessment Report provided	250-868-7853 Greg.baytalan@interiorhealth.ca	Mailed Oct 9, 2015 RN117068906CA Delivered Oct 13, 2015 Draft TAR forwarded in March 2016
Registered Mail to Stakeholders: - Cover letter - Letter requesting amendment with "before" and "after" table of Permit conditions - Environmental Protection Notice - Atlantic Power Renewal Project Fact Sheet	Cariboo Chilcotin Conservation Society Unit 102, 197 2nd Ave North Williams Lake, B.C.	250-398-7929 ccentre@ccconserv.org	Mailed Oct 9, 2015 RN117068852CA Delivered Oct 13, 2015

First Nations Bands

Boundary Name	Contact Type	Contact Title	Contact Organization	Contact Address	Contact Phone #	Contact Fax & Email	Mailed
Neskonlith Indian Band	PRIMARY	Chief and Council	**Neskonlith Indian Band**	PO Box 1096 Chase BC, V0E 1M0	250-679-3295	250-679-5306 referrals@skatsin.com	Mailed Oct 9, 2015 RN117068866CA Delivered Oct 13, 2015 In addition, the Neskonlith Office Administrator was contacted by phone and email on Aug 20, 2015 with a request for a meeting; a follow-up email on Sep 30, 2015 renewed the offer to meet and share information; on Oct 14, 2015 and Oct 16, 2015 the Referrals Coordinator andthe Interim Natural Resources Coordinator (NRC) were emailed to extend the offer to meet; on Oct 19, 2015 the Interim NRC was contacted by phone and invited to meet to discuss the project. There has been no correspondence since that day.
Tsilhqot'in - Engagement Zone A	PRIMARY	Chief and Council	**Tsilhqot'in National Government**	253 Fourth Ave North Williams Lake, BC	(250) 392-3918	(250) 398-5798 tng-director@wlake.com	Mailed Oct 9, 2015 RN117068818CA Delivered Oct 13, 2015
Tsilhqot'in Nation	CC	Chief and Council	**Toosey Indian Band**	PO Box 80 Riske Creek, BC V0L 1T0	250-659-5655		Mailed Oct 9, 2015 RN117069141CA Oct 13, 2015 attempted delivery, left card for Oct 19, 2015 final notice, will return to sender if not Oct 25, 2015 GW call 250-659-5655 and 1-877-338-2288 and left messages to call back Oct 29, 2015 return to sender Oct 31, 2015 GW call 250-659-5655 left message with Councilor Violet Tipple to call back Nov 2, 2015 called Georgina Johnny, Councilor and emailed info to her for distribution to Chief & Council In addition, an email introduction and request for a meeting was sent to the Toosey Office Manager on August 31, 2015; a follow-up email was sent on Sept 30, 2015; a meeting planned with Chief and Council for October 22, 2015 was cancelled that morning due to unforseen challenges with the Band. There has been no response to date to an offer to reschedule the meeting.
Williams Lake Indian Band	PRIMARY	Chief and Council	**Williams Lake Indian Band**	2672 Indian Drive, Williams Lake, BC	250-296-3507		Mailed Oct 9, 2015 RN117069610CA Delivered Oct 13, 2015 Draft Consultation Report and Draft Technical Assessment Report delivered (in electronic format) on March 14, 2016.
Xatsull First Nation		Chief and Council	**Soda Creek Indian Band**	3405 Mountain House Rd, Williams Lake, BC	250-989-2323		Mailed Oct 9, 2015 RN117069654CA Delivered Oct 13, 2015
Stswecem'c Xgat'tem		Chief and Council	**Canoe Creek Indian Band**	Dog Creek, BC V0L 1J0	250-440-5645		Mailed Oct 9, 2015 RN117068849CA Oct 23, 2015 T Shannon provided verbal update and copy RWDI Report Oct 25, 2015 GW call left msg Oct 31, 2015 GW call left msg Oct 31, 2015 Shows "Item in Transit" Ticket ctd Oct 29, 2015 received
		Chief and Council	**Canim Lake Band**	BOX 1030 100 Mile House, BC	250-397-2227		Mailed Oct 9, 2015 RN117068835CA Delivered Oct 19, 2015
		Chief and Council	**Esk'etemc**	Box 157 Alkali Lake, BC V0L 1B0	250-440-5611		Mailed Oct 9, 2015 RN117068821CA Oct 25, 2015 msg at 2504405611, emailed Oct 31, 2015 Shows "Item in Transit" Ticket created Oct 31, 2015 GW call message for Robin Robbins Nov 2, 2015 call confirmed receipt on Oct 13, 2015

Posting at Atlantic Power, Williams Lake

Billboards, as specified in Schedule B of the BC Public Notification Regulation, were posted at the entrance to the Atlantic Power site on October 6, 2015 and remained in place for the duration of the public comment period. The photographs presented here were taken on the day of posting.

EPN at Entrance to Atlantic Power, Williams Lake

Publications

The Environmental Protection Notice was published, as specified in Section 6 of the BC Public Notification Regulation, in the Williams Lake Tribune Newspaper on October 14, 2015 and in the BC Gazette Part 1 on October 15, 2015. Copies from the electronic editions are displayed here for reference. Original newspaper clipping and Gazette publication can be supplied upon request. waddellenvironmental@gmail.com

Williams Lake Tribune – October 14, 2015

Legal Notices **Legal Notices** **Legal Notices**

ENVIRONMENTAL PROTECTION NOTICE

Application for a ***Permit amendment*** under the Provisions of the Environmental Management Act.
We/I, ***Mark Blezard, Atlantic Power Preferred Equity Ltd., 4455 Mackenzie Avenue North, Williams Lake, BC, V2G 5E8***, intend to submit this amendment application to the Director to amend ***Permit 8808***, issued ***February 20, 1991 and last amended November 20, 2012*** which authorizes the ***discharge of air contaminants***, from an ***electrical power generating plant.***

The land upon which the facility is situated ***and the discharge occurs*** is ***Lot B of District Lot 72, Cariboo District Plan PGP35292 (Parcel Identifier: 017-247-276)*** located at ***4455 Mackenzie Avenue North, Williams Lake, BC, V2G 4R7, within the Williams Lake airshed.***

The amendment requests that the following conditions be changed as outlined below:

1. Remove the section allowing discharges from the ash silo vent. This system is now fully enclosed.
2. Raise the limit on waste rail ties as a proportion of the authorized fuel from the current 5% to 50%.
3. Expand the provision to burn non-hazardous wood waste.
4. Remove the requirement that continuous emission monitors be maintained and audited in accordance with EPS 1/PG/7 as these protocols were designed for fossil fuel burning systems.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant, with a copy to the Director, Environmental Protection at 400-640 Borland Street, Williams Lake, BC, V2G 2T1 or via email to the Director, Environmental Protection *authorizations.north@gov.bc.ca* and referencing the applicant name, the location, and the authorization number PA-8808 in the subject line. The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Dated this 8th day of October, 2015.
Contact person Glenda Waddell
email: waddellenvironmental@gmail.com
Phone: 1-250-640-8088

A26 www.wltribune.com

Wednesday, October 14, 2015 Williams Lake Tribune

Transportation — Recreational/Sale

1995 Ft Explorer camper. Roomy, N/S queen bed, 3burner stove with oven, over-size fridge freezer, bath/shower combo, new stereo. Excellent condition. Asking 5500.00. Phone 250 989 14

Travel trailer
1 bdrm. (Back up to the lake & enjoy dinner, watching/listening to the loons. Dining area converts to a 2nd bed). Bright large windows. Pulled easily with small Mazda truck.
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7 passenger, a/c, factory dvd, p/s, fully loaded, leather, remote start, 4.2 L auto.
Reduced! $2800 obo.
Mike or Sheila
250-398-7589 or
250-305-4709.

Transportation — Trucks & Vans

2005 GMC 2500 SLT
4 Door, L-Box,
New Tranny,
New T-Case.
$4500. obo
(250)267-6697

Exercise
Your Brain.

Transportation — Trucks - Logging

1997 Freightliner
FL 170 with sleeper-cab, aluminum flat deck with tool boxes and sides and 5th wheel hitch, air brakes, exhaust brake, 8.5 L Cummins diesel, good rubber.
$28,900 OBO
250-296-3318

RECYCLE

Transportation — Boats

12' Aluminum boat and U-built trailer combo, New electric motor and deep cycle marine battery, 2 seats, 2 rod holders, 2 oars.
$1500. Firm
(778)412-6888

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11th Annual Seniors Village Garage Sale
Saturday, October 17th
9:00 am to 1:00 pm
1455 Western Avenue
(back courtyard)
Hot dogs & pop available.
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Elks Hall
October 31st
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Dated this 8th day of October, 2015.
Contact person Glenda Waddell
email: waddellenvironmental@gmail.com
Phone: 1-250-640-8088

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Volume CLV, No. 41
October 15, 2015

The British Columbia Gazette
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Application No. 341684

Dated this 8th day of October, 2015. Contact person, Glenda Waddell, Email waddellenvironmental@gmail.com Phone: 1-250-640-8088 [oc15]

BRITISH
COLUMBIA

The British Columbia Gazette

PUBLISHED BY AUTHORITY

Vol. CLV VICTORIA, OCTOBER 15, 2015 **No. 41**

MINISTRY OF ENVIRONMENT

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Dated this 8th day of October, 2015. Contact person, Glenda Waddell, Email waddellenvironmental@gmail.com Phone: 1-250-640-8088 [oc15]

MINISTRY OF JUSTICE

NOTICE TO CREDITORS AND OTHERS

Notice is hereby given that creditors and others having claims against the following estates:

Frederick Lefevre Baker (also known as Fred Baker), deceased, formerly of No. 101 - 1625 West 13th Avenue, Vancouver, BC, are required to send full particulars of such claims to the undersigned executors, c/o Cameron & Company, Barristers & Solicitors, 304 - 2695 Granville Street, Vancouver, BC V6H 3H4, on or before the 17th day of November 2015, after which date the estate's assets will be distributed, having regard only to the claims that have been received. — Diane Susan Baker and Richard Lefevre Baker, *Executors*. Cameron & Company, *Solicitors*. [oc15]

Kenneth Wayne Barrass, deceased, formerly of 10 - 1855 Willemar Avenue, Courtenay, BC, are required to send full particulars of such claims to the undersigned executor, c/o 201 - 467 Cumberland Road, Courtenay, BC V9N 2C5, on or before the 16th day of November 2015, after which date the estate's assets will be distributed, having regard only to the claims that have been received. — Stephen Douglas Veitch, *Executor*. David A. McVea, *Solicitor*. [oc15]

Gustave Albert Baudais, deceased, formerly of 400 Stewart Street, Comox, BC, are required to send full particulars of such claims to the executor, c/o Holland Cameron, Solicitors for the Estate, 1779 Comox Avenue, Comox, BC V9M 3L9, on or before the 29th day of November 2015, after which date the estate's assets will be distributed, having regard only to the claims that have been received. — Gordon Brent Baudais, *Executor*. Holland Cameron, *Solicitors*. [oc15]

Shirley Elaine Bath, deceased, formerly of 406 - 145 Keith Road West, North Vancouver, BC, are required to send full particulars of such claims to the undersigned executor at 13 - 2118 Eastern Avenue, North Vancouver, BC V7L 3G3, on or before the 21st day of November 2015, after which date the estate's assets will be distributed, having regard only to the claims that have been received. — Valerie Louise Benton, *Executor*. [oc15]

John Allan Brookes, deceased, formerly of 985 Malaspina Crescent, Nanaimo, BC, are required to send full particulars of such claims to the undersigned executor at 1980 Estevan Road, Nanaimo, BC V9S 3Z2, on or before the 16th day of November 2015, after which date the estate's assets will be distributed, having regard only to the claims that have been received. — Jai Anthony Brookes, *Executor*. [oc15]

Douglas Allan Burnett, deceased, formerly of 3671 Piercy Road, Courtenay, BC, are required to send full particulars of such claims to the undersigned executor, c/o Catherine L. Miller, Allen & Company, 480 - 10th Street, Courtenay, BC V9N 1P6, on or before the 22nd day of November 2015, after which date the estate's assets will be distributed, having regard only to the claims that have been received. — Kelly Wayne Vossler, *Executor*. Catherine L. Miller, *Solicitor*. [oc15]

Sonja Kay Clark, deceased, formerly of 102 - 326 West 3rd Street, North Vancouver, BC, are required to send full particulars of such claims to the undersigned executor at 102 - 326 West 3rd Street, North Vancouver, BC V7M 1G4, on or before the 16th day of November 2015, after which date the estate's assets will be distributed, having regard only to the claims that have been received. — William R. Clark, *Executor*. [oc15]

Voluntary Consultation

A number of stakeholders toured the WLPP and met with Atlantic Power staff. Among them were Rhonda Leech, WLIB – Lands & Resources Officer, Steve O'Hara of the Gibraltar Mine, Monika Lamb-Yorski of the WL Tribune, Greg Baytalan, Interior Health and Peter Lawrie, Brady Nelless, Jack Green and Dan Bings of the Ministry of Environment.

An extensive, voluntary communications program was carried out from May 2015 to the date of this report. An outline of this program can be found at Appendix F.

Summary

The feedback on this consultation process has been a blend between those that support our application to allow for up to 50% RRT in our biomass fuel and those who are opposed.

Conversations with responders are included in Appendix A. Questions have been screened from the inputs and catalogued to allow responders to identify the answers to their specific questions (see Appendix C). We have endeavored to answer every question with sound, science-based information.

The staff at WLPP would like to thank the Ministry of Environment for their guidance through this process and the residents and local authorities of Williams Lake for their thoughtful and informed inputs. We appreciate the time taken to write letters and participate in public meetings and plant tours.

This report was prepared by Glenda Waddell, President of Waddell Environmental Inc. and is submitted to the Ministry of Environment by:

Mark Blezard, P. Eng.
Plant Manager
Williams Lake Power Plant

APPENDIX A

Stakeholder Feedback

Contents

Stakeholder Feedback

1) Cariboo Chilcotin Conservation Society

On Wed, Oct 14, 2015 at 10:53 AM, Conservation Society <ccentre@ccconserv.org> wrote:
Hello Glenda
We received the letter/permit 8808 amendment and Fact Sheet yesterday. I have scanned this and sent it off to our Board for input. In the 'wish to comment' info it gives the option of emailing the Director, Environment Protection and referencing, did you also require this cc'd to you as well?
Also, one of our Directors was wondering where more emissions reports might be found, and thought a lack of information available here (that we have seen) on the potential chemistry. Direction to this information, possibly on-line or in a pdf, would be valuable in our making more informed inquires and comments.
all the best
--
Marg Evans
Education Coordinator/
Executive Director
Cariboo Chilcotin Conservation Society
250.398.7929
www.ccconserv.org

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Thu, Oct 15, 2015 at 11:18 AM
Subject: Atlantic Power, Williams Lake BC, PA-8808
To: Conservation Society <ccentre@ccconserv.org>, authorizations.north@gov.bc.ca
Hello Marg,

Thanks for your interest in this project.
Could you email me all comments and cc the Director? I'll be including these in our final Consultation Report which is then submitted to the Ministry of Environment.
The RWDI Dispersion Modelling Study provides a complete outline of work to evaluate emissions. In short, Atlantic Power conducted a trial burn where the feed to the energy system was replaced with 100% railway tie material. This is a conservative approach in that this application is requesting a maximum of 50% railway tie material combined with the standard wood residue. Emission results from that trial were input to a dispersion model to project impacts on the surrounding area.
The RWDI Report has been made available at the Williams Lake Library. The .pdf file is just over 4MB. Please let me know if you would like a copy sent via email.

Glenda Waddell | Waddell Environmental Inc.
Prince George, BC, Canada
Phone: +1 250 640 8088

On Mon, Oct 19, 2015 at 8:22 AM, Conservation Society <ccentre@ccconserv.org> wrote:
Hi Glenda, Thank you for your quick response, and yes, please send the RWDI Report, we should be able to manage 4MB.
Thanks, Marg

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Mon, Oct 19, 2015 at 11:24 AM
Subject: Re: Atlantic Power, Williams Lake BC, PA-8808
To: Conservation Society <ccentre@ccconserv.org>, authorizations.north@gov.bc.ca
Hello Marg,
The final RWDI Dispersion Modelling Study Report is attached.

From: **Conservation Society** <ccentre@ccconserv.org>
Date: Mon, Oct 19, 2015 at 9:57 AM
Subject: Re: Atlantic Power, Williams Lake BC, PA-8808
To: Glenda Waddell <waddellenvironmental@gmail.com>
Hi again Glenda, in the interim of preparing our input, it was requested by our Board that Atlantic Power do a bit more outreach to the general public so they know about the permit condition and time frame for input. Thanks, Marg

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Tue, Oct 20, 2015 at 10:22 AM
Subject: Fwd: Atlantic Power, Williams Lake BC, PA-8808
To: Conservation Society <ccentre@ccconserv.org>, authorizations.north@gov.bc.ca
Good morning Marg,

Thanks again for the input. I'm sending two files that outline the communications to date. The "APWL Public Engagement Outline" shows meetings, presentations and an open house that were conducted as part of the voluntary outreach by the folks at Atlantic Power. The "AP Air Permit Amendment Public Notification Outline" shows the series of regulatory notices required to complete the permit amendment.

Attempts were made to schedule meetings with the Field Naturalist group and the Cariboo Chilcotin Conservation Society and we would still be interested in getting together with both groups.
In addition, media coverage to date (does not include radio):
June 4 – 'Railway ties eyed for fueling Atlantic Power Corporation' – newspaper article in the WL Tribune
June 18 – 'Public airs views on railway ties' – newspaper article in the WL Tribune
· June 25 – 'Column: Good idea, wrong location to burn railroad ties' – guest column in the WL Tribune
· July 08 – 'Burning railroad ties should be rejected' – Letter to the Editor in the WL Tribune
· July 14 – 'Letter: Power plant provides needed solution' – Letter to the Editor – WL Tribune
· August 4- "Energy plant shares experience with burning rail ties": http://www.wltribune.com/news/320679402.html
· Sept 01 – 'Industry: Atlantic Power Seeks 10-Year Contract Extension with BC Hydro' – The Green Gazette

Atlantic Power has been actively meeting and communicating with local government, First Nations, City, Chamber of Commerce, interest groups and the public. A Consultation Report will document these communication.

We're happy to answer any questions and would like to meet with The Conservation Society if that can be arranged.

Glenda

From: **Conservation Society** <ccentre@ccconserv.org>
Date: Wed, Oct 21, 2015 at 8:37 AM
Subject: Re: Fwd: Atlantic Power, Williams Lake BC, PA-8808
To: Glenda Waddell <waddellenvironmental@gmail.com>
Cc: W D Lloyd <wdlloyd@hotmail.com>, Conservation Society <ccentre@ccconserv.org>, Sue Hemphill <shemphill@netbistro.com>, martin kruus <martin.kruus@sd27.bc.ca>,

Martin/Catherin Kruz/Kimber <mkruus@telus.net>, Rick Dawson <rjames2@shaw.ca>, Diana French <dianafr@shaw.ca>, Marg Evans <kimari@xplornet.com>, Fred McMechan <fred_mcmechan@telus.net>

Thanks you for this Glenda.

We will continue reviewing the materials on hand. A meeting with our Board would be something we would consider in combination with the Williams Lake Field Naturalists, and would have it open to the public. The reason it has not happened to date, as I am sure you would appreciate, is there is a lot of technical details that have to be reviewed by persons with the background in such details, this process is currently underway.

Regarding the public engagement, we have been following the media and public meetings. What we meant by more public awareness was specifically referring to the permit condition and details on how to have input on this.

We received a letter in the mail, and are wondering if anything has been put out to the general public as to the due date for submissions? Along with this, a summary of the data (i.e. RWDI Air Dispersion modeling study), that the general public would understand could accompany this. Our point is that data done in a specific field, no matter how exact, cannot necessarily be appreciated by a person, no matter how highly educated, if not educated in that field - so simplified would be best, so that further questions and clarifications could be made.

For example, in the June 18th Tribune report quoting Terry Shannon, Environment Manager, replying to the question "People are asking if the rail ties will make the air quality worse?" (a big concern), is reported to have been replied to with "Yes in some cases, no in other cases." For a start, elaborating on this response might assist the broader public with a clearer understanding. As you no doubt are well aware, air quality in the Williams Lake area is a huge concern and one few people take lightly.

Hopefully Glenda, this clarifies our process and please don't hesitate to contact us in the interim.

respectfully
Marg

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Mon, Nov 2, 2015 at 3:44 PM
Subject: Re: CCCS Comment on AP Amendment
To: Conservation Society <ccentre@ccconserv.org>, authorizations.north@gov.bc.ca, Glenda Waddell <waddellenvironmental@gmail.com>
Thanks for your input.

We will review these items and get back to you.

All correspondence will be included in the Consultation Report.

On Mon, Nov 2, 2015 at 9:04 AM, Conservation Society <ccentre@ccconserv.org> wrote:
Hello Glenda
After reviewing the Atlantic Power's documents on the proposed amendment to increase the use of railway ties to 50% , the Conservation Society has compiled a list of questions/comments (attached). Once we have these questions clarified, the Board would appreciate meeting with you for any further clarifications.
We would appreciate your confirmation of receipt of this document.
Respectfully,
Marg Evans
Education Coordinator/
Executive Director
Cariboo Chilcotin Conservation Society
250.398.7929
www.ccconserv.org

Atlantic Power Corporation
Williams Lake Power Plant
Glenda Waddell, Waddell Environmental Inc.
Dear Glenda:
We of the Cariboo Chilcotin Conservation Society would first like to acknowledge the benefits that have been provided to the community from the partnership with the Atlantic power plant in terms of electricity production and reduced fly-ash from local mill waste burning compared to the previous system of bee-hive burners. However, we are concerned with the proposal to bring treated railway ties from across western Canada to be burned in high proportions in a facility within a highly populated, valley air-shed. Although we are not experts in toxic emissions and their effects, we do have many questions and concerns which do not appear to have been adequately addressed in the material we have seen. Questions include:

- Has recent testing been done with effects burning fuel mixes as high as 50% railways tie material to determine toxic emissions?
- Has this type of testing been carried out over longer time periods to look at effects of variations in the process over time?
- Is planned annual stack testing adequate to guarantee that toxic emissions will not occur periodically throughout the year. Should random testing by a third party be required?
- Lack of natural fibre is sited as a long term concern yet we continue to burn millions of tonnes in the bush. Would it not be more efficient, both in transport/greenhouse gas emissions, and provide sustainable local employment (ie trucking from within the Cariboo) to explore increasing the use of accessible local waste wood directly from logging sites?
- Have testing and modelling adequately considered longer term cumulative effects on soils and water including potential for bioaccumulation of chlorinated hydrocarbons?
- The treatment of railway ties with PCP raises the possibility of release of chlorinated hydrocarbons such as Dioxin which are very persistent, very toxic and subject to bioaccumulation in soil and water. How will this be measured and mitigated for soil and water in surrounding areas? Are you able to easily differentiate ties that are treated with PCPs and creosote and modify the processes to deal with these more risky chemicals?

◎ If we run presently at an average of 82% of our allowed particulate emission targets, what are the health risks if we add dioxins, toxic hydrocarbons and pentachlorophenol to the air shed? The long term cumulative effects must be known before proceeding. This has to have an impact on air, water and soil.
◎ What measures are in place to measure the consequences of off gassing from this fibre in the storage pile? When tie fibre is present in the pile now it can be smelled for several kilometres at times, especially uphill from the site (i.e. 168 Mile Road residents). Is this a potential health issue for your immediate neighbours?
◎ How will PCP leaching from stored ties be measured, monitored and dealt with so as not to contaminate the site?
◎ Has testing and modelling adequately considered the cumulative effects of all emissions in the air shed especially during inversion conditions which are common here at certain times of year? Is there a plan to reduce the amount of ties in the fuel mix under these conditions?
◎ What are the risks and contingency plans for fire risk for stored ties during wildfire events such as we experienced in 2010?
◎ When passing the power plant each day, spot fires are visible and a continual occurrence in the fibre pile which currently contains some chipped rail ties in the mixed. What are the consequences with this fibre in the mix with regards to low temperature combustion?
◎ The reference summary provided by Atlantic Power suggest that **most** toxic substances will be mitigated by treatment to be within allowed guidelines. Which substances do tests suggest will not be mitigated to this level? And what plans are in place to monitor and mitigate these substances?
◎ The study by R.W.D.I. Air Inc. was commissioned by Atlantic Power. Is the Ministry of Environment also commissioning a control study to verify this information and expand the parameters to address some of our concerns in regard to airborne toxins that were not addressed?
◎ What are the alternatives to the Williams Lake site? Surely there is a facility whose geographical disposition area is less populated and more topographically suited for dispersal of treated railway ties.
While we acknowledge that disposal of treated rail ties is a needed service, it seems that the 5% allowed in current fuel mix contributes more than our areas' share towards meeting this need without expanding the percentage to meet the disposal needs for most of Western Canada. We look forward to your responses and would hope that a healthy alternative is available more a more locally sourced waste wood.
Sincerely,
Bill Lloyd, President Cariboo Chilcotin Conservation Society
cc Williams Lake Field Naturalists [Air Quality]

2) Kathie Mitchell

On Tue, Oct 20, 2015 at 12:20 PM, kathie mitchell <kmitchell@windsorplywood.com> wrote:
Glenda Waddell,
I am against the application for a Permit amendment For: Mark Blezard,Atlantic Power Preferred Equity Ltd.,4455 Mackenzie Avenue North,Williams Lake,BC, V2G 5E8.
The land upon which the facility is situated and discharge occurs is Lot B of district Lot 72, C D P PGP35292 located 4455 Mackenzie Ave. North, Williams Lake, BC, V2G 4R7 with the Williams lake airshed.
I am against all 4 amendment requests.
Please contact me if any further submissions need to be stated

Kathie Mitchell

Windsor Plywood
Williams Lake B.C.
250-398-7118

---------- Forwarded message ----------
From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Tue, Oct 20, 2015 at 2:29 PM
Subject: Re: Environmental Protection Notice
To: kathie mitchell <kmitchell@windsorplywood.com>, authorizations.north@gov.bc.ca

Hello Kathie,

Thank you for your input on this application. I have copied this email to the Ministry of Environment and will include it in the final report to the Ministry.

3) Information Package for 8 Neighbor Stakeholders

From: Frankie Nelson
Sent: Wednesday, October 14, 2015 2:44 PM
To: 'Glenda Waddell'
Cc: Mark Blezard
Subject: RE: Information Package for 8 Neighbor Stakeholders - Page one of cover letters

Public Consultation / Hand Delivered neighbor packages on Tuesday, October 13, 2015

Cattlemen's Choice Café / Williams Lake Stockyards:
We met with Wilf Smith, Area Manager for BC Livestock Producers Co-Op. He was not aware of the project. He thanked us for stopping over, and commented that we helped him out in years past with diverting some shavings to him when he was short.

Animal Care Hospital:
We met with Virginia at the reception desk. She will be passing the package onto the owner/operator Dr. Doug Magnowski, as he was out of the clinic at the time. We briefly explained the project to her. She had no questions.

Total Ice:
We met with the owner/operator Tyrell Lucas. He was well aware of our project as he sits on the City of WL Economic Development Committee. His only question was related to fugitive dust. We explained to him that we had a formal plan in place, and respond accordingly as weather conditions warrant, and that we work with the MOE to meet their requirements in addressing any public complaints. He said he knowingly built the facility there, so would not ever make a complaint, he was just more interested in how we manage it.

Allteck Line Contractors:
We met with Sherry at the site office. She will pass the package onto Clayton Neuner, Manager Operations – Cariboo, as he was away. We briefly explained the project to her. She had no questions.

Mueller Electric:
We met with Jack Kerr. He will pass the package onto Barry and Karen Sokolan, the owners. Mueller is our main electrical contractor, and Barry is the FSR on our Electrical Permit. Jack's only question was around the timing of when we would be ordering parts, and beginning the electrical portion on the new shredding system. Mark explained the planned timing.

Eldorado Log Hauling:
We met with Bridgitte Pinchbeck, Manager. She is the daughter of the owner, Lee Todd. She was not aware of the project. We explained it at a high level, and then she had several questions. She was very engaged and interested in the project:

Q: Would we be burning 100% ties at any time? A: No. We directed her to / explained the info in the package.
Q: Will any of the equipment change in order to burn ties. A: No. Same equipment in place since the 2001 test burn. We will be adding a shredder to process the ties on site.
Q: What are the emissions at the various mixes of fuel? A: We directed her to review the RWDI report available at the library and/or to contact Glenda.
Q: Will there be additional air testing? A: We expect the MOE may add some additional requirements to our annual testing. We explained our CEMS unit, monthly MOE reporting, and that we have a 3rd party test done annually. This is in addition to the spot checks that the MOE performs twice a year. Also, that we have been doing the RATA testing.
Q: Will there be another open house? A: We are not planning another at this time. Dependent on the public comments received during this 30-day period. Outlined the various public outreach we have done to date.
Q: Can we have a tour? A: Yes, give us a call and we can set something up.

<u>West Fraser Mills – Plywood Plant:</u>
We met Brad Hehr, Superintendent. We briefed him, and he was aware of the project. He asked the status of the permitting – we advised we had just filed our application and just beginning our formal public period. He asked about the waste heat project – potential Mark had talked about previously with them. Mark advised we were currently working with the Economic Development group on the greenhouse project, and that he would keep him posted as to any potential with West Fraser.

<u>Tolko Mills – Soda Creek site:</u>
We met with Mike Dextrase, Mill Manager. Mike was at the public open house and is well informed on our project. He thanked us for stopping in. We had some discussion around fugitive dust management – his dealings with the MOE and public complaints. We shared some of our recent improvements with him.

From: Frankie Nelson
Sent: Tuesday, October 13, 2015 4:42 PM
To: 'Glenda Waddell'
Subject: RE: Information Package for 8 Neighbor Stakeholders - Page one of cover letters

Mark and I hand delivered all of the packages today. I will summarize the details and questions/comments for you tomorrow.

Frankie Nelson <fnelson@atlanticpower.com>

Further to this, I just received a phone call from Dr. Magnowski (Animal Care Hospital). He asked about why we dropped of the package – and was he to respond formally? I advised no, that we wanted to make sure he was fully informed and that we wanted to be able to address any concerns he may have. He said his only real concern was around fugitive dust of RRT, and pile fires that contained RRT. I briefly explained the new shredding system, and how it was being designed to specifically address these concerns.

He was interested in the emissions – I directed him to the RWDI report. He advised he did not have time to read a 200 page report. I suggested he call Glenda to get further information, but I could tell him that we were within our permit levels, even at the 100% testing. His other question was around adding the 872 liters of liquids in 2.7.2 – would it have any emissions, and thought it seemed like a lot of liquid. I explained the boiler temperature was so hot it would destroy the components. He understood that, as he runs a crematorium, however acknowledged that he still gets smell out his stack. I explained that our precip is overdesigned for our facility so would not be the case here.

I suggested he call Mark next week if he had any further questions around the design / containment of the shredded ties, and Glenda if he had any further questions regarding emissions.

Frankie

4) Jim Willems

On Sun, Oct 18, 2015 at 11:01 AM, Jim Willems <jimwillems@live.ca> wrote:
Glenda Waddell,
I am against the application for a Permit amendment For: Mark Blezard,Atlantic Power Preferred Equity Ltd.,4455 Mackenzie Avenue North,Williams Lake,BC, V2G 5E8.
The land upon which the facility is situated and discharge occurs is Lot B of district Lot 72, C D P PGP35292 located 4455 Mackenzie Ave. North, Williams Lake, BC, V2G 4R7 with the Williams lake airshed.
I am against all 4 amendment requests.
Please contact me if any further submissions need to be stated.
Jim Willems
401 Palomino Rd.
Williams Lake,BC.
V2G 5B2.
Home phone 250 392 2617
cell 250 398 0117

Regards
Jim Willems

---------- Forwarded message ----------
From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Mon, Oct 19, 2015 at 10:54 AM
Subject: Re: Environmental Protection Notice
To: Jim Willems <jimwillems@live.ca>, authorizations.north@gov.bc.ca

Hello Jim,

Thank you for your input on this application. I have copied this email to the Ministry of Environment and will include it in the final report to the Ministry.

5) Les Butler

From: Les Butler [mailto:Les.Butler@tolko.com]
Sent: Tuesday, October 13, 2015 5:02 PM
To: Frankie Nelson
Subject: RE: ATLANTIC POWER - OPEN HOUSE

Thanks, hope you had a good summer

Les Butler
Fibre manager
Tolko Industries LTD.
250-550-1482
Cell 250-308-7922

From: Frankie Nelson [mailto:fnelson@atlanticpower.com]
Sent: Tuesday, October 13, 2015 4:58 PM
To: Les Butler
Subject: RE: ATLANTIC POWER - OPEN HOUSE

Hi Les, just to keep you updated on this, we have filed our application to the MOE so are entering the formal public consolation period. See attached that was hand delivered to Mike Dextrase at the Soda Creek Mill today. Let me know if you have any questions or comments.

Regards,
Frankie

From: Les Butler [mailto:Les.Butler@tolko.com]
Sent: Thursday, June 11, 2015 6:37 AM
To: Frankie Nelson
Subject: RE: ATLANTIC POWER - OPEN HOUSE

Thanks Frankie,
I think this is really positive as I know you can handle the material well and it is a perfect use for it.

From: Frankie Nelson [mailto:fnelson@atlanticpower.com]
Sent: Wednesday, June 10, 2015 2:45 PM
To: Les Butler
Subject: ATLANTIC POWER - OPEN HOUSE

Hi Les, we have put out a public invite via the local newspaper and radio, but as you don't reside here I thought I'd be sure you were aware of our project, and **Open House at the Gibraltar Room on Wednesday, June 17th**. If you, or a representative, are available please stop in any time between **5:00 and 8:00 p.m.**, even for just a few minutes. It will be very informal, with some poster boards for review and people available to answer any questions. Attached is an outline of our project, that we are presenting for feedback from the community prior to making our application to the Ministry of Environment.

Regards, *Frankie*

6) Diane Dunaway

Diane Dunaway <diane@dunawayranch.com>

Thanks Glenda, Diane

On 10/23/15 6:43 PM, "Glenda Waddell" <waddellenvironmental@gmail.com> wrote:

Thank you for the input Diane. I'm copying the Ministry of Environment and your letter will be included in the Consultation Report.

On Thu, Oct 22, 2015 at 11:12 AM, Diane Dunaway <diane@dunawayranch.com> wrote:

To whom it may concern:

Please find attached my letter of concern.

With thanks,

Diane Dunaway

Diane Dunaway
5914 Soda Creek Macalister Road
Williams Lake, BC V2G 5A5
Email: diane@dunawayranch.com

22 October 2015

Director, Environmental Protection
400-640 Borland St.
Williams Lake BC V2G 2T1
Email: authorizations.north@gov.bc.ca

To whom it may concern:

RE: Proposed increase of rail-tie incineration
by Atlantic Power at 4455 Mackenzie, Williams Lake BC V2G 4E8

Much concern arises from the practices witnessed a few years ago when chipped CN railway ties were stockpiled nearby the Station House Gallery at the foot of Oliver Street in downtown Williams Lake. It created a considerable fire hazard and there were no provisions (protection from rain and snow melts, etc.) to protect ground water from creosote dilution and subsequent seepage. Toxic fumes were also a worry.

My uneasiness is based on the following: Creosote treated rail-ties contain large quantities of dioxins, PAHs (Polycyclic Aromatic Hydrocarbons) and chlorophenols that cause serious human illness. Dioxins and PAHs are known to include compounds that are listed as Group 1 Carcinogens (cancer causing compounds) by the International Agency for Research on Cancer (IARC) while chlorophenols are listed as Group 2B Carcinogens (i.e., they are suspected carcinogens). In addition dioxins and chlorophenols are also known to cause serious adverse affects to many human organ systems at low concentrations, and in the case of dioxins, are very persistent in the environment (IARC 1997).

As always it comes down to "at what cost" for jobs and how accurate/scientifically sound is the risk assessment? While it's incumbent on us to become educated about these issues and learn about what's gone in to a risk assessment, we are reliant on you as our environmental expert and representative to advise us honestly. So I ask you, has the bar been raised since 2010 and are proposed practices to be exemplary? Will our family and friends and wildlife be negatively impacted by this proposal, be it through poor quality air emissions cumulative effects, or otherwise?

Thank you in advance for your time and consideration.

Yours truly,

Diane Dunaway

cc: waddellenvironmental@gmail.com

7) Best Buy Propane

BEST BUY PROPANE LTD.

#203 – 197 n 2ND Avenue, Williams Lake, BC, V2G 1Z5, (250) 305-0446

October 26, 2016

Director of Environmental Protection

400-640 Borland Street

Williams Lake, BC

V2G2T1

Authorizatios.north@gov.bc.ca

waddellenviromental@gmail.com

To Whom This Letter May Concern:

Re Support for Atlantic Power EPA Extension and the increase use of burning rail way ties

Our company is a local family company employing 25 young kids. It's important to have a strong diverse economy. Atlantic power contribution to Williams Lake economy is Enormous.

We have significantly cleaner air because the beehive burners have been replaced. The use of old ties is brilliant because it burn so hot at 2000 degrees

Please take this letter as our companies support in this project and encourage this extension to burn ties.

Yours truly

Scott Nelson

President

250-305-4967

8) Sarah Bell

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Sun, Oct 25, 2015 at 8:06 AM
Subject: Re: Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8
To: Sarah Bell <sarah__bell@hotmail.com>
Cc: "authorizations.north@gov.bc.ca" <authorizations.north@gov.bc.ca>

Sarah,

Thank you for your input. A copy will be included in the Consultation Report.

On Sat, Oct 24, 2015 at 2:28 PM, Sarah Bell <sarah__bell@hotmail.com> wrote:
Director, Environmental Protection
400-640 Borland St.
Williams Lake BC V2G 2T1

Re: Atlantic Power Corporation, Williams Lake's biomass-fueled electricity generation plant, is looking at burning railway ties to extend the plant's energy purchase agreement with BC Hydro.

If the air quality in Williams Lake worsens due to the burning of railway ties, my family and may be forced to relocate to a different city. We moved to Williams Lake five years ago so my husband could work as an RN at the hospital. I have asthma and one of my children develops croup each year. In addition, one of our neighbors is on oxygen. My children just participated in the School District 27 cross- country run at Boitanio Park - an outdoor sport I am glad they could participate in. There are numerous outdoor community walk/runs that take place through-out the year. How many people would not be able to participate if the Air Quality Health Index was even a little higher on that day? Williams Lake already has low quality air during parts of the year and we are forced to limit our outside activities during this time. I do hope that the burning of 45% more railway ties is not permitted so residents of Williams Lake can focus on improving the air quality, not impair it.

Sincerely

Sarah Bell
Williams Lake

9) Canoe Creek Band

From: **Terry Shannon** <tshannon@atlanticpower.com>
Date: Fri, Oct 23, 2015 at 1:13 PM
Subject: Canoe Creek Band Contact
To: "Glenda Waddell (waddellenvironmental@gmail.com)" <waddellenvironmental@gmail.com>

Glenda,
In returning a previous call made by Brent Adolf to Kevin Brown, I talked to a Ms. Kareri Koster in his absence. She is the Stewardship Coordinator for the Canoe Creek Band.
I provided her a verbal general project update, and also emailed her a copy of the RWDI Report. She did not say what, if any, kind of response she may make. I believe it was just a status update call primarily.
Please log accordingly. Thanks.
Terry

Terrence A. Shannon
EHS Manager
8835 Balboa Ave, Suite D
San Diego, CA 92123

On Mon, Nov 2, 2015 at 10:42 AM, Kateri Koster <stewardship@canoecreekband.ca> wrote:
Good morning Glenda,

I was forwarded your email from our Main Reception. We received your information package on October 29th and are currently reviewing it. If I have any questions I will be sure to follow up with you within the next couple of weeks.

Thanks,

Kateri

Kateri Koster, B.A.
Stewardship Coordinator
Stswecem'c - Xgat'tem First Nation
General Delivery
Dog Creek, BC
(TEL) 250.440.5649
(TEL) 250.440.5645 ext. 214
(FAX) 250.440.5679

Check us out at canoecreekband.ca

10) Sage Birchwater

On Fri, Oct 23, 2015 at 9:34 AM, <sagebirchwater@shaw.ca> wrote:
I am writing in response to the request by Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8, to burn railway ties in Williams Lake.
What are the air quality standards referred to by the applicant?
Does this take into consideration the residual build up of toxins?
How would this build up of toxins be measured?
Would this eventually make Williams Lake a toxic place to live, raise children and breath?
Who would be in charge of measuring any toxic build up?
What assurances can you provide that we can trust the science?

Thank you

Sage Birchwater

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Fri, Oct 23, 2015 at 5:53 PM
Subject: Re: burning railway ties and air quality in Williams Lake
To: sagebirchwater@shaw.ca

Thanks for your interest in this project. I will get back to you with answers to your questions.

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Sat, Nov 7, 2015 at 9:32 AM
Subject: WLPP Air Permit 8808 Amendment Application - Sage Birchwater Questions/Answers
To: sagebirchwater@shaw.ca, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Thanks for your questions Sage. If you're planning to write another article, please let us know, and we'd be happy to put you in touch with Terry Shannon to provide any additional information you may need.

Please find answers to your questions below:

From: <sagebirchwater@shaw.ca>
Date: Fri, Oct 23, 2015 at 9:34 AM
Subject: burning railway ties and air quality in Williams Lake
To: authorizations.north@gov.bc.ca
Cc: waddellenvironmental@gmail.com

I am writing in response to the request by Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8, to burn railway ties in Williams Lake.

What are the air quality standards referred to by the applicant?
Where they exist, air quality standards for British Columbia are used. In absence of local standards, ambient air standards from Ontario are used for reference.

Does this take into consideration the residual build up of toxins?
Yes. The model does include accumulated pollutants in worst cases where inversion conditions and/or calm winds prevent dispersion.

How would this build up of toxins be measured?
The model, which was run in compliance with the Guidelines for Air Quality Dispersion Modelling in British Columbia considered worst case scenarios.

Would this eventually make Williams Lake a toxic place to live, raise children and breath?
We refer you to the RWDI modelling report for the results. All impacts in the community, including worst case scenarios, are predicted to be within BC ambient air quality standards.

Who would be in charge of measuring any toxic build up?
The Ministry of Environment, with financial support from local industry, are responsible for monitoring air contaminants. Monitoring is done on a continuous basis and results are available on the Ministry website.

What assurances can you provide that we can trust the science?
The RWDI modelling study was designed with input from the Ministry of Environment. The dispersion model (Calpuff/Calmet) is the model system routinely used for regulatory purposes throughout the US and Canada.

Thank you

Sage Birchwater

11) Robert Kjelsrud

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Sat, Oct 31, 2015 at 12:23 PM
Subject: Re: Atlantic Power, 4455 MacKenzie Ave North, Williams Lake, B.C. V2G 4E8
To: Robert Kjelsrud <kjelsrud@shaw.ca>
Cc: authorizations.north@gov.bc.ca

Mr. Kjelsrud,

Thank you for your interest in this project.

Your input will be included in the Consultation Report.

On Fri, Oct 30, 2015 at 11:19 AM, Robert Kjelsrud <kjelsrud@shaw.ca> wrote:
To whom it may concern:

I am taking this opportunity to voice my concerns about the above mentioned business increasing the amount of contaminated railroad ties for their fueling of their co-generation plant. I do not feel that there has been a thorough assessment of the short and long term effects to our air to allow for this to proceed at this time and I believe that this endeavor should be put on hold until all of the information can be presented, debated and decided upon. I believe that any scientific data should be acquired by a qualified firm of the Provincial Environmental Branches' choosing so as to negate any conflict of interest (real or perceived) and the cost of this should be borne by the applicant.

I strongly believe that the risk to our air quality out weighs the need for a expeditious decision on this matter.

Yours truly,
Robert C. Kjelsrud
778-412-0056

12) Michael Kjelsrud

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Sat, Oct 31, 2015 at 12:34 PM
Subject: Re: Atlantic Power, 4455 MacKenzie Avenue, Williams Lake BC
To: Michael Kjelsrud <degreemanagementinc@gmail.com>
Cc: authorizations.north@gov.bc.ca

Mr. Kjelsrud,

Thank you for your interest in this project.

Your input will be included in the Consultation Report.

On Sat, Oct 31, 2015 at 9:35 AM, Michael Kjelsrud <degreemanagementinc@gmail.com> wrote:
To whom it may concern:

I am taking this opportunity to voice my concerns about the above mentioned business increasing the amount of contaminated railroad ties for their fueling of their co-generation plant. I do not feel that there has been a thorough assessment of the short and long term effects to our air to allow for this to proceed at this time and I believe that this endeavor should be put on hold until all of the information can be presented, debated and decided upon. I believe that any scientific data should be acquired by a qualified firm of the Provincial Environmental Branches' choosing so as to negate any conflict of interest (real or perceived) and the cost of this should be borne by the applicant.

I strongly believe that the risk to our air quality out weighs the need for a expeditious decision on this matter.

Michael Kjelsrud
1154 Tower Crescent,
Williams Lake, BC

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13) Toosey Indian Band

Williams Lake Power Plant Air Permit Amendment
Glenda Waddell <waddellenvironmental@gmail.com> Mon, Nov 2, 2015 at 12:42 PM
To: Georgina Johnny <ginajohnny_58@hotmail.com>, authorizations.north@gov.bc.ca
Georgina,

Thanks for your time on the phone. We're not sure why you didn't receive the original mail out. Please let me know if you're able to open the two attachments and whether you will be able to distribute this to your Chief and the other Councillors. If you'd like me to try to mail this information again just let me know. The information was mailed on October 9th and addressed to Chief and Council.

Thanks again for your help.

Glenda Waddell | Waddell Environmental Inc.
Prince George, BC, Canada
Phone: +1 250 640 8088

2 attachments
Toosey Indian Band Information Package.pdf 143K
Atlantic Power Renewal Project Fact Sheet.pdf 1280K

On Mon, Nov 2, 2015 at 1:11 PM, Gina Johnny <ginajohnny_58@hotmail.com> wrote:
Hi Glenda,
Just replying back letting you know I received your e-mail. And I will print it and hand out to Chief & Council.

Thank you,
Gina M Johnny

14) Esk'etemc

From: Glenda Waddell <waddellenvironmental@gmail.com>
Date: Sun, Oct 25, 2015 at 3:52 PM
Subject: Fwd: Williams Lake Power Plant Information
To: erobbins@esketemec.ca

Hello,
I mailed a package of information pertaining to the Williams Lake Power Plant renewal project to the following address on October 9th. Could you let me know if you've received this item?

Chief & Council
Esk'etemc
Box 157 Alkali Lake, BC
V0L 1B0

Thanks for your time.

Glenda Waddell | Waddell Environmental Inc.
Prince George, BC, Canada
Phone: +1 250 640 8088

Note: Parcel was received on October 13, 2015 but not tracked as delivered by Canada Post.

15) Mary Montgomery

From: **Mary Montgomery** <montgomerymary@gmail.com>
Date: Mon, Nov 2, 2015 at 10:40 AM
Subject: Fwd: Emailing: railway ties burned.docx
To: authorizations.north@gov.bc.ca

November 2, 2015

Director, Environmental at Protection authorizations.north@gov.bc.ca
Glenda Waddell at waddellenvironmental@gmail.com

This letter is in response to the article written in the ***Williams Lake Tribune, The Weekend Advisor*** dated Friday, October 23, 2015 regarding the Atlantic Power at 4455 Mackenzie, Williams Lake BC V2G 4E8 proposal and amendment to raise the limit of burning of old rail ties from the current 5% to 50% to produce power to sell to BC Hydro.

From *Calgary Herald* Published on: August 16, 2015 *"Much of the area is contaminated from a former creosote plant. Previous estimates have put the cleanup costs at between $50 million and $300 million", "Creosote is a compound that was once used to preserve wood products such as railway ties and power poles, but it has since been linked to certain cancers and birth defects"* and *"The city spent $3.5 million trying to clean up the site in the 1990s, including the construction of a 650-metre long subsurface retaining wall and the installation of water-pumping wells, in hopes of preventing further seepage into and across the river."* The paper also states "*While reports on the area's creosote problem have previously been commissioned by the city, the issue hasn't been recently examined— despite the 2013 floods, stories of creosote seeping across the river into the basements of nearby homes last year, and talk that a potential new Flames mega-complex could be housed on the land."*

From ***Health Canada, Environmental and Workplace Health "Archived – Creosote-impregnated Waste Materials – PSL1" Under 3.1 CEPA 11(a): Environment*** "Groundwater has been severely contaminated at several *creosote-contaminated sites*. And "*There are strong correlations between the presence of PAHs from waste creosote sources in the sediments of Eagle Harbor, Washington and the Elizabeth River, Virginia, the levels of PAHs found in the tissues of fish in these two aquatic systems, and liver tumors discovered in these fish."*

In a paper produced by the ***University of California, Los Angeles, Labor Occupational Safety and Health Program***, August 2003 it states that *"creosote treated wood burned the creosote evaporates and pollutes the air, may enter the soil and water, may dissolve and move into the groundwater through the soil, and the less dense creosote chemicals stay near to the top of the water and can be ingested by animals, entering the human food chain". Outlying areas depend on wells for their household water. "Long-term exposure to creosote can damage the kidneys, liver, and brain. Creosote-charged smoke can cause difficulty in breathing and asthma."*

MSDS SHEETS SDS ID: 00228327 **on Creosote Pressure Treated Wood**, where the product is used in railroad ties.
*"Storage: Store in a well-ventilated place. Store locked up." "***Conditions for Safe Storage, including any Incompatibilities**
Store and handle in accordance with all current regulations and standards. Avoid heat, flames, sparks and other sources of ignition. ***Store in a well-ventilated area. Keep container tightly closed. Store locked up."***

“**Hazard Statement(s)**
May form combustible dust concentrations in air (during handling or processing).
Causes skin irritation
Causes serious eye irritation
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
May cause cancer
May cause respiratory irritation
Unsuitable Extinguishing Media “

US National Library of Medicine , National Institutes of Health did a study “Soil and plant samples were collected in four functional parts of the junction, i.e. the loading ramp, main track within platform area, rolling stock cleaning bay and the railway siding.” and concluded “The railway siding and the platform area are the places *highly contaminated with heavy metals*.”

I have seen railway ties stored in the open in several different locations in the City of Williams Lake. In the past I personally have driven past the Power Plant in the summer months, with my windows down and can smell the chemicals

Either Atlantic Power is unaware or unconcerned of the health risks and hazards of creosote.

With all the evidence of contamination of soil, water table and air from seepage with the railway ties laying on the soil and the health issues that raises, the question of burning this dangerous byproduct near any population let alone within city limits should not be permitted. The seepage into the water table will contaminate our water sources. We must protect the residents of our area keeping in mind our most vulnerable citizens, our babies and children.

I would like to add that with all of the restrictions, rules, laws and regulations regarding second hand cigarette smoke why would the practice of burning railroad ties in BC would be approved?

I am not in agreement for any burning of old rail ties in Williams Lake and I am asking the practice be stopped completely.

16) William Chapman

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Mon, Nov 2, 2015 at 3:18 PM
Subject: Re: Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8
To: William Chapman <suillustomentosus@gmail.com>
Cc: authorizations.north@gov.bc.ca, Glenda Waddell <waddellenvironmental@gmail.com>
Mr. Chapman,

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

On Mon, Nov 2, 2015 at 2:34 PM, William Chapman <suillustomentosus@gmail.com> wrote:
Director, Environmental Protection
400-640 Borland St.
Williams Lake BC V2G 2T1

Dear Director,
As a research scientist with many years of experience dealing with environmental issues, I am opposed, though not in my official capacity, to burning of the railway ties in the Atlantic Power power plant on the following grounds:

1. The disposal of the ash from the power plant has created the situation for an environmental disaster of the first order. The ash from the plant (see attached analysis) has high levels of several heavy metals. This is normal for ash and is to be expected.

2. The pH of the ash is about 13.8 and a highly concentrated caustic, which is normal for ash (lye is made from ash, for example). This strong caustic is chemically equivalent to the caustic spill a few years ago which killed a great deal of the life downstream in the Squamish River.

3. The slope where the ash dump is located is an unstable slope which fails regularly. Local people will recall that portions of the Green Acres Mobile Home Park failed into the Williams Creek Valley just a few years ago. The trailer park is on the same slope as the dump and is located just three kilometers from it. The bench on which the ash dump is located is very active with ample evidence of recent large failures. The accumulation of ash is top loading the slope in question with presumably hundreds of thousands of tonnes of ash which will increase the likelihood of a failure.

4. The ash is currently stored on coarse textured fluvial deposits which offer virtually no protection against leaching. The ash dump is located above Williams Creek which flows directly into the Fraser River.

5. If, though it would be reasonable to say “when” the caustic ash gets into Williams Creek and then into the Fraser River it will endanger the entire Fraser River ecosystem and all the major fisheries from Williams Lake downstream. The ash dump for the Atlantic Power power plant is a stupidity that beggars the imagination.

6. In the attached chemical analyses, which were taken in 2008, you can see that the supposed ash from the power plant was in fact around 40% carbon at that time, which means the fuelstock was not being fully consumed. This sample was taken during a period when the plant was burning railway ties. Discussions with the plant at that time revealed that the plant was not functioning properly which is why it was not fully burning its fuel stock. This went on for a period of months to years. During that time there was no meaningful monitoring of gaseous emissions or of the chemical makeup of the charcoal being produced by the plant as it was incompletely combusting a hazardous material to charcoal which was then stored on an unstable and porous slope along a tributary of one of the most important fisheries in Canada.

Therefore, I submit that Atlantic Power and the previous company which they subsumed, EPCOR, have demonstrated not the slightest behaviour which could earn them the confidence of the community. As many others will point out, there is no shortage of fuelstock for the plant- woody debris that is currently burned in open piles in logging sites could be used for fuel rather than ties. The money in ties is that no rational community wants to deal with them. The Williams Lake valley is wholly unsuited for a hazardous material disposal site because it is a small valley with poor air turnover for much of the year, the area where the creosote ties would be chipped is located within 1.5 km of residential areas and so will stink horribly for those people, the power plant has already created an environmental risk of the first order and it did not behave responsibly in the past when it was burning railway ties and so has not earned the right to be trusted with this precarious activity.

This application must be rejected and work begun immediately to deal with extreme hazardous situation created by the ash dump.

Please acknowledge receipt of this submission

Bill Chapman, Ph.D. Williams Lake, BC

17) Roger Hamilton

November 3, 2015

Director, Environmental Protection
400-640 Borland Street
Williams Lake, BC V2G 2T1
Delivered via: authorizations.north@gov.bc.ca

Re: proposed amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808

The proposed amendment posted October 8, 2015 will adversely affect me and I request the Director consider the following information.

The Environmental Protection Notice identifies an application to "2. Raise the limit on waste rail ties as a proportion of the authorized fuel from the current 5% to 50%."

Permit 8808, clause 2.7.1 currently states, in part "The incineration of wood residue treated with creosote and/or a creosote-pentachlorophenol blended preservative (treated wood) is authorized subject to the following conditions:

- The treated wood component shall not exceed 5% of the total biomass fuel supply calculated on an annual basis;"

**The public notice fails to clearly describe both the volume and hazardous components of waste rail ties proposed for incineration at the power plant.

It is understood rail ties are manufactured using variable proportions of creosote and/or pentachlorophenol preservatives, both of these preservatives are soluble in diesel fuel which is used to dilute and carry the preservatives in the treatment process. Comparison of the lab analyses of "Regular Hog Fuel" and "Railtie Composite Fuel" conducted during the April 2001 trial burn confirms this understanding.

Results from Table 8 of the 2001 Survey Report are summarised below for your convenience (ref. RWDI Report pdf p. 57/176):

	Dioxin/Furan (pg/g)	PAH (ng/g)	Chlorophenols (ng/g)
Hog Fuel	1 TEQ	12,353	30.3
Railtie Fuel	4,040 TEQ	7,361,000	72,093

The presence of the element chlorine in pentachlorophenol promotes the formation of dioxins/furans during combustion processes.

The "Air Dispersion Modelling Study" by RWDI Air Inc. dated September 8, 2015 includes a copy of the "Emission Survey Report" at Appendix A (ref. pdf p. 28/176 RWDI Report). This report presents results of a manual stack sampling survey conducted in April 2001 to assess the discharge characteristics of regular wood waste compared with 100% treated wood (rail ties) sourced from CN Rail. The results of this stack survey were used by RWDI in their modelling work.

The amount of treated wood, in tonnes/day, represented by 50% of the total fuel supply has not been defined. An unsigned, undated information sheet which pre-dates the amendment application suggests 50% of the fuel supply, calculated on an annual basis, amounts to 300,000 tonnes of treated wood.

It is unknown how many days/year the plant typically operates. The amount of treated wood in tonnes/day is required to better understand what a 50% concentration of treated wood in the fuel supply actually represents.

I also note the public notice dated October 8, 2015 differs from the actual application dated July 10, 2015 which proposes the following wording change: "the treated wood component shall not exceed 50% of the total biomass fuel supply on an annual basis".

**The RWDI Air Dispersion Modelling Study predicts that nitrogen dioxide concentrations will exceed the BC Ambient Air Objectives in residential neighbourhoods.

The report authors discount this result by suggesting "the adjustment for background potentially double counts the plant emissions." The argument appears to be based on the fact that "the inclusion of rail ties in the fuel mix has no or very little effect on the plant NOx emissions." (ref. Summary and Conclusions, p.11, RWDI Report) NOx does not appear to have been tested for in the manual stack survey conducted April 2001; it is assumed data from the power plants' continuous emission monitor for NOx was used during the trial burn.

The nitrogen dioxide data reproduced from Table 7 (ref. p.9, RWDI Report) is summarised as: background concentration 63.9 ug/m^3 + power plant maximum predicted concentration 190 ug/m^3 = 254 ug/m^3 or 135% of the BC Air Quality Objective of 188 ug/m^3.

The "double counting" argument would be stronger if the power plant were the only wood combustion source in the Williams Lake valley. There are two wood fired power boilers at the plywood plant adjacent to the power plant and at least one saw mill wood fired energy system in the valley. The use of residential wood heaters during the winter months is also common practice in the valley.

It appears the background concentration was obtained from the provincial meteorological station located at Columneetza School which represents a long term average collected with modern equipment maintained by skilled technicians. The emissions from the power plant are continuously analyzed for nitrogen oxides by continuous emission monitors. The data appears to be solid and I assume that air dispersion modelling has improved since the permit was first issued in 1991. The evidence suggests that current power plant emissions exceed provincial air quality objectives for nitrogen dioxide.

**Authorizing new contaminants into the Williams Lake air shed, contaminants for which we have no background data or ambient objectives, and an air shed already subject to air quality exceedances is contrary to your Divisions stated goals of "pollution prevention" and "continuous improvement in air...quality".

Notable increases in contaminant concentrations to the Williams Lake air shed are predicted for sulphur dioxide, (no background data to 57% of the BC Ambient Objective @ 50% rail ties), hydrogen chloride (no background data to 66% of the Ontario Objective @ 100% rail ties) and Total PAH's (no background data to 27% of the Ontario Objective @ 100% rail ties) (ref. Table's 7and 8, p.9, 10, RWDI Report).

The Ontario Objective is used because BC does not have an ambient air objective for these parameters. No background data indicates that there is no monitoring being done to determine what concentrations of sulphur dioxide, hydrogen chloride or polycyclic aromatic hydrocarbons are currently present in our air shed.

The 2001 trial burn identified very high concentrations of sulphur dioxide and hydrogen chloride associated with burning of the rail tie fuel relative to regular wood waste. For example, sulphur oxides increased from 1 to 172 mg/m^3 (180 requirement) and hydrogen chloride increased from non-detectable to 59.8 mg/m^3 (50 standard) when burning 100% rail ties vs regular hog fuel. (Ref. Trial Burn, Summary of Results, RWDI Report pdf p.32/176)

The modelling results also indicate that small particulate matter $PM_{2.5}$ and PM_{10} concentrations are already predicted to be 82% of the ambient air quality objective with negligible contribution from the rail tie fuel.

**The RWDI Report does not acknowledge that the power plant and the City of Williams Lake share a narrow, deep valley which is subject to very strong temperature inversions. The report fails to use common language and model output mapping which is easily assessed by city residents.

"Pasquill-Gifford stability classes" are reportedly used to address impacts during worst case meteorological conditions. I do not know what a Pasquill-Gifford stability classification system is but I am familiar with strong temperature inversions which can trap air pollutants in the valley for extended time periods. The exposure of residents located on the floor and side walls of the valley are highest during these adverse meteorological conditions and the modelling should target these specific "worst case" conditions. The model authors appear to be based in Guelph, Ontario; it is not clear they understand local meteorological / geographical conditions.

The dispersion modelling output (pdf p.22-26/176, RWDI Report) is presented on 1:160,000 scale mapping making it impossible for people to find their neighbourhood relative to the predicted plume and contaminant concentrations. The model is reportedly capable of offering 250 meter receptor resolution within 2km of the stack and 500 m resolution within 5 km of the stack; model output mapped at an appropriate scale is a reasonable request to allow residents situated on the valley sides or valley floor the opportunity to assess their exposures. In particular, the residents living in the areas predicted to experience concentrations of nitrogen dioxide in excess of the BC Ambient Air Objective should be informed. At a minimum, the information should be easily accessible.

** It is not reasonable to use evidence from a trial burn conducted over 14 years ago using rail ties from one source to accurately represent conditions going forward.

The trial burn and stack survey were conducted 14 .5 years ago. It is understood that once granted, a permit authorization becomes a right which cannot be revoked except under extreme and rare circumstances. The power boiler and its associated pollution control equipment is 14 years older and maintenance, process and equipment modifications and/or changes over the last 14 years may have changed the performance characteristics. For example, the authorized flow rate during the trial burn was 100 m^3/s; the current authorization is for 110 m^3/s. A new trial burn which would reflect current plant conditions and use up-to-date laboratory and testing technologies is warranted.

A note from Atlantic dated June 17, 2015 declined to clarify the source of future waste rail ties so it should be assumed the treated wood may be sourced anywhere in North America. Evidence is required to ensure that waste rail ties from CN Rail, CP Rail or Burlington Northern etc. are indistinguishable in contaminant types and concentrations. If there are material differences, then each rail tie source should undergo testing and/or trials.

**Waste ash requires secure, long term disposal.

In the June 17, 2015 note, Atlantic Power advised that pollutant levels in the ash from rail ties are slightly higher than those from traditional fuel sources but "are still well within BC Regulations." The Director is requested to clarify what regulations are applicable and what, if any standards are applicable to the disposal of waste treated wood ash.

Table 8, titled "Fuel and Ash Summary Analytical Data" (ref. pdf p.57/176, RWDI Report) presents lab results comparing the Dioxin/Furan, polycyclic aromatic hydrocarbon (PAH) and chlorophenol concentrations between regular hog fuel ash and rail tie ash generated from the burn trial.

Table 8 indicates the rail tie ash contained 788 pg/g of Dioxin/Furan or 33 times more than was present in the regular hog fuel ash (23.8 pg/g). Table 8 also indicates there are ~40% more polycyclic aromatic hydrocarbons (PAH) in the rail tie ash than the regular ash; 1,267 ng/g vs 899 ng/g. This is notable because polycyclic aromatic hydrocarbons are believed to be quite flammable and susceptible to destruction by incineration. It is understood they are associated with the creosote preservative and contribute to the "higher heating value" of rail ties noted by Atlantic in their June 17, 2015 note. Their elevated presence in the ash waste stream warrants further investigation.

The numbers represent very tiny concentrations; however the literature indicates that dioxins/furans are highly toxic, long lasting chemicals that pose health risks even at low exposure levels. Polycyclic aromatic hydrocarbons are also identified as having significant health and environmental impacts if not managed properly.

I regularly ride past the original existing ash landfill which is located west of the Soda Creek Road just past the mills. The ash landfill appears to be filling up; is there a new site available and is it suitable for the disposal of treated wood ash? What BC Regulations and standards are applicable to the disposal of treated wood ash? A thorough examination of the characteristics and quantities of treated wood ash is warranted to ensure they are safely disposed of. Approving a new source of highly contaminated wood ash before we know where it will be disposed of is not good management.

**Performance bonding is warranted to ensure long term liabilities associated with the ash landfills are addressed.

A cursory internet search indicates that Atlantic Power Preferred Equity Ltd. is a corporation incorporated under the laws of the Province of Alberta and is an indirect, wholly-owned subsidiary of Atlantic Power. The Corporation directly holds Atlantic Power's business and power generation and other assets in British Columbia, operates as a holding company and indirectly holds certain of Atlantic Power's business and power generation and other assets in the United States.

The corporation appears to be a financial construct formed to take advantage of tax laws and the "indirect" relationship to its parent company may serve to provide shelter from liability. The parent company, based in Massachusetts, USA, has reportedly been losing money for the last few years.

5

I understand Energy and Mines routinely assess long term liabilities associated with mine reclamation requirements and establish performance bonding to ensure British Columbia is not left with unfunded liabilities. A similar assessment and bonding process is warranted to ensure the long term security of ash landfills.

**The application dated July 10, 2015 is not fully reflected in the public notice dated October 8, 2015. It is not clear if section 2.7.2 of the application has been abandoned or if it was inadvertently missed from the Public Notification.

The proposal relates to section 2.7.2 of Permit 8808; it appears Atlantic is seeking preauthorization from the Director to accept and incinerate up to 872 liters/day of hydrocarbon contaminated absorbent materials originating from accidental spills. Amounts in excess of 872 liters continue to require the authorization of the Director. The free liquid component is to meet the waste oil provisions of the Hazardous Waste Regulation.

The existing clause requires written approval of the Director to incinerate hydrocarbon contaminated wood residues with no daily limit specified. This clause appears to allow the plant to dispose of in house generated fuel spills which were absorbed with hog fuel to be incinerated on site.

The proposed changes will preauthorize acceptance at the power plant of up to 872 liters/day of commercial sorbents used in spill clean-ups for incineration. It is unknown if this activity is being undertaken on a fee for service basis or what the rationale for the 872 liter daily limit is.

If the proposed amendment to section 2.7.2 is still under consideration, public notice is warranted.

Thank you for this opportunity to comment.

Rodger Hamilton

Cc Glenda Waddell waddellenvironmental@gmail.com
Mayor and Council, City of Williams Lake kdressler@williamslake.ca
Donna Barnett, MLA donna.barnett.mla@leg.bc.ca
Cariboo Regional District mailbox@cariboord.ca

On Tue, Nov 3, 2015 at 12:03 PM, R Hamilton <rghamilton59@gmail.com> wrote: Please find attached my letter of comment regarding the proposed amendment to authorization 8808. Rodger Hamilton
From: **Glenda Waddell** <waddellenvironmental@gmail.com> Date: Wed, Nov 4, 2015 at 10:13 AM Subject: Re: Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808 To: R Hamilton <rghamilton59@gmail.com>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca> Mr Hamilton, Thank you for your input on this project. Your letter will be included in the Consultation Report. We will be taking your concerns into account as we proceed.
From: **Terry Shannon** <tshannon@atlanticpower.com> Date: Tue, Nov 3, 2015 at 2:29 PM Subject: FW: Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808 To: "snelson@williamslake.ca" <snelson@williamslake.ca> Cc: "Glenda Waddell (waddellenvironmental@gmail.com)" <waddellenvironmental@gmail.com>, Kevin Brown <kevin@kbcommunications.ca>, Brian Chatlosh <bchatlosh@atlanticpower.com> Councilman Nelson,, I acknowledge receipt of your email concerning Mr. Hamilton's comments on our permit Amendment. I am also forwarding it to our other team members and the official coordinator for such responses, Ms. Glenda Waddell of WEI. Ms. Waddell enters all received comments into a database, which will be submitted to the MOE in the form of a Consultation Report, after the end of the Public Comment period. Thanks. Terry Terrence A. Shannon EHS Manager 8835 Balboa Ave, Suite D San Diego, CA 92123   From: Scott Nelson [mailto:snelson@williamslake.ca] Sent: Tuesday, November 03, 2015 2:03 PM To: Kevin Brown Kb Communications; Terry Shannon Subject: Fwd: Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808 From scott Sent from my iPhone Begin forwarded message: **From:** "Kim Dressler" <kdressler@williamslake.ca> **Date:** November 3, 2015 at 1:20:12 PM PST

To: "Craig Smith" <csmith@williamslake.ca>, "Ivan Bonnell" <ibonnell@williamslake.ca>, "Jason Ryll" <jryll@williamslake.ca>, "Laurie Walters" <lwalters@williamslake.ca>, "Mayor" <mayor@williamslake.ca>, "Scott Nelson" <Snelson@williamslake.ca>, "Sue Zacharias" <szacharias@williamslake.ca>
Cc: "Darrell Garceau" <dgarceau@williamslake.ca>, "Cindy Bouchard" <cbouchard@williamslake.ca>, <rghamilton59@gmail.com>
Subject: FW: Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808

Mayor and Council –
I was requested to distribute the attached correspondence to you by Mr. Rodger Hamilton.
Thank you,
Kim

Kim Dressler, BA, B.Ed.
Executive Assistant
City of Williams Lake
450 Mart St.
Williams Lake, BC V2G 1N3
Tel: 250-392-1775
Fax: 250-392-4408
Email: kdressler@williamslake.ca
Web: www.williamslake.ca

On Fri, Nov 27, 2015 at 9:03 AM, Glenda Waddell <waddellenvironmental@gmail.com<mailto:waddellenvironmental@gmail.com>> wrote:
Mr Hamilton
We would like to invite you to join us, along with Dan Bings and Peter Lawrie at the WLPP next week if you're available. We'd like the opportunity to talk about the planned changes and discuss the amendment application.
We are still firming up the schedule but hoping you could pencil Dec 2nd at 09:30. Please let me know if this works.
Glenda

On Sat, Nov 28, 2015 at 10:00 AM, Glenda Waddell <waddellenvironmental@gmail.com<mailto:waddellenvironmental@gmail.com>> wrote:
Mr. Hamilton,
We have firmed up the schedule for meeting with Dan and Peter on December 2nd. Would you be able to join the group at the WLPP at 11 a.m.?

Please let us know if this time works for you.

On Nov 28, 2015, at 9:57 PM, R Hamilton <rghamilton59@gmail.com<mailto:rghamilton59@gmail.com>> wrote:

Ms. Waddell
Thank you for the invitation but I am not clear as to the purpose of the meeting; is there an agenda? Can you tell me the purpose of the meeting?

On Sunday, 29 November 2015, Glenda Waddell <waddellenvironmental@gmail.com> wrote:

Mr Hamilton,
Peter Lawrie from the Ministry office in Prince George is working on our amendment application and will be coming on Dec 2 to familiarize himself with the plant, our plans for RRT handling, the energy system, etc. He will be joined by Dan Bings.

Given your input on the proposed changes to the Permit and your history with this file, we felt it would be beneficial if you were able to join the group for an overview of the plans and a discussion of the amendment application.

We have been extending invitations to stakeholders who expressed an interest in learning more about the project and are pleased with the number of folks who've accepted.

I hope this gives you a better sense of the purpose for this meeting.

Sincerely

Glenda Waddell

On Sun, Nov 29, 2015 at 9:42 PM, R Hamilton <rghamilton59@gmail.com> wrote:
Ms Wadell

Can you tell me who the stakeholders are that have been invited / and accepted please?

Rodger Hamilton

On Mon, Nov 30, 2015 at 7:58 AM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:

The stakeholders I referred to were not booked for the morning of December 2nd. I believe this meeting will include Atlantic Power staff, Peter, Dan and, hopefully, yourself.

Regards

On Nov 30, 2015, at 7:04 PM, R Hamilton <rghamilton59@gmail.com> wrote:

Your mention of stakeholders piqued my interest so I contacted 9 individual and two organization stakeholders and no one reported receiving an invitation. In the course of this survey, I was invited to a meeting of stakeholders which is also scheduled for tomorrow. I have decided to attend this meeting instead of your proposed meeting at the power plant.

Thank you for the invitation.

Rodger Hamilton

On Tue, Dec 1, 2015 at 7:26 AM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:
Mr. Hamilton,

Thanks for the response.

Perhaps I was unclear as to the schedule.

Dan and Peter will be at WLPP on Wednesday (tomorrow) at 11 so should not conflict with your meeting today. Your background on this file would, no doubt, be helpful to Peter and we would like the opportunity to discuss your concerns.

Hoping this works.
Glenda Waddell

On Tue, Dec 1, 2015 at 8:53 PM, R Hamilton <rghamilton59@gmail.com> wrote:

Ms. Waddell,
You have been very clear as to the schedule. I was mistaken re: meeting dates; probably due to the fact that I have been retired for over 5 years and Sundays feel like any other work day.
I really doubt that my background on the file would be helpful to Peter but he may contact me directly if he wishes.
Regarding an opportunity to discuss concerns, it is my view the wider community has to be involved at this stage. The views expressed in my November 3 correspondence remain unchanged; I am opposed to increasing the treated wood component.
I will not be attending the meeting but thank you for the offer.

Rodger Hamilton

18) H.A. Groenenberg

H.A. (Bert) Groenenberg

17 Windmill Crescent
Williams Lake, BC V2G 1A8

November 3, 2015

Glenda Waddell
Waddell Environmental Inc.
waddellenvironmental@gmail.com
(250)640-8088

Re: Proposal to burn more rail ties at Atlantic Power, Williams Lake, BC

First of all, I am writing as a resident of Williams Lake so do not represent any group in these comments and questions.

As a resident of Williams Lake since 1990, I appreciate the role the power plant has played in reducing particulate emission in the valley area. As we all know, we have a very different situation today. There is an increased demand for fibre to heat buildings, to manufacture medium density fibreboard and wood pellets, among other uses. It is further reduced as local mills adjust to make up for almost three decades of over harvesting caused by global warming and resultant the mountain pine beetle epidemic.

Your application to burn additional quantities of creosoted and pentachlorophenol railway ties lead to these questions:

1. Your information states that only three days worth of ties will be stored on site. Elsewhere it states that the amount is 20,000 tonnes or 300,000 rail ties. Is this still three days worth of burning? Ie: Will you burn about 100,000 rail ties in day?

2. In a public meeting, you were quoted as saying emissions would increase but still well below "guideline levels." Unless the rules have changed since I last researched this subject, guideline levels are derived from using the best available control technology (BACT) to mitigate general emissions. As far as I know, guideline levels are not based on any health measure. This is still correct?

3. What is the Best Available Control technology? Will you be using it?

4. What are the expected health effects on the most vulnerable population: young children, asthmatics and immuno-compromised of the added emissions in the immediate term? The medium term? The long term? When we experience a temperature inversion, often in the fall?

5. What will be the effect on the Williams Lake Airshed Management Plan to continuous improvement of particulate matter (PM_{10} and $PM_{2.5}$) on the air shed? Will there be an improvement?

6. What will be the medium to long term effect of emissions on in the entire airshed? (For example, based on decades of lead in gasoline, it is not recommended to grow vegetables on land within a quarter mile of a major roadway; there is too much lead in the soil.)

7. One of the stated benefits of the generating plant is jobs. But wood fibre has many other uses that did not exist in 1990 as mentioned in the preamble. If there are adverse health effects, directly or indirectly, from the plant, could we realise just as many if not more jobs from another use of the existing wood fibre with fewer health effects.

8. Fugitive dust and odours from the storage area – As we experience in another major wood fibre processing facility in Williams Lake, particulate sources are not only from the stacks and/or permitted source. Fugitive dust from the storage area can far exceed any permitted source but cannot be practically measured. Yet it is and continues to be an issue even with extensive mitigation for the pellet plant. What is planned to ensure the same thing does not occur at the power plant?

Sincerely;

H.A.(Bert) Groenenberg

Cc: Matthew Lamb-Yorski. MoE

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Wed, Nov 4, 2015 at 11:18 AM
Subject: Re: FW: Ltr re Rail ties Atlantic Power
To: Bert Groenenberg <b.groen4@carrierchilcotin.org>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>
Mr. Groenenberg,

Thank you for your input on this application.
We will be taking your concerns into consideration and a copy of your letter will be included in the Consultation Report.

On Wed, Nov 4, 2015 at 11:01 AM, Bert Groenenberg <b.groen4@carrierchilcotin.org> wrote:
Gentlemen/ Mesdames;
My comments are in the attached email.
Please accept and acknowledge receipt of this email.
Bert Groenenberg

19) Williams Lake Chamber of Commerce

Williams Lake & District
CHAMBER OF COMMERCE
"THE VOICE OF BUSINESS"

Location: 1660 South Broadway
Mailing: PO Box 4878, Williams Lake, BC V2G 2V8
Phone: 250-392-5025 • Fax: 250-392-4214
Email: visitors@telus.net
www.williamslakechamber.com

October 8, 2015

Ministry of Environment:

On behalf of the board of directors of the Williams Lake & District Chamber of Commerce we offer our support to Atlantic Power (Williams Lake Power Plant), as it is a major employer of the Williams Lake business community.

Since 1993, it has provided a stable source of electricity for the BC Hydro grid, well-paying long-term jobs and economic stability for its employees and the local economy.

A brief list of the positive impacts the Plant has had on the community include the following:

- The plant has helped to reduce particulate emissions in the Williams Lake Airshed by 90 % since it began operating in 1993;
- It directly employs 32 people;
- It supports many more jobs in the region through the annual expenditure of about $8 million on goods and services;
- It is the Number One tax payer for the City of Williams Lake at $1.3 million per year
- It contributes through donations generously to services in the community

Recently, the Board has become familiar with the Plant's intentions to extend its EPA with BC Hydro for another 10 years. A critical part of that action is the Plant's request of the Ministry of Environment to expand its current permitted use of rail tie fuel from 5 % to 25 % of the overall annual fuel use. The Plant has completed a rigorous scientific review, including detailed air modeling, of any potential human health or environmental impacts that could occur due to this change. These studies and analyses have demonstrated that the design of the plant's combustion and pollution control systems can effectively control the burning of rail ties without any adverse impacts.

The Chamber believes that what are at stake are family supporting jobs, substantial annual economic activity and continuing cleaner air in the community.

Accordingly, the Chamber strongly recommends that the Ministry or Environment, BC Hydro and CN Rail approve the necessary steps to ensure the continued long-term presence of this valuable member of our Williams Lake community.

Yours truly,

Angela Sommer
President

/cb

cc Ministry of Environment, BC Hydro, CN Rail, MLA Donna Barnett and Coralee Oakes, City of Williams Lake

WILLIAMS LAKE ~ IN THE HEART OF THE CARIBOO

Visitor Centre

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Wed, Nov 4, 2015 at 4:20 PM
Subject: Atlantic Power Williams Lake Permit 8808 - WL & District Chamber of Commerce
To: Claudia Blair <visitors@telus.net>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Claudia,

Thank you for forwarding this letter concerning the Atlantic Power Williams Lake Permit Amendment. I am copying the Ministry of Environment Authorizations system and the letter will be included in the Consultation Report.

---------- Forwarded message ----------
From: **Claudia Blair** <visitors@telus.net>
Date: Wed, Nov 4, 2015 at 2:33 PM
Subject: Atlantic Power Williams Lake
To: waddellenvironmental@gmail.com
Cc: Cam McAlpine <cammcalpine@gmail.com>, City of WL - Mayor Walt Cobb <mayor@williamslake.ca>, Donna Barnett MLA - Williams Lake <donna.barnett.mla@leg.bc.ca>, Tribune - Monica Lamb-Yorski <news@wltribune.com>, MLA Cariboo North Coralee Oakes <coralee.oakes.mla@leg.bc.ca>

Claudia Blair
Executive Director
Williams Lake & District Chamber of Commerce
1660 South Broadway
250-392-5025 or 1-877-967-5253
williamslakechamber.com or tourismwilliamslake.com

Recipient of the 2014 Chamber of the Year Award

Accredited Chamber of Commerce "With Distinction"

20) Cariboo Regional District

---------- Forwarded message ----------
From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Sat, Nov 7, 2015 at 12:51 PM
Subject: Re: Support for Application to Amend
To: Nyree Alexander <nalexander@cariboord.bc.ca>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Thank you Nyree.

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

I have also copied the Ministry of Environment on this message.

On Thu, Nov 5, 2015 at 1:57 PM, Nyree Alexander <nalexander@cariboord.bc.ca> wrote:
Good afternoon,

Please see attached letter.

Nyree Alexander
Customer and Office Services / Finance Clerk
nalexander@cariboord.ca

Cariboo Regional District

Suite D, 180 N Third Avenue, Williams Lake, BC V2G 2A4
Tel: 250-392-3351 TF: 1-800-665-1636
Fax: 250-392-2812

File: 510-01

November 4, 2015

Atlantic Power
c/o Glenda Waddell, Waddell Environmental Ltd.
waddellenvironmental@gmail.com

Dear Ms. Waddell:

Re: Support for Application to Amend Atlantic Power Williams Lake Air Permit PA-8808
Located at 4455 Mackenzie Avenue North, Williams Lake, BC

The Cariboo Regional District Board of Directors would like to express their support for Atlantic Power Corporation's application to amend Air Permit PA-8808 under the provisions of the Environmental Protection Act, subject to the proposed amendment meeting Ministry of Environment standards.

The Board recognizes that approval of this permit would allow Atlantic Power to supplement its Williams Lake Plant operations with a higher component of used railway ties, and we support this initiative, subject to environmental standards being met.

Yours truly,

Al Richmond

Al Richmond
Chair

cc: Director, Environmental Protection
Mark Blezard, Williams Lake Power Plant Manager

21) Roger Gajek

Roger Gajek called Glenda Waddell on November 5, 2015. He had two concerns:

1) He understood the Amendment application to say that WLPP was requesting to discontinue the continuous emission monitors (CEMs). GW explained that was not the case. The application is there to remove the requirement to follow a federal protocol that was not designed for biomass facilities. The CEMs at WLPP will continue to operate and will continue to be verified by the MoE auditing program and by third party stack testing. This is consistent with all similar CEMs at pulpmills and power plants throughout the province.
2) He expressed concern about dust from piles of chipped RRT and from the shredding process and the need for more time to comment.

GW asked Roger to send his concerns in writing for the record.

Roger's home phone is 250-392-4906.

22) Cathy Koot

To: Atlantic Power Corporation, Williams Lake Power Plant
C/O cstahl@atlanticpower.com
CC: envprotdiv@Victoria1.gov.bc.ca
Re: Atlantic Power Rail Tie Shredding and Burning Proposal
June 16, 2015
Dear Mr. Stahl,
I am writing to you in lieu of attending the Open House scheduled for June 17, 2015 in Williams Lake, BC, as I will be out of town that day. I have a number of questions regarding the company's proposal to increase the acceptance of treated rail ties to our community of Williams Lake, BC, plus increase the capacity to store, shred and burn them at the power plant. My concerns relate to the risks of leaching out of toxins in both the pre-burned and ash phases, the risk of uncontrolled fire and the potential for extremely toxic resultant smoke emissions, as well as the very prospect of having to live with the environmental and health effects of long-term pollution resulting from regular and potentially increased treated-rail-tie emissions.
Here are my initial questions regarding the proposal:
What strategy will be use to prevent run-off from un-shredded and shredded ties stored on location?
How will toxic dust generated from the shredding process be managed to prevent inhalation and spread into environment?
Spontaneous combustion is a known hazard in chip piles. How will spontaneous fires be prevented in tie chip piles?
The plant location is in the urban/wildland interface. If there is a forest fire, how will solid and shredded ties be stored so they are not at risk of combustion, knowing that uncontrolled burning will emit tremendous amounts of carcinogens and other toxins?
What quantity of rail ties would be on site at a given time?
I have heard of observations of unburned wood chips within ash from the plant, which suggests that there can be incomplete combustion in the present system. Treated chips would release toxic smoke if not burned with sufficient oxygen, i.e. such as when blowers become clogged. What assurances can Atlantic Power provide that incomplete combustion of treated chips would never occur?
If incomplete combustion does occur, how will the ash be treated differently from the current ash dumping process so that leaching into the soil and potentially the Williams Lake River below the dump site does not occur?
How do pollutant levels in tie ash differ from those in untreated wood ash?
How does Atlantic Power define the term "periodic basis" with regard to the desired intention to burn a 50/50 tie and untreated wood mix?
We can expect continued decreased fibre supply from local mill sources between now and 2028. If Atlantic Power were to get approval to burn more ties, what is the likelihood of Williams Lake becoming the primary rail tie disposal destination for Western Canada and/or beyond?
Has there been any work done to assess the expected cumulative effects of long-term emissions from rail-tie burning into the Williams Lake Airshed, which regularly experiences temperature inversions?
What actual evidence does Atlantic Power have that ties can be burned safely and efficiently, as is stated but not really supported in the fact sheet?
Thank you for the opportunity to contribute my questions and concerns about the proposal.
Sincerely,
Cathy Koot
Williams Lake, BC cathykoot@telus.net

Response to Inquiry from Cathy Koot
Received June 17, 2015
Williams Lake, BC
cathykoot@telus.net

What strategy will be use to prevent run-off from un-shredded and shredded ties stored on location?
The shredded ties represent larger concerns than the whole ties due to the increase in the overall surface area of the material. In order to reduce the risk of run-off, ties will only be shredded as needed and stored in small quantities. Any shredded tie materials will be kept in an enclosed silo and will not be exposed to rain or snow. The whole ties will be stored in a concentrated area on site, and a prescriptive storm water management and monitoring plan will be adhered to in accordance with Ministry of the Environment requirements.

How will toxic dust generated from the shredding process be managed to prevent inhalation and spread into environment?
The process will involve the use of a low speed shredder, not a high speed hog as had been used in the past during previous grinding activities. This process would emit very little fugitive dust, most of which would not be inhalable due to the particle size. Furthermore, there will be dust suppression on the shredder to manage any dust created.

How will spontaneous fires be prevented in tie chip piles?
Spontaneous combustion can occur when piles of shredded wood have been left for long periods of time (>3 months), and when certain other ambient conditions are met. The rail ties in this case will only be shredded as needed and will be maintained in a controlled environment in relatively small quantities (1-3 day supply).

The plant location is in the urban/wildland interface. If there is a forest fire, how will solid and shredded ties be stored so they are not at risk of combustion?
The plant has an irrigation sprinkler system surrounding the fuel pile, a fire water loop with deluge stations around the perimeter, and qualified and trained staff to manage any potential fire situations.

What quantity of rail ties would be on site at a given time?
The size of the pile would vary seasonally. On average, we expect an inventory of approximately 10,000 tonnes, but this could range as high as 20,000 tonnes during peak periods (300,000 ties).

What assurances can Atlantic Power provide that incomplete combustion of treated chips would never occur?
Excess oxygen is consistently maintained at the require boiler design level which supports complete combustion, and the system includes modern emissions abatement equipment that treats the flue gas prior to discharging from the stack. In addition, the plant has a CEMS unit (continuous emissions monitoring system) which monitors opacity and NOx that would help us to identify conditions in which complete combustion may not occur. The results from the CEMS monitoring are regularly reported to the MOE. Incomplete combustion occurs in an uncontrolled environment, whereas fuel burnt in a wood-fired boiler is part of a controlled high-temperature combustion environment which greatly reduces the possibility of incomplete combustion. The shredded rail ties have a higher heating value and tend to burn more quickly and completely than green / wet wood.

If incomplete combustion does occur, how will the ash be treated differently from the current ash dumping process so that leaching into the soil and potentially the Williams Lake River below the dump site does not occur?
In the unlikely event that wood is not completely burned and is apparent in the ash, this ash would be

collected by a loader and added back on the fuel pile for re-introduction in to the furnace. Otherwise the ash will be handled and managed in the same way.

How do pollutant levels in the ash differ from those in untreated wood ash?
The pollutant levels in the ash from rail ties, although slightly higher than those from traditional fuel sources, are still well within BC Regulations.

How does Atlantic Power define the term "periodic basis" with regard to the desired intention to burn a 50/50 tie and untreated wood mix?
The amount of rail ties burned will vary on the supply and availability of the ties, as well as supply and availability of traditional biomass supply. We expect to burn an average concentration of rail ties of approximately 15%-25% on an annual basis. However, we are requesting the flexibility to go up to a 50/50 mix. The 50/50 ratio is being used as the basis for all modeling as a proactive measure.

If Atlantic Power were to get approval to burn more ties, what is the likelihood of Williams Lake becoming the primary rail tie disposal destination for Western Canada and/or beyond?
Our primary fuel source will always be our traditional fuel supply from the local mills. In the event that additional area mills are closed, no more than 50% of our fuel supply would come from rail ties as permitted. Furthermore, the availability of rail ties is also limited.

Has there been any work done to assess the expected cumulative effects of long-term emissions from rail-tie burning into the Williams Lake Airshed, which regularly experiences temperature inversions?
It is the Province's responsibility to manage the airshed, and in doing so they impose standards which take into consideration cumulative long term health effects, which we must assess as part of our dispersion modelling. This modelling will capture all meteorological conditions experienced by the airshed, including temperature inversions.

What actual evidence does Atlantic Power have that ties can be burned safely and efficiently, as is stated but not really supported in the fact sheet?
The Williams Lake Power Plant conducted a week-long test in 2001, burning 100% rail ties, and the air testing results were well below permit standards. Since then, there have no material changes to the plant process that would alter the results. Within that context, and given that we will be burning at most a 50/50 mixture of rail ties and traditional fuel sources, we believe the process will be safe. Additionally, there are currently 13 plants in the United States burning rail ties for power, which we believe demonstrate it can be done at scale in a safe and effective manner.

23) Interior Health

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Wed, Nov 4, 2015 at 4:42 PM
Subject: Re: Williams Lake Power, Site Visit
To: "Baytalan, Greg" <Greg.Baytalan@interiorhealth.ca>

Hello Greg,

We're working on schedules as well. Will get back to you as soon as possible.

On Tue, Nov 3, 2015 at 7:37 PM, Baytalan, Greg <Greg.Baytalan@interiorhealth.ca> wrote:
Glenda…In effort to juggle a busy schedule, I'm trying to see if I can make the upcoming November 19, 2015 Williams Lake Air Quality Roundtable meeting. This meeting extends to 2:00 pm. I'm wondering if it's possible for you to show me around the Williams Lake Power facility, either after the meeting on the 19th, the afternoon of the 18th, or the morning of 20th?

Greg Baytalan, B.Sc., C.P.H.I.(C)
Specialist Environmental Health Officer
Interior Health

Questions presented in the following letter from Greg Baytalan can be found in Appendix C of this report as follows:

Question #1 – Section 1.3.2

Question #2 – Section 1.2.5

Question #3 – Section 1.8.3.3

Question #4 – Section 2.9.1

Interior Health
Every person matters

October 28, 2015

File: Williams Lake Power Plant, Atlantic Power

Glenda Waddell
Waddell Environmental Inc.
waddellenvironmental@gmail.com

Dear Glenda Waddell:

Re: Williams Lake Power Plant, Atlantic Power Corp. MOE Air Permit Amendment 8808

I am in receipt of the October 8, 2015 letter from Mark Blezard, P. Eng., Plant Manager, Williams Lake Power Plant that describes you as the contact for MOE Air Permit Amendment 8808.

Mentioned is an increase in the volume of treated wood from 5% to 50% of the total biomass fuel supply; treated wood includes railway ties. Included is the incineration of hydrocarbon contaminated absorbent materials up to 872 liters/day of waste oil, and clean construction demolition waste.

In the above context the following questions are provided:

- The amendment proposes to delete the provisions for continuous emission monitors audited in accordance with Environment Canada's EPS 1/PG/7 Protocols and Performance Specifications, for the reason that these protocols are intended for fossil fuel burning systems. In that treated railway ties, contaminated absorbent materials, and 872 liters/day of waste oil contains fossil fuels, can you explain justification for deletion of the provisions mentioned, and describe what will be in place to suffice?

- It is my understanding that railway ties are treated with either creosote or pentachlorophenol and that diesel fuel is used as the carrier into the wood. Are you able to supply Plant temperature specifications in comparison to those adequate enough to destroy chemicals (example dioxins and furans, or other) to thereby render stack emissions of non-concern in this context?

- Diesel fuel, in particular fuel of previous decades contained sulphur. How do you see the proposed new sources of fuel impacting sulphur emissions?

- What procedures will be in place to ensure demolition waste is clean and free of non-biomass ingredients such as asbestos-containing drywall filler, and what provisions are in place for particulate matter (PM) reduction?

I look forward to your response, and can be reached at (250) 868-7853 if you wish to discuss.

Sincerely,

Greg Baytalan
cc. Mark Blezard, Plant Manager, Williams Lake Power
Mathew Lamb-Yorski, Environmental Protection Officer, MOE

Bus: (250) 868-7853
Fax: (250) 868-7760
Email: greg.baytalan@interiorhealth.ca
Web: www.interiorhealth.ca

INTERIOR HEALTH
Health Protection
1340 Ellis Street
Kelowna, BC,V1Y 9N1

24) John Pickford

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Sat, Nov 7, 2015 at 10:37 AM
Subject: Re: Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8 application to burn rail ties
To: john snick <jsnick66@hotmail.com>
Cc: "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

On Thu, Nov 5, 2015 at 1:23 AM, john snick <jsnick66@hotmail.com> wrote:
Director, Environmental Protection
400-640 Borland St.
Williams Lake, BC V2G 2T1
Dear Sir / Madam:
Please note my opposition to the approval of the applicant, Atlantic Power,
being allowed to burn additional railway ties in Williams Lake generation facility.
The "Witch's Brew" of chemicals contained in both the stored and chipped tiesand the resulting smokestack effluent - dioxins and furans, according to the applicant's representatives - will degrade the atmosphere of Williams Lake and compromise the health and safety of the area residents by air pollution as well as possible contamination of drinking water sources. Such deleterious effluents can also be added to environment by storing and chipping of cresote impregnated ties.(For years it has been illegal for homeowners to buy the preservative Creosote. This is a harmful substance.)
I humbly suggest that we protect the relatively pristine air quality of the area and maintain such atmosphere for future generations. this is our duty and obligation. Thank you for your attention to this matter and for allowing my input on such an important matter as the air we, and our descendants, breathe.

Respectfully,
John Pickford,
Williams Lake, B.C.

25) Karen Dunphy

On Thu, Nov 5, 2015 at 7:32 AM, Karen <pkmdunphy@shaw.ca> wrote:
Please read the attached letter.

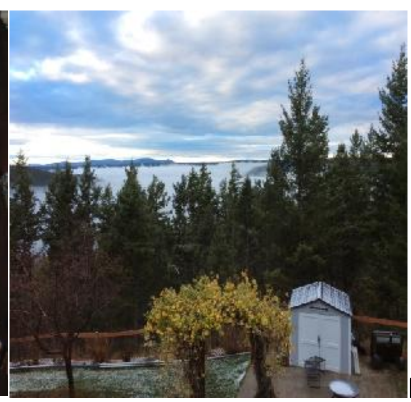
To Whom It May Concern:

I live at the top of 168 Mile Road looking towards Westridge above and to the northeast of the power plant. I drive past this plant morning, noon and night on the Mackenzie Connector. I already have concerns about the mountainous acres of wood waste piled at this plant that is constantly steaming or catching fire or being sent into the atmosphere on windy days (see Pic #1). I cannot believe their permit would allow this amount of dangerous combustible material to be stored in city limits. I will confess I like the smell of wood, a good campfire, or the smell of a lumber yard but on the weekend of October 16/17 and again to a lesser extent on Oct 23 the smell as I drove by and then got out of my car in the driveway was acrid, eye burning and immediately made you feel like you had a head cold. My neighbours all commented on it. It was a chemical smell and as it was strongest as you drove past the power plant I can only guess that something was different on those days. In my research I have read that the biggest complaints of neighbours for plants burning railway ties are the chipping dust, smell and storage of the railway ties. A radio interview with Scott Nelson one of our city councillors stated, in answer to a question about complaints in previous years, that the complaints were about the location of the chipping process and storage of the ties. Literally 5 minutes up the road in a quantity 10 times that amount is not an answer to those complaints just because it may be hidden from view!!! That is also my greatest concern. The chipping every 3 days, the vast storage of 1000's of ties trucked here from all over the country. As well where the ash is going to be trucked to and stored. Does the ash after burning creosote still contain chemicals? Is there really a study that knows what the long term effects are? Kamloops city and medical community did not want their citizens used as experiments in the unknown long term effects in a valley atmosphere. **"The location is very central in the base of the valley, literally within hundreds of yards of housing," said Kamloops Councillor John O'Fee. "So what if this is not working properly, what if we are sending heavy metals into the air and don't know about its effects for 10 years?"** We are in even a smaller valley that is subject to inversion numerous times of the year. (see picture #2 & 3 & 4)These supposedly safe emissions do not blow away in the wind. Right beside this plant is a hockey rink and the local stockyards as well as homes just up the street it is not in the middle of nowhere. This plant is a corporation with shareholders and is only interested in the bottom line. Our city council and CRD are only interested in the tax dollars they would lose if this plant shuts down. I would hope your interest lies in the impact on human health. There was a reason they were only allowed to burn 5% railway ties in the first place and should stay that way. If they can truck ties from all over the place they can truck wood waste just the same. They are looking for a cheaper alternative. Cogeneration plants were not built to burn railway ties for energy. If they had a plant, not in a valley right in city limits, but in an open area away from population then I may think different. Please say no to Atlantic Powers' application or at the very least to mitigate the risks have their storage and chipping facilities out of town and truck the chip waste here as needed stored in a safe environment for a few days' worth at a time.

Sincerely Karen Dunphy

1995 168 Mile Road
Williams Lake, BC
pkmdunphy@shaw.ca
250-392-4148

Pic #1 Dust storm in the valley. The chip piles at the power plant and all the mills that day blanketed everything. June 2015. Picture not doing it justice. The power plant would be to the left in the valley.

Pic# 2 & 3 Inversion. I have many of these pictures where I show my friends in town that it really is sunny out there even though you can't tell downtown. Happens Spring, Fall and Winter.

Pic #4 INVERSION TRAPS POLLUTANTS IN THE VALLEY!!S

Sometimes the condition of the atmosphere is very still (stable) and there is very little mixing. This occurs when the air near the surface of the earth is cooler than the air above (a temperature inversion). This cooler air is heavier and will not want to move up to mix with the warmer air above. Any pollutants released near the surface will get trapped and build up in the cooler layer of air near the surface. Temperature inversions are very common in B.C., especially in mountain valleys, often forming during calm clear nights with light winds. They can even persist throughout the day during the winter.

A Temperature Inversion in a Valley

This inversion and the valley walls trap pollution.

(From A Teacher's Guide to Clean Air, Ministry of Environment)

On Fri, Nov 13, 2015 at 3:02 PM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:
Karen,

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

26) Williams Lake Field Naturalist

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Sat, Nov 7, 2015 at 11:06 AM
Subject: Re: submission re Atlantic Power rail tie burning application
To: Fred McMechan <fred_mcmechan@telus.net>
Cc: Director EnvironmentalProtection <authorizations.north@gov.bc.ca>

Mr. McMechan,

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

The 30 day comment period ends on November 15th.

On Thu, Nov 5, 2015 at 11:53 AM, Fred McMechan <fred_mcmechan@telus.net> wrote:
Director, Environmental Protection,

Please find attached the submission by the Williams Lake Field Naturalists regarding the Atlantic Power rail tie burning application
Please reply providing a receipt for receiving this submission. Thank you.
Sincerely ,
Fred McMechan, president, Williams Lake Field Naturalists

WILLIAMS LAKE FIELD NATURALISTS

1305A Borland Road
Williams Lake, BC
V2G 5K5

November 3, 2015

Director, Environmental Protection
400-640 Borland St. Williams Lake BC V2G 2T1
Via email: authorizations.north@gov.bc.ca

Hello,

Re: Comments from the Williams Lake Field Naturalists regarding Atlantic Power's application to burn up to 50% rail ties in Williams Lake (Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8, Permit 8808 amendment)

The Williams Lake Field Naturalists (WLFN) understand the value of the Atlantic Power plant in generation of electricity and reduction of fly-ash from burning local mill waste. However, we have substantial concerns with bringing in a significant new waste stream from across western Canada that would increase the potential for toxic emissions into a relatively restricted and highly populated valley. We request that the following questions and concerns be considered by the Ministry of Environment when evaluating this proposal:

1. The corporation has indicated that air dispersion modeling captures all meteorological conditions experienced by the airshed, including temperature inversions which can trap air pollutants in the valley for extended time periods. However, we understand that the model does not acknowledge presence of other wood-fired heaters, power boilers and industrial energy systems in the Williams Lake Valley in the analysis of exceedance of the nitrogen dioxide ambient objective.

a. The scale of the map in the report is 1:160 000, which is inadequate to evaluate neighbourhood scale effects. Can a map with greater resolution be produced such that local residents can read the modeled effects at a neighbourhood scale?

b. We submit that it is essential that the Province ensure that the cumulative effects of all emissions in the airshed have been adequately considered in this permit application?

c. It is unclear to us whether modeling adequately considered long term cumulative effects on soils and water including potential for bioaccumulation. We submit that potential long-term effects must be seriously and thoroughly assessed.

2. Is there a plan to reduce the amount of ties in the fuel mix during inversion conditions?

3. The Air Dispersion Modeling Study utilizes results from a 2001 manual stack sampling survey for a trial burn using rail ties from one source.

a. The 2001 sampling results may not accurately represent fuel and emission conditions over the next 25 year power purchase agreement. Evidence is required to ensure that waste rail ties from varied sources (e.g. CN Rail, CP Rail, Burlington Northern, etc.) are indistinguishable in contaminant types and concentrations. If there are material differences, then each rail tie source should undergo testing.

b. The power boiler and its associated pollution control equipment have aged 14.5

years since the stack sampling. We are concerned that maintenance, process and equipment modifications and/or changes over that period may have changed the performance characteristics and emissions.

4. As railway ties are often treated with variable amounts of pentachlorophenol (PCP), combustion of the ties can release chlorinated hydrocarbons such as dioxins and furans. These toxins are very persistent, extremely toxic, and subject to bioaccumulation in animals, soil and water.
a. How will the release of these toxins be measured and their effects mitigated in surrounding soil and water?
b. Will the corporation be able to differentiate ties that are treated with PCP and modify the processes to deal with these more risky chemicals?

5. Atlantic Power has indicated that whole ties will be stored in a concentrated area on site, and a prescriptive storm water management and monitoring plan adhered to. As PCP and creosote are toxic, how will leaching from stored ties be controlled, measured, and monitored to avoid contamination of the site?

6. The reference summary provided by Atlantic Power suggests that most of the toxic substances will be mitigated by treatment to be within allowed guidelines. Which substances will not be mitigated to this level?

7. What BC regulations and standards are used to determine acceptable pollution from rail tie ash? As the current ash dump is close to capacity, will this assessment consider the location of a new landfill for ash containing rail tie contaminants?

8. The plant location is in the urban/wildland interface. Is there evidence that an irrigation and water deluge system would be effective at extinguishing a fire within 150,000 – 300,000 ties?

We appreciate the need to maintain a fuel source for the energy plant. However, we are opposed to increasing the proportion of rail ties in the fuel mix beyond the currently permitted 5% to meet this need. In our opinion, the topography and population density of the Williams Lake Valley and the potential for damaging cumulative effects of pollution emissions is too great a risk for the proposed increase to be approved.
Thank you for the opportunity to comment.
Sincerely,
Fred McMechan, President, Williams Lake Field Naturalists

27) Fred McMechan

From: Glenda Waddell <waddellenvironmental@gmail.com>
Date: Sat, Nov 7, 2015 at 11:16 AM
Subject: Re: Amendment application-PA8808 Atlantic Power
To: Fred McMechan <fred_mcmechan@telus.net>
Cc: Director EnvironmentalProtection <authorizations.north@gov.bc.ca>

Mr. McMechan,

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

---------- Forwarded message ----------
From: **Fred McMechan** <fred_mcmechan@telus.net>
Date: Fri, Nov 6, 2015 at 11:38 AM
Subject: Amendment application-PA8808 Atlantic Power
To: Director EnvironmentalProtection <authorizations.north@gov.bc.ca>
Cc: Glenda Waddell <waddellenvironmental@gmail.com>, Donna Barnett <donna.barnett.mla@leg.bc.ca>, Kim Dressler <kdressler@williamslake.ca>, CaribooRegionalDistrict <mailbox@cariboord.ca>

Director, Environmental Protection
Please find attached : a submission from Fred McMechan on the proposed amendment to permit 8808 for Atlantic Power. Please send me a receipt indicating this submission has been received.
Thank you, Fred McMechan

Fred McMechan,
1225 Moon Avenue
Williams Lake BC V2G 4C1
Email: fred_mcmechan@telus.net

November 5, 2015

Director, Environmental Protection
400-640 Borland Road Street
Williams Lake BC
V2G 2T1

RE: proposed amendment to PA 8808 V2G by Atlantic Power Preferred Equity Ltd., 4455 Mackenzie Avenue, Williams Lake BC V2G 5E8

I wish to comment personally on this proposed amendment. I have been a resident of Williams Lake for over 50 years. I am very concerned about the potential negative effects from the burning of railway ties in the Williams Lake River Valley which may occur with the approval of this amendment. I hope that I can continue living in a valley which has a healthy air quality. I strongly oppose this amendment and recommend that the present permit be kept.

I wish to present two major factors which I believe support my viewpoint:

1) Williams Lake is located in a narrow deep valley which has strong temperature inversions.
   There is a probability, however small, that there could be the release of toxic chemicals into the valley with the burning of ties, due to such possibilities as inadequate monitoring, human error during the operation and machine malfunctions. If this event occurred there would be, especially during an inversion, a serious detrimental effect on the health of our residents. We simply cannot take any chances that the air quality can be compromised and the health of residents be negatively affected.
   If a plant needs to be built to burn railway ties as outlined in the proposed amendment, then it should be located well away from any residential area such as in our city, and in an area where any toxic fumes can be dispersed by winds in the area .
2) I am also concerned about the following socio-economic factor regarding the welcoming of new residents to our city. I wish to see that our city can welcome families, seniors and others with an expectation that they are going to live in a healthy, vibrant city. If our city ends up with a reputation of having a plant which burns railway ties and has possible negative impacts on health then potential new residents will rightfully decide to live elsewhere. Besides losing the dynamics of having new residents the economic benefits of having an increase in population will be lost.

Yours sincerely,

Fred McMechan
cc. Glenda Waddell, waddellenvironmental@gmail.com
Donna Barnett, donna.barnett@leg.bc.ca
City Council, City of Williams Lake, kdressler@williamslake.ca
Board, Cariboo Regional District, mailbox@cariboord.ca

28) Bette McLellan

---------- Forwarded message ----------
From: **Bette McLennan** <bettemcl@gmail.com>
Date: Thu, Nov 5, 2015 at 6:10 PM
Subject: Burning of railway ties in Williams Lake
To: authorizations.north@gov.bc.ca
Cc: waddellenvironmental@gmail.com

To Whom it May Concern:

I am very opposed to the burning of creosote and pentachlorophenol treated tied by Atlantic Power in our community. The air quality in our area, particularly the bowl that the city and power plant are located in, is already at a level that is bordering on unhealthy.
Although there seems to be assurances that the particulate and gases emitted will not be adverse to our health, I have severe reservations in trusting that argument. Surely any chemical release could result in affects that aren't expected. Too many times I've seen this happen in industry. If this application is granted, we could see ties being shipped here from all over Canada. What are the cumulative effects over time of such burning? No one knows for sure.
All my children & grandchildren live in this area, so, of course, I would be opposed to anything that could negate a healthy environment for them. Breathing pure air seems like it should be human right!!
Please turn down this application. There must be a better way!
Sincerely & hopefully yours,
Bette

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Tue, Nov 10, 2015 at 1:46 PM
Subject: Re: Burning of railway ties in Williams Lake
To: Bette McLennan <bettemcl@gmail.com>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Bette,

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

29) Leah Selk

---------- Forwarded message ----------
From: **Leah Selk** <leahjselk@gmail.com>
Date: Fri, Nov 6, 2015 at 2:07 PM
Subject: Re: Proposed Amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808
To: authorizations.north@gov.bc.ca
Cc: waddellenvironmental@gmail.com, donna.barnett.mla@leg.bc.ca, kdressler@williamslake.ca, mailbox@cariboord.ca

To whom it may concern,

I am writing as a property owner and resident of the city of Williams Lake to express my concerns regarding the proposed amendment posted October 8, 2015. The Environmental Protection Notice identifies an application to “2. Raise the limit on waste rail ties as a proportion of the authorized fuel from the 5% to 50%.”

I do not feel there has been sufficient, independent assessment of the short and long term effects to the air quality of our valley-based community, to the environmental impacts and hazards of storing the ties, or to the safety of the community should a disaster arise. I have great concerns for residential attraction and retention to Williams Lake, as well as a potential reduction in property values should this amendment be approved prior to further assessment and debate. These concerns have not been adequately addressed in the available material.

I strongly believe these concerns demand further independent investigation before a decision on this matter.

Regards,

Leah Selk

Leah Selk
1154 Tower Cres
Williams Lake, BC V2G 1A4
leahjselk@gmail.com

Director, Environmental Protection
400-640 Borland St
Williams Lake, BC
V2G 2T1
Delivered via: authorizations.north@gov.bc.ca

cc: Glenda Waddell, waddellenvironmental@gmail.com
Donna Barnett, MLA, donna.barnett.mla@leg.bc.ca
Mayor and Council, City of Williams Lake, kdressler@williamslake.ca
Cariboo Regional District, mailbox@cariboord.ca

Re: Proposed Amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808

To whom it may concern,

I am writing as a property owner and resident of the city of Williams Lake to express my concerns regarding the proposed amendment posted October 8, 2015. The Environmental Protection Notice identifies an application to "2. Raise the limit on waste rail ties as a proportion of the authorized fuel from the 5% to 50%."

I do not feel there has been sufficient, independent assessment of the short and long term effects to the air quality of our valley-based community, to the environmental impacts and hazards of storing the ties, or to the safety of the community should a disaster arise. I have great concerns for residential attraction and retention to Williams Lake, as well as a potential reduction in property values should this amendment be approved prior to further assessment and debate. These concerns have not been adequately addressed in the available material.

I strongly believe these concerns demand further independent investigation before a decision on this matter.

Regards,

LeahSelk

Leah Selk

30) Kris Andrews

---------- Forwarded message ----------
From: **Kris Andrews** <darcyandrews@shaw.ca>
Date: Fri, Nov 6, 2015 at 3:04 PM
Subject: Letter to EP regarding Atlantic Power Corp application to ament PE 8808, October 15, 2015.
To: authorizations.north@gov.bc.ca
C: waddellenvironmental@gmail.com, kdressler@williamslake.ca, donna.barnett.mla@leg.bc.ca, mailbox@cariboord.ca

Please find attached a letter from myself, Kris Andrews, regarding an application to amend Atlantic Power Corp, PE 8808 dated Oct 15, 2015.

Kris Andrews
1385 Borland Road
Williams Lake, B.C.
250-382-2764
darcyandrews@shaw.ca

Kris Andrews
1385 Borland Road
Williams Lake, B.C.
V2G 5K5

Nov 6, 2015

Director, Environmental Protection
400-640 Borland Street
Williams Lake, BC V2G 2T1
(delivered via: authorizations.north@gov.bc.ca)

Re: Application to Amend Waste Managment Permit PE 8808, Atlantic Power Corporation, Williams Lake, dated Oct 8, 2015

Dear Sir or Madame
I wish to register with you, my concerns regarding the request by Atlantic Power Corporation to amend Waste Management Permit 8808 to allow:

- **Section 2.7.1: burning of up to 50% treated railroad at its power plant, and**
- **Section 2.7.2: burning of contaminated absorbent materials originating from accidental spills up to 872 l/day or more subject to the Directors authorization and**
- **Section 2.7.3: burning of specified non hazardous biomass wastes from w/in the CRD not to exceed 1% daily feed of plastic glass and metal contaminants (how to ensure < 1%?)**

I have been a resident of Williams Lake for 41 years. The proposal to use the current Atlantic Power Plant facility in our community to become the Western Canada centre for disposal of waste railroad ties treated with creosote and pentachlorophenol's by burning them in the power boiler, in addition to up to 872 L/day of liquid waste in contaminated absorbent materials and other specified biomass wastes with hazardous items (metals, glass and plastic reduced to <1%) <u>is unacceptable</u> to me.

Williams Lake has a history of having some of the worst air quality conditions in the province due to its valley situation and its long lasting winter temperature inversions resulting in poor venting and subsequent build up of contaminants harmful to human health in the airshed. This is inspite of the fact that the Atlantic Power Plant was initially approved to address the issue of particulate air quality exceedances in the airshed due to burning of forest industry wood waste in the old inefficient beehive burners.

A great deal more information needs to be made available to Williams Lake residents before they can understand the effects of the proposed permit amendments on air, water and soil quality as well as food crop production in the William's Lake air and watersheds.(Kale is recommended for monitoring organic contaminants such as dioxins and furans discharged from incinerators in Europe due to uptake in its waxy cuticle.)

Air Quality Concerns:

1. **The April 2001 stack test results from LanFranco and Associates reported by RWDI (Sept 8, 2015) in their air dispersion modelling study for Atlantic Power Corp, Williams Lake indicates that there would be significant increases in concentrations of several air contaminants released when burning 100% rail ties i.e. hydrogen chloride, sulphur dioxide, and total chlorophenols as well as minor increases for other contaminants including some metals and furans etc. Is a 14 year old stack test of one hour duration on 3 consecutive days sufficient to characterize a worst case scenario for modelling airshed conditions in WIlliams Lake. We do not know the weight or volumetric mix of creosote treated ties to pentachlophenol treated ties fed to the burners during the LaFranco stack tests. Feed from these tests should be characterized and possibly each type of treated tie tested separately to determing effiency of organic compound destruction during the combustion and heat recovery processes. I did not notice that NOx's were sampled during the 2001 stack tests. I don't think the values used in the model from the plants Continuous Monitors were reported in the RWDI model, although NO_x is a contaminant of concern in the WL airshed and the report suggests the model predicted NO_x levels could reach or exceed the Ambient Air Quality Objectives.**

2. **Does the RWDI airshed model take into account the organic contaminant loading from volatilization of creosote and PCP compounds from ties stored at the plant and in shredded chips waiting to be feed to the burner. The fumes coming off the rail tie chipping facility at the Stationhouse Gallery was over powering. I would be surprised if these fumes are harmless to human health during long exposures. How are they additive to the other stack emissions and other sources of VOC's in the airshed?**

3. **How can I evaluate the effect of a possible fire in the tie or chip storage area on air quality and my health? The chipping facility at the Stationhouse Gallery was sparking frequently. It is amazing that a fire did not get started at this site.**

4. **Waste Management Permit number 103943, issued to Aboriginal Cogeneration Corporation in Kamloops in 2010 for burning railroad ties to generate power specifically <u>prohibits use of rail ties treated with pentachlorophenol</u> as an authorized fuel along with a long list of other types of combustible wastes. Kamloops appears to be a much larger air shed than Williams Lake. Why should Atlantic Power be permitted to be burn chlorophenol treated rail ties in the in the William's Lake airshed?**

5. **How does the height of the power plant discharge to air compare to the upper limit of stable air formed during inversion conditions? Is it possible to raise the height of the power plant discharge through a piped system to a height above the maximum stable air upper limit, such as appears to be used at the pulp mill in Kamloops?**

6. **The open house held by Atlantic Power Corp in July did not present information on the design of the burner system that would help to understand the efficiency of the wood waste combustion processes, what type of incineration occurs, what temperatures are reached in the different parts of the combustion and heat recovery processes, how air or oxygen is introduced into the system to ensure that the time, temperature and turbulence conditions are sufficient to break down the toxic organic chemicals introduced into the burner and to ensure that toxic products are not reformed where temperatures are reduced following heat recovery.**

7. **I have heard from a knowledgeable person who visited the plant several years ago that uncombusted wood fibres were observed in the ash indicating incomplete combustion and the vents that introduce air into the combustion chambers were plugged with ash and solid materials in a manner that would reduce the needed oxidizing atmosphere. These conditions of operation are not optimal. What steps will be taken if rail ties are burned in the plant to prevent clogging of the air vents to**

ensure complete combustion to destroy toxic organic compounds in the treated wood chips.

Miscellaneous comments;

1. On January 31, 2013, the Environmental Protection Agency (EPA) published in the 40 CFR Part 63, the National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters (commonly known as Boiler MACT). Under Boiler MACT, treated wood, including railway ties, will not be able to be used as fuel in boilers after January 31, 2016 unless there is a successful appeal of this regulatory condition. **On line EPA fact sheets on the recent conditions under which commercial and industrial incinerators and boilers will be required to operate state that b**iomass electricity is expensive especially when health care costs from resulting diseases are taken into consideration. It is costly as well as dirty, In 2010, EPA estimated that the value of the benefits resulting from tightening restrictions on air toxics emissions from commercial and industrial boilers and process heaters - ranges from $17 billion to $41 billion for the year 2013, outweighing the costs by at least $14 billion. Further those standards will avoid up to 8,100 premature deaths, 5,100 heart attacks, and 52,000 asthma attacks. EPA estimates that Americans would receive 12 to 30 dollars in health benefits for every dollar spent to meet the proposed standards. I hope these EPA standards will be consulted when drafting new operation and monitoring conditions for PE8808. I would hope to see many more conditions and specifications included in PE8808 if it is amended to allow burning of greater than 5% treated waste rail ties.
2. I would like to know how this permit amendment application will be evaluated by the Ministry of Environment and I would like to have an opportunity to be informed by and ask questions of the permit regulators about conditions that will be required in an amended permit PE 8808 before it is issued, regarding the quantity and quality of material to be disposed of in the plant, operation and maintenance conditions, pollution abatement conditions, monitoring conditions, parameters and frequency of sampling, inspection frequency by regulatory agencies, and transparency and availability of emission and monitoring results, plant compliance inspections and frequency of state of the airshed reporting to the public.
3. The Ministry of Environment needs to work on a solution for disposal of old toxic rail ties in British Columbia that meets the industry needs, but does not compromise the health and well being of its citizens. I have heard that Europe is investigating the possibility of using alternate materials for ties. This seems desirable as we continue to strive for ways to minimize our impact on climate through CO_2 emissions.
4. **The citizens of Williams Lake lobbied hard to stop the chipping of the rail ties in the centre of our downtown several years ago when the volatilization of the chipped ties at the bottom of Oliver Street overpowered anyone in that part of town, especially**

those businesses located right next to the operation. And that was only for introducing a 5% feed into the power plant. It is totally unacceptable to subject the citizens of Williams Lake to breathing air containing volatilization products from the ties as they are chipped, or from the stack emissions when they are burned at a rate of up to 50% feed.

5. **One of the key criteria in establishing a waste wood burning facility should be local air quality conditions. While the Atlantic Power Corp cogen plant has improved air quality in the WL airshed by reducing levels of particulate release from the old days of the bee hive burner, the burning of waste wood treated with preservatives that are toxic to life is a different issue. Plants that dispose of toxic materials should not be sited in populated valley bottoms with diurnal and seasonal poor venting conditions. There are other locations away from populated valley bottoms, not subject to winter temperature inversions and entrapped air conditions, where the "risk" of human error or profit driven corporate efficiencies will not affect the health of a community of 11,000 people. Don't play the risk game with our community! Why not put such a facility in a place with a lower frequency of temperature inversions, and a source of wood fibre for power generation and CN railway running through it, such as Dunkley Lumber located between Prince George and Quesnel or Ainsworth Lumber between 100 Mile House and Clinton?**
6. **Kamloops rejected a proposal to burn rail ties in its community even though a provincial Waste Management Permit was issued and even though this permit was to be located in a larger more southern valley bottom. The Kamloops permit prohibits burning of rail ties treated with pentachlorophenol along with many other potential combustibles. The WL Atlantic Power Corp permit allows burning of PCP treated ties and the amendment application has requested authorization to burn hydrocarbon contaminated absorbent materials up to 872 l/day in accordance with the Hazardous Waste Regulations and up other authorized construction and demolition wastes, paper, etc containing less than 1% plastic, glass and metals. The Kamloops permit references preparation of a Ties Screening Procedure acceptable to the Director with records of material rejected during the screening process to be kept for 5 years. The facilities, plans, works assessment, investigations surveys, programs and reports related to design of the facility must be certified by qualified professionals for the Kamloops permit. Odour Control beyond the property boundaries is a requirement of the Kamloops permit. Fugitive dust control must adhere to a Dust Control Plan. The Kamloops Permit required sampling of the authorized discharges within 30 days of start up for a large suite of parameters and <u>quarterly</u> thereafter. Continuous Emissions Monitors on the discharge stacks in the Kamloops permit are required for: CO, O2, CO3 and Temperature at two locations in the system assembly. An environment monitoring program including continuous monitoring of visible haze from the discharges using a web based camera at approved locations is**

required. Sampling and monitoring conditions must be validated with data confirming they were done under normal operating conditions. These conditions are far more stringent than those in Permit 8808. I hope PE 8808 will be amended to include these far more stringent monitoring conditions if it is granted approval to burn up to 50% rail ties.

7. **European Fire Ant: in May of this year, CP rail ties from the old Arbutus line in Vancouver were found to be infested with European Fire Ants. I hope these ants won't establish in Williams Lake if by chance they arrive here on rail ties from the southern parts of our Province.**

In conclusion, i believe it is unacceptable to allow PE 8808 to be amended to permit burning of 50% rail ties in this populated community.

Thank you for allowing me to submit my concerns on this permit amendment application. I would appreciate being kept informed of any decisions or further information released on this proposed permit amendment.

If you wish to contact me I can be reached by phone at 250-382-2764 or email at: darcyandrews@shaw.ca.

Yours truly

Kris Andrews
Williams Lake resident.

Cc Glenda Waddell waddellenvironmental@gmail.com
Mayor and Council, City of Williams Lake kdressler@williamslake.ca
Donna Barnett, MLA donna.barnett.mla@leg.bc.ca
Cariboo Regional District mailbox@cariboord.ca

On Fri, Nov 13, 2015 at 3:01 PM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:

Mr. Andrews,

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

31) Robin Dawes

---------- Forwarded message ----------
From: **Robin Dawes** <robindawes2@gmail.com>
Date: Fri, Nov 6, 2015 at 10:03 PM
Subject: Re: proposed amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808
To: authorizations.north@gov.bc.ca
Cc: waddellenvironmental@gmail.com, kdressler@williamslake.ca, donna.barnett.mla@leg.bc.ca, mailbox@cariboord.ca,info@williamslakechamber.com

Attached please find my submission to the call for public input regarding the proposed amendment to Atlantic Power Preferred Equity Ltd request to amende permit PA-8808.
Thank you for the opportunity to make this input.
Robin Dawes
1390 12th Ave
Williams Lake BC
V2G 3X4

Nov 8, 2015

Director, Environmental Protection
400-640 Borland Street
Williams Lake, BC V2G 2T1
Delivered via: authorizations.north@gov.bc.ca
Re: proposed amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808
Thank you for the opportunity to reply to the proposed amendment to a change in Atlantic Power's licensing agreement PA-8808.
I have a number of concerns with regard to the proposed licensing amendment and some suggestions as to how I feel these issues might be appropriately addressed.
First, it must be acknowledged that the biomass-fueled electricity generation plant, currently operated by Atlantic Power, has been instrumental in improvements to air quality in Williams Lake under the Williams Lake Airshed Management Plan. This improvement has been significant and the presence of the Power Plant helps to maintain this improvement. Still, a number of concerning environmental realities exist.

1) Due to environmental concerns regarding the toxicity of burning, storage and disposal of railroad ties the Power Generating Plant voluntarily discontinued the burning of railway ties some years ago. As a result the current impact of allowing and implementing a 50% burn limit is effectively the difference from 0 to 50%. This may skew further the controversial concerns regarding the possible exceedance to nitrogen dioxide ambient objectives as the difference between the current license limits and the proposed limits may not adequately be accounted for in the modeling. RWDI Air Inc identifies and acknowledges the predictive complexities for NOx discharge but none-the-less confirms that in certain circumstances NOx exceedences may be reached within Williams Lake. This fact does pose an identifiable risk to the community.
2) The storage of large quantities of railroad ties introduces a real threat to the community in the event of fire as the open burning of preserved wood is known to release high levels of dangerous toxins. With the proximity of the power plant as close as it is to residential areas the very large storage volumes of this material would introduce significant risk to the residents of Williams Lake.
3) The disposal of ash and residue from the burning of railroad ties has been documented as being of greater toxicity and persistence than general hog fuel. This includes the presence of dioxins and furans which are dangerous at very minute levels. The volume of treated material being proposed for disposal through the power plant is very significant. The increased volume of treated material introduces commensurate increased risk to the community.

4) The only point source comparison of emissions that I was able to find for Williams Lake was the one completed in 2012 using the same Air Dispersion Model that RWDI Air Inc used in Sept 2015 to predict the impact on emissions of a 50% railway tie burn at Atlantic Power. The 2012 report identified the power generating plant under permit 8808 as one of the most significant contributors of emissions amongst the industrial permits for SOx, NOx, PM10 and CO. Currently the air quality measurements for PM10 stand at

about 85% of the targets set for 2016 by the Williams Lake Air Quality Round Table. The Round Table, in its appeal to the public, emphasized stridently that no level of particulate matter in the air was without health impact and that provincial guidelines and Airshed Management targets were not set as limits that it is acceptable to pollute up to. The goal of the Roundtable was to seek continuous improvement. Despite the level of success that Williams Lake has achieved it is more important at this point to understand that, conversely, we are within 15% of exceeding targets. It is a fact that the community of Williams Lake is still faces significant risk due to the existing quality of air and that there is further work to be done to change this. It would not be unreasonable to expect existing risks and contributing air quality issues to be addressed on the part of Atlantic Power prior to the introduction of new risks.

5) On a daily basis considerable waste heat from Atlantic Power is discharged into the atmosphere. It is unclear as to whether Atlantic Power's determination to reintroduce toxic substances into the community at large is based on necessity or profits. In fact, it is not yet clear whether more local existing roadside residues could indeed meet the shortfalls anticipated by Atlantic Power thus preserving jobs while simultaneously lowering the carbon footprint and mitigating the impact of higher risk material usage to the community.
6) At the same time that Atlantic Power is seeking an amendment to permit 8808, the existing Williams Lake Airshed Management Plan 2006-2016, and presumably, the participation of the Roundtable Members, will be coming to an end. This leaves the community without a structured Airshed Management Plan which includes transparent and measurable goals and commitments. The piecemeal amendment of permits without this guiding structure puts the residents of Williams Lake further at risk as the overall impact of any single decision outside of the consideration of the whole is lost.
7) In the brochure that was published for distribution to the general public under the auspicious of the Williams Lake Air Quality Roundtable the authors had the wisdom to identify the desire to achieve a level of Air Quality that was conducive to the health of all, including those who may seek to retire in the area, as a worthy goal of the Roundtable. Presumably this was an acknowledgment of the difficulty of attracting residents to the community under the existing air quality standards and represented an understanding of the economic impact this might have on the community. I am recently a new resident of Williams Lake and am only too well aware of the negative reputation that Williams Lake garnered at large with regard to air quality. It was with a great deal of research that I was able to allay my concerns when making my decision to retire to the area. It is a demographic reality that retirees represent an economic force that can and has enhance the stability of other communities. Due to its many attributes it is not unreasonable to imagine that Williams Lake could be an attractive destination retirement community that could be promoted to the benefit of the area. Unfortunately, the publicity associated with Williams Lake choosing to become a major repository for the burning of toxic railway ties within the vicinity of the town will not enhance its reputation or its attractiveness as a community. Mitigating the already existing reputation for poor air quality remains a challenge which requires effort and determination. The intrinsic risk of burning railway ties within the community will not enhance the economic potential of encouraging newcomers to our community.

RECOMMENDATIONS

Fortunately the existing contract between Atlantic Power and BC Hydro does not expire for another two years thus affording time for a considered approach to this issue. I would like to recommend that the amendment to the requested permit (or any permit to discharge air pollution) not be considered outside of a renewed commitment and direction from the Williams Lake Air Quality Roundtable and within the context of a revised Air Quality Management Plan. I would recommend that the renewed Roundtable participants be representative of the entire community and that they immediately begin establishing new goals addressing the above and other identifiable risks. I believe that the risk to community health will be unacceptable if this proposal goes ahead outside of the context of a collaborative Management Plan that addresses documentable risks. I believe that the economic impact from lost opportunities will risk the well being of the community which is much in need of economic diversity and stability.

The community of Williams Lake is not unique in its struggle to exist on the horns of a dilemma. The industrial base, located as it is in the bottom of the valley, surrounded by the residential community and prone to serious temperature inversions, is both an asset and a liability to the town. This is dual relationship is true also of the Power Plant. The need to balance this reality requires careful and collaborative consideration.

It would be reasonable to expect that the application to revise this permit should become a pivotal event engendering and requiring a renewed commitment on the part of Williams Lake to the creation of a collaborative plan for exemplary air quality management within the community. It would be reasonable to expect that Atlantic

Power should embrace this as an opportunity to assume a leadership role in ensuring that their presence as an asset in the community greatly exceeds their presence as a liability. It would also be reasonable to expect that the BC Ministry of Environment should endorse and facilitate these objectives.
Robin Dawes

Cc
Glenda Waddell waddellenvironmental@gmail.com
Mayor and Council, City of Williams Lake kdressler@williamslake.ca
Donna Barnett, MLA donna.barnett.mla@leg.bc.ca
Cariboo Regional District mailbox@cariboord.ca
Angela Sommer, Chair, Williams Lake Chamber of Commerce info@williamslakechamber.com

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Tue, Nov 10, 2015 at 1:58 PM
Subject: Re: proposed amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808
To: Robin Dawes <robindawes2@gmail.com>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Dear Robin,

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

32) Barb Langford

---------- Forwarded message ----------
From: **Caitlin Langford** <Caitlin.Langford@alumni.unbc.ca>
Date: Fri, Nov 6, 2015 at 10:43 PM
Subject: Letter to the Director of Environmental Protection permit# pa-8808
To: "waddellenvironmental@gmail.com" <waddellenvironmental@gmail.com>, "authorizations.north@gov.bc.ca" <authorizations.north@gov.bc.ca>

To Whom it may concern,

I am emailing on behalf of my mother, Barb Langford, who was unable to deliver this letter in person as she had originally hoped. Attached is a copy of her letter voicing her concern regarding the proposal for the percent increase of railway tie combustion at A.P.C. in Williams Lake. She can be contacted by phone at (250)-305-8786 or (250)-392-6786 if needed.

Thank you for your time,

-Caitlin Langford

Permit# pa-8808

October 28th, 2015

Director of Environmental Protection,

I am writing to voice the concern of my family and myself over the increase in the percentage of ground railway ties in the wood-waste to be incinerated at Atlantic Power Corporation, 4455 Mackenzie Avenue, Williams Lake B.C., V2G 4E8.

We have lived on 168 Mile Road for twenty-two years and have a fantastic view of the valley. On many days, the vapors from A.P.C.—be these steam, fog, or 'smog'—hover over the valley to the point where I begin to feel like I live inside a cloud. If I travel down the hill into the city the 'cloud' clears away; my point being that we experience many inversion days. Before you regard my case as nothing more than a quarrel with industry in my backyard and a bit of steam obstructing my view, please hear my concerns regarding the health of the environment, my family, and my community.

Atlantic Power Corporation has been a definite improvement to air quality and the amount of ash in the air since the days of the beehive burners. However, there are present day issues that are the cause for my concern and fear they will only worsen if A.PC. is allowed to burn an increased percentage of railway ties. Despite air quality monitoring at the boiler level, there appears to be no consideration of the mountains of shredded smoldering wood/tie waste and the precipitation runoff through these waste piles and into our groundwater and the nearby creeks in our watershed. While none of my family members, including myself, suffer from respiratory ailments, there are many days when the smell in the air is terrible and overwhelming and deteriorates the quality of the air where we live. I suffer the effects of the poor air quality physically, immediately getting a sore throat, hoarse voice, and a heavy feeling in my chest. The last time this occurred was between October 10th and 12th of this year and the smell coming from A.P.C. was completely revolting. I have spoken to other people that have also felt adverse effects from these emissions, and the odor is always the worst and most potent surrounding A.P.C. but can also be detected as far away as our residence and the surrounding neighborhood.

With this in mind, the present concern is not with the operations of the plant itself, but with the proposition of increasing the number of ties the plant combusts. The spokesperson for A.P.C. has admitted that there is an increase in these harmful, carcinogenic chemicals into our environment with they burn 5% ties in their wood-waste mixture as opposed to wood-waste

Permit# pa-8808

alone. I cannot begin to fathom the negative repercussions of burning a 50% railway tie mixture. Additionally, A.P.C. has suggested that they will only grind ties on an 'as needed' basis and have proposed to store them in a silo. I am concerned about the amount of research that has gone into this idea and if this has been done before with any success elsewhere as these ideas do not seem safe to me. Is Williams Lake to be a 'guinea pig' community for this practice? I am sure that I do not speak only for myself when I voice my concern regarding the potential lack of research of the potential health and environmental impacts at this site. Williams Lake is a narrow valley and the proximity of the river valley, which feeds into the Fraser River, to the A.P.C. should not be overlooked. As a neighborhood local to the A.P.C., we have some serious doubts that the protocols suggested will actually keep all these harmful pollutants contained.

The issue of localized pollutants aside, I feel it is worth mentioning the carbon footprint that will result from the transport of these ties, potentially from all over North America. This being said, the ties will not arrive in some magical bubble that will keep them contained until such a time that they are shredded. I would think that 300 000+ ties stock-piled within the A.P.C. facility would definitely lead to contaminated soil, air, and water seeing as this would be a huge concentration all in one area. This also leads me to question if all the ties are of the same composition and therefore just how many carcinogens is the community being exposed to? When questioned about combustibility, A.P.C. says they have safeguards against fire, yet I drive past A.P.C. on a daily basis and I can see these huge piles smoldering practically every day. I have seen in the past this get to a point of real concern, wondering if the entire mound would ignite. Does this also mean that the company will require more city water when they are already one of the greatest consumers of clean drinking water within city limits? I am sorry but I do not have faith in A.P.C.'s ability to control a fire were one to break out in the ties—whether they be shredded or whole. Even if said fire only burned for ten minutes I believe it would harmfully contaminate our air, we would be forced to inhale the dioxins, polycyclic hydrocarbons, chlorophenols, as well as many others; all of which are carcinogens.

Or do we evacuate?

The ash waste crated from the burning of these ties should also be considered. A.P.C. says that all chemicals are rendered into their natural form, but what does these mean to the layperson? Are they saying that this process makes them less dangerous or harmful in some

Permit# pa-8808

way? Where does the ash go, is it still to be dumped above the River Valley? Or spread out on farm or rangeland? What about chemical residues?

In summary, I understand the need for a new fuel source in order to keep the A.P.C. operating and that this is important to local economy. However, I feel that other avenues involving less hazardous fuel sources need to be explored and that more research needs to be conducted regarding the impact of transport, storage, and incineration of railway ties to our community. It is my understanding that the burning of ties represents a greater financial gain for A.P.C. than other wood waste, but I feel this would come at a huge cost to the health, environment, and the potential for growth to Williams Lake and Area—who will want to live and invest in a community that is under suspicion of toxicity? A.P.C. cannot be 100% sure that the residents of the area will not be exposed to harmful pollutants on a daily basis or on a cumulative basis close to residential areas and also to the Williams Lake River Valley. I feel that A.P.C. is not the place to safely dispose of these ties at this time.

Please do not allow this proposed expansion, for the health of our community and the environment. Thank you for your time,

Barb Langford

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Tue, Nov 10, 2015 at 2:10 PM
Subject: Re: Letter to the Director of Environmental Protection permit# pa-8808
To: Caitlin Langford <Caitlin.Langford@alumni.unbc.ca>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Dear Caitlin,

Please let your Mother know that we appreciate her input to this amendment application. We will be preparing a response to her comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

33) Jim Hilton

---------- Forwarded message ----------
From: <jimhilton@xplornet.com>
Date: Sat, Nov 7, 2015 at 8:12 AM
Subject: Fwd: burning rail road ties at APC
To: glenda waddell <waddellenvironmental@gmail.com>

I had your name spelled wrong so you didn't get my first attempt. Hope you get it this time.

-------- Original Message --------

Subject: burning rail road ties at APC
Date: 2015-11-07 07:52
From: jimhilton@xplornet.com
To: glenda wadell <wadellenvironmental@gmail.com>
Cc: authorizations.north@gov.bc.ca

I have been submitting forestry related articles to the Tribune for a couple of years. I have attached some of the articles which relate to the discussion re the burning of ties at Atlantic Power Corp plant in Williams Lake. I hope they will be useful for the ongoing discussion.

Article #1

Good idea wrong location

For those who attended the recent information session hosted by Atlantic Power Corporation on increasing the use of old creosoted railroad ties in the Williams Lake Power Plant (WLPP) also known as the cogen plant, how many noticed the poster and fact sheet that showed the proposed percentage of ties used in the plant could reach 50% of the fibre mix? Any mix approaching these high percentages would mean a massive transport of ties (and possibly other related and dangerous products) into our community.

Current science indicates that disposal of creosoted railroad ties is least polluting when burned in a hot contained environment like the WLPP. The main concern is where such a plant should be located. In my opinion these kinds of plants should be built well away from any populated areas and their critical water sources. Operations using a large percentage of treated feedstock could eventually become the repository for a wide variety of dangerous products. Also consider the human tendency for monitoring and quality control to become lax as time goes on and equipment to become less efficient and properly maintained. Hence the need for a considerable buffer from populated areas. With the ongoing discussions about the Mount Polly mine breach, the public is going to be sceptical about industry claims about not creating adverse health, safety and environmental impacts on the community.

A much smaller proposal to burn railroad ties in Kamloops was rejected because of potential health concerns. This proposal was to use the latest technology and was small in comparison (two one megawatt plants compared to the 66 megawatt plant here). Local politicians and residents should be concerned about Williams Lake becoming the railroad tie burning capital of the province or of western Canada. More thought needs to go into the alternate use of rail ties and where a processing plant should be located which would burn a high percentage of rejected ties.

An anticipated short fall of saw logs caused by the mountain pine beetle epidemic could come within the next 5 to 10 years and would mean a reduction of lumber production as well as the resultant residual material (chips, sawdust, bark etc.) currently used by the WLLP and pellet plant.
In my opinion the anticipated fibre shortfall for the cogeneration plant in Williams Lake and possibly the pellet plant could be met by using the residual fibre left on many logging sites. The majority of the cull piles (cull logs, tops, branches etc.) following logging have been traditionally burned on site because this material was consider too expensive compared to the relatively cheap residual fibre coming from the lumber mills.
I think Atlantic Power corporation has a responsibility to the people of Williams Lake and surrounding communities to look at all fibre options to meet the anticipated shortfall especially if it minimizes health risks and reduces local green house gas production.
All levels of government need to encourage the best use of our resources along with protecting our health and environment.
Article #2
November 8 / 15 deadline for comments regarding APC plan to burn more rail road ties.
Take some time to review the website "http.breatheasywilliamslake.org/railwayties/". As indicated in the latest Tribune article it was developed and maintained by two local groups concerned about Atlantic power Corporations (APC) plan to burn more railroad ties in their plant.
It provides a good review of information published and discussed to date and raises a number of concerns about this proposal. I found the articles by Cathy Koot and Roger Hamilton most informative and I encourage everyone to read them. For those who don't have access to this information I will provide a summary of the information presented.
Roger is retired from the ministry of environment here in the Williams lake office so is in a good position to look at the technical aspects of the proposal. He raises 7 points that are relevant to the proposal including the following; periodic thermal inversions in the valley, omission of other existing wood power systems in the valley, 14 year old test data, differences in treated versus non treated ash stockpiled in the city limits and the capacity of the existing deposit in the lower valley. Roger is also concerned about what 50% use ties looks like on an annual basis and longterm concerns about handling and storage of the ties. Some of the information presented can be fairly technical but Roger does a good job of presenting it in an understandable form. I think he presents enough information for the residents who will be impacted to take a close look at the proposal. Until some of these issues are addressed we should be rejecting the proposal as submitted. Rogers article was submitted on October 26 /15 so Atlantic power has not provide comments in the issues he raised and unfortunately will probably not prior to the deadline for submission.
Cathy Koots' article was submitted on June 17, 2015 and includes a response from APC . Unfortunately the information provided by APC was very weak in some areas as pointed out by Roger. The one week trial conducted 14 years ago could have a very different outcome if it had taken place during one of the inversions (worst case scenarios) and more precise monitoring had taken place throughout the valley during the test.
I experienced the variable weather patterns for 41 years in an around the Williams Lake area and have witnessed the vast difference in the cloud cover in town versus my residence on the plateau.
With all due respect for the town councils support for the APC proposal as submitted and their concern for shortage of fibre and loss of jobs, I think it's more about profits when you consider all of the

untreated residual wood currently being burned following logging. Even with a reduction in the cut there would still be sufficient clean fibre to meet the needs of the power plant. Future generations could be left with a costly clean up if we are too hasty with these kinds of proposals.

Article #3

Would an eco fee help the recycling or disposal of rail road ties?

The true production costs of hazardous products must include environmentally sound disposal fees. The recycling of any hazardous product is helped along with some form of environmental tax or eco fee. The lead acid battery stewardship plan helps get used batteries back to a recycling plant. In 2012 all electric lamps, ballasts and fixtures were to be included in the BC recycling regulation. I think most would agree that the refunds for beverage containers and eco fees on electronic devices also helps to keep these items off the roads and land fills and into the hands of industries that make a living off their return.

A quick review of Wikipedia indicates the wood railroad ties are going to be a problem for some time. With over 3000 ties per mile of rail road and 90 percent being wood, no wonder we have a recycling problem. While hardwood (oak etc.) are the best they are harder to come by so the majority are from Fir with a minority from specialty wood which does not need treatment. Concrete ties are a better choice because they are stronger, last longer, are cheaper and carry more weight but are nosier and take more work to set in the rail bed. Some other products are being tried like recycled plastic and rubber composites but are expensive (some over $100 each) and dependant on the amount of recycled material available. Perhaps a combination of a concrete tie with a composite mat to help with noise and facilitating the placement of the tie could be the choice of the future.

For those who may be interested in using ties for landscaping they can be purchased from some building supply stores, in one case for $14 apiece. You are advised not to use them around edible plants because of treatments like creosote, pentachlorophenol or chromated copper arsenate. Some buyers also suggest you sort through them prior to purchase if possible since a percentage are not of the best quality. Be prepared to handle a heavy product and deal with potential hazards when sawing them. This is not different from dealing from any treated wood product.

If a deposit or handling tax was associated with the ties there would be some incentive for a business to sort through the ties and have some type of testing device which could rate the ties for condition and have a price appropriate for the better grade of ties.

Eventually the ties fall apart and are usually burned but maybe they could be ground and mixed with recycled plastic to make more ties or other landscaping products. It is this kind of venture that might benefit from a tax credit or eco fee.

With the ever increasing variety of products and their packaging it is imperative to include all of the costs associated with their production, marketing and eventual disposal. An eco fee is probably the fairest way of dealing with these added costs.

Article #4

Is using forest land for primary bioenergy production a wise choice?

Most people would agree that using residual wood for bioenergy is a good choice but what if green fibre is grown on forest land with the primary purpose of converting it to some form of energy (pellets, syngas or electricity)?

In Ben Parfitts' 2010 paper on bioenergy he has a section on "Wood as energy: Promises and Pitfalls." which reviews the various options.

With the pine beetle epidemic in BC, it was perhaps inevitable that the province would seize upon bioenergy as key to revitalizing its forest industry

The mountain pine beetle epidemic was one of the main reasons for the government to initiate the “Call for Power” by BC Hydro in which the Crown Corporation sought expressions of interest from private power producers interested in utilizing wood or biomass as a new energy source.

The first four projects approved did not require companies to log more trees, but rather to use wood waste that already existed at sawmill and pulp and paper facilities or that could be retrieved from wood left behind at logging sites. Three of the four projects involved existing pulp and paper facilities, participants in an industry that is both a major power user and power generator. In total, BC Hydro said, the four projects combined would generate 579 gigawatt hours of new electricity annually, enough to power more than 52,000 homes.

In March 2009, BC Hydro announced its second Call for Power. The call again focused on wood as an energy source. Only this time, the wood could come from new forest tenures the province made available for the express purpose of converting “wood waste” to power. This made the second call significantly more controversial. It implied that logging might occur directly in support of energy production. This marked a radical departure from the norm, wherein the “fallout” or by-product from sawmills — wood chips and sawdust — became the feedstock for the pulp and paper industry, wood pellet producers, wood boilers, and the occasional wood-fired electrical generating facility. It raised the alarm of the province’s pulp and paper industry, which worried about increased competition for finite wood supplies. Environmental groups also expressed concern. Would bioenergy producers start logging healthy, green forests to meet their needs? Finally, First Nations expressed strong reservations about the call and its potential to further alienate lands and resources to which they laid claim.

For the time being, the Ministry of Forests seems to be heeding those concerns. Aware that the beetle-killed trees it promotes as a raw material source for the bioenergy industry are finite, the ministry is only offering time-limited rights of access to the dead trees?

There are many who question the practicality and expense of burning wood to make electricity especially in large expensive facilities that require fibre guarantees. At far less cost, more flexible clean burning technologies are available to burn wood for home and business heating purposes and are increasingly common in local retail stores.

Article #5

Impact of sawlog supply crunch reduced through cooperation.

A recent article (May issue of the Logging and Sawmilling Journal) on highlights of a panel discussion organized by the Council of Forest Industries (COFI) in Prince George proposes a cooperative approach between government, industry and consultants on how to best use the fibre remaining at roadside after logging. COFI started by canvassing 19 interior forest companies to estimate what was happening in the bush. Estimates of residuals left after logging varied from 12 percent of the harvest to 30 percent. The panel members emphasized that "we need that fibre" and to extract it requires a re-definition of forest management including integrated planning and harvest regimes. The objective includes removing the different types of fibre in as few passes as possible. The forest companies, government and consultants would be wise not to work in isolation. "It would pay dividends to involve from an early date logging contractors who will end up investing in a harvesting system and trying to make it work." It will also be important to include logging equipment manufacturers to develop or modify a new range of equipment to effectively deal with the different fibre types.

The author also discussed the importance of working with First Nations who control access to the use of their traditional territories. The recent court victories have not necessarily brought justice and streamlining is needed in the land referral process.
As pointed out by one of the participants , it is critical to deal with the fibre issue now since it is predicted that in the next ten years, 2 to 3 more mills in B.C. are likely to close in addition to the ones already shut down and slowdowns (shorter production hours per week) in the remaining mills are likely. The most probable locations for the closures will be in the Prince George and Cariboo regions followed by the Kootenays.
In the same issue an article by Tony Krazanowski "Advancing woody biomass inventory precision for forest residues in Canada" a updated inventory (2013 -2014) of biomass was presented. Using a new inventory of mills producing over 100, 000 cubic meters of logs, mill and road side harvest residues are estimated to nearly 51 million oven dried tonnes. When converted to energy equivalents it is over one billion gigajoules which at $4 dollars per gigajoule represents a value of $4 billion dollars for Canada. As expected, B.C. has the majority of forest residues with a 40% estimate of this total.
A third article in the same journal describes a project in the village of Telkwa using wood waste from a small sawmill operation to heat a school, municipal building, local business and private homes within 200 meters of the boiler. Support for the project came from the Ominica Beetle Action Coalition Committee and the Wood Waste to Heat Initiative. Wood slabs from the mill were chipped into useable fuel instead of burning as waste.
Article #6
BC should take the lead in use of residual logging biomass.
A recent (2014) and very detailed report provides the current status of forest biomass policy in Canada. According to the authors, BC's harvest in 2009 was about 48 million cubic meters and covered an area of 122,620 hectares. It was estimated that we had the largest volume of roadside harvest residuals (tops, branches and cull logs) in Canada, 13.7 million bone dry tons (bone dry means zero percent moisture content). This is almost half of the Canadian total and double that of Quebec with the second greatest amount. The potential exists for BC to provide 50% of its current fossil fuel needs from existing biomass resources associated with forestry , agriculture, and municipal waste. Forest residues from existing sustainable forest industry are estimated to be enough to contribute to almost 21% of the provinces fossil energy demand. (12Mt dry /yr). This figure was arrived at by assuming that 30% of the forest harvest would be residual and 70% of that could be removed. Unfortunately most of the residual material is now burned at the roadsides to mitigate wildfire hazards. Existing technologies could convert this material into alternate energy forms like wood pellets, bio-fuels, industrial heating or electricity.
Residue and dead trees from the mountain pine beetle outbreak are estimated to be able to contribute an extra 11 Mt (dry)/ yr until 2026 which would be enough to provide 19% of the provinces energy needs.
At present there is no specific forest biomass harvesting policy in place to regulate operations. If forest companies have a cutting permit they have the rights to all woody biomass on their blocks and may remove and harvest any material they wish within the requirements of retention of coarse wood debris (cwd) under the Forest and Range Practices Act which are minimal. No specific licence or agreement for biomass harvesting is required. The Forest Act now includes two timber tenures that have the purpose of accessing road and landing waste that will not be utilized by the person who conducted the

original harvest. These two fibre recovery tenures are the "Fibre Supply Licence to Cut and the Fibre Forestry Licences to Cut". Once harvesting is completed on a specific block the primary harvester is required to provide notice whether or not the waste remaining on the block will be utilized. If not the rights to the fibre may be allocated to the holder of one of the new fibre tenures.

As discussed in previous articles, the main long term focus should be on the future technologies and value added jobs associated with any industry (pulp and paper, sawmilling, wood fibre production etc.). The large amount of biomass gives BC the opportunity to develop new industries and technologies that are now being developed elsewhere.

A compilation of forest biomass harvesting and related policy. Technical report 081. 2014. By Jean Roach and Shannon M. Birch.

Article #7

Chief foresters aac determination wl tas.

The determination of the annual allowable cut (AAC) for the Willimas lake TSA is contained in a 60 pager report by Dave Peterson. A summary of previous determinations may be helpful in seeing how the cf arrived at his decision on march 2015.

The wl tsa was established in 1981 and the base case AAC was set at 2.5 million cubic meters. The aac fluctuated a number of times up to 2015. For example in 1985 the aac was 3.7 million cubic meters(mcm) , 1989- 4.1 mcm, 1992- 3.975 mcm, 1996 - 3.8 mcm, 2003 - 3.768 , 2007 - 5.77 mcm and finally in 2015 it was 3 million cubic meters. The reasons for the change varied from a fluctuating mountain pine beetle attack, including or excluding of the three western supply blocks, considerations of deciduous or problem forest types. In the early determinations the three western supply blocks were not considered economically viable until carrier lumber established two mills there showing it was possible to sucessfully harvest these stands. Fluctuating markets and development of harvesting and milling tehnologies also contributed to the inclusion of some forest types and log qualities in the AAC determination.

No doubt the largest impact on the aac has been the ongoing attacks of the mountain pine beetle. The "' report showed lodge pole pine make up "" percent of the wl tsa volume. The 2007 aac in crease to 5.77 million cubic meters was an attempt to focus the harvest on the dead pine so the green trees could be reserved for the mid term era. The mid term is the reduced AAC (approximately 60 years) when the new pine stands are putting on growth for the next harvest.

The chief forester's 2007 determination (5.77 mcm AAC) was predicated on directing the "entire AAC" at stands with at least 70 percent pine that are located "west" of the Fraser River.

It turns out the word entire does not mean 100% but more like 70 %. As noted in the cf 2005 determination in the period between 2007 and 2013, the annual average harvest of pine was two million cubic meters while the non pine was 880,000 cubic meters. There was no breakdown as to the amount of the harvest that came from west of the fraser river. This would be important information since a the past increases in the aac was pridicated on the inclusion of the 3 western supply blocks. Some of the processing plants like the plywood plant can't use much of the dead chilcotin pine.

Effective February 25, 2015, the new AAC for the Williams Lake TSA will be 3 000 000 cubic metres. This includes a partition of a maximum of 1 500 000 cubic metres per year for live volume which means the remainder of the AAC is for salvaging dead trees. It is my expectation that non-pine leading stands will contribute a maximum of 880 000 cubic metres to the AAC of this TSA. This AAC will remain in effect until a new AAC is determined, which must take place within 10 years of this determination

Article #8

Corporate profits versus local jobs and environmental concerns.

In last week's article, I said the use of rail ties versus logging residual material for the Atlantic Pacific Corporation (APC) was about profits. I want to clarify that I am not against a company making a profit but I think it is important to look at all facets of an operation to see how profit margins are arrived at and the long-term impacts on the community.

What is the rush? I think we need a detailed comparison of the pros and cons of using railroad ties versus using local logging residues. This comparison must include the number of local jobs gained or lost resulting from both approaches as well as the impact on our environment. With the anticipated short fall of lumber production and mill waste, I was optimistic that the logging residue would become competitive and make up for any losses in mill waste. This is why I am disappointed with the decision to use creosoted rail road ties instead without an explanation of why APC is going that route.

My assumption is the use of rail ties is more profitable because the cost of trucking logging residue is more expensive than the rail transportation of rail ties. Unfortunately that means a loss of local trucking jobs. It also means a greater green house gas production for the town and surrounding community. i.e. the logging waste will still be burned and we will also be importing and burning rail ties. My other assumption is that the processing (chipping, drying and grinding) would have similar costs using either fibre source but with more health risks from the creosoted ties.

Retaining jobs and protecting the environment takes planning and long-term commitments. A power plant in Charlottetown PEI provides a good model to follow. This private biomass heat and electrical power plant was established in the 1980's using mill waste from a local lumber mill. The high cost of importing oil forced the town to install 17 km of pipes to deliver the heat from the power plant to businesses and homes. Since the mill closed in 2007, a small company has been meeting the fibre needs by chipping a variety of industry wood waste.

In 2008 when there was a reduction in the lumber production and reduced mill waste in the interior of BC the wood fibre was supplemented by processing the logging cull piles. This was not as profitable for the companies but they wanted to maintain production and fulfill their commitments to customers and they did get some experience and cost information associated with this approach.

Unfortunately millions of heat units have been wasted by the APC plant since it was constructed and millions more have been lost by burning cull piles. That translates into a lot heating fuel that could have been saved for future generations.

Hopefully the promises of infrastructure investments by the new Liberal federal government will translate into some biomass plants like the one in Charlottetown. There are a number of rural communities throughout the province who could benefit from this investment.

Hi Angie.

I have attached another article on the rail road tie issue to clarify some points in the my submission last week. Apparently some people have had trouble accessing the breatheasy site, so I think my summary may be useful to some of your readers. Unfortunately I have left these a little late for the Nov 8 deadline. I will be away for a few days so wanted to get this in today.

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Tue, Nov 10, 2015 at 2:16 PM
Subject: Re: burning rail road ties at APC
To: jimhilton@xplornet.com, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Mr. Hilton,

Thank you for your input to this amendment application. We will be preparing a response to your comments in the attached articles, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

On Fri, Nov 13, 2015 at 3:36 AM, <jimhilton@xplornet.com> wrote:

Thank you for your reply. It is encouraging that someone is taking some time to review the information being submitted. Since my submission i have done some more thinking about the issue and have attached some additional thoughts which i hope you can consider in your report.

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Fri, Nov 13, 2015 at 12:49 PM
Subject: Re: burning rail road ties at APC
To: jimhilton@xplornet.com

Mr Hilton,

I will include this article in the Consultation Report along with those previously sent. Thanks again for taking the time to comment on this project.

Article #9

Update on Williams Lake TSA options for using roadside logging residuals.

In this article I have used information from articles submitted to the tribune since march 2014. They can all be found by reviewing the Tribune.com site under "Opinions and search for Jim Hilton". Considering the short deadline imposed by APC (and the government?) I have not taken the time to refer to each source that I have discussed. As stated previously, this is a very serious proposal that should not be rushed considering the potential health risks and opportunity to use fibre that has been wasted up to this point.

For some additional information it is useful to look at a similar situation in Whitecourt Alberta (population of 10,000 two hours north of Edmonton). A 25 megawatt plant was constructed there 20 years ago. The power plant is part of a complex (Miller western forest products) which also includes a lumber and pulp mill. The AAC of 2 million cubic meters of logs supplies 50% lumber, 40% chips (that goes to an adjacent pulp mill) and 10%

hog fuel (220 thousand metric tons for the power plant) which is 10 minutes away. Some other interesting information is the plant only burns clean hog fuel (no waste wood with paint or preservatives) and receives renewable energy credits (RECs)for their efforts. As well as income from the electricity produced and the RECs, they sell ash to the famers in the area as well as receiving a small amount for dealing with the waste wood.

They also discuss the option of bringing in additional residual wood waste which has to be within a 60 km distance from the power plant or the trucking costs start to be uneconomical. The haul distance should be on some kind of sliding scale with the profit margin adjusted as all factors are considered.

The hog fuel produced (10%)is considerably less than that in the Williams lake situation. If we assume the APC and PPP get all of their fibre needs from the Williams lake AAC (2.8 to 3.4 million cubic meters depending on what years are used) it turns out to be approximately 23 % (i.e. 800 thousand tons (600 for APC and 200 Pinnacle Pellet Plant).

The estimation of the residual road side fibre is more complicated since the government is no longer tracking waste billing. One estimate from the Pacific institute '' puts the BC total at 13.7 million metric tons and based on the percentage of AAC in the Williams lake TSA I got approximately one million metric tons.

The existing mill residue meets the needs of the power plant and the pellet plant and is produced from an AAC cut level of 3.4 million cubic meters from 2003 to 2012. (the actual AAC of 5.7 million cubic meters has never been achieved with the existing mill capacity of the lumber mills in Williams lake.) Another figure from the Chief foresters report is 2.88 million cubic meters used from 2007 to 2013.

The chief forester set the AAC at 3 million for ten years which should mean the same mill residual of 800 thousand tons. When the AAC is reduced to 1.5 million cubic meters this would mean approx 400 tons of mill waste or a shortage of 400 thousand tons. If the Pacific Institute number is correct the roadside logging residual would also be half but would make up for the mill reduction. As discussed in the Whitecourt situation the average hauling distance of this material would be significantly longer than 60 kms.

Chipping and drying the material before shipping from the more remote areas may be part of the answer since the tops, branches and cull logs would be more efficiently handled as dry chips.

In another article the fibre remaining at roadside after logging was estimated to be from 12 to 30 percent of the AAC. The Council of forest industries (COFI) canvassed 19 interior forest companies. If we used the cut level that has been achieved to the past decade (3.4 million cubic meters would mean from 0.4 million to 1.2 million cubic meters per year of roadside fibre remaining).

Harvest from 2007 to 2013 was 2.88 million m3. After shelf life of pine gone the AAC will be 1.5 million or half of the past 6 years. Or about 400 thousand metric tons of residual material. If and when the AAC is reduced to 1.5 my assumption is the roadside logging residual will also be half or 0.18 to 0.45 million metric tons. There would be a short fall of fibre .18 + .4 = .518 if we assume the 12 % but sufficient if we assume 30%. The big question is the escalating trucking costs as the fibre is transported from the farthest blocks in the TSA.

As I have commented on before there is a more accurate way of determining the amount of roadside logging residue using the Ministry of Forests inventory data instead of the estimates submitted by COFI.

There is also some potential for fibre from rehabilitation and silviculture projects. After the shift from the beetle killed stands to the live stands (1.5 million cubic meters) some potential fibre could come from rehabilitation i.e. clear cut and planting or some form of selective harvest with retention of the healthy trees. The material harvested could be burned on site or moved in some form of power plant.

Another report to consider is the WL TSA rational report which shows where the harvest will concentrate during the reduced AAC. It shows most will be near Williams lake as the western supply blocks will have had most of the harvest to deal with the beetle. Some of the questions that need clarification are the following: After the beetle harvest what will the roadside logging residual be compared to the waste residual from the saw mill i.e. what is the level of roadside residue tops, branches and cull logs compared to the mill waste residue??? i.e. is the tops and branches equal to the sawdust and bark from the mill waste. Where do the chips from the chipping saws go to ? does any end up at the APC and PPP in Williams lake. i.e. why is the hog fuel over 20% compared to the 10% in Whitecourt?

Future infrastructure investments for the more remote areas like the Chilcotin

Some things that could make a difference in the feasibility of using the fibre in the more remote areas are the following;

1. creation of high capacity hydro lines sufficient to enable the establishment of facilities that have high electrical energy needs. i.e. the lumber mill and pulp plant in Whitecourt take 85 megawatts of electricity.

2. the presence of high capacity lines would enable power to go both directions, if a power producing facility was established in the remote area. I.e. like wind, solar or biomass facilities.

3. the best case scenario for a remote community with an existing or proposed lumber mill is to have a system that could produce heat for the plant (drying of lumber) as well as other heat for business or private homes in the area. The power plant could use hog fuel from the mill to produce electricity along with the heat and use the electricity for the mill needs and sell any excess to the grid.

4. most new facilities should also have the ability to produce other products like syngas, biochar or charcoal that could be produced in the summer time when heat production may be surplus to heating needs.

5. the concentration of mills in Williams lake has lead to great efficiencies in the milling of lumber but smaller facilities in more rural communities that produce lumber, electricity and syngas may be more efficient in the long run because all of the products are easier and more economical to transport than the relatively heavy logs and chips (higher moisture percentage).

6. when the AAC returns to the existing level the government should offer incentives for facilities to be established in rural communities rather than larger communities so we don't end up with the same transport problem with residual logging material.

7. the transport of residual logging material to the mills in Williams lake is complicated not only by the map distance but also the topography of the road i.e. Crossing river valleys like the Chilcotin and Fraser rivers adds significantly to the hauling costs compared to a flatter road profile.

8. a change in policy as per the paper by Adam Kamp could have a considerable impact on the economics of dealing with the cull material at the roadside. i.e. attach a fee for fibre burnt, have a fibre based AAC, eliminate waste benchmarks and increase penalties for waste and increase the use of cruise based billing.

9. my assumption is there are much more efficient plants than the APC plant in Williams Lake. With the impending fibre shortfall maybe it is time to scale back and plan the replacement of this facility with one in a more remote area that could make more efficient use of the fibre that is used including rail road ties.

In summary it is easy to place a limit on the hauling distances in some economic models but a change in a few factors could make it more profitable.

34) 4 Anonymous Messages

Anonymous messages sent to Ministry of Environment:
“Please do not burn the old railroad ties in Williams Lake. burning these emits harmful toxins in our air . Cancer causing toxins ! Please do not do this to us “
October 24, 2015 To Whom it may concern: In response to add in newspaper Re: Input needed on rail ties. The application to the Director of Environmental Protection by Atlantic Power . We are NOT interested in having this company burn rail Ties or non-hazardous solid Waste as We have read and are very concerned about the air quality in Williams Lake as it is toxic to our lungs, our skin, our water ect.
Living in the downtown core of Williams lake to have access to the gem of the river valley; I am always concerned with the air quality in town. Living close to McKenzie Ave.; makes one constantly aware of the the vehicle emissions, especially with idling trucks of freight lines. I also lived with the beehive burners and flyash, so I am well aware that the air quality has dramatically improved. It is hard to believe that the pellet plant was allowed to be built the basin we live in; and it seems ridiculous that we would subject the populace to the toxins released in 2015. Instead of going backward, I expect the decision to burn the ties here will reflect the known science and will be reversed.
Sent: Monday, November 9, 2015 10:08 AM To: ENV BC Air Quality ENV:EX Subject: Burning creosote railroad ties Hello My name is XXXXXXXXXXXXX. I am a lifelong resident of Williams Lake. I am concerned about the deterioration of the air quality in the Williams Lake valley! I am totally opposed to the burning of creosote soaked railroad ties in the EPCOR plant in Williams Lake. I would like an update on the proposed permit and any other information you could provide me with. Thank you XXXXXXXXX

35) David Richardson, Williams Lake Council of Canadians

From: **David Richardson** <richardsondavidc@gmail.com>
Date: Mon, Nov 9, 2015 at 8:46 PM
Subject: Re: proposed amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808
To: waddellenvironmental@gmail.com

This is a response to the Atlantic Power proposed amendment PA-8808

It is written on behalf of the Williams Lake Council of Canadians.

November 9, 2015

Director, Environmental Protection
400-640 Borland Street
Williams Lake, BC V2G 2T1
Delivered via: authorizations.north@gov.bc.ca

Re: proposed amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808

We think that there is a good chance that, if approved, the permit amendment 8808 proposed by Atlantic Power to raise the limit from 5% to 50% on waste rail ties as a proportion of the authorized fuel that can be burned to produce power at the local Williams Lake Co-generation plant would be detrimental to the health of people living in the Williams Lake valley area.

Williams Lake has an aging population many of whom have asthma or CPOD. We already have a high negative rating in terms of our air shed. Adding more dioxins, furans, nitrogen dioxide, sulphur dioxide and hydrogen chloride to this air shed will exacerbate the problem and combined with frequent inversions in the fall and winter months, negatively affect an already overloaded system.

There are many questions that have been at best only partially answered with respect to this permit application. Adverse effects could include a negative impact on property values, as well as health issues. Many of us remember the 'good' old days of fly ash falling from the skies. Once the permit is approved the burning of ties could be very long term. Where will the ties come from? How much will the chemical composition vary? For how long will the 50% burn last?

Can we rely on agencies such as the Ministry of Environment to monitor our air quality? Government has cut back on monitoring environmental problems. Remember the tailings pond breach?

It has been argued that the recent reduction of the Annual Allowable Cut (AAC) in the Williams Lake area may mean that there will not be enough fiber for the Co-Gen plant. Therefore the burning of more ties is essential to keep the plant operating. However, the local mills have not been using the maximum amount of the old AAC. It is possible they have been using an amount closer to the new AAC for a while. This would mean that even though the AAC has been cut back a lot, in fact the amount of fiber used by the local mills has not changed much. Substituting the burning of substances in the railway ties to keep the plant operating is a poor trade off if it negatively affects the health of people living in Williams Lake.

There was a trial burn of waste railway ties in 2001. The trial burn evidence may not apply now. Do all ties have the same chemical composition? Does the aging of equipment at the plant change the results? Remember this study is from 14 years ago. Does the duration of the 2001 trial burn match the potential of a very long-term (several years) burn of waste rail ties at the plant? Are the City, Regional District (both of which have given their blessing to the permit) and the Ministry of Environment willing to do the necessary monitoring to ensure that air quality is maintained? Are there safeguards in place to review the permit if monitoring shows that air quality has been impacted?

Finally, we realize that permit amendment 8808 is following protocol by asking for 30 days of public feedback. However is 30 days really enough time to have the appropriate scientific information disseminated, enough time for people to think through the application and respond in an informed manner? The issue of burning waste railway ties could be with us for a very long time if this permit is approved. Health issues often take years to develop. Surely, we should spend more time investigating an issue that has the potential to have detrimental health effects on the people of Williams Lake for a very long time.

David Richardson on behalf of the Williams Lake Chapter of the Council of Canadians
On Fri, Nov 13, 2015 at 2:59 PM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:

Mr. Richardson

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

36) Nola Daintith

From: **Nola & Rodger** <dnola@telus.net>
Date: Sun, Nov 8, 2015 at 7:31 PM
Subject: letter regarding Atlantic Power amendment PA-8808
To: authorizations.north@gov.bc.ca
C: waddellenvironmental@gmail.com, kdressler@williamslake.ca, donna.barnett.mla@leg.bc.ca, mailbox@cariboord.ca

Please find attached a letter of concern regarding the Atlantic Power amendment PA-8808.

Thank you,
Nola Daintith
1047 Moxon Place
Williams Lake, BC V2G 4H8

November 8, 2015
Director, Environmental Protection
400-640 Borland Street
Williams Lake, BC V2G 2T1
Delivered via: authorizations.north@gov.bc.ca

Re: Proposed amendment, Atlantic Power Preferred Equity Ltd., Williams Lake, PA-8808
I have three major issues with the proposed amendment posted October 8, 2015 in the Williams Lake Tribune that lead me to oppose the application. I believe that the long-term health of Williams Lake residents will be adversely affected by the amendment that will substantially increase the burning of treated rail ties in the co-generation plant.

1. Negative Impact on Air Quality
The Williams Lake air shed already has significant industrial and residential inputs which impact air quality, especially during periods of temperature inversions. Increasing the proportion of rail ties that could be burned by Atlantic Power from 5% to 50% – a ten-fold increase – will introduce new contaminants into the air shed and further impact air quality to an unquantified degree. Rail ties are treated with variable proportions of the wood preservative pentachlorophenol (PCP), and chlorinated hydrocarbons such as dioxins and furans can be released during combustion. These toxins are very persistent and subject to bioaccumulation in animals, soil and water.

An air quality monitoring study completed by Atlantic Power in September 2015 appears to use outdated data (from 2001) and fails to recognize other nearby industrial inputs to the air shed. Does this air quality monitoring study take into account the cumulative effects of all industrial inputs or only that of Atlantic Power? Further, this study predicts that burning rail ties will result in levels of nitrogen dioxide that exceed allowable limits in BC.

2. Transportation, Storage and Chipping of Rail Ties
The proposed amendment would allow a maximum of 50% of rail ties in the fuel mix. Even though Atlantic Power states that they would, on average, only burn 15-25% in the mix, if the amendment is approved there is nothing that would prevent them from burning at the maximum rate. The amount of treated wood, in tonnes/day, that would be burned at 50% is not defined. An Atlantic Power information sheet suggests that 600,000 tonnes of wood waste is burned annually so, conceivably, up to 300,000 tonnes of treated rail ties could be burned on an annual basis. How many rail ties is this and how would they be shipped to the plant? It is likely that they would arrive by rail where they would be unloaded and transported by truck. Will this result in rail ties being stockpiled in the railway yard or at a nearby siding, and increased industrial traffic through the city?

How many rail ties will be stockpiled on the site at any time? How will leachates from the stored rail ties be monitored so as not to contaminate the site and surrounding areas? Rail ties are extremely flammable and with the site located within the wildland urban interface there is the potential for wildfires to impact the stockpiled ties, and for fires on the site to result in a potentially devastating wildfire. Does Atlantic Power have a plan in place for dealing with a fibre supply that has increased hazards compared to clean wood waste?
Atlantic Power maintains that the rail tie chipping operation will be contained on site and that only small volumes of chipped material will be stockpiled. It would seem that the chipping operation has the potential to create chemical-laden dust that could further impact air quality. We have all seen the dust that is generated from the log and mill yards on dry, windy days. Will the Atlantic Power operation be any different?

3. Diminishing Local Supply of Clean Wood Fibre
Atlantic Power claims that diminishing supplies of waste wood and increasing competition for that waste are forcing them to request an amendment to increase the proportion of rail ties in the fuel mix. The annual allowable cut for the Williams Lake TSA was reduced to 3.0M m^3/ha in 2015. This is 0.3M m^3/ha lower than the average annual harvest rate of 3.3M m^3/ha reported from 2003-2012 (Timber Supply Review Public Discussion Paper, 2014). The availability of wood waste from the local mills will be reduced but perhaps not to the degree claimed by Atlantic Power. Further, huge volumes of logging debris are burned on an annual basis. The provincial government is encouraging the use of this fibre for bioenergy so it would seem that now is the time for Atlantic Power to investigate options for utilizing this fibre source. Logging debris may not be as convenient as rail ties but is does not come with the same issues as rail ties.

I have lived in Williams Lake since 1989 so I appreciate that the co-generation plant has had a positive impact on air quality. I believe that the proposed amendment will not result in a positive impact. The co-generation plant was located and designed and to burn clean wood waste from nearby sawmills, <u>not</u> treated rail ties. There are other facilities in Western Canada that are purpose-built for the disposal of hazardous materials such as rail ties (eg. Swan Hills, Alberta), and these facilities are not located in close proximity to residential areas.

As the Director of Environmental Protection, I urge you and you staff to consider the cumulative impacts of this amendment on the quality of air in the Williams Lake valley and the potential long-term impacts on the residents. Thank you for considering these comments.

Yours truly,
Nola Daintith

Cc Glenda Waddell waddellenvironmental@gmail.com
Mayor and Council, City of Williams Lake kdressler@williamslake.ca
Donna Barnett, MLA donna.barnett.mla@leg.bc.ca
Cariboo Regional District mailbox@cariboord.ca

On Fri, Nov 13, 2015 at 2:57 PM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:
Nola,
Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

37) Leo Rankin

From: **Connie and Leo** <c_leo@shaw.ca>
Date: Sun, Nov 8, 2015 at 6:57 PM
Subject: Changes ot Atlantic Power's Permit: Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8
To: authorizations.north@gov.bc.ca
Cc: waddellenvironmental@gmail.com
Director Environmental Protection
We are writing to voice our concerns regarding the application of Atlantic Power Corporation to expand the amount of railway ties being burned at their facility in Williams Lake It from 5% to 50% of total burned material. The increase by tenfold appears to us to be extremely risky and a drastic alteration in operations considering the potential risks of a vulnerable air-shed.

This escalation of contaminated products being burned seems to be an extreme alteration in the corporation capacity and a dangerous scenario for the Williams Lake River Valley where the city and the power plant are located. The valley is prone to inversions causing poor air quality, particularly during the winter months. We have many questions and concerns.

- Has the dispersion modelling and stack test data considered the effect of temperature ' inversions on contaminant dispersion from stacks?
  - How much will dioxins and furan residues increase in the air around town with this increase in railway tie burning?
  - How much of the railway ties to be burned contain PCPs?
  - How will these bi-products of the burning process bio accumulate in the environment around the town of Williams Lake?
  - Where is the additional contaminated ash going to be deposited? Fifty percent of the ash may now contain furans and dioxans instead of only 5%? The resultant ash is unlike regular waste wood due mainly to the existence of the wood preservatives pentachlorophenol and creosote
  - How many ties will be processed each year in Williams Lake? Will they be distributed equally during the year? Is there a plan to avoid burning ties during periods of severe temperature inversions?

We would like to have some answers to these questions and reassurance that this operation is safe before we feel that this increase in burning of dangerous chemicals is acceptable and permissible within the Williams Lake River Valley.

Thanks for considering these comments.
Leo Rankin
Connie Haeussler
1495 N 11th Avenue, Williams Lake, B.C., V2g 3X3

On Tue, Nov 10, 2015 at 1:08 PM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:
Mr. Rankin
Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

38) Kim Herdman

On Fri, Nov 13, 2015 at 1:48 PM, Kim Herdman <kyherdman@gmail.com> wrote:

Kim Y Herdman
250-392-6597
kyherdman@gmail.com

332 3rd ave n.
Williams Lake
BC V2G 2A8

November 13, 2015

Honourable Mary Polak, Minister of the Environment
Al Richmond, Williams Lake CRD Chair
Mayor Walt Cobb and Council, City of Williams Lake
Director, Environmental Protection
Glenda Waddell

RE: Atlantic Power **4455 Mackenzie, Williams Lake - Permit** 8808 amendment to **burn Rail Ties**

I attended the Atlantic Power open house in the summer and after seeing their presentation I am no more in favour of this proposal than before I went. Their case was based on how this facility cured Williams Lake of its air quality problem. They had before and after pictures to prove their assertion that Atlantic Power is good for Williams Lake. They had statistics on how much money they generate and taxes they provide to the City. On first glance it would seem that allowing them to burn rail ties is a no brainer as the City needs their taxes and the 30 or so jobs and let us not forget the clean air. While nobody can disagree that the before and after photos they had on display of the valley shows a remarkable improvement to the air quality, it is my belief that the improvement in air quality was due to the elimination of burning waste wood products in the Bee Hive Burners. The air quality would have been improved regardless just by the shuttering of the burners.

The business model of using waste wood products to generate electricity at that time probably was a good one, get rid of a product that was a problem and generate tax dollars, jobs and electricity. It seems that the business model that made this facility favourable years ago has changed. Increased usage of waste wood by the pellet industry, along with the shuttering of many sawmills is making it more difficult to have enough supply at a profitable price point. As I understand transporting the biomass is another big factor and any transport over 60 kilometres has a negative affect on profitability. With the precarious state of the lumber industry be it from market price, allowable cut, softwood lumber agreement, it seems that Atlantic Power's ability to secure the fuel to run the plant is aligned with the long term viability of the local Lumber producers. The use of used Rail ties would solve their supply problem and help generate a profit...a cheap product or probably more likely a product that they would receive money to burn...but at what cost to the environment and the health of the Citizens of Williams Lake? This application is for approval to burn 50% rail ties; what if the amount of fuel from other sources declines will Atlantic Power then need to burn a higher percentage to stay in business?

"In 2005 Williams Lake recorded the first and the sixth highest level of fine particulate air pollution out of 38 communities in B.C. where continuous monitoring is conducted." (Williams Lake Air quality round table http://breatheasywilliamslake.org/) The location of this facility in the valley air shed and its close proximity to the city is cause for concern not only with the burning of the ties but the storage and chipping of the ties. The possible storage of up to 300,000 toxic railway ties is extremely scary and would be an intolerable risk to the citizens not only because of threat of fire in the storage, but toxic leaching to the ground water and the fine particulates that would be produced with the chips.

It became clear at the open house that another selling point for this proposal is that Atlantic Power would be doing a great service to the country by disposing of these rail ties. I have to ask why is Williams Lake being asked to be put at risk...Atlantic Power is in the power generating business not the toxic waste disposal business. If they cannot generate power in a clean environmentally friendly way then maybe we should look at alternatives like solar or other more green technology. To allow Atlantic Power to go through with this plan will only harm Williams Lake's reputation and will make it harder to attract retirees, professionals, and doctors who are wanting a healthy environment to live in.

Sincerely

Kim Herdman

Glenda Waddell <waddellenvironmental@gmail.com> Nov 13, 2015

to Kim

Kim,

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

39) Kathy Fraser

On Wed, Nov 11, 2015 at 3:28 PM, Kathy Fraser <krokif@shaw.ca> wrote:

Re: Atlantic Power, 4455 Mackenzie, Williams Lake, B.C. V2G4E8

Dismayed with idea of burning Rail Ties in Williams Lake. Our air quality at times is less than desirable. Industries in our town already produce much dust and air pollutants, and because of the inversions we experience the polluted air lingers for days. Medical researchers claim that pollution is major cause of
many illnesses such as heart attacks, respiratory diseases, cancer etc.

This is 2015, all levels of Governments worldwide are trying to slow down the pollution put into the air, it's a matter of survival!

The burning of these rail ties has been turned down by Kamloops, B.C., other places in Canada and several places in the U.S. If the other communities
have considered it unsafe for their community – Why should Williams Lake consider it okay?

For these reasons we do not think that Atlantic Power Corporation should be allowed to burn railway ties in Williams Lake!

K. Orleski & K. Fraser

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Fri, Nov 13, 2015 at 2:52 PM
Subject: Re: Burning of Rail Ties
To: Kathy Fraser <krokif@shaw.ca>
Cc: "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Kathy,

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

On Tue, Nov 24, 2015 at 4:07 PM, Kathy Fraser <krokif@shaw.ca> wrote:

Glenda,
Further to our Nov 11, 2015 email which was also printed in the Williams Lake Tribune on Friday 13, 2015. We have had several phone calls from people that had read our letter and agreed with us, and also wondering if we also knew that West Fraser Sawmill is hauling wood chips to Atlantic Power Co-Gen Plant for burning which contain formaldehyde used in gluing wood. In past years this wood waste was shipped out of town as hazardous material.

It is our understanding that formaldehyde is also a known carcinogen.

If this is so, we wonder what changed and when was Atlantic Power given permission to burn this toxic waste.

From: Glenda Waddell [mailto:waddellenvironmental@gmail.com]
Sent: November-26-15 8:34 AM
To: Kathy Fraser
Cc: Authorizations-North ENV:EX
Subject: Re: Burning of Rail Ties

Kathy,

The Williams Lake Power Plant receives bark only from the West Fraser plywood plant.

On Thu, Nov 26, 2015 at 2:15 PM, Kathy Fraser <krokif@shaw.ca> wrote:

Glenda,

Sincerely Sorry. On checking original information it was not West Fraser Sawmill, but rather stated Tolko Soda Creek who in past years had wood waste containing formaldehyde hauled out as hazardous waste but is now burning waste containing formaldehyde in Williams Lake.

40) Dr Skye Raffard

From: **Skye Raffard** <skye.raffard@gmail.com>
Date: Fri, Nov 13, 2015 at 3:06 PM
Subject: Atlantic Power Corporation permit
To: waddellenvironmental@gmail.com, donna.barnett.mla@leg.bc.ca, kdressler@williamslake.ca, mailbox@cariboord.ca

Attached please find your copy of my letter to the Director, Environmental Protection. Dr. Skye Raffard

Skye Raffard BSc MD FRCSC 401 – 517 Sixth Avenue North Williams Lake BC V2G 2G8 phone 250 392 1137 fax 250 392 1014

11 November 2015

Director, Environmental Protection
400-640 Borland Street Williams Lake BC V2G 2T1
email: authorizations.north@gov.bc.ca

Re: Atlantic Power, 4455 Mackenzie, Williams Lake, BC V2G 4E8

My name is Dr. Skye Raffard. I'm a Specialist Physician in Williams Lake, BC, one of several Specialists in the Medical Community serving Cariboo Memorial Hospital and it's geographically large referral area. There are many more Family Doctors, Emergency Doctors, Nurses, Physiotherapists, Respiratory Therapists, and other allied Health Workers providing care to the people in this community. My voice is one of many, my views widely shared among my colleagues.

In perusing the articulate and thorough responses to Atlantic Power Corporation's proposal to store, chip, and burn (and the amendment to dramatically increase the percentage of) chemically treated railroad ties in their facility in the Williams Lake Valley, I see that you have already heard the many valid concerns. For the sake of brevity, I won't repeat those concerns; you may assume my views and those of my colleagues echo those of Kris Andrews, Fred McMechan, President of the Williams Lake Field Naturalists, Bill Lloyd of the Cariboo Chilcotin Conservation Society, Rodger Hamilton, and Cathy Koot, among others. The science is irrefutable.

You cannot help but sense the skepticism of the people of this community with respect to Atlantic Power Corporation's ability to ensure our safety during the many stages of storage, chipping, burning, monitoring of the presence of toxic leachate, safety and completeness of combustion, detection of toxic and carcinogenic air and water borne particles, and management of ash, etc. Allowing industry to largely self regulate, or at least self-report, has unfortunately become more common, and it may save money in the short term, but that does not make it a good idea. Out of dire need, the community has had to appoint additional "Watchdogs", and I sense that that is what is happening here.

I'm a busy Doctor. I was in the Operating Room during Atlantic Power's Open House in June 2015, and regrettably could not attend that meeting. Had I done so I would have asked company representatives to answer to the known health risks, including cancer risks, of locating this project in this Valley. And since that Open House, I've been busy taking care of patients, believing that given sufficient intelligent feedback and the asking of probing questions, Atlantic Power Corporation would abandon their stated plans for this valley. Apparently I have been naïve.

I have to say, history is interesting. I moved to Williams Lake in 1998, roughly five years after the end of the "beehive" burners, and the elimination of fly-ash in this town. The co-generation plant was heralded for improving the air quality, and the respiratory health, of the community. At that time, no one raised the spectre of dirty air containing toxic particles that would later cause cancer. For that's really the problem, isn't it? People don't get cancer the minute they inhale a carcinogenic emission. It takes years to develop cancer, and then it takes decades to prove the cause. Look at the history of tobacco as a cause of lung cancer, and the refusal of industry to accept responsibility until forced to do so.

Additionally, there are the possible teratogenic effects of invisible toxins. Would the community really embrace the creation of a few extra jobs in exchange for their health, or the health and safety of their babies and children? Quite clearly, if fully informed, they would not.

Now, this facility, formerly a model of environmentally sound, ecologically sensitive, and economically sustainable business proposes to harm, and potentially seriously and permanently harm the community in which it is located. Is this overcalling the risk? Looking at the list of toxic by-products of even complete combustion, I know it is not.

It is, unfortunately, abundantly clear that Atlantic Power cannot claim to keep the citizens of Williams Lake safe. They have been challenged to do so, and their inadequate and at times evasive responses are telling. When Atlantic Power does not, and in fact by virtue of their proposal, cannot act in accordance with what is morally, ethically, scientifically and legally the right thing to do, then they must be made to do so, by refusing their permit.

Will there be alternatives available to them? Most assuredly. Is there a better, safer location in which to dispose of railroad ties? Of course there is. It's located out of town, out of a valley with a history of poor air quality and frequent temperature inversions, and under the watchful eye of a body that has the ability to address the (likely) situation of inadvertent toxic release.

The application under consideration is fraught with potential for harm. There are too many steps and stages for potentially disastrous consequences that a quick "rubber-stamp" approval cannot suffice. Before this was an issue facing Williams Lake, the permitting Authority in Kamloops faced this issue; they listened to the Medical Community who raised my same concerns, and they denied that application. I encourage you to review their experience.

Thank you for taking time to hear the concerns of only one of many Physicians in this community, and for your careful consideration of the health ramifications of allowing Atlantic Power's proposal to continue.

This letter will be presented at the regular Medical Staff Meeting at Cariboo Memorial Hospital later this month. If desired, a copy of the endorsed and signed letter will be forwarded to you. If you would like to discuss this with me in person, or by telephone, please contact me at the above address or by telephone. You may also email me at: skye.raffard@gmail.com.

Sincerely,

Dr. Skye Raffard

Cc Glenda Waddell waddellenvironmental@gmail.com
Donna Barnett, MLA donna.barnett.mla@leg.bc.ca
Mayor and Council, City of Williams Lake kdressler@williamslake.ca
Cariboo Regional District mailbox@cariboord.ca

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Fri, Nov 13, 2015 at 4:30 PM
Subject: Re: Atlantic Power Corporation permit
To: Skye Raffard <skye.raffard@gmail.com>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Dr Raffard

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

41) Dr. Doug Neufeld

December 8, 2015

To The Medical Staff of Cariboo memorial Hospital

In society , when a group of Physicians speaks with one voice it carries an immense power. With this power comes responsibility. Before making statements, it is the expectation of society that we are evidence based and make sound, evidence based decisions. We are people of science.

When "Doctors" condemn smoking, we speak as a unified, evidence based voice.

At our medical staff meeting of November 19, 2015 Dr Raffard submitted her letter written to the Director of Environmental Protection, dated November 11th, 2015. In her letter she speaks in opposition to Atlantic Power's application to burn an increased percentage of rail road ties at their Williams Lake energy generation plant.

In her last paragraph Dr Raffard writes "This letter will be presented at the regular Medical Staff Meeting at Cariboo Memorial Hospital later this month. If desired, a copy of the endorsed and signed letter will be forwarded to you."

As well as practising as a full time Family Doctor in Williams Lake for the last 25 years, I try to contribute to the community in other venues as well. I recently finished a 3 year term as a school board trustee and most recently was appointed to the board of the "Williams Lake Economic Development Corporation." It is through this venue that I became familiar with Atlantic Power and their request to increase the percentage of railroad ties they want to burn as a fiber supply. They are very good corporate citizens in our community and what they essentially do is burn waste wood fibre from the woodmills, extremely efficiently ,at very high temperatures (2000 degrees fahrenheit) to make electricity that powers unto 52,000 houses. Due to a decreasing annual allowable cut for timber ,there is a decreasing wood fibre supply and Atlantic power wants to burn used railroad ties to supplement their fibre supply. This will give them the stability for future operations. They are negotiating a new contract with BC hydro in 2018 and need the stability of the fibre supply. They plan on using between 15 to 25% ties for fibre and are applying for a maximum of 50% . They have done test burns with 100% ties which revealed emissions well below the acceptable levels required by the ministry of environment.

Atlantic Power provides 32 full time jobs in Williams. They are the largest single taxpayer in Williams Lake(1.3 Million) , as well as up to $800,000 in utility taxes. They spend up to 8 to 10 million dollars in our local economy and have an excellent track record. The expansion would create 2 or 3 more jobs. The Williams Lake Economic Development Corporation is working with Atlantic Power to use the steam generated in the production of power to heat greenhouses for agricultural use.

In closing, there are 3 points I would like you to consider

1) Before passing judgement , I encourage to review the available data. There is a 400 page document at the library with all the environmental studies. In addition, Terry Shannon, environmental manager for Atlantic Power would be happy to meet with the medical staff to answer any questions.

2) Every decision is a balance of risk vs benefit. To make an informed decision, again know your science and know the consequences. This includes the huge economic consequences of this decision to our community. After carefully reviewing the data and making myself aware of the the risks and benefits of the situation, I am in favour of the application. I am not asking the medical staff to support me, I am simply asking each individual , if they are going to pass an opinion , to know their facts, and make an informed evidence based decision.

3) Dr Raffard's letter has already been submitted to the Ministry of the Environment. It is my interpretation that her letter implies that the Medical Staff has endorsed and signed her letter While I respect Dr Raffard's right to her opinion, I know there are many members of the medical staff who do not endorse her letter and will not sign it. Therefore, at this time, we are clearly not speaking as one voice and the Ministry of the Environment needs to be made aware of this.

Sincerely
Doug Neufeld

cc Williams Lake Development Corporation
Mayor and Council Williams Lake
Director of Environmental Protection
Glenda Waddell-environmental consultant

Jan 21/16 Please forward to Ministry of Environment.

Thanks
Doug.

42) Jean Wellburn

From: **Jean Wellburn** <j_orache@hotmail.com>
Date: Sat, Nov 14, 2015 at 8:15 AM
Subject: No burning rail-ties at Atlantic Power Wms.Lake
To: "authorizations.north@gov.bc.ca" <authorizations.north@gov.bc.ca>, "waddellenvironmental@gmail.com" <waddellenvironmental@gmail.com>, Jean Wellburn <j_orache@hotmail.com>

I am opposed to the burning of rail ties in the Atlantic Power Williams Lake B.C. Co-gen plant because the plant is situated in a valley and Williams Lake is subjected to thermal inversions depending on climatic conditions . Specifically in the winter, the discharge from the stacks will sit in the air for considerable time. This makes breathing even more difficult.

Please do not burn the rail ties in the Williams Lake valley.

Thank you,

Mrs. Jean Wellburn (Retired Early Childhood Educator-Teacher)

On Sat, Nov 14, 2015 at 9:20 AM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:

Mrs. Wellburn,

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

43) Bruce MacLeod

On Sat, Nov 14, 2015 at 12:13 PM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:
Mr. MacLeod,

Thank you for your input to this amendment application.

Your correspondence here will be included in the Consultation Report.

On Sat, Nov 14, 2015 at 11:58 AM, Bruce MacLeod <bruceandfaye@bcwireless.com> wrote:
re: (Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8)

Rather than burn the ties, perhaps they could be put to good use building bridges to replace all of the culverts that are continually plugging up, washing out roads, limiting fish access upstream by being above the lower level of the road so fish cannot pass through in summer, etc. Wrap the ties in an aluminum alloy tin to prevent contaminants from escaping and replace all the culverts on our back roads. This would provide jobs, relieve the stress on wild fish stocks, provide access for fish and anglers in fishing season, and eliminate road washouts like in our Beaver Valley Lakes system.

Bruce MacLeod, Horsefly

44) Eric Pascas

From: **Glenda Waddell** <waddellenvironmental@gmail.com>
Date: Thu, Nov 19, 2015 at 8:52 AM
Subject: Re: Atlantic Power 8808
To: Shirley Pascas <espascas@gmail.com>, "Authorizations-North ENV:EX" <authorizations.north@gov.bc.ca>

Shirley,

This works.

Thank you for your input to this amendment application. We will be preparing a response to your comments, along with the other comments we are receiving. All such comments and responses will be included in our Consultation Report, which will be submitted to the Ministry of Environment after the close of the Comment Period.

On Wed, Nov 18, 2015 at 8:38 PM, Shirley Pascas <espascas@gmail.com> wrote:
Try this...

Eric Pascas

On Wed, Nov 18, 2015 at 2:23 PM, Glenda Waddell <waddellenvironmental@gmail.com> wrote:
Hello Shirley,

I've been trying to find a program that I can use to open your attachment and, so far, no luck. Would you be able to scan the letter and email me the scanned copy. If that doesn't work could you give me a call so we can work out the best way to do this?

Thanks

Glenda

My concerns are:

1) If the majority of the community does not support burning treated ties, and the Ministry of Environment approves it, will both levels of local Government still support it?

2) I am concerned about using a model to predict the concentrations of emissions at various locations in the valley. Can we expect that there will be ongoing monitoring of the emissions at various locations, and under various climate conditions? This will serve to confirm the predicted values from the model. If the actual emissions vary unfavourably to the predicted emissions, and exceed the thresholds, then what? Will the amendment be rescinded?

3) Does the dispersion model consider emissions from other sources? If no, how will the overall impact be assessed?

4) An independent review needs to be conducted that serves the interests of the people that are most affected by the emissions, i.e. those living in proximity to the facility.

Eric Pascas

45) Peter Epp

From: WL01M252@atlanticpower.com [mailto:WL01M252@atlanticpower.com]
Sent: Monday, November 16, 2015 10:05 AM
To: Mark Blezard
Subject: [Image File] Mark,KMBT250, #391

FROM:
Image data has been attached to
the E-Mail.

CITY OF WILLIAMS LAKE

450 MART STREET, WILLIAMS LAKE, BRITISH COLUMBIA V2G 1N3
TELEPHONE (250)392-2311 FAX (250)392-4408

RECEIVED IN
NOV 16 2015
WILLIAMS LAKE

November 6, 2015

File: 1-70-23

Atlantic Power Corporation
4455 Mackenzie Avenue North
Williams Lake, BC
V2G 5E8

Dear Sirs/Mesdames:

RE: Letter from Peter Epp – Burning Creosote Railroad Ties

Please find attached a copy of a letter from Peter Epp that was received by Mayor and Council for your file and information.

Yours truly,

C Bouchard

Cindy Bouchard
Manager of Legislative Services

/mlk

Attachment

MUSEUM of the CARIBOO CHILCOTIN

www.williamslake.ca

CENTRAL CARIBOO Catch the Adventure

1-2 KCMYC Nov 6 Emailed

MAYOR AND COUNCIL CITY OF WILLIAMS LAKE

TO WHOM IT MAY CONCERN NOV 6/2015

RE "BURNING CREOSOTE RAILROAD TIES"

POINT ① THE CITY, REGIONAL DIST, MINISTRY OF ENVIRONMENT ARE NOT MANDATED TO FIND WOOD FIBER FOR "ATLANTIC POWER".

POINT ② THE CITY, REGIONAL DIST, MINISTRY OF ENVIRONMENT ARE MANDATED TO KEEP PEOPLE LIVING IN THEIR JURISDICTION SAFE AND ENVIRONMENT SAFE.

POINT ③ ORIGINAL LOCATION FOR POWER PLANT WAS TO BE OUT OF TOWN AND ON TOP OF A MOUNTAIN. THERE OWN WATER SYSTEM. NOT ON OUR LIMITED AQUIFER TREATED DRINKING WATER. MILLIONS UPON MILLIONS OF GALLONS EACH YEAR. THERE WERE OTHER OBLIGATIONS IN ORIGINAL AGREEMENT THAT WERE NEVER MET BY EPCOR.

POINT ④ THE WOOD WASTE ASH HAULED TO THE ASH DUMP SITE IS SO CAUSTIC IT EATS METAL. PLANT MUST SHUT DOWN EACH YEAR FOR WEEK'S AND WEEK'S TO REPLACE METAL EATEN UP BY ASH. ALSO OTHER EQUIPMENT USED TO HAUL AND LOAD ASH TAKEN TO ASH DUMP SITE. ASH IS ALSO IN THE AIR.

POINT ⑤ REMEMBER THIS IS UNTREATED WOOD. NOT TREATED WITH CEMICAL'S ETC.

POINT ⑥ NOW THEY WISH TO START INCREASING CONSUMPTION OF TREATED SO CONTINUED OPERATION CAN BE MAINTAINED - POSSIBLY COULD BE DONE IF PLANT WOULD HAVE BEEN BUILT ON ORIGINAL PLANED SITE?

2-2

POINT(7) WE NOW HAVE THE PLANT BELOW THE MOUNTAINS ON BOTH SIDES OF THE VALLEY. WHEN AN INVERSION HAPPENS AND THEY HAPPEN ALL THE TIME. SOMETIMES SHORT 3 OR 4 DAY'S SOMETIME WEEK'S OR LONGER NO AIR POLUTION CAN ESCAPE. PEOPLE ARE BREATHING WHAT EVER IS BEEING PRODUCED BY INDUSTRY PLUS HOUSEHOLD'S. ETC

POINT (8) IS THERE A BETTER USE FOR WOOD WASTE THAN TO POLUTE OUR LOCAL ENVIRONMENT AS WELL AS USING UP MILLIONS OF GALLONS OF TREATED AQUIFER WATER? AT THE TIME THE PLANT WAS BUILT FEW OPTIONS. TO-DAY OTHER OPTIONS EXIST. POSSIBLY TIME TO RETHINK PLANT'S REQUEST FOR MORE WOOD FIBER. SAVE OUR DRINKING WATER AND ELIMINATE THE AIR POLUTION. WE CANNOT MOVE THE CITY TO THE TOP OF THE MOUNTAIN. I DO NOT UNDERSTAND WHY THIS OPTION IS EVEN ON THE TABLE. "SHORT OF WOOD FIBER" ONCE YOU START BURNING TIES THEY WILL BE COMING FROM ALL OVER CANADA AND THE U.S.A. THIS OLD COWBOY'S OPINION.

Peter Epp SR.

COPIES TO

M.L.A. FOR CARIBOO CHILCOTIN DONNA BARNETT
MAYOR AND COUNCIL CITY OF WILLIAMS LAKE
CARIBOO REGIONAL DISTRICT
BRITISH COLUMBIA MINISTRY OF ENVIRONMENT
EDITOR WILLIAM LAKE TRIBUNE
CARIBOO COUNTRY REBECCA DYOK ANCHOR

46) Mila Hurt

2015-11-17 18:21 GMT-08:00 Vaclav <vhurt@telus.net>:
STOP to burning of old rail ties in Williams Lake

Mila Hurt
vhurt@telus.net

Mila submitted the same letter as #15 Mary Montgomery. *See on page # 26 of this Appendix.*

47) Vaclav Hurt

2015-11-17 18:24 GMT-08:00 Vaclav Hurt <hurtvaclav7@gmail.com>:

Burning of old rail ties in Williams Lake - STOP NOW!!!!

Vaclav Hurt
hurtvaclav7@gmail.com

Vaclav submitted the same letter as #15 Mary Montgomery. See on page # 26 of this Appendix.

48) Steve O'Hara

From: Steve Ohara
Sent: Tuesday, October 20, 2015 2:25 PM
To: waddellenvironmental@gmail.com
Cc: authorizations.north@gov.bc.ca

Hello;

I am concerned that my family and neighbors may be adversely affected by this proposed amendment to Atlantic Powers Permit # 8808. I live off of the 168 Mile Road directly north east of the Power Plant site. Throughout the winter, it is very evident that our neighborhood is influenced by the Power Plants air discharge. The plume can be seen and its moisture creates crystals that float in the air as it dissipates and freezes. This is inhaled by all of us. Also the last time the power plant burnt the creosote railway ties, I complained then of the stench in the air that we were inhaling as well. I understand that the generating facility was established to address previous critical air quality problems. But why has Williams Lake been chosen to dispose of others waste railway ties? Who is profiting from this, at our expense? This amendment is suggesting to raise the limit on waste railway ties as a proportion of the authorized fuel from 5 % to 50 %. If our neighborhood was affected by the previous 5 % which received complaints, can you imagine what it would be like at 50 %. This will definitely reduce the land value of our properties. How many of the people in this neighborhood even read the newspaper to see this amendment and ads. Have you gone door to door? Attached is a photo taken at the bottom of my street this past Saturday, 17 October, 2015. The "smog" in the valley bottom is not from the Power Plant, but from all industries, vehicles etc in the town site to the south. Williams Lake already has air quality issues and this amendment will only add to our problems.

I would expect that the government of BC would be closely monitoring these emissions for long term impacts and for the health and safety of the public and environment. Not reduce its requirement for continuous emission monitoring. Little is known about this science, as it seems that disposing of creosote-laden railway ties is an issue in other areas throughout the country. This letter is of the same concern as to why your previous creosote pile on the CN property was stopped. Noxious fumes.

I would like to understand more about your management plan and the science before this application is approved. Please reply so I know you received.

Steve O'Hara

From: Steve Ohara <sohara@gibraltarmine.com<mailto:sohara@gibraltarmine.com>>
Date: November 27, 2015 at 6:17:24 AM PST
To: "'mblezard@atlanticpower.com<mailto:mblezard@atlanticpower.com>'"
<mblezard@atlanticpower.com<mailto:mblezard@atlanticpower.com>>

Subject: Re: Plant Tour at the Williams Lake Power Plant

Yes I am very interested. I am off til tuesday. I will be in touch then. Thanks for the invite. Steve

____
From: Mark Blezard <mblezard@atlanticpower.com><mailto:mblezard@atlanticpower.com>>
To: Steve Ohara
Sent: Thu Nov 26 17:37:49 2015
Subject: Plant Tour at the Williams Lake Power Plant

Hi Steve,
I was wondering if you were interested in a plant tour of our facility and review of our proposed RRT shredding system?

I'm available any time after Dec 7th.

Regards,

Mark Blezard

49) City of Williams Lake, Mayor and Council

OFFICE OF THE MAYOR
CITY OF WILLIAMS LAKE
450 MART STREET, WILLIAMS LAKE, BRITISH COLUMBIA V2G 1N3
TELEPHONE 250-392-2311 FAX 250-392-4408

RECEIVED IN
OCT 05 2015
WILLIAMS LAKE

September 22, 2015

File No: 1-70-23 / 0530-08

Atlantic Power Corporation
4455 MacKenzie Ave N
Williams Lake, BC
V2G 5E8

Dear Sirs/Mesdames:

Re: Support for Atlantic Power's Williams Lake Power Plant Renewal Project

Attached please find a letter of support from City of Williams Lake Council.

Should you require anything further, please do not hesitate to contact me.

Yours sincerely,

Walt

Walt Cobb, Mayor
City of Williams Lake

Attch. (1)

MUSEUM of the CARIBOO CHILCOTIN

www.williamslake.ca

CENTRAL CARIBOO Catch the Adventure

OFFICE OF THE MAYOR
CITY OF WILLIAMS LAKE
450 MART STREET, WILLIAMS LAKE, BRITISH COLUMBIA V2G 1N3
TELEPHONE 250-392-2311 FAX 250-392-4408

September 22, 2015

File No: 1-70-23 / 0530-08

To Whom it May Concern:

Re: Support for Atlantic Power's Williams Lake Power Plant Renewal Project

At its Regular meeting on September 15, 2015, City of Williams Lake Council passed a resolution to support Atlantic Power Williams Lake's application to the Ministry of Environment to amend the existing environmental permit to increase the percentage of rail ties allowed to be burned.

It is our understanding that Atlantic Power anticipates burning 15-25% rail ties on an average annual basis, with the possibility of burning a 50/50 mix of rail ties and traditional wood fibre as needed. We are confident that the proposed measures to be taken by Atlantic Power will address environmental, health, and safety concerns.

In addition to generating power, Atlantic Power is a significant employer and contributor to our local economy. City of Williams Lake Council supports Atlantic Power's Williams Lake Power Plant Renewal Project, and looks forward to continued success in the company's efforts to address the changing requirements of our local economy.

Should you have any questions or require further information, please do not hesitate to contact me.

Yours sincerely,

Walt Cobb, Mayor
City of Williams Lake

MUSEUM of the CARIBOO CHILCOTIN

www.williamslake.ca

CENTRAL CARIBOO Catch the Adventure

50) Central Cariboo Economic Development Corporation

Indicative Term Sheet

for

Waste Heat Supply

between

Atlantic Power Williams Lake

and

Central Cariboo Economic Development Corporation C/O City of Williams Lake

July 6, 2015

I. **Indicative Term Sheet Non-binding** – this Indicative Term Sheet is non-binding and does not constitute an offer or other commitment by Atlantic Power (Williams Lake) Ltd. (APWL) of any kind or character, and unless and until a definitive agreement regarding a potential transaction has been executed by both parties, APWL is not under any obligation, legal or otherwise, to conclude an agreement. Any binding commitment would be subject to the approval of APWL parent company senior management and Board of Directors.

II. **Summary** – APWL and the Central Cariboo Economic Development Corporation (EDC), as may be assigned by EDC as provided below, would enter into a waste heat supply agreement (Agreement) for the provision of waste heat by APWL to a greenhouse to be developed adjacent to APWL electricity generation facility in Williams Lake (Facility).

III. **Term** – The Agreement would commence upon execution by the parties and would expire on March 30, 2028, unless terminated earlier in accordance with the terms of the Agreement.

IV. **Delivery and Return Points** – a location, or locations, to be determined by APWL on or immediately adjacent to the APWL Facility site for the delivery and return of effluent water from the Facility. Each party would be responsible to construct, own and operate all facilities on such respective party's side of the delivery and return points. The parties would enter into any necessary easement required to connect each party's facilities to the delivery and return points.

V. **Waste Heat Quantity** – Subject to the non-exclusivity provision below, APWL would offer to provide up to the entire hot water effluent being produced by the Facility at any given time.

VI. **Waste Heat Specification** – Waste Heat would be provided in the form of hot water effluent from the Facility on an "as-is, where-is" basis with no obligation with respect to water properties.

VII. **Nature of Service** – Waste Heat would be provided by APWL on an "as-available" basis when and if the Facility is in operations. Such operations shall be determined by APWL in its sole discretion. APWL would have no liability whatsoever with respect to interruption of Waste Heat supply and EDC, or its assignee, would be fully responsible for back-up heat supply to the greenhouse if needed when the Facility is not in operations.

VIII. **Water Return** – EDC, or its assignee, would be obligated to return all water provided by APWL to the return point as determined by APWL as described above. Such returned water would be required to be in the same condition as it was provided, other than being cooler in temperature.

IX. **Payments** – Waste Heat would be provided and returned at no charge.

X. **Non-exclusivity** – This Indicative Term Sheet is non-exclusive and shall not prevent APWL from soliciting other potential users of Waste Heat from the Facility until a definitive Agreement is entered into by the parties.

XI. **Assignment** – EDC may assign this term sheet to a qualified greenhouse operating company with the consent of APWL, such consent not to be unreasonably withheld.

XII. **Other Terms and Conditions** – Any definitive Agreement will contain other terms and conditions reasonable and customary for an agreement of this nature.

XIII. **Conditions Precedent** – Execution of a definitive Agreement would be subject to the following:

1) Extension of APWL's Energy Purchase Agreement with BC Hydro through March of 2028.
2) Execution of a definitive agreement with the City of Williams Lake, currently under discussion, regarding the expansion of APWL's ash disposal landfill site.

Signed and agreed upon as of the date first above written

Central Cariboo Economic Development Corporation C/O City of Williams Lake

By:______________________________

I have the ability to bind the Company

Larry Stranberg, Chair

Atlantic Power Limited Partnership

By: **Atlantic Power GP INC.**, its General Partner

By:______________________________

I have the ability to bind the Company

Terrance Ronan, Chief Financial Officer

Approved as to Form

51) Williams Lake Indian Band

Williams Lake Indian Band
2672 Indian Drive Williams
Lake, BC V2G 5K9

January 4, 2016

VIA EMAIL: Al Richmond– arichmond@cariboord.bc.ca

Dear Al Richmond, CRD Chair

Re: Signing Ceremony –Williams Lake Indian Band & Atlantic Power Williams Lake

It is with great pleasure that I write to invite you to a ceremony to commemorate the signing of a Community Benefits Agreement ("CBA") between Williams Lake Indian Band and Atlantic Power.

The CBA is intended to establish a mutually beneficial, cooperative and productive relationship through which Atlantic recognizes and respects the aboriginal rights, title and interests asserted by the Williams Lake Indian Band while engaged in Activities which may affect the WLIB Stewardship Area.

The signing ceremony will take place **on January 7th, 2016 commencing at 8:30 a.m. at the Chief James Louie Resource Building, located at 2661 Indian Drive, Williams Lake Indian Reserve No. 1**.

The morning ceremony will commence with a welcome and opening prayer followed by speakers from both organizations and the signing of the agreement. Light refreshments will be served following the signing. We anticipate that the event will conclude by 9:15 am.

To R.S.V.P, please contact Rhonda Leech, Lands & Resources Officer at (250) 296 - 3507 ext. 123 or via email at rhonda.leech@williamslakeindianband.ca.

I hope you are able to accept this invitation and I look forward to hearing from you.

Yours sincerely

Rhonda Leech
WLIB Lands & Resources Officer

Toll Free: 1-877-856-3507 Phone: 250-296-3507
Fax : 250-296-4750
Website:www.williamslakeband.ca

Williams Lake Indian Band
2672 Indian Drive Williams Lake, BC
_V2G 5K9_

February 22, 2016

Atlantic Power (Williams Lake) Ltd.
3 Allied Drive, Suite 220,
Dedham, MA, 02026, USA

Attention: Brian Chatlosh, Vice President, Commercial Development

Re: Letter of Support – Atlantic Power (Williams Lake) Proposal

This conditional letter of support is in regard to the Atlantic Power Williams Lake Ltd. ("APWL") proposal to utilize railway ties as a supplement to its declining wood fibre supply at the biomass power generating facility in Williams Lake (the "APWL Proposal").

WLIB and APWL have concluded a Community Benefits Agreement, dated January 7, 2016 which includes at its core a mechanism through which the parties have engaged, and will continue to engage, with respect to the Proposal and other activities at the Atlantic Power facility in Williams Lake.

The WLIB has been in discussions with APWL regarding the APWL Proposal and has worked with an environmental consulting firm to review the air quality modeling and other data. Based on this review and subsequent responses provided by APWL we advise that we are supportive of the Proposal, provided that APWL can satisfy all environmental standards and any other reasonable requests imposed by the Province of British Columbia or WLIB with respect to the Proposal.

If you have any further questions regarding WLIB's interest in, or position regarding, the Proposal, feel free to contact the undersigned at (250) 296 – 3507 or Aaron Higginbottom, Natural Resource Manager at (250) 296-3507 ext. 113.

Regards,

Chief Ann C. Louie
Williams Lake Indian Band

Toll Free: 1-877-856-3507 Phone: 250-296-3507
Fax: 250-296-4750
Website:www.williamslakeband.ca

teranis

October 30, 2015
File: TR15047.01

SENT BY EMAIL ONLY

Ms. Rhonda Leech,
Natural Resource Management,
Lands and Resources Officer,
Williams Lake Indian Band,
2672 Indian Drive,
Williams Lake, BC.
V2G 5K9

Dear Ms. Leech:

Re: Williams Lake Power Project – Review of Air Dispersion Modelling Study Completed by RWDI for Atlantic Power Corporation - DRAFT

Teranis Consulting Ltd. (Teranis) was retained by the Williams Lake Indian Band (WLIB) to review a document[1] produced by RWDI Air Inc. (RWDI), which reported the modelled emissions of parameters of concern from a trial burn conducted at the Atlantic Power Corporation Williams Lake Power Plant (WLPP - the Facility), Williams Lake, BC, in April 2001.

PROJECT BACKGROUND

In 2001, a trial was completed by TransCanada Power to assess the emissions generated from the combustion of 100% treated rail ties. Emissions testing was performed by A. Lanfranco and Associates (Lanfranco) and presented in their report to TransCanada Power entitled Emission Survey Report, Regular Wood Waste and Rail Tie Wood Waste (April 2001).

The data reported by Lanfranco (2001) was subsequently utilised by RWDI in their modelling of emissions for "contaminants of interest" including: total particulate matter (TPM), sulphur dioxide (SO_2), hydrogen chloride (HCl), dioxins and furans, polycyclic aromatic hydrocarbons (PAHs), and metals (Pb, Sb, Cu, Mn, V, Zn, As, Cr, Co, Ni, Se, Te, Ti, Cd and Hg). Oxides of nitrogen (NOx) values were obtained from the permanently installed Continuous Emissions Monitoring (CEMs) system. The results of the modelling were reported to Atlantic Power Corporation by RWDI in September 2015.

PROJECT OBJECTIVE

The objective of this project was to review the RWDI report to determine if there were limitations to the interpretation of the modelled data and to identify additional information to support the modelling report and provide additional information regarding operations and environmental management at the facility.

[1] Air Dispersion Modelling Study, Final Report, September 8, 2015. RWDI

Teranis Consulting Ltd.
580 – 1125 Howe Street
Vancouver, BC, V6Z 2K8
Tel: (604) - 681 2888
Fax: (604) - 681 2891

MODELLING REVIEW

The review of the RWDI technical report was completed by PGL Environmental. The purpose of the review was to assess the scope of the modelling exercise and determine whether additional impacts to air quality may result from changes to fuel source. A summary of findings from this review include the following:

1. Onsite shredding of rail ties is proposed as part of the renewal project. Inclusion of this particulate source, or identification of associated emission control equipment, does not appear to have been included in the reviewed material. All potential sources associated with the renewal project should be included, especially given that PM_{10} concentrations are already predicted to be 82% of the objective (including background concentrations).

2. Modelling was conducted following the *Guidelines for Air Dispersion Modelling in British Columbia*, with results compared to the applicable BC Air Quality Objectives (AQOs).

3. RWDI indicates that the exceedances of the AAQO are limited to an area within one to two kilometers to the northwest of the facility and a smaller area within a few hundred meters to the southwest. Sensitive receptors or receptors of concern to the WLIB (cultural and/or traditional significance) within this area should be identified on maps that show the frequency of exceedances of objectives or guidelines at each receptor.

4. Background concentrations of sulphur dioxide were not provided resulting in a lower potential maximum predicted concentration at 57% of the objective value (50% Rail Ties). Sulphur dioxide exceeds the maximum predicted concentration (at 100% Rail Ties) without inclusion of a background value. The region will have pollution contributed from other industrial sites, residential pollution, and/or naturally occurring pollution. In order to appropriately predict the overall air quality in the area once the proposed fuel source is implemented, a background concentration is required for all contaminants.

5. Emissions utilized in the air dispersion modelling are based on a 2001 stack testing program.at WLPP, with the power plant combusting 100% rail ties. Confirmation is required to determine whether changes to operating conditions or infrastructure through upgrades have occurred within the subsequent 14 years. Any such changes may affect the point source stack parameters, which may affect the confidence in the emission data.

6. In the absence of a provincial or national objective, rationale should be provided for comparison to Ontario ambient air quality criteria (AAQC) rather than potentially more conservative EPA or WHO guidelines.

7. CALMET was applied for a 1-year model period of January 1, 2012 to December 31, 2012. Confirmation is required to confirm why only one years' worth of data was utilized and whether the 2012 meteorological data is reflective of typical meteorological conditions.

8. The FAQ sheet supplied by Atlantic Power said that their modelling would consider the effect of inversions. No direct reference to inversions is provided by RWDI in their report.

9. Figure 6 states "Predicted Ninety-Ninth Percentile Peak Daily 1-Hour Maximum SO_2 Including Ambient Background Value for 50% Rail Ties"; however, Table 7 indicates that no background concentrations were applied to the comparison.

10. RWDI indicates that 1-hour NO_2 predicted concentrations were at or slightly above the AQO; however, the adjustment for background potentially double counts the plant emissions. Modelling should be updated to confirm corrected concentrations to determine whether NO_2 predicted concentrations are actually above or below the AQO.

11. For instances where emissions are predicted to be above AQO's, emission control or mitigation methods should be presented for consideration.

12. An air quality monitoring program should be provided to confirm air quality objectives are met during potential operation and identify any meteorological conditions in which the fuel mix should be altered to reduce the occurrence of exceedances.

ADDITIONAL CONSIDERATIONS

Following the review of the RWDI report and in consideration of the operational changes required for the WLPP, the WLIB may require further information and/or clarification for a number of points to enable consideration of their options. These questions/points include (in no specific order), the following:

1) The RWDI report uses data obtained from a 2001 trial and stack test report.
   i. Have emission controls at the Facility changed since this stack test was completed, and if so, how would these changes likely influence the emissions?

2) The RWDI report does not report the assessment and quantification of the feedstock utilized during the trial burn. Concentrations of preservatives retained within the ties are likely to vary (wood species, age, weathering factors, etc.) and the ratio of each treatment e.g. creosote, pentachlorophenol (PCP), chromated copper arsenate (CCA) will depend on their source.
   i. Although creosote is the dominant preservative used in the rail industry, it is anticipated that there may be ties burned that are treated with PCP, CCA or more recently, ACQ (alkaline copper quaternary), rather than creosote. Have these other feedstocks been considered and accounted for within the trial burn scenario considering their ratios may vary through time?
   ii. What was the PAH concentration range within the rail ties used as feedstock?
   iii. Were the rail ties used in the trial burn randomly selected from the feedstock, and if so, what were their treatment characteristics and/or PAH (PCP, CCA etc.) concentration ranges?

3) The RWDI report identifies predicted emissions of total PAHs (particulate and vapour phase) in Table 8.
   i. Has there been any account taken in the emissions estimate to address the variability of PAH concentrations for the feedstock[2]?

[2] Within and between ties.

ii. Similarly, have the emissions estimates for metals, chlorophenol[3], dioxins and furans been assessed based on the potential variability of contaminants within feedstock?

4) The FAQ (p3) indicates that the high boiler operating temperatures (and the emissions controls) are effective in removing contaminants of concern.
   i. Have there been any analyses of the ash generated from the trial to determine residual (if any) amounts of PAH, PCP and metals?
   ii. What is the pH of the ash and have there been any leachate tests performed with the ash?

5) The FAQ (p3) indicates that the elevated boiler operating temperatures (2,000 °F) keep emissions below provincial health and environmental standards.
   i. What were the boiler operating temperatures during the trial?
   ii. What are typical boiler operating temperatures and ranges?
   iii. What were the boiler temperatures during the month preceding and following the trial?

6) While controlled combustion conditions can destroy dioxins and other chlorinated aromatic substances in treated ties, dioxins can reform within the convection zone of the boiler, which are assumed to be collected by the flue gas treatment system.
   i. Are solids trapped by the emissions control consolidated with the boiler ash for disposal, or segregated for separate testing and disposal?
   ii. Have there been any analyses performed on solids recovered from the emissions control system?

7) It is assumed that the operation of the facility is 24/7; however, it is likely that there are shutdowns for routine maintenance and potentially during an emergency.
   i. Have there been any emergency shutdowns during operation of the Facility?
   ii. How long does it take for the Facility to be shut down?
   iii. Is there any data available for combustion temperatures during a shutdown (until combustion is complete)?
   iv. What are the NOx concentrations recorded by the CEMs during this process?

8) The FAQ (p4) suggests that the higher heating value of the shredded rail ties burns more quickly and completely than green/wet wood.
   i. Could the 50% estimate for SO_2 concentrations (i.e. 50% of emissions from combustion of 100% rail ties) underestimate SO_2 emissions considering the potential for incomplete combustion when burning ties with other wood waste?

---

[3] Based on PCP concentrations.

ii. Has historical combustion of wet/green wood waste presented evidence indicating a reduction of boiler temperatures and/or increased incomplete combustion?

9) The FAQ (p4) identifies that *the pollutant levels in the ash from rail ties, although somewhat higher than from traditional fuel sources, are still well within BC Regulations*.
    i. What analyses have been performed for ash samples?
    ii. To which regulation(s) is Atlantic Power comparing this data?

10) The RWDI report references background concentrations and compares these to the emissions estimates.
    i. How did background concentrations in 2012 compare to other years?
    ii. What is the long-term trend in background concentrations for the available parameters?

11) SO_2 and NO_2[4] emissions identified in the trial burn in the vicinity of the facility are already elevated near or above some of the Air Quality Objectives (AQOs) presented in the RWDI report.
    i. Could the estimated emissions to the local air shed limit the development of other industries that could produce TPM, SO_2, NOx and, PAH's?

12) The RWDI report estimates emissions for parameters with AQOs.
    i. Has any evaluation been made for any potential nuisance impacts from the combustion/storage of rail ties, such as odour?

13) Naphthalene is a volatile parameter and constituent of creosote. It is regulated in the workplace, and under the BC Contaminated Sites Regulation (CSR) in soil vapour.
    i. Where there is proposed large scale storage of creosote-treated rail ties, has there been any assessment performed to determine potential impacts to neighbours and for worker exposure?

14) The FAQ (p2) indicates that chipping of rail ties will occur at the plant site.
    i. Is this the only location where ties will be chipped and stored?
    ii. What management practices are in place to recover dust and/or chip deposited over the site?

[4] It is acknowledged that the NO_2 emissions calculation may double count emissions from the Facility.

OFF-SITE STORAGE/DISPOSAL

It has been indicated that Atlantic Power will utilise land to the northwest of the current Atlantic Power Ash Landfill, situated on Soda Creek Road (see Attachment A). We presently do not have details for the rail tie management plan, and therefore some of the following questions may be redundant. However, the following questions are presented for consideration and review:

A) There are two parcels of land identified to be developed by Atlantic Power to enable this project to proceed.
   i. Has there been a baseline investigation completed to determine pre-development environmental conditions of the parcels?
   ii. Will these parcels be used for storage of treated ties?
   iii. Will the areas be paved?
   iv. If surfaces are unpaved, will surface runoff be collected and treated prior to discharge?
   v. Will downgradient ground/surface water quality be monitored?
   vi. Is chipping of ties planned to occur on either of these parcels?

We appreciate this opportunity to work with you on this project. Should you require any additional information, please do not hesitate to contact Alan Lynch directly.

Sincerely,

TERANIS CONSULTING LTD.

Alan Lynch, B.Sc.(ENS)
Senior Scientist
Tel: (604) 681 2888
alan.lynch@teranis.ca

Stewart Brown M.Sc., P.Ag., R.P.Bio.
Senior Environmental Consultant
PGL Environmental Consultants
Tel: (604) 895 7612
sbrown@pggroup.com

Attachments:

Attachment A – Figures identifying Parcels of Land to be utilised by Atlantic Power

Re: WLIB - Review of RWDI Modelling Report Completed for Atlantic Power Corp Williams Lake Power Project, BC. - DRAFT

REFERENCES

Atlantic Power Corporation (July 2015) Atlantic Power Williams Lake Renewal Project FREQUENTLY ASKED QUESTIONS. http://www.atlanticpower.com/williams-lake

Atlantic Power Corporation Fact Sheet - Atlantic Power Williams Lake Renewal Project. ATLANTICPOWER.COM/WILLIAMS-LAKE

RWDI (2015) Air Dispersion Modelling Study, Final Report, September 8, 2015.

Attachment A
Atlantic Power – Additional Parcels

CityMap

City of Williams Lake

208.3 0 104.14 208.3 Meters

NAD_1983_UTM_Zone_10N

1: 4,100

All data, information and maps are provided 'as is' without guarantee of accuracy. Lot line locations as shown are approximate and cannot be used to establish legal boundaries.

Notes

CityMap

City of Williams Lake

116.8 0 58.42 116.8 Meters

NAD_1983_UTM_Zone_10N

1: 2,300

Notes

AtlanticPower
Corporation

November 18, 2015

Rhonda Leech
Natural Resource Management
Lands & Resources Officer
Williams Lake Indian Band
2672 Indian Drive
Williams Lake BC V2G 5K9

Dear Ms. Leech:

Thank you for providing the comments and questions from Teranis Consulting Ltd. on RWDI's air dispersion modelling report. We shared those comments and questions with RWDI, and the responses are attached. As some of the comments and questions relate to plant operations or other matters beyond the scope of RWDI's report, we are providing the responses in two parts. The first part, prepared by Atlantic Power, addresses plant operations and other matters (Attachment A), and the second part, prepared by RWDI, addresses specific questions on the air dispersion modelling report (Attachment B).

We are available to discuss these responses with you and Teranis, at your convenience. Atlantic Power Williams Lake is committed to maintaining a mutually beneficial, cooperative, and productive relationship with the Williams Lake Indian Band.

Very truly yours,

Brian Chatlosh
Director, Asset Management

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Attachment A
Responses to Teranis' Comments
Plant Operations and Other Matters

Atlantic Power Corporation (AP) owns and operates the Williams Lake Power Plant (WLPP), a 66 Megawatt biomass-fuelled electricity generation station. The plant has been operating since 1993, and the plant is currently permitted to use up to 5% rail ties. AP retained RWDI AIR Inc. (RWDI) to complete an air dispersion modelling study in support of an application to increase the amount of treated rail ties allowed to be consumed as fuel for the power plant. AP is committed to maintaining a mutually beneficial, cooperative, and productive relationship with the Williams Lake Indian Band (WLIB), and as part of that cooperation, AP has agreed to work with WLIB's consultant, Teranis Consulting Ltd. (Teranis), to review any comments or questions on the air dispersion modelling report.

On October 30, 2015, Teranis, on behalf of WLIB, provided a letter outlining their questions and comments based on their review of RWDI's Air Dispersion Modelling Study dated September 8, 2015. This Attachment A provides responses to questions and/or comments related to the power plant operation or other matters. Attachment B, prepared by RWDI, provides responses to specific questions pertaining to their report. For ease of review, we have provided the specific question/comment from the Teranis report and our response in order of the report.

Comment 1: Onsite shredding of rail ties is proposed as part of the renewal project. Inclusion of this particulate source, or identification of associated emission control equipment, does not appear to have been included in the renewal material. All potential sources associated with the renewal project should be included, especially given that PM10 concentrations are already predicted to be 82% of the objective (including background concentrations).

Response 1: Per RWDI's response, the air dispersion model focuses on point sources (e.g. the stack) and does not include fugitive sources. Nevertheless, management of fugitive emissions is a key element of the design process for the new rail tie (RRT) shredding system. The preliminary design includes these measures:

-Receipt of whole ties and unloading with a grapple arm (i.e. no dumping).

-Covered conveyors will be used.

-The collecting conveyor beneath the shredder will be equipped with an enclosed skirtboard, just below the shredder's discharge chute, and the outlet opening of the skirtboard will be enclosed with dust curtains.

-The stream of shredded RRTs through the disc screen and hog tower will be enclosed with chutes that are fitted with dust curtains at the inlet and outlet chute openings.

-The collecting conveyor below the disc screen and hog will be fitted with an enclosed skirtboard, just below the disc screen's and hog's discharge chute, and the outlet opening of the skirtboard will be enclosed with dust curtains.

-Shredded RRTs will be stored in an enclosed area (e.g. silo or bin).

These design features, while still preliminary, will ensure minimal fugitive dust from the receipt, handling, and storage of the rail ties.

Comment 5: Emissions utilized in the air dispersion modelling are based on 2001 stack testing program at WLPP, with the power plant combusting 100% rail ties. Confirmation is required to determine whether changes to the operating conditions or infrastructure through upgrades have occurred within the subsequent 14 years. Any such changes may affect the point source stack parameters, which may affect the confidence in the emission data.

Responses 5: There have not been any material changes to plant design or configuration since 2001 that would affect the point source stack parameters, beyond an increase in allowable flow rate (100 to 110 m3/sec) made to the permit in 2010. RWDI has provided comments on the significance of the change in the flow rate.

The following section addresses the comments covered under the "Additional Considerations" (AC) Section of the Teranis letter. Again, this Attachment A provides responses to questions and/or comments related to the power plant operation or other matters, and Attachment B, prepared by RWDI, provides responses to specific questions pertaining to their report.

AC Comment 1: The RWDI report uses data obtained from a 2001 trial and stack test report.

i. Have emission controls at the Facility changed since this stack test was completed, and if so, how would these changes likely influence the emissions?

AC Response 1: There have not been any changes to emission controls at the plant since the 2001 stack test.

AC Comment 2: The RWDI report does not report the assessment and quantification of the feedstock utilized during the trial burn. Concentrations of preservatives retained within the ties are likely to vary (wood species, age, weathering factors, etc.) and the ratio of each treatment e.g.

creosote, pentachlorophenol (PCP), chromated copper arsenate (CCA) will depend on their source.

i. Although creosote is the dominant preservative used in the rail industry, it is anticipated that there may be ties burned that are treated with PCP, CCA or more recently, ACQ (alkaline copper quaternary), rather than creosote. Have these other feedstocks been considered and accounted for within the trial burn scenario considering their ratios may vary through time?

ii. What was the PAH concentration range within the rail ties used as feedstock?

iii. Were the rail ties used in the trial burn randomly selected from the feedstock, and if so, what were their treatment characteristics and/or PAH (PCP, CCA etc.) concentration ranges?

AC Response 2: The incineration of wood residue treated with metal derived preservatives (such as CCA or ACQ) is prohibited in the current permit, and no changes to this provision are being requested. Further, CN (the expected primary rail tie supplier) has confirmed that they have not used metal treated ties in their system, and our fuel supply agreement with CN (and others) will prohibit any metal treated rail ties.

CN has indicated that the expected rail tie supply will consist of mostly creosote treated ties with some penta treated ties. The ties used in the 2001 test are expected to be representative of the future supply, and were not specially selected for the test. The PAH levels of the ties are shown in Table 8 of the 2001 test report (appended to the RWDI report). The PAH emission levels in the stack during the 2001 test did not show a significant difference between regular wood fuel and rail tie fuel, indicating that the PAH emission rate is not directly related to the PAH levels in the fuel.

AC Comment 4: The FAQ (p3) indicates that the high boiler operating temperatures (and the emissions controls) are effective in removing contaminants of concern.
i. Have there been any analyses of the ash generated from the trial to determine residual (if any) amounts of PAH, PCP and metals?
ii. What is the pH of the ash and have there been any leachate tests performed with the ash?

AC Response 4: Table 8 of the 2001 test report (Appended to the RWDI report) shows the referenced constituents of the ash. In Section 5.0 of the 2001 test report the leachate test results and pH levels are provided.

AC Comment 5: **The FAQ (p3) indicates that the elevated boiler operating temperatures (2,000 °F) keep emissions below provincial health and environmental standards.**
i. What were the boiler operating temperatures during the trial?
ii. What are typical boiler operating temperatures and ranges?
iii. What were the boiler temperatures during the month preceding and following the trial?

AC Response 5: The design temperature of the furnace, and its effectiveness in ensuring complete combustion with low emissions was confirmed by the 2001 stack test and the recent air modelling. The primary parameters for measuring combustion effectiveness (and therefore reaching the design combustion temperatures) are carbon monoxide (CO) and excess oxygen (O2). If combustion is incomplete CO levels will rise and excess O2 levels will drop, typically. CO levels and excess O2 levels are monitored closely, and fuel and air flow to the boiler are regulated to ensure complete combustion, regardless of fuel composition. Table 6 of the 2001 test report shows CO levels were within their normal range during the test, and dropped slightly from the regular-wood-fuel portions of the test to the rail-tie-fuel portions of the test. Furnace temperature (fireball temperature) is not measured, and we do not have the requested historical values.

AC Comment 6: **While controlled combustion conditions can destroy dioxins and other chlorinated aromatic substances in treated ties, dioxins can reform within the convection zone of the boiler, which are assumed to be collected by the flue gas treatment system.**
i. Are solids trapped by the emissions control consolidated with the boiler ash for disposal, or segregated for separate testing and disposal?
ii. Have there been any analyses performed on solids recovered from the emissions control system?

AC Response 6: All ash (bottom ash from the bottom of the boiler, ash from the mechanical collectors, and fly ash from the electrostatic precipitator) is consolidated for disposal at the project's ash landfill. The ash was tested during the 2001 test, and the results are shown in Table 8 of that report.

AC Comment 7: **It is assumed that the operation of the facility is 24/7; however, it is likely that there are shutdowns for routine maintenance and potentially during an emergency.**
i. Have there been any emergency shutdowns during operation of the Facility?
ii. How long does it take for the Facility to be shut down?
iii. Is there any data available for combustion temperatures during a shutdown (until combustion is complete)?
iv. What are the NOx concentrations recorded by the CEMs during this process?

AC Response 7: Yes, the facility operates 24/7. During planned maintenance shutdowns, fuel flow to the boiler is gradually reduced to empty the fuel feed bins for maintenance, and combustion parameters and emissions are within normal ranges during the shutdown which occurs over about 2 hours. During a recent (11/2) planned shutdown, flue gas temperatures in the economizer reduced by about 125 F over the 2 hour shutdown period, and NOx decreased from about 120 ppm to 40 ppm.

An unplanned shutdown can occur, for example if the BC Hydro transmission system goes down or if a major piece of equipment fails. In these cases, the plant would trip (which means the steam turbine generator is electrically disconnect from the grid and the fuel flow to the boiler is stopped). Such an upset condition happens quickly, typically in less than a minute. Even with the fans shutdown, air continues to flow to the boiler immediately after a trip, and any fuel already in the boiler on the grate continues to combust. There is only a small amount of RRT burning at one time (<1 ton/min at the 50% limit). Because the RRT/regular wood fuel mixture on the grate is contained in the large metal furnace, the RRT will stay in place and burn out very quickly. Plant trips are rare, but during a 2014 plant trip, flue gas temperatures were steady up to the point of the trip and then begin a gradual decline. NOx was 110 ppm immediately prior to the trip, and then also began a slow decline (5 minutes later it was 76 ppm).

AC Comment 8: The FAQ (p4) suggests that the higher heating value of the shredded rail ties burns more quickly and completely than green/wet wood.

i. Could the 50% estimate for SO2 concentrations (i.e. 50% of emissions from combustion of 100% rail ties) underestimate SO2 emissions considering the potential for incomplete combustion when burning ties with other wood waste?

i. Has historical combustion of wet/green wood waste presented evidence indicating a reduction of boiler temperatures and/or increased incomplete combustion?

AC Response 8: The intention of the FAQ was to inform people that the constituents of rail ties will not pose health or environmental hazards if properly combusted, the plant ensures good combustion using regular wood fuel today, and given the higher energy content and lower moisture content of rail ties, continued operation of the plant with good combustion can be assured.

Combusting rail ties with regular wood fuel will not result in incomplete combustion. As noted in the response to the previous comment, the boiler is monitored closely for combustion efficiency and the fuel and air flow are adjusted to ensure complete combustion. The introduction of some rail tie fuel will only enhance the current excellent operating conditions of the boiler.

The Williams Lake boiler was specifically designed for biomass with the ability to achieve full steam output with fuel moisture contents up to 55%. The plant's wood deliveries range from green wood and bark (~40% moisture content) to mill shavings (~15% moisture content). The plant maintains a large wood inventory in the fuel yard, and the fuel in the yard is well mixed. The moisture level of the fuel fed into the boiler is typically stays in the 30-40% range.

AC Comment 9: The FAQ (p4) identifies that the pollutant levels in the ash from rail ties, although somewhat higher than from traditional fuel sources, are still well within BC Regulations.

i. What analyses have been performed for ash samples?

ii. To which regulation(s) is Atlantic Power comparing this data?

AC Response 9: Table 8 of the 2001 test report (Appended to the RWDI report) shows the results of the analyses of the ash samples. In Section 5.0 of the 2001 test report the leachate test results are compared to the BC Special Waste Regulations.

AC Comment 12: The RWDI report estimates emissions for parameters with AQOs.

i. Has any evaluation been made for any potential nuisance impacts from the combustion/storage of rail ties, such as odour?

AC Response 12: Odour issues related to the combustion of the ties are addressed by RWDI.

The rail ties being used for fuel will typically have been removed from service after 20-30 years or more. These rail ties have weathered in place for decades, and they should be relatively depleted of volatiles and semi-volatility in the outer layers. As such, there will be limited off-gassing associated with the ties when stored whole prior to shredding and consumption. The shredded rail ties will be stored in a silo or bin to minimize odours.

AC Comment 13: Naphthalene is a volatile parameter and constituent of creosote. It is regulated in the workplace, and under BC Contaminated Sites Regulation (CSR) in soil vapour.

i) Where there is proposed large scale storage of creosote-treated rail ties, has there been any assessment performed to determine the impact to neighbours and for worker exposure?

AC Response 13: AP routinely assesses the exposure of our employees to hazards, and we provide our employees with the necessary personal protective equipment (PPE) to safely perform their work. In addition, WorkSafe BC provides oversight on worker safety.

See also, RWDI's response related to the airshed.

AC Comment 14: The FAQ (p2) indicates that chipping of rail ties will occur at the plant site.

i. Is this the only location where ties will be chipped and stored?

ii. What management practices are in place to recover dust and/or chip deposited over the site?

AC Response 14: Yes, our plan is to install an extensive, permanent rail tie shredding system at the power plant site. As noted in the response to the first question, the system will includes numerous measures to control fugitive dust such as covered belts. Similar to current operating practices, the plant staff will periodically clean up any of the limited amounts of dust and chips near the shredding equipment that are not addressed by the fugitive dust mitigation measures noted previously, and this material will be deposited in the shredded rail tie silo or bin.

The following section addresses the comments covered under the "Off-Site Storage/Disposal" (OD) Section of the Teranis letter.

OD Comment A: There are two parcels of land identified to be developed by Atlantic Power to enable this project to proceed.

i. Has there been a baseline investigation completed to determine pre-development environmental conditions of the parcels?

OC Comment Ai Response: Yes, a baseline investigation of the parcels was conducted by Partner Engineering. A copy of the Final Report (Phase One Environmental Assessment) was provided to the WLIB in October, 2015.

ii. Will these parcels be used for storage of treated ties?

OC Comment Aii Response: No, these parcels will not be used for storage of rail ties.

iii. Will the areas be paved?

OC Comment Aiii Response: Design of the expansion of the landfill has not been started as of November 2015. It is anticipated that the design effort will start in Q1-2016. It is reasonable to assume that a portion of the parcel may be paved.

iv. If surfaces are unpaved, will surface runoff be collected and treated prior to discharge?

OC Comment Aiv Response: Assuming that the project is authorized, landfill activities regarding material handling, pollution control and surface water runoff, will be conducted in accordance with an updated Management Plan (not yet prepared) approved by the MOE.

v. Will downgradient ground/surface water quality be monitored?

OC Comment Av Response: The existing Management Plan governs activities associated with the landfill operation, and it includes provisions for containment berms and groundwater monitoring, as well as other operational requirements.

vi. Is chipping of ties planned to occur on either of these parcels?

OC Comment Avi Response: No chipping of railroad ties will occur at these parcels.

Attachment B
Responses to Teranis' Comments
RWDI Air Dispersion Model Report
(Letter from RWDI Dated November 17, 2015)

RWDI
CONSULTING ENGINEERS & SCIENTISTS

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November 17, 2015

Mr. Terrance Shannon
EHS Manager
Atlantic Power Corporation
William Lake Power Plant
4455 Mackenzie Ave N
Williams Lake, BC V2G 5E8

Re: Atlantic Power Corporation – William Lake Power Plant
Response to Comments – Teranis Consulting Ltd. / Williams Lake Indian Band
RWDI Reference No. 1500355

Email: tshannon@atlanticpower.com

Dear Mr. Shannon,

RWDI AIR Inc. (RWDI) was retained by Atlantic Power Corporation – Williams Lake Power Plant (WLPP) to complete an air dispersion modelling study in support of an application to increase the amount of treated rail ties allowed to be consumed as feedstock into the power plant. On October 30, 2015, Teranis Consulting Ltd. (Teranis), on behalf of Williams Lake Indian Band (WLIB), provided a letter outlining the questions and clarifications based on their review of RWDI's Air Dispersion Modelling Study dated September 8, 2015. This letter is intended to provide the responses to questions and/or clarifications to specific questions pertaining to our report. Other comments that are related to WLPP will be responded to under separate cover from WLPP. For ease of review, RWDI has provided the specific question/comment from the Teranis report and our response in order of the report.

Comment 1: **Onsite shredding of rail ties is proposed as part of the renewal project. Inclusion of this particulate source, or identification of associated emission control equipment, does not appear to have been included in the renewal material. All potential sources associated with the renewal project should be included, especially given that PM10 concentrations are already predicted to be 82% of the objective (including background concentrations).**

Response 1: *Fugitive dust sources are not typically covered in discharge permits and are thus also not included in the modelling. The design of the equipment to be used for the shredding of railroad ties includes measures that will be used to reduce and eliminate fugitive emissions from the shredding activities. In addition, a Fugitive Dust Plan is in-place at the Plant, which specifies steps taken to minimize fugitive dust generated by plant activities. Further, any fugitive dust created by this process would be mechanically generated wood particles (as opposed to being the result of combustion, for example) and wood therefore likely occur in large size fractions greater than $PM_{2.5}$ and PM_{10} that would be easily captured by mitigation efforts, and that would settle within or close to the plant should they occur. There should be negligible influence on ambient $PM_{2.5}$ or PM_{10} on or off site.*

Comment 2: **Modelling was conducted following the *Guidelines for Air Dispersion Modelling in British Columbia*, with results compared to applicable BC Air Quality Objectives (AQOs).**

Response 2: *This is correct. The modelling was conducted in accordance with regulatory guidelines and a detailed model plan was approved by MOE staff prior to commencement of the study.*

Comment 3: **RWDI indicates that the exceedances of the AAQO are limited to area within one to two kilometers to the northwest of the facility with a smaller area within a few hundred meters to the southwest. Sensitive receptors or receptors of concern to the WLIB (cultural and/or traditional significance) within this area should be identified on maps that show the frequency of exceedance of objectives or guidelines at each receptor**.

Response 3: *RWDI will be able to complete this analysis as requested. However, we would require the assistance of WLIB to provide the locations of any sensitive receptor or receptor of concern to the WLIB. Note: the potential exceedances of the objectives relate to* NO_x*, and the inclusion of rail ties in the fuel mix has no or very little effect on the plant* NO_x *emissions.*

Comment 4: **Background concentrations of sulphur dioxide were not provided resulting in a lower potential maximum predicted concentration at 57% of the objective value (50% rail ties). Sulphur dioxide exceeds the maximum predicted concentration (at 100% rail ties) without the inclusion of a background value. The region will have pollution contributed from other industrial sites, residential pollution, and/or naturally occurring pollution. In order to appropriately predict the overall air quality in the area once the proposed fuel source is implemented, a background concentration is required for all contaminants.**

Response 4: *RWDI acknowledges that ideally background concentrations for all contaminants would be assessed with the modelling for comparison to the AAQOs. However, in this case, not all contaminants have existing background data for comparison. Local background concentrations vary, so RWDI would be concerned about applying a background concentration from another area to this area. We would also note that typically air quality monitors are only deployed when potential concerns with specific facilities are suggested based on permitted emissions or modeling studies. Thus the fact that there are no specific monitors for* SO_2*, (while PM and* NO_x *are currently monitored) tends to suggest that there are no existing major facilities or sources in the area for which resulting ambient concentrations of* SO_2 *are a concern.*

Comment 5: **Emissions utilized in the air dispersion modelling are based on 2001 stack testing program at WLPP, with the power plant combusting 100% rail ties. Confirmation is required to determine whether changes to the operating conditions or infrastructure through upgrades have occurred within the subsequent 14 years. Any such changes may affect the point source stack parameters, which may affect the confidence in the emission data.**

Response 5: *There have not been any material changes to plant design or configuration since 2001 that would affect the point source stack parameters, beyond an increase in allowable flow rate (100 to 110 m^3/sec) made to the Discharge permit in 2010. Given a constant stack concentration, an increase in flow rate would result in a similar increase in emissions. But the increase flow would also result in a greater exit velocity which would enhance dispersion, offsetting the increase in emissions. In addition, the total pollutant emissions are controlled by the amount of fuel burned. If the same amount of fuel was burned using a higher air flow, overall pollutant emissions would remain constant and the higher flow rate would again increase dispersion. For these reasons, the flow rate increase is not expected to have a material impact on the test results.*

Comment 6: **In the absence of a provincial or national objective, rationale should be provided for comparison to Ontario ambient air quality criteria (AAQC) rather than potentially more conservative EPA or WHO guidelines.**

Response 6: *Where applicable, preference is given to Canadian objectives developed in regard to similar industry under similar national guidelines and objectives. This is a standard approach for BC applications.*

Comment 7: **CALMET was applied for a 1-year model period of January 1, 2012 to December 31, 2012. Confirmation is required to confirm why one years' worth of data was utilized and whether the 2012 meteorological data is reflective of typical meteorological conditions.**

Response 7: *A one year period is a standard approach for a study of this type and conforms to BC Modelling Guidelines. As noted in the report, BC MOE has provided province-wide WRF data for certain years to assist with standardized dispersion studies in BC. The 2012 was selected by MOE as a representative year for those inputs. The data provided was included in our monitoring plan that was approved by the Ministry (see correspondence in Appendix B of the modelling report)*

Comment 8: **The FAQ sheet supplied by Atlantic Power said that their modelling would consider the effect of inversion. No direct reference to inversions is provided by RWDI in their Report.**

Response 8: *Inversions are considered. The dispersion modelling, calculated on an hourly basis, was conducted using the CALPUFF modelling system as required by the Guidelines for Dispersion Modelling in British Columbia. The BC guideline states in Section 2.3.2.4 regarding CALPUFF and CALMET:*

> *CALPUFF is a Gaussian puff model that can account for time- and space-varying meteorological conditions, different source configurations and contaminants, and chemical transformations. The specific treatments include curved trajectories, building downwash, plume penetration into a capping inversion, fumigation, coastal interaction effects, terrain impingement, stagnation, and transformation-related effects (contaminant removal due to wet scavenging and dry deposition, chemical reactions) and visibility effects of particulates. It can be applied to model near field effects (in the order of tens of metres) to transport distances of hundreds of kilometres. CALPUFF is a modelling system comprised of three component submodels: CALMET (meteorological model), CALPUFF (calculates output), CALPOST (analysis and display of output). The meteorological fields used by CALPUFF are produced by CALMET — a meteorological model that includes a diagnostic wind field model. This model contains treatments of slope flows, valley flows, terrain blocking effects, kinematic terrain effects (i.e., speed up over hills), lake and sea breeze circulations, and a procedure to insure mass is conserved in the domain. CALMET inputs include surface and upper-air meteorological data as well as the option to use the gridded meteorological fields produced by mesoscale meteorological models.*

The excerpted portions above all pertain to the model's ability to include atmospheric processes in complex terrain, including inversions.

Comment 9: **Figure 6 states "Predicted Ninety-Ninth Percentile Peak 1-Hour Maximum SO2 Including Ambient Background Value for 50% Rail Ties"; however, Table 7 indicates that no background concentrations were applied for comparison.**

Response 9: *Figure 6 contains a typographic error and Table 7 is correct. We apologize for the inconvenience. To confirm, no background data was available for SO_2.*

Comment 10: **RWDI indicates that 1-hour predicted concentrations were at or slightly above the AQOs however, the adjustment for background potentially double counts the plant emissions. Modelling should be updated to confirm the corrected concentrations to determine whether NO2 predicted concentrations are actually above or below the AQO.**

Response 10: *In general, modeling must account for the effect of emissions both from the facility being evaluated (typically a new facility) and existing emissions from other sources. That is why modeling results for a proposed facility alone are added to the background from existing sources as measured by the ambient monitoring. However, because this facility is already in operation, emissions from the plant that do not change (such as NO_x) will also be captured in the monitoring data, hence the potential for double counting. It is not possible to completely remove the effect of current facility operations from the monitoring results. As such there is no update that can be done to remove the artifact of double counting. The NO_2 results were presented with and without the background included to bound the results.*

Comment 11: **For instances where emissions are predicted to be above the AQOs, emission control or mitigation methods should be presented for consideration.**

Response 11: *The inclusion of rail ties in the fuel mix has no or very little effect on the plant NO_x emissions, and, therefore, there is no impact expected from revising the permit from the current 5% RRT limit to a higher limit. Further mitigation is not warranted given the conservatism of the model study and the limited potentially affected area.*

Comment 12: **An air quality monitoring program should be provided to confirm air quality objectives are met during potential operation and identify any meteorological conditions in which the fuel mix should be altered to reduce the occurrence of exceedances.**

Response 12: *Air quality is already being measured at the two locations in Williams Lake. In addition, the plant undergoes annual emissions testing, and once rail tie use is recommenced, the stack test results can be compared to previous test results to confirm the model basis.*

The following section outlines the comments covered under the "Additional Considerations" (AC) Section of the Teranis letter. AC Comments 1, 2, 4 to 9, 12 and 14 are addressed separately by AP, while the comments directly related to the air dispersion modelling report are addressed below.

AC Comment 3: **The RWDI report identifies predicted emissions of total PAHs (particulate and vapour phase) in Table 8.**

i) Has there been any account taken in the emissions estimate to address the variability of PAH concentrations for the feedstock?

ii) Similarly, have the emissions estimates for metals, chlorophenol, dioxins and furans been assessed based on the potential variability of contaminants within feedstock?

AC Response 3: *A study of The PAH levels in Table 8 of the 2001 test report show a wide range of PAH levels between regular fuel and rail tie fuel, yet the PAH emission levels in the stack did not show a significant difference. Therefore, it is expected that further variations of the PAH levels in the rail tie fuel will also not show a significant difference in stack PAH levels.*

Table 8 of the RWDI report shows the maximum predicted concentration of metals, chlorophenol, and dioxins/furans, all of which are well below 1% of the AAQOs. Therefore, variations in the feedstock mixture are not expected to significantly change the results of the air dispersion model.

AC Comment 10: **The RWDI report references background concentrations and compares these to the emissions estimates:**

i) How did the background concentrations in 2012 compare to other years?

ii) What is the long-term trend in background concentrations for the available parameters?

AC Response 10: *A study of trends in PM up to 2011 has been completed previously by MOE. http://www.bcairquality.ca/reports/pdfs/aq_williams_lake_Sept2012.pdf*

The results of that study show that the $PM_{2.5}$ background value of 20.2 µg/m^3 from 2012 used for the study is higher than 2011 and equal or higher than all years since 2006, within the exception of 2010 which was dominated by forest fires. When the effects of forest fires are removed from the historical measurements, then the $PM_{2.5}$ value of 20.2 µg/m^3 used for background is higher than 2010 also. In general $PM_{2.5}$ values, with the exclusion of forest fires, show a slight downward trend since 2006. Similar trend is seen for PM_{10}

The BC Lung Association also publishes historical summary of air quality in BC. http://www.bc.lung.ca/airquality/stateoftheair-report.html Although William's Lake is not specifically noted, the results show that both PM and NO_x show downward trends across the province. This is due to factors such as vehicle emission standards and restrictions on open burning and reduced use of wood as fuel for home heating.

AC Comment 11: **SO_2 and NO_2 emissions identified in the trial burn in the vicinity of the facility are already elevated near or above some of the AQOs presented in the RWDI Report.**

i) Could the estimated emissions to the local air shed limit the development of other industries that could produce TPM, SO_2, NO_x and PAH's?

AC Response 11: *The estimated impacts (developed with a conservative methodology) are in the vicinity of the plant. The vast majority of future potential industry in the airshed would not be likely to have significant impacts in the same areas. The long term management of airshed emissions and air quality is the responsibility of the BC MOE. This air dispersion modelling report was also provided to the BC Ministry for review and comment.*

AC Comment 12: **The RWDI report estimates emissions for parameters with AQOs.**

i) Has any evaluation been made for any potential nuisance impacts from the combustion/storage of ties, such as odour?

C Response 12: *Odour has not been specifically addressed and was not identified as a major concern in pre-consultation. As noted in the following response, it is not expected that there will be sufficient emissions of any potentially odiferous compounds emitted from the ties well stored in their whole state that could result in offsite odours*.

AC Comment 13: **Naphthalene is a volatile parameter and constituent of creosote. It is regulated in the workplace, and under BC Contaminated Sites Regulation (CSR) in soil vapour.**

i) Where there is proposed large scale storage of creosote-treated rail ties, has there been any assessment performed to determine the impact to neighbours and for worker exposure?

AC Response 13: *Onsite worker exposure is regulated by WorkSafe BC and is not part of the regulatory environmental permitting process. The 2001 study did include a list of speciated PAH substances that were included in the Total PAH emission rate and predicted concentrations in the stack. Within the data, naphthalene is noted as being an "artifact" and therefore there is no data available for a direct evaluation. Therefore, total PAHs were assessed and related to the potential impact to neighbours in the report (see Table 8, for example).*

The ties being used for fuel will be 'aged' in the sense that as a result of weathering in place they should be relatively depleted of volatiles and semi-volatility in the outer layers. As such, there will be limited off-gassing associated with the ties when stored whole prior to shredding and consumption.

The last section of the Teranis report provides some comments with respect to Off-Site Storage/Disposal. These items will be covered by WLPP under separate cover.

We trust these responses address the comments provided. Should you have any questions, please do not hesitate to contact us.

Yours very truly,

RWDI AIR Inc.

Jeff Lundgren, M.Sc.
Technical Director, Principal

Brad Bergeron, d.E.T., A.Sc.T.
Sr. Project Manager, Principal

BCB/jo

APPENDIX B

Media Coverage

Wednesday, October 14, 2015 **Williams Lake Tribune**

Legal Notices **Legal Notices** **Legal Notices**

ENVIRONMENTAL PROTECTION NOTICE

Application for a ***Permit amendment*** under the Provisions of the Environmental Management Act.
We/I, ***Mark Blezard, Atlantic Power Preferred Equity Ltd., 4455 Mackenzie Avenue North, Williams Lake, BC, V2G 5E8***, intend to submit this amendment application to the Director to amend ***Permit 8808***, issued ***February 20, 1991 and last amended November 20, 2012*** which authorizes the ***discharge of air contaminants***, from an ***electrical power generating plant.***

The land upon which the facility is situated ***and the discharge occurs*** is ***Lot B of District Lot 72, Cariboo District Plan PGP35292 (Parcel Identifier: 017-247-276)*** located at ***4455 Mackenzie Avenue North, Williams Lake, BC, V2G 4R7, within the Williams Lake airshed.***

The amendment requests that the following conditions be changed as outlined below:

1. Remove the section allowing discharges from the ash silo vent. This system is now fully enclosed.
2. Raise the limit on waste rail ties as a proportion of the authorized fuel from the current 5% to 50%.
3. Expand the provision to burn non-hazardous wood waste.
4. Remove the requirement that continuous emission monitors be maintained and audited in accordance with EPS 1/PG/7 as these protocols were designed for fossil fuel burning systems.

Any person who may be adversely affected by the proposed amendment and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant, with a copy to the Director, Environmental Protection at 400-640 Borland Street, Williams Lake, BC, V2G 2T1 or via email to the Director, Environmental Protection *authorizations.north@gov.bc.ca* and referencing the applicant name, the location, and the authorization number PA-8808 in the subject line. The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Dated this 8th day of October, 2015.
Contact person Glenda Waddell
email: waddellenvironmental@gmail.com
Phone: 1-250-640-8088

Wednesday, October 14, 2015 Williams Lake Tribune

Transportation — Trucks & Vans

2005 Ford Freestar Ltd. 7 passenger, a/c, factory dvd, p/s, fully loaded, leather, remote start, 4.2 L auto. Reduced! $2800 obo. Mike or Sheila 250-398-7589 or 250-305-4709.

Transportation — Trucks & Vans

2005 GMC 2500 SLT 4 Door, L-Box, New Tranny, New T-Case. $4500. obo (250)267-6697

Transportation — Trucks - Logging

1997 Freightliner FL 170 with sleeper-cab, aluminum flat deck with tool boxes and sides and 5th wheel hitch, air brakes, exhaust brake, 8.5 L Cummins diesel, good rubber. $28,900 OBO 250-296-3318

Transportation — Boats

12' Aluminum boat and U-built trailer combo, New electric motor and deep cycle marine battery, 2 seats, 2 rod holders, 2 oars. $1500. Firm (778)412-6888

GARAGE SALE DIRECTORY

11th Annual Seniors Village Garage Sale Saturday, October 17th 9:00 am to 1:00 pm 1455 Western Avenue (back courtyard) Hot dogs & pop available. Loads of treasures!

Garage/Craft Sale Elks Hall October 31st 9:00am - 3:00pm Table Rentals $10.00. Sharon 250-392-4873 or Doreen 250-392-5451 sponsored by Elks and Royal Purple.

Legal Notices

ENVIRONMENTAL PROTECTION NOTICE

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Cars - Domestic

October 14, 2015 Williams Lake Tribune

Verbatim Transcript

CBC FM 91.5 Radio One

Daybreak Kamloops
October 26, 2015
6:00 – 8:30 am
Host: Shelley Joyce
"Scott Nelson" Williams Lake City Councillor
[KEVOCT2615A]

. . . . .

NELSON: Good morning, Shelley.

JOYCE: So this idea of burning railway ties was political poison down here. Why has your City Council decided to support the plan?

NELSON: Well, I think it's – if we look back to the late eighties and the beginning of the nineties, we had a very serious problem with the air quality inside Williams Lake. We used to burn all of the sawmill residue in those huge, big, large beehive burners. So when this new plant came in, what it did do was it actually reduced the particulate emissions from the beehive burners and cleaned our air up by over forty percent. It was a significant, huge advantage having this – this company come to town to clean our air up.

JOYCE: Hmm.

NELSON: And one of the things that we found was that at the same time it obviously created, y'know, thirty-two to thirty-five full-time jobs inside the City of Williams Lake. So it was a fantastic opportunity to clean up a long-term problem that was established here in Williams Lake.

JOYCE: Why do they want to add rail ties to the mix now?

NELSON: Well, the reason for that is that the Pine Beetle and the downfall in terms of what has taken place with the forestry, is that they just want to make sure that as the Pine Beetle residues continue to decline, that has – that has a problem with the amount of economically viable wood waste. So they have done a number of pre-burns on these - in these plants, and they have found that they are well below the EPA standards.

JOYCE: Are you – are you concerned at all about burning these – these creosote-covered rail ties? Could it impair the air quality?

NELSON: No. I think the biggest thing that we found was when we did it – we had previously burned ties in the City of Williams Lake - and I think the biggest issue was with the location that we had it at. And where they have moved them to, it is going to be on site now: it is going to be in a much better controlled situation. And they will have a greater degree of accuracy, and being able to put the ties through in a much cleaner and better way of doing it.

JOYCE: Why would moving a location make it better, air quality-wise?

NELSON: Because it was at the bottom of a hill in the downtown core. So we are anticipating that – right now, they are allowed to burn five percent of ties under their existing EPA emissions standards. If they – if they – if this is passed, then what will happen is they will be allowed to burn up to fifty percent ties – now, that's on average. So they want to be able to burn between fifteen to twenty-five percent of ties at any given time. So to put that in context, 800,000 tons is about 1.2 million railway ties.

JOYCE: What are you hearing from the public about this plan?

NELSON: Well Atlantic Power has a great – a great name in our community. They – they've gone out; they have worked along with the First Nations, like in consultation with the First Nations. They have worked with the City; they have – they have had one or two public meetings already. They have been endorsed by the City of Williams Lake; they have been endorsed by the Cariboo Regional District on Friday. It is a company that actually goes out and listens, and works with the communities to make sure that any concerns are addressed -they address it from internally.

JOYCE: Hmm.

NELSON: Y'know, I think the big thing with Atlantic Power, from the perspective of where we are as a community, is it brings diversity to our community; diversity in the sense that, you know, we are a commodity – we have got lumber, we have got mining we have got forestry, we have got agriculture. We have also got biomass. It is the largest independent power producing plant on the North American continent, and it sits right here in William Lake. And so really one of the advantages is that, you know, they have been working with the Economic Development Group, working with [inaud] Power, to be able to feed the excess with [inaud] air into a potential food market area. So there are going to be some opportunities that are going to come from this, as well.

JOYCE: Well, sounds pretty inventive. Who is going to make the final decision here on whether burning rail ties goes ahead?

NELSON: That is going to be the Ministry of Environment.

JOYCE: And when does that happen?

NELSON: I think it happens in about thirty days.

JOYCE: All right. Scott, thanks for updating us on this. We will stay in touch.

NELSON: Thank you very much.

JOYCE: OK, bye-bye.

NELSON: Bye-bye.

JOYCE: Scott Nelson, Williams Lake City Councillor. Public comment period on this proposal is open now; it closes November 8th. For more information, go on line at breatheasywilliamslake.org.

Input needed on burning rail ties at power plant – Williams Lake Tribune

- *posted* Oct 23, 2015 *at* 9:00 AM

The public has until Nov. 14. to voice their opinions regarding a move by Atlantic Power Corporation to burn rail ties in the lakecity.

Atlantic Power submitted its application for a permit amendment at its biomass-fuelled electricity generation plant in Williams Lake on Oct. 8, 2015.

In the amendment, the company is asking to raise its limit on burning old rail ties from the current five per cent to 50 per cent.

Atlantic Power is also asking to expand the provision to burn non-hazardous wood waste.

The Williams Lake Field Naturalists and the Williams Lake Air Quality Roundtable have shared information regarding the application on a website — http://breatheasywilliamslake.org/railway-ties/ — to assist people in informing themselves about the issue.

The website also includes the company's application and explains how to submit comments about the application to the Director of Environmental Protection.

Williams Lake supports move to burn more rail ties in city

A plan to incinerate railway ties was stopped in Kamloops, but is supported by Williams Lake council

CBC News Posted: Oct 26, 2015 8:32 AM PT Last Updated: Oct 26, 2015 8:32 AM PT
Williams Lake supports move to burn more rail ties in city 4:17
Tempers flared a few years ago in Kamloops when a proposal was put forward to incinerate railway ties in the city.
In the face of environmental concerns, the idea fizzled; city council eventually voted no.
Now, a similar proposal has surfaced in Williams Lake, but council has come out in support.
Atlantic Power Corporation already has an operation in Williams Lake.
They generate power using wood waste from local mills as their fuel supply and now they want to add creosote-soaked railway ties to the mix.
Williams Lake city councillor Scott Nelson spoke with Daybreak.

LETTERS TO THE EDITOR Williams Lake Tribune

- *posted* Nov 3, 2015 *at* 4:00 PM

Editor:

What is this about “Input needed on rail ties” on page one of the *Williams Lake Tribune’s* Oct. 23 newspaper?

By starting with little or no information, we are told the public has roughly two weeks to voice our opinions regarding a move by Atlantic Power Corporation to raise its limit on burning old rail ties from the current five per cent to 50 per cent. This is a matter that concerns everyone.

We had this same discussion regarding burning old rail ties some years ago in Kamloops when I lived there.

Since most conscientious people lead busy lives, it took some time for the interest in the topic to build up.

Then more time for controversy to heat up as the public became more knowledgable.

In the end, Kamloops rejected having chemically-treated ties pollute the atmosphere and affect the health of the present and possible future generations.

Certainly, more time is needed.

To get the requested “needed” input out in the open in such a short period of time seems ridiculous.

I have also just heard that city council has already approved Atlantic Power Corporation’s request.

Could this possibly be true? If so, whatever happened to public input?

Julia Farina
Williams Lake

Williams Lake Airshed Website:

BREATHE EASY

RAILWAY TIES

Atlantic Power Corporation, Williams Lake's biomass-fueled electricity generation plant, is looking at burning railway ties to extend the plant's energy purchase agreement with BC Hydro. This page presents a collection of articles and statements published on the topic to help you understand the application and possible effects on local air quality.

Atlantic Power has now (October 8) applied to Environmental Protection to change their permit. The application explaining the requested changes in their permit is in the file below (Atlantic Power's Application).

If you are concerned about how the burning of rail road ties may affect local air quality, you can provide relevant information or make comments until November 14. You can send these comments to:

Director, Environmental Protection

400-640 Borland St.

Williams Lake BC V2G 2T1

Or by email: authorizations.north@gov.bc.ca

Be sure to reference the applicants name (Atlantic Power, 4455 Mackenzie, Williams Lake BC V2G4E8)

Also copy your comments to Glenda Waddell, waddellenvironmental@gmail.com

Atlantic Power's application

Atlantic Power Williams Lake Renewal Project Fact Sheet

Atlantic Power's answers to questions posed by Cathy Koot

Comments on the permit amendment prepared by Roger Hamilton, October 26, 2015

Letters: Dismayed with idea of burning rail ties in the city

- *posted* Nov 12, 2015 *at* 3:00 PM - Williams Lake Tribune
-

Editor:
Patrick Radolla's, letter to the editor in the Nov. 11 Williams Lake Tribune – totally agree and couldn't have said it better.
We are dismayed with idea of burning rail ties in Williams Lake.
Our air quality at times is less than desirable.
Industries in our town already produce much dust and air pollutants, and because of the inversions we experience the polluted air lingers for days.
Medical researchers claim that pollution is a major cause of many illnesses such as heart attacks, respiratory diseases, cancer, etc.
This is 2015, all levels of governments worldwide are trying to slow down the pollution put into the air, it's a matter of survival.
The burning of these rail ties has been turned down by Kamloops, B.C., other places in Canada and several places in the U.S. If the other communities have considered it unsafe for their community — Why should Williams Lake consider it OK?
For these reasons we do not think that Atlantic Power Corporation should be allowed to burn railway ties in Williams Lake!
Keith Orleski and Kathy Fraser
Williams Lake

- *by* Monica Lamb-Yorski - Williams Lake Tribune
- *posted* Jan 5, 2016 *at* 1:00 PM

NEWS

Exploring Atlantic Power’s bid to burn rail ties

An aerial view from the rooftop of the power plant looking down on the water cooling system.
— Image Credit: Monica Lamb-Yorski Photo

-

Monitoring for pollutants such as sulphur dioxide (SO2) will be necessary for several years if Atlantic Power gets permission to burn more rail ties in its biomass- fired generating plant in Williams Lake.

“Currently there is no SO2 monitoring in the airshed because we don’t monitor SO2 in an airshed unless we have sources,” said Ralph Adams, air quality meteorologist with the Ministry of Environment, noting sources of SO2 normally are oil refineries, pulp mills or smelters.

While sulphur isn’t in the creosote itself, the oil used to carry creosote into the rail ties is based on diesel, which does have some sulphur in it, Adams said.

Presently Atlantic Power has permission to burn five per cent rail ties in its fuel mass, but has chosen not to burn any since 2010.

Five years later the company is requesting to burn more rail ties because it anticipates a decrease in availability of biomass due to the annual allowable cut for the Williams Lake timber supply area being reduced from 5.7 million cubic metres to three million cubic metres.

During a recent tour of Atlantic Power’s plant in Williams Lake, manager Mark Blezard said if the permit amendment is approved, the plan is to burn 800,000 rail ties annually.

“We would be using 75 per cent regular biomass fuel and 25 per cent rail ties,” Blezard said.

For storage of the ties before they are shredded, two scenarios for the same location are being considered by the company.

One option is to dig out an area, insert ballast rock to support the ties, add a layer of biomass fuel and then stack the ties on top.

The second option would see covered storage of the ties in two or three smaller buildings where the ties would be stacked on asphalt.

“Right now we’ve done a model storing 300,000 ties in here at once if we had to, but that might be impractical,” Blezard said.

Once the ties are shredded, they will go by conveyor belt into a covered bin where a two-day supply will be stored and kept separate from the other biomass.

Mixing of the rail ties and the biomass fuel will only happen once the fuel is entering the plant where the nine-storey boiler is housed.

The company is considering a manufactured slow speed shredder built in Oregon because it creates less dust and particulate, and can work with metal, said Terry Shannon, Atlantic Power's environmental manager of western operations.

Responding to public concerns about emissions from burning rail ties, the company has said repeatedly that during a 100-per cent rail tie burn test in 2001, results showed most pollutants were either destroyed at the boiler's high temperatures of 1,371C to 1,648C or removed using the plant's environmental controls.

When asked how the public can be assured the high boiler temperatures will be maintained, Shannon said the system does not operate properly unless those high temperatures are sustained at all times.

So far 50 people or groups have submitted comments about the permit amendment.

Each comment will be addressed and compiled in a report, Shannon said.

APPENDIX C

Questions & Answers

Table of Contents

1. Air

1.1. Air Quality General

1.1.1. What will be the effect on the Williams Lake Airshed Management Plan to continuous improvement of particulate matter (PM10 and PM2.5) on the air shed? Will there be an improvement?

Yes. The pollution controls in place at the Williams Lake Power Plant (WLPP) are such that particulate emissions are extremely low. The trial burn using 100% railway ties (RRT) showed that the plant will continue to operate well below its permitted levels for particulate. Based on the documented improvements in Williams Lake's particulate levels after the plant came on-line, it is concluded that continued operation of the plant going forward is beneficial to maintaining the continuous improvement in the area's air quality.

1.1.2. What will be the medium to long term effect of emissions on in the entire airshed?

This question sums up the purpose behind the RWDI Dispersion Modelling Study. The report is attached in Appendix D. The model projects that any increases due to the burning of rail ties will not cause exceedances of the BC Ambient Air Quality Objectives (BCAAQO).

1.1.3. Will the air quality in Williams Lake be generally worse that it is now?

All predicted results in the community are within the BC Ambient Air Quality Standards or, absent a BC Standard, the Ontario Ambient Air Quality Standard. The testing and dispersion modelling show that some emissions (e.g. hydrogen chloride and sulphur dioxide) may increase and some (e.g. particulate and some trace metals) may decrease. When our plant opened in 1993, there was an immediate improvement in air quality because we consumed the material that used to be burned in beehive burners. If we keep operating, Williams Lake continues to have cleaner air, local sawmills continue to have a wood residue disposal solution, and fossil fuels like coal, oil and natural gas are displaced with renewable fuels.

1.1.4. What actual evidence does Atlantic Power have that ties can be burned safely and efficiently, as is stated but not really supported in the fact sheet?

The WLPP conducted a multi-day test in 2001, burning 100% rail ties, and the air testing results were well below permit standards. Since then, there have been no material changes to the plant process that would alter the results. Within that context, and given that we will be burning at most a 50/50 mixture of rail ties and traditional fuel sources, we are assured the process will meet all standards.

1.1.5. I understand that guideline levels are derived from using the best available control technology (BACT) to mitigate general emissions. As far as I know, guideline levels are not based on any health measure. This is still correct?

The design of the Williams Lake Plant was reviewed and approved by the MOE. The subsequent emission limits established for the plant were based on British Columbia's regulatory structure at the time of the plant's start-up, which do consider health impacts.

Similarly, any additional emission limits that may result from this permit amendment will be based on British Columbia regulations, as directed by the MOE.

However, in a Human Health Risk Study (See Appendix E) completed by Intrinsik Environmental Sciences, Inc., (Intrinsik), emissions from the plant were compared to other scientific and regulatory exposure limits, and were determined to pose a negligible risk, as described below:

Potential health risks were determined by comparing the predicted maximum ground-level air concentrations of the COPC at the MPOI for averaging times associated with both short-term and long-term exposures with exposure limits established by regulatory and leading scientific authorities responsible for the protection of public health. These limits incorporate a high degree of protection to accommodate vulnerable members of the population in order to determine the potential health risks to the people living in the area or who might frequent the area for work, recreation or other purposes. In accordance with accepted HHRA protocol, the exposure limits were based on a COPC's most sensitive toxicological endpoint. In all cases, the cancer risk estimates were predicted to be less than one in 100,000 (i.e., one extra cancer case in a population of 100,000 people), indicating that the chemical emissions from the WLPP burning 100% rail ties are associated with a negligible level of risk, as defined by BC MOE and Health Canada.

1.1.6. Is there a plan to reduce thee amount of ties in the fuel mix during inversion conditions?

Based on the results of the RWDI Air modeling, the potential air quality effects due to inversions were not significant with respect to burning rail ties. The dispersion modelling, which is calculated on an hourly basis (i.e. taking into account inversions), is conducted using the CALPUFF modelling system as required by the Guidelines for Dispersion Modelling in British Columbia (Section 2.3.2.4). Accordingly, there is no need to alter and/or reduce the amount of ties during inversion conditions.

1.2. Emissions

1.2.1. What assurances can Atlantic Power provide that incomplete combustion of treated chips would never occur?

Excess oxygen in the boiler flue gas is consistently maintained at the required boiler design level which supports complete combustion. In addition, the plant has a continuous emission monitoring system (CEMS) unit which monitors opacity and NOx, Carbon Monoxide (CO) and Oxygen (O2), that alerts operators to conditions where complete combustion may not occur. The results from the CEMS monitoring relative to permit compliance (opacity and NOx) are regularly reported to the MOE. Incomplete combustion occurs in an uncontrolled environment, whereas fuel burnt in a wood-fired boiler is part of a tightly controlled high-temperature combustion environment. In addition, the shredded rail ties have a higher heating value and tend to burn more quickly and completely than green / wet wood.

Please see Q&A # 1.2.2 and 1.2.8 for additional answers to this question.

1.2.2. What steps will be taken if rail ties are burned in the plant to prevent clogging of the air vents to ensure complete combustion to destroy toxic organic compounds in the treated wood chips.

There is only a small amount of RRT burning at any one time (<1 ton/min at the 50% limit). If there is a significant equipment malfunction, the plant would trip and shut down. Upset conditions happen quickly, typically in a second or two. So with the RRT being contained in the large metal furnace, if there is a significant equipment malfunction, the RRT will stay in place and burn out very quickly, in a matter of minutes. Also, shredding the RRT only as they are consumed, with only a small quantity of shredded RRT in an enclosed bin or silo eliminates any issues with handling shredded RRT and any potential for spontaneous combustion.

1.2.3. Will any of the equipment change in order to burn ties?

No. The same combustion equipment is in place and operating as it did during the 2001 test burn. We will be adding a shredder to process the ties on site, as well as conveyor equipment and a silo to contain the shredded ties.

Also, please see Q&A #'s 2.1.2 and 2.6.2 for additional answers to this question.

1.2.4. What is BACT for the proposed emissions and how does your plant compare?

The following table is offered for comparison.

Standards for Emissions from New Large Biomass Energy Facilities			
	Particulate milligrams/m^3	**Dioxins/Furans nanograms/m^3**	**Opacity**
BCMoE FactSheet on Air Emissions from *(new)* Biomass-Fired Electrical Power Generation – Nov 2011	20	0.1	10
WLPP Average emissions	4.0[1]		1.12[2]
WLPP Burning 100% Rail Ties	2.3	0.0034	

Notes:

1. 2008 – 14 average
2. 2015 average

Also please see Q&A #'s 1.2.5 and 1.2.8 for further answers to this question.

1.2.5. It is my understanding that railway ties are treated with either creosote or pentachlorophenol (PCP) and that diesel fuel is used as the carrier into the wood. Are you able to supply Plant temperature specifications in comparison to those adequate enough to destroy chemicals (example dioxins and furans, or other) to thereby render stack emissions of non-concern in this context?

Modeling of the furnace temperature by Jansen Combustion and Boiler Technologies confirmed the operating temperature of the WLPP system is in excess of 2000 degrees F (1400 degrees K,), which is more than adequate to destroy the contaminants of concern in creosote (dioxins, furans, pentachlorophenols), all of which decompose at temperatures significantly below 2000 degrees F. This was verified in our trial burn of 100% railway ties where dioxins and furans were measured at 30 times lower than required by the BCMoE FactSheet on Air Emissions from (new) Biomass-Fired Electrical Power Generation – Aug 2013. The very low levels of dioxins/furans in the stack emissions during the 2001 test burn was expected given the plant's boiler design with a furnace temperature in excess of 2,000 F and long residence time.

Also, please see Q&A # 1.2.8 for additional answers to this question.

1.2.6. The presence of the element chlorine in pentachlorophenol promotes the formation of dioxins/furans during combustion process.

True, however, the proportion of penta treated ties is expected to be relatively low, (less than 10% on an infrequent basis), and the other factors that lead to formation of dioxins/furans (low furnace temperatures and low residence times in the furnace) do not exist for this boiler.

Also, please see Q&A # 1.2.5 for additional answers to this question.

1.2.7. How does the height of the power plant discharge to air compare to the upper limit of stable air formed during inversion conditions? Is it possible to raise the height of the power plant discharge through a piped system to a height above the maximum stable air upper limit, such as appears to be used at the pulp mill in Kamloops?

The RWDI air dispersion modeling (Appendix D) includes the effects of inversions for our project and finds no significant deterioration in Williams Lake air quality due to the inclusion of rail ties as a fuel source.

The WLPP stack measures 60.7 meters in height. The stack was designed to discharge at this elevation for optimal dispersion while maintaining stability of the structure. In addition, the ground elevation of WLPP is approximately 17 meters above the ground elevation of downtown Williams Lake.

Accordingly, the stack is of sufficient height to avoid air quality impacts during inversions and thus there is no need to increase the stack's height.

1.2.8. Can you provide information on the design of the burner system that would help to understand the efficiency of the wood waste combustion processes, what type of incineration occurs, what temperatures are reached in the different parts of the combustion and heat recovery processes, how air or oxygen is introduced into the system to ensure that the time, temperature and turbulence conditions are sufficient to break down the toxic organic chemicals introduced into the burner and to ensure that toxic products are not reformed where temperatures are reduced following heat recovery?

The effectiveness of the plant's combustion system was verified in our trial burn of 100% railway ties where dioxins and furans were measured at 30 times lower than required by the BCMoE FactSheet on Air Emissions from (new) Biomass-Fired Electrical Power Generation – Aug 2013.

The boiler is made by Babcock & Wilcox, Canada. It is a Stirling type boiler with a specifically designed furnace for biomass fuel called a CCZ (controlled combustion zone), and the boiler has a Detroit stoker hydro-grate, which holds the combusting wood. Heat input to the boiler typically ranges between 900 - 1,000 million Btu/hr depending on the moisture content of the fuel. Boiler efficiency is approximately 75% to 68% over the same range, and the thermal output of the boiler (which does not vary with fuel moisture content) is approximately 680 million Btu /hr. The boiler can produce about 615,000 lb/hr of steam at 950 degrees F and 1550 psi.

The attached table shows the operating temperatures of the boiler at full load. Most of the values are from field measurements collected on 8/14/14. Our consultant used these field measurements to calculate other parameters which cannot be measured by typical instruments due to accessibility and very high temperatures. For the flue gas temperatures (identified as FG), we have highlighted the calculated values including the flue gas temperature at the inlet to the superheater of 1,978 F. The corresponding lower furnace temperature (above the grate) is about 2,500 F. The Adiabatic Flame Temperature provided in the table is a theoretical value and is not a physical parameter. The retention time is approximately 1 second. Reformation of toxic substances does not occur in this boiler due to insufficient time in the reformation temperature range as well as flue gas characteristics. The lack of reformation is demonstrated by the results of the 2001 stack test which showed very low levels of polychlorinated dibenzo-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF).

Boiler Test Summary - Jansen

JANSEN	**Company: Atlantic Power Inc.** **Location: Williams Lake, B.C. Canada** **Job No.: 2013-0132**	
Combustion and Boiler Technologies, Inc.	By: MAA	
Subject: Summary	**Date: 9/01/2014**	
TEST NO.		**Site Visit**
		(08/20/14)
Steam Flow	lb/hr	613,398
Type of Fuel	-	Wood
Excess Air	%	20.7
Flue Gas 02 (wet base), BB Outl.	vol.%	2.90%
Flue Gas 02 (dry base)	vol.%	3.60%
Flue Gas 02 from TAH (dry)	vol.%	3.60%
Higher Heating Value Mix. (Dry)	Btu/lb	9,100
Fuel Mixture Moisture Content	%	34.70%
Heat Input from Natural Gas	Btu %	0.0%
Quantities (As-received)		
RR Ties	lb/hr	0
S.V. Wood	lb/hr	150,586
Wood 50% moisture	lb/hr	0
No. 6 0il	lb/hr	0
Nat. Gas	scfh	0
Spray Water	lb/hr	57,260
FGR	lb/hr	0
Flue Gas leaving Furnace	lb/hr	880,127
Flue Gas leaving TAH w/ Leakage	lb/hr	956,157
Air to Unit (Incl. HVLC NCG)	lb/hr	737,143
Air to FD Fan (Incl. Leakage) Pressures	lb/hr	813,173
Pressures		
Steam at SH Outlet	psig	1,530
Boiler Drum	psig	1,620
Drop, Drum to SH Outlet	psi	90
Temperatures		
Superheated Steam at SH Outlet	OF	945
Adiabatic Flame Temperature	OF	3,121
FG Superheater Inlet	OF	1,978
FG Generating Bank Inlet	OF	1,581
FG Generating Bank Outlet	OF	797
FG Economizer Outlet	OF	583
FG TAH Outlet	OF	335
Feedwater to Unit	OF	382
Feedwater to Steam Drum	OF	480
Combustion air from TAH	OF	479
Air to TAH	OF	160
Flue Gas Volume Flows At TAH Outlet		
At TAH Outlet	scfm	214,533
at elevation of 2,150ft	acfm	354,790
Total Heat Input (fuel, air)	MBtu/hr	909.8
Total Heat Input on Grate	MBtu/hr	894.8
Total Heat per Grate Area	MBtu/hr-ft	1.29
Total Heat per Furnace Volume	Btu/hr-ft3	24,246
Efficiency of Unit	%	74.6

1.3. Emissions Monitoring

1.3.1. I understand that WLPP is requesting to discontinue the continuous emission monitors (CEMs). With the request to burn more RRT, this is not the time to remove emission monitors. (paraphrased phone call)

We are not asking to remove emission monitors. The application seeks to remove the requirement to follow a federal protocol for maintaining and auditing the CEMs that was not designed for biomass facilities. The CEMs at WLPP will continue to operate and will continue to be verified by the MoE auditing program and by third party stack testing (in accordance with BC Manual for Continuous Monitoring and Collection of Air Samples, 2003 Edition).This is consistent with all similar CEMs at pulp mills and power plants throughout the province.

Also please see Q&A # 1.3.2 for additional answers to this question.

1.3.2. The amendment proposes to delete the provisions for continuous emission monitors audited in accordance with Environment Canada's EPS 1/PG/7 Protocols and Performance Specifications, for the reason that these protocols are intended for fossil fuel burning systems. In that treated railway ties, contaminated absorbent materials, and 872 liters/day of waste oil contains fossil fuels, can you explain justification for deletion of the provisions mentioned, and describe what will be in place to suffice?

The continuous emission monitors (CEMs) at the Williams Lake Power Plant are currently and will continue to be subjected to the same rigorous calibration protocols as other similar systems in the province (BC Manual for Continuous Monitoring and Collection of Air Samples, 2003 Edition). This includes hog and recovery boilers at pulp mills (some of which are permitted to burn waste oil, RRT and other fuel types) and other biomass energy systems. All Permitted CEMs are audited by Ministry of Environment twice yearly and must meet a series of requirements. In addition, the CEM readings are compared with the annual stack testing required by the Permit. We believe that the federal EPS Protocols are redundant to the provincial requirements. When compared to the large amount of non-fossil-fuel containing biomass which will still be used in the event the permit amendment is approved, the amount of fossil fuel contained in the waste streams noted above is considered to be a minor percentage. Accordingly, it is concluded that the Provincial rules and protocols are more than sufficient to ensure comprehensive quality control of the CEMs.

The current permit allows the burning of hydrocarbon contaminated materials with the prior written approval of MOE along with recordkeeping provisions. The permit amendment seeks to broaden the type of contaminated materials allowed (i.e. absorbent materials), eliminate the prior written approval administrative burden while maintaining the recordkeeping provisions. The provision to burn "hydrocarbon contaminated absorbent materials originating from accidental spills" up to a maximum of 872 liters/day is intended to allow for spill recovery materials (obtained through cleanup efforts within the local area) to be disposed of in the energy system. These occurrences are rare, the volumes would normally be low and the high temperatures within our furnace ensure complete destruction. The burning of these materials is allowed under our current permit but requires written authorization by the Director.

We believe that eliminating the time consuming step of obtaining prior written approval to burn hydrocarbon contaminated materials will allow us to accept these materials from 3rd parties in an expeditious manner to ensure they are handled properly.

1.3.3. Will there be additional air testing?

We have continuous emission monitors measuring nitrogen oxides and opacity (particulate). We report monthly to the MOE and a 3rd party test is done annually. This is in addition to the spot checks that the MOE performs twice a year. The MOE may require additional testing.

1.3.4. Has recent testing been done with effects burning fuel mixes as high as 50% railways tie material to determine toxic emissions?

Out of caution, the 2001 trial was conducted using 100% RRT. The stack testing technology and methodology have not changed. Our data, which is representative of a fuel mix consisting of 100 % rail-ties, is considered to be very conservative and indicative of insignificant impacts on human health and the environment.

1.3.5. Has this type of testing been carried out over longer time periods to look at effects of variations in the process over time?

Yes. Electrical power plants across North America have been burning used RRT for many years. For reference, please see an interview conducted by the Williams Lake Tribune, on August 4, 2015, with a plant representative from the French Island plant in Wisconsin, which summarizes their experience with burning rail-ties, wood waste and RDF. In addition, our pollution control equipment delivers emissions that are well within our permit limits. This added to the highly controlled, high temperature furnace results in almost no variability over time.

As stated above, the data from our test in 2001 are considered conservative and representative. If Williams Lake is approved to use a higher percentage of rail-ties in its fuel mix, testing of the emissions (continuous emissions monitoring and annual stack tests) will be conducted on a routine basis going forward, so as to confirm the lack of any adverse impact on the Williams Lake air shed.

1.3.6. Is planned annual stack testing adequate to guarantee that toxic emissions will not occur periodically throughout the year. Should random testing by a third party be required?

As stated above, there is almost no variability in our process and the continuous emissions monitoring system provides a thorough check of combustion effectiveness. All of our stack testing is conducted by a qualified, independent firm and Ministry of Environment conducts verification audits of our continuous emission monitors twice yearly.

1.4. Ambient Monitoring

1.4.1. An air quality monitoring program should be provided to confirm air quality objectives are met during potential operation and identify any meteorological conditions in which the fuel mix should be altered to reduce the occurrence of exceedances.

There is no background data for ambient levels of sulphur dioxide, hydrogen chloride or Total PAHs.

Notable increases in contaminant concentrations to the Williams Lake air shed are predicted for sulphur dioxide (no background data to 57% of the BC Ambient Objective @ 50% rail ties), hydrogen chloride (no background data to 66% of the Ontario Objective @ 100% rail ties) and total PAHs (no background data to 27% of the Ontario Objective at 100% rail ties). The 2001 trial burn identified very high concentrations of sulphur dioxide and hydrogen chloride associated with burning of the rail tie fuel relative to regular wood waste. For example, sulphur oxides increased from 1 to 172mg/m3 (180 requirement) and hydrogen chloride increased from non-detectable to 59.8 mg/m3 (50 standard) when burning 100% rail ties vs regular hog fuel. The modelling results also indicate that small particulate matter PM2.5 and PM10 concentrations are already predicted to be 82% of the ambient air quality objective with negligible contribution from the rail tie fuel.

The Ministry of Environment, with financial support from local industry, is responsible for monitoring air contaminants. It is the Ministry's role to determine whether the current monitoring system should be expanded to include other contaminants of concern. Note that because the trial burn was run using 100% rail ties, and that we are applying to raise the limit to a 50% maximum, it is concluded that emissions of all the compounds of concern noted above will be within the applicable Provincial standards. This conclusion is documented in the RWDI Air Modeling Report.

1.4.2. Who would be in charge of measuring any toxic build up?

As noted above, the Ministry of Environment, with financial support from local industry, is responsible for monitoring air contaminants. Monitoring is done on a continuous basis and results are available on the Ministry website. AP will continue to support and participate in the community airshed monitoring system. The decision to add monitors should continue to be based on health and environmental concerns. If that rationale indicates a new monitor and AP is a key source of the contaminant in question we will support the cost of the new monitoring equipment.

1.5. Emissions – Fugitive

1.5.1. How will you control fugitive dust from piles and roadways?

We have a dust suppression program plan in place, and respond accordingly as weather conditions warrant. In addition, we work with the MOE to meet their requirements in addressing any public complaints. Our project will not materially change the total truck deliveries to the plant site since the rail tie deliveries replace current residual wood waste deliveries. In addition, in the event the permit amendment is approved, it is anticipated that truck deliveries of fiber to the plant, as well as use of the truck dumper, will be reduced, due to the supplemental use of rail-ties in its place. The rail ties will be stored whole on the power plant site until needed. Once the rail ties are shredded, the shredded material will be stored in a bunker or silo (not in open piles) which will minimize fugitive dust.

Also, please see Q&A # 1.8.1.8 for additional answers to this question.

1.5.2. The RWDI report (see Appendix D) estimates emissions for parameters with AQOs. Has any evaluation been made for any potential nuisance impacts from the combustion/storage of rail ties, such as odour?

As noted in the following response, it is not expected that there will be sufficient emissions of any potentially odiferous compounds emitted from the ties well stored in their whole state that could result in offsite odours**.** The rail ties being used for fuel will typically have been removed from service after 20-30 years or more. These end-of-service ties that have experienced several decades of chemical loss mechanisms including exposure to the sun's UVs and radiation, freezing and leaching due to heat and precipitation. The shredded rail ties will be stored in a silo or bin to minimize odours.

1.5.3. Naphthalene is a volatile parameter and constituent of creosote. It is regulated in the workplace, and under BC Contaminated Sites Regulation (CSR) in soil vapour. Where there is proposed large scale storage of creosote-treated rail ties, has there been any assessment performed to determine the impact to neighbours and for worker exposure?

Onsite worker exposure is regulated by WorkSafe BC and is not part of the regulatory environmental permitting process. The 2001 study did include a list of speciated PAH substances that were included in the Total PAH emission rate and predicted concentrations in the stack. Within the data, naphthalene is noted as being an “artifact” and therefore there is no data available for a direct evaluation. Therefore, total PAHs were assessed and related to the potential impact to neighbours in the report (see Table 8, for example).

The ties being used for fuel will be ‘aged’ in the sense that as a result of weathering in place they should be relatively depleted of volatiles and semi- volatility in the outer layers. As such, there will be limited off-gassing associated with the ties when stored whole prior to shredding and consumption.

AP routinely assesses the exposure of our employees to hazards. In addition, Intrinsik is being contracted to conduct a work-place health and safety evaluation of the use of rail-ties as a supplement to our combustion fuel, so as to ensure there are no adverse health impacts posed to our workers. In addition, WorkSafe BC provides routine oversight and reviews of our worker safety program.

1.6. Rail Tie Variability/Sources

1.6.1. The RWDI report (See Appendix D) identifies predicted emissions of total PAHs (particulate and vapour phase) in Table 8.

a. **Has there been any account taken in the emissions estimate to address the variability of PAH concentrations for the feedstock?**
b. **Similarly, have the emissions estimates for metals, chlorophenol, dioxins and furans been assessed based on the potential variability of contaminants within feedstock?**

The PAH levels in Table 8 of the 2001 test report show a wide range of PAH levels between regular fuel and rail tie fuel, yet the PAH emission levels in the stack did not show a significant difference. Therefore, it is expected that further variations of the PAH levels in the rail tie fuel will also not show a significant difference in stack PAH levels.

Table 8 of the RWDI report shows the maximum predicted concentration of metals, chlorophenol, and dioxins/furans, all of which are well below 1% of the AAQOs. Therefore, variations in the feedstock mixture are not expected to significantly change the results of the air dispersion model.

1.6.2. RWDI report does not report the assessment and quantification of the feedstock utilized during the trial burn. Concentrations of preservatives retained within the ties are likely to vary (wood species, age, weathering factors, etc.) and the ratio of each treatment e.g. creosote, pentachlorophenol (PCP), chromated copper arsenate (CCA) will depend on their source.

a. **Although creosote is the dominant preservative used in the rail industry, it is anticipated that there may be ties burned that are treated with PCP, CCA or more recently, ACQ (alkaline copper quaternary), rather than creosote. Have these other feedstocks been considered and accounted for within the trial burn scenario considering their ratios may vary through time?**
b. **What was the PAH concentration range within the rail ties used as feedstock?**
c. **Were the rail ties used in the trial burn randomly selected from the feedstock, and if so, what were their treatment characteristics and/or PAH (PCP, CCA etc.) concentration ranges?**

The combustion of wood residue treated with metal derived preservatives (such as CCA or ACQ) is prohibited in the current permit, and no changes to this provision are being requested. Further, CN (the expected primary rail tie supplier) has confirmed that they have not used metal treated ties in their system, and our fuel supply agreement with CN (and others) will prohibit any metal treated rail ties.

CN has indicated that the expected rail tie supply will consist of mostly creosote treated ties with some penta treated ties. The ties used in the 2001 test were randomly selected and are expected to be representative of the future supply. The PAH levels of the ties are shown in Table 8 of the 2001 test report (appended to the RWDI report (see Appendix D)). The PAH emission levels in the stack during the 2001 test did not show a significant difference between regular wood fuel and rail tie fuel, indicating that the PAH emission rate is not directly related to the PAH levels in the fuel.

Also, see Q&A # 1.5.2, 1.5.3 and 1.6.1 for additional answers to this question.

1.6.3. WLPP declined to clarify the source of the future waste rail ties so it should be assumed the treated wood may be sourced anywhere in North America. Evidence

is required to ensure that waste rail ties from CN Rail, CP Rail or Burlington Northern etc. are indistinguishable in contaminant types and concentrations. If there are material differences, then each rail tie source should undergo testing and/or trials.

Please see Q&A # 1.6.1 and 1.6.2 for an answer to this question.

1.6.4. Where will the ties come from? How much will the chemical composition vary? For how long will the 50% burn last? Will RRT be burned seasonally or at an even rate throughout the year?

Based on our discussions with CN, the rail ties will be coming from the western Canada portion of their system. We anticipate that deliveries of rail ties may diminish at certain times of the year. At no time will our fuel mix show greater than 50% RRT.

We expect that on average the plant would consume between 55,000 - 85,000 tonnes of rail ties per year up to a maximum of 100,000 tonnes per year. The plant consumed about 410,000 tonnes of fuel in 2014, so the expected rail tie use would equate to about 25% of the annual fuel mix if the plant continues to operate as it did in 2014. However, in the future the plant may operate less frequently causing the percentage of rail tie use to approach as much as one third of the total fuel use on an annual basis. Over shorter durations, rail ties would not exceed 50% of the plant fuel mix.

Also please see Q&A # 1.6.2 for additional answers to this question.

1.6.5. Are you able to easily differentiate ties that are treated with PCPs and creosote and modify the processes to deal with these more risky chemicals? What percent will contain PCP?

Table 8 of the RWDI report shows the maximum predicted concentration of metals, chlorophenol, and dioxins/furans, all of which are well below 1% of the AAQOs. Therefore, variations in the feedstock mixture are not expected to significantly change the results of the air dispersion model.

1.7. Trial Burn

1.7.1. The April 2001 stack test results indicates that there would be significant increases in concentrations of several air contaminants released when burning 100% rail ties i.e. hydrogen chloride, sulphur dioxide, and total chlorophenols as well as minor increases for other contaminants including some metals and furans etc. Is a 14 year old stack test of one hour duration on 3 consecutive days sufficient to characterize a worst case scenario for modelling airshed conditions in Williams Lake?

AP engaged independent consultants to conduct both air modeling (RWDI) and human health evaluations (Intrinsik), both of which concluded that emissions from burning rail-ties at a 50 %

mixture are within the applicable BC or Ontario provincial standards, and do not pose a risk to the environment or human health.

The decision to use the April 2001 Stack test was based on a determination that the testing methods, fuels, and worst-case scenario (100 % rail-ties) would be a scientifically valid basis for evaluating the permit amendment request to burn a 50 % rail-tie mixture. In addition, prior to conducting the modeling effort by RWDI, the use of the 2001 report was evaluated and approved by the MOE.

1.7.2. Emissions utilized in the air dispersion modelling are based on 2001 stack testing program at WLPP, with the power plant combusting 100% rail ties. Confirmation is required to determine whether changes to the operating conditions or infrastructure through upgrades have occurred within the subsequent 14 years. Any such changes may affect the point source stack parameters, which may affect the confidence in the emission data.

There have not been any material changes to plant design or configuration since 2001 that would affect the point source stack parameters, beyond an increase in allowable flow rate (100 - 110 m3/sec) made to the Discharge permit in 2010. Given a constant stack concentration, an increase in flow rate would result in a similar increase in emissions. But the increased flow would also result in a greater exit velocity which would enhance dispersion, offsetting the increase in emissions. In addition, the total pollutant emissions are controlled by the amount of fuel burned. If the same amount of fuel was burned using a higher air flow, overall pollutant emissions would remain constant and the higher flow rate would again increase dispersion. For these reasons, the flow rate increase is not expected to have a material impact on the test results.

1.7.3. The trial burn and stack survey were conducted 14.5 years ago. It is understood that once granted a permit authorization becomes a right which cannot be revoked except under extreme and rare circumstances. The power boiler and its associated pollution control equipment is 14 years older and maintenance, process and equipment modifications and/or changes over the last 14 years may have changed the performance characteristics. For example, the authorized flow rate during the trial burn was 100m/s; the current authorization is for 110m/s. A new trial burn which would reflect current plant conditions and use up-to-date laboratory and testing technologies is warranted.

If WLPP is approved to use a higher percentage of rail-ties in its fuel mix, testing of the emissions from the stack will be conducted on a routine basis going forward, so as to ensure the lack of impact from the combustion of rail-ties.

Also, please see Q&A #'s 1.3.5. 1.7.1 and 1.7.2 for additional answers to this question.

1.7.4. The authorized flow rate during the trial burn was 100m3/s. The current authorization is for 110m3/sed. A new trial burn would reflect current plant conditions and use up-to-date laboratory and testing technologies.

The pollution control equipment was oversized for the system meaning that we are able to achieve much lower emissions than industry standard. Our equipment and associated controls are all functioning as they did during the trial. Similarly, stack testing methods and lab technologies have not changed.

Please see Q&A #'s 1.7.1, 1.7.2 and 1.7.3 for additional answers to this question.

1.7.5. The RWDI report uses data obtained from a 2001 trial and stack test report.

- **a. Have emission controls at the Facility changed since this stack test was completed?**
- **b. If so, how would these changes likely influence the emissions?**

There have not been any changes to our emission controls at the plant since the 2001 stack test. Our CEMs and third party stack test results verify that the electrostatic precipitator (ESP) is functioning at high efficiency.

Also please see Q&A 1.7.2 for additional answers to this question.

1.7.6. Atlantic Power indicates that the elevated boiler operating temperatures (2,000 °F) keep emissions below provincial health and environmental standards.

- **a. What were the boiler operating temperatures during the trial?**
- **b. What are typical boiler operating temperatures and ranges?**
- **c. What were the boiler temperatures during the month preceding and following the trial?**

The design temperature of the furnace, and its effectiveness in ensuring complete combustion with low emissions was confirmed by the 2001 stack test and the recent air modelling. The primary parameters for measuring combustion effectiveness (and therefore reaching the design combustion temperatures) are carbon monoxide (CO) and excess oxygen (O2). If combustion is inefficient CO levels will rise and excess O2 levels will drop, typically. CO levels and excess O2 levels are monitored closely, and fuel and air flow to the boiler are regulated to ensure complete combustion, regardless of fuel composition. Table 6 of the 2001 test report shows CO levels were within their normal range during the test, and dropped slightly from the regular-wood-fuel portions of the test to the rail-tie-fuel portions of the test.

Furnace temperature (fireball temperature) is not measured routinely, and we do not have the requested historical values.

Also, please see Q&A # 1.2.8 for additional answers to this question.

1.7.7. Atlantic Power suggests that the higher heating value of the shredded rail ties burns more quickly and completely than green wood.

- **a. Could the 50% estimate for SO2 concentrations (i.e. 50% of emissions from combustion of 100% rail ties) underestimate SO2 emissions considering the potential for incomplete combustion when burning ties with other wood waste?**

b. Has historical combustion of wet/green wood waste presented evidence indicating a reduction of boiler temperatures and/or increased incomplete combustion?

The plant ensures good combustion using regular wood fuel today, and given the higher energy content and lower moisture content of rail ties, continued operation of the plant with good combustion can be assured. Combusting rail ties with regular wood fuel will not result in incomplete combustion. The boiler is monitored closely for combustion efficiency and the fuel and air flow are adjusted to ensure complete combustion. The introduction of some rail tie fuel will only enhance the current excellent operating conditions of the boiler.

The Williams Lake boiler was specifically designed for biomass with the ability to achieve full steam output with fuel moisture contents up to 55%. The plant's wood deliveries range from green wood and bark (~40% moisture content) to mill shavings (~15% moisture content). The plant maintains a large wood inventory in the fuel yard, and the fuel in the yard is well mixed. The moisture level of the fuel fed into the boiler typically stays in the 30-40% range.

Also, please see Q&A # 1.2.8 for additional answers to this question.

1.7.8. We do not know the weight or volumetric mix of creosote treated ties to pentachlophenol treated ties fed to the burners during the trial. Feed from these tests should be characterized and possibly each type of treated tie tested separately to determine efficiency of organic compound destruction during the combustion and heat recovery processes.

CN has indicated that the expected rail tie supply will consist of mostly creosote treated ties with some penta treated ties. The ties used in the 2001 test were randomly selected and are expected to be representative of the future supply. The PAH levels of the ties are shown in Table 8 of the 2001 test report (appended to the RWDI report). The PAH emission levels in the stack during the 2001 test did not show a significant difference between regular wood fuel and rail tie fuel, indicating that the PAH emission rate is not directly related to the PAH levels in the fuel.

In addition, Table 8 of the RWDI report shows the maximum predicted concentration of metals, chlorophenol, and dioxins/furans, all of which are well below 1% of the AAQOs. Therefore, variations in the feedstock mixture are not expected to significantly change the results of the air dispersion model.

1.8. Dispersion Model – See Report in Appendix D

1.8.1. Model Design

1.8.1.1. Confirm modelling was conducted following the Guidelines for Air Dispersion Modelling in British Columbia, with results compared to applicable BC Air Quality Objectives (AQOs).

This is correct. The modelling was conducted in accordance with regulatory guidelines and a detailed model plan was approved by MOE staff prior to commencement of the study.

1.8.1.2. In the absence of a provincial or national objective, rationale should be provided for comparison to Ontario ambient air quality criteria (AAQC) rather than potentially more conservative EPA or WHO guidelines.

Where applicable, preference is given to Canadian objectives developed in regard to similar industry under similar national guidelines and objectives. This is a standard approach for BC applications.

1.8.1.3. What are the air quality standards referred to by the applicant?

Where they exist air quality standards for British Columbia are used. In absence of local standards, ambient air standards from Ontario are used for reference.

B.C. Ambient Air Quality Objectives – Updated October 30, 2015 can be found at http://www.bcairquality.ca/reports/pdfs/aqotable.pdf

Ontario Ambient Air Quality Criteria - April 2012 can be found at http://www.airqualityontario.com/downloads/AmbientAirQualityCriteria.pdf

1.8.1.4. CALMET was applied for a 1-year model period of January 1, 2012 to December 31, 2012. Confirmation is required to confirm why one years' worth of data was utilized and whether the 2012 meteorological data is reflective of typical meteorological conditions.

A one year period is a standard approach for a study of this type and conforms to BC Modelling Guidelines. As noted in the report, BC MOE has provided province-wide WRF data for certain years to assist with standardized dispersion studies in BC. The 2012 was selected by MOE as a representative year for those inputs. The data provided was included in our monitoring plan that was approved by the Ministry (see correspondence in Appendix B of the modelling report).

1.8.1.5. The RWDI report references background concentrations and compares these to the emissions estimates:

- **How did the background concentrations in 2012 compare to other years?**
- **What is the long-term trend in background concentrations for the available parameters?**

A study of trends in PM up to 2011 has been completed previously by MOE. http://www.bcairquality.ca/reports/pdfs/aq_williams_lake_Sept2012.pdf

The results of that study show that the PM background values of 20.2 µg/m^3 from 2012 used for the study is higher than 2011 and equal or higher than all years since 2006, within the exception of 2010 which was dominated by forest fires. When the effects of forest fires are removed from the historical measurements, then the $PM_{2.5}$ value of 20.2 µg/m used for background is higher than 2010 also. In general $PM_{2.5}$ values, with the exclusion of forest fires, show a slight downward trend since 2006. Similar trend is seen for PM_{10}.

The BC Lung Association also publishes historical summary of air quality in BC. http://www.bc.lung.ca/airquality/stateoftheair-report.html Although William's Lake is not specifically noted, the results show that both PM and NO_X show downward trends across the province. This is due to factors such as vehicle emission standards and restrictions on open burning and reduced use of wood as fuel for home heating.

1.8.1.6. Atlantic Power said that their modelling would consider the effect of inversion. No direct reference to inversions is provided by RWDI in their Report.

Inversions are considered. The dispersion modelling, calculated on an hourly basis, was conducted using the CALPUFF modelling system as required by the Guidelines for Dispersion Modelling in British Columbia. The BC guideline states in Section 2.3.2.4 regarding CALPUFF and CALMET:

CALPUFF is a Gaussian puff model that can account for time- and space-varying meteorological conditions, different source configurations and contaminants, and chemical transformations. The specific treatments include curved trajectories, building downwash, plume penetration into a capping inversion, fumigation, coastal interaction effects, terrain impingement, stagnation, and transformation- related effects (contaminant removal due to wet scavenging and dry deposition, chemical reactions) and visibility effects of particulates. It can be applied to model near field effects (in the order of tens of metres) to transport distances of hundreds of kilometers. CALPUFF is a modelling system comprised of three component sub models: CALMET (meteorological model), CALPUFF (calculates output), CALPOST (analysis and display of output). The meteorological fields used by CALPUFF are produced by CALMET — a meteorological model that includes a diagnostic wind field model. This model contains treatments of slope flows, valley flows, terrain blocking effects, kinematic terrain effects (i.e., speed up over hills), lake and sea breeze circulations, and a procedure to insure mass is conserved in the domain. CALMET inputs include surface and upper-air meteorological data as well as the option to use the gridded meteorological fields produced by mesoscale meteorological models.

The excerpted portions above all pertain to the model's ability to include atmospheric processes in complex terrain, including inversions.

1.8.1.7. Does the dispersion model consider emissions from other sources? If no, how will the overall impact be assessed?

The model considers point sources from WLPP and adds the predicted impact to the ambient levels experienced in the airshed over the period of 2012. In this way, the combined impact from all sources in the community is considered.

1.8.1.8. Onsite shredding of rail ties is proposed as part of the renewal project. Inclusion of this particulate source, or identification of associated emission control equipment, does not appear to have been included in the renewal material. All potential sources associated with the renewal project should be included, especially given that PM10 concentrations are already predicted to be 82% of the objective (including background concentrations).

Fugitive dust sources are not typically covered in discharge permits and are thus also not included in the modelling. The design of the equipment to be used for the shredding of railroad ties includes measures that will be used to reduce and eliminate fugitive emissions from the shredding activities. In addition, a Fugitive Dust Plan is in-place at the Plant, which specifies steps taken to minimize fugitive dust generated by plant activities. Further, any fugitive dust created by this process would be mechanically generated wood particles (as opposed to being the result of combustion, for example) and would therefore likely occur in large size fractions greater than PM2.5 and PM10 that would be easily captured by mitigation efforts, and that would settle within or close to the plant should they occur. There would be negligible influence on ambient PM2.5 or PM10 on or off site.

Per RWDI's response above, the air dispersion model focuses on point sources (e.g. the stack) and does not include fugitive sources. Nevertheless, management of fugitive emissions is a key element of the design process for the new rail tie (RRT) shredding system and the Fugitive Dust Plan will be modified in coordination with the MOE to account for the potential for fugitive dust from the rail-tie handling activities that will occur. The preliminary design of the rail-tie handling system includes these measures:

- Receipt of whole ties and unloading with a grapple arm (i.e. no dumping).
- Covered conveyors will be used.
- The collecting conveyor beneath the shredder will be equipped with an enclosed skirtboard, just below the shredder's discharge chute, and the outlet opening of the skirtboard will be enclosed with dust curtains.
- The stream of shredded RRTs through the disc screen and hog tower (or secondary shredder) will be enclosed with chutes that are fitted with dust curtains at the inlet and outlet chute openings.
- The collecting conveyor below the disc screen and hog (or secondary shredder) will be fitted with an enclosed skirtboard, just below the disc screen's and hog's discharge chute, and the outlet opening of the skirtboard will be enclosed with dust curtains.
- Shredded RRTs will be stored in an enclosed area (e.g. silo or bin).

These design features, while still preliminary, will ensure minimal fugitive dust from the receipt, handling, and storage of the rail ties.

1.8.1.9. Does the RWDI airshed model take into account the organic contaminant loading from volatilization of creosote and PCP compounds from ties stored at the plant and in shredded chips waiting to be feed to the burner.

The model does not consider fugitive emissions (particulate or vapor) from RRT or chips. However, these emissions will be minimized by limited onsite storage of shredded rail-tie fuel supply, containing shredded rail ties in a bin or silo and managing the volume of whole RRT.

In addition, please see Q&A #'s 1.5.2, 1.5.3, 2.4.3 and 2.5.3 for additional answers to this question.

1.8.2. Particulate

1.8.2.1. The trial burn and modelling results indicate that small particulate matter PM2.5 and PM10 concentrations are already predicted to be 82% of the ambient air quality objective with negligible contribution from the rail tie fuel.

Particulate emissions from the plant are consistently lower than the permitted limits of 50 mg/m3, averaging 6.3 mg/m3, or 12.5 % % of that limit, in the last thirteen years of testing. In addition, as detailed in Table 6 of RWDI's Report, the plant's particulate emissions are less than 2% of the ambient air quality standard, while 80% of the 82% of such emissions in the Williams Lake area come from other sources. The addition of rail ties to the fuel mixture does not increase the particulate emissions. Furthermore, the studies by RWDI and Intrinsik conclude there are no significant impacts to either human health or the environment from the proposed amendment.

1.8.3. Sulphur Dioxide (SO2)

1.8.3.1. Figure 6 states "Predicted Ninety-Ninth Percentile Peak 1-Hour Maximum SO2 Including Ambient Background Value for 50% Rail Ties"; however, Table 7 indicates that no background concentrations were applied for comparison.

Figure 6 contains a typographic error and Table 7 is correct. To confirm, no background data was available for SO_2.

1.8.3.2. Background concentrations of sulphur dioxide were not provided resulting in a lower potential maximum predicted concentration at 57% of the objective value (50% rail ties). Sulphur dioxide exceeds the maximum predicted concentration (at 100% rail ties) without the inclusion of a background value. The region will have pollution contributed from other industrial sites, residential pollution, and/or naturally occurring pollution. In order to appropriately predict the overall air quality in the area once the proposed fuel source is implemented, a background concentration is required for all contaminants.

Ideally background concentrations for all contaminants would be assessed with the modelling for comparison to the AAQOs. However, in many cases, not all contaminants have existing background data for comparison. Local background concentrations vary, so we would be concerned about applying a background concentration from another area to this area. We would also note that typically air quality monitors are only deployed when potential concerns with specific facilities are suggested based on permitted emissions or modeling studies. Thus the fact that there are no specific monitors for SO_2, (while PM and NO_x are currently monitored) tends to suggest that there are no existing major facilities or sources in the area for which resulting ambient concentrations of SO_2 are a concern.

In addition, Intrinsik's human health evaluation (see Appendix E) concludes, based on "the potential change in SO2 emissions associated with the proposed increase in the volume of rail ties in the fuel mix at the WLPP; the conservatism incorporated in the predicted ground-level air concentrations of SO2; the areal extent of the predicted exceedances of the BC MOE AAQO; the likelihood of an exceedance of the BC MOE

AAQO occurring; and the levels of exposure that have resulted in observed adverse health effects in humans, as documented in the most recent scientific literature, the predicted short-term SO2 air concentrations are not expected to adversely affect the health of people living in the area or who might frequent the area for work, recreation or other purposes."

1.8.3.3. Diesel fuel, in particular fuel of previous decades contained sulphur. How do you see the proposed new sources of fuel impacting sulphur emissions?

The RWDI Modelling study showed Sulphur dioxide levels all below the BC Ambient Air Quality Standard at 50% rail ties.

In addition, please see Q&A # 1.8.3.2 for additional answers to this question.

1.8.4. Nitrogen Oxides (NOx)

1.8.4.1. RWDI indicates that 1-hour predicted concentrations were at or slightly above the AQOs however, the adjustment for background potentially double counts the plant emissions. Modelling should be updated to confirm the corrected concentrations to determine whether NO2 predicted concentrations are actually above or below the AQO.

In general, modeling must account for the effect of emissions both from the facility being evaluated (typically a new facility) and existing emissions from other sources. That is why modeling results for a proposed facility alone are added to the background from existing sources as measured by the ambient monitoring. However, because this facility is already in operation, emissions from the plant that do not change (such as NO_X) will also be captured in the background-monitoring data, hence the potential for double counting. It is not possible to completely remove the effect of current facility operations from the monitoring results. As such there is no update that can be done to remove the artifact of double counting. The NO_2 results were presented with and without the background included so as to bound the results. As stated below, the inclusion of rail ties in the fuel mix has no or very little effect on the plant NO_X emissions.

1.8.4.2. For instances where emissions are predicted to be above the AQOs emission control, or mitigation methods should be presented for consideration.

The inclusion of rail ties in the fuel mix has no or very little effect on the plant NO_X emissions, and, therefore, there is no impact expected from revising the permit from the current 5% RRT limit to a higher limit. Further mitigation is not warranted given the conservatism of the model study and the limited potentially affected area.

1.8.4.3. The model suggests that current power plant emissions exceed provincial air quality objectives for nitrogen dioxide.

RWDI points out in the report that the process of adding background ambient values to the modeled emissions data has the effect of double counting. This is consistent with the fact that nitrogen dioxide emissions are virtually unchanged whether burning traditional wood fibre or 100% rail way ties. This, and other conservative assumptions in the analysis, indicates that the BC Ambient Air Quality Standards for this compound will not be exceeded during actual operations.

In addition, please see Q&A # 1.8.4.1 for additional answers to this question.

1.8.4.4. The evidence suggests that current power plant emissions exceed provincial air quality objectives for nitrogen dioxide.

Measured ambient nitrogen dioxide levels are significantly lower than the BCAAQO and the plant's emissions are less than its permit limits. NOx emission remained largely unchanged when burning 100% rail ties versus traditional wood fibre. We expect that Williams Lake will continue to achieve the AAQO for nitrogen dioxide.

In addition, please see Q&A #'s 1.8.4.1, 1.8.4.2 and 1.8.4.3 for additional answers to this question.

1.8.4.5. RWDI indicates that the exceedances of the AAQO are limited to area within one to two kilometers to the northwest of the facility with a smaller area within a few hundred meters to the southwest. Sensitive receptors or receptors of concern to the Williams Lake Indian Band (WLIB) (cultural and/or traditional significance) within this area should be identified on maps that show the frequency of exceedance of objectives or guidelines at each receptor.

RWDI will complete this analysis in cooperation with WLIB. Note: the potential exceedances of the objectives relate to NO_X, and the inclusion of rail ties in the fuel mix has no or very little effect on the plant NO_X emissions.

1.8.5. Miscellaneous

1.8.5.1. I am concerned about using a model to predict the concentrations of emissions at various locations in the valley. Can we expect that there will be ongoing monitoring of the emissions at various locations, and under various climate conditions? This will serve to confirm the predicted values from the model. If the actual emissions vary unfavourably to the predicted emissions and exceed the thresholds, then what? Will the amendment be rescinded?

The Calpuff model is utilized for airshed management and regulatory decision making throughout North America and is routinely compared with local ambient data. There are a number of ambient monitors in Williams Lake and the Ministry of Environment is responsible for ensuring that the monitoring program is protective of residents and the environment.

The Ministry of Environment, with financial support from local industry, is responsible for monitoring air contaminants. Monitoring is done on a continuous basis and results are available on the Ministry website. AP will continue to support and participate in the community airshed monitoring system. The decision to add monitors should continue to be based on health and environmental concerns. If that rationale indicates a new monitor and AP is a key source of the contaminant in question we will support the cost of the new monitoring equipment.

Please see Q&A # 1.8.1.6 for additional answers to this question.

1.8.5.2. What assurances can you provide that we can trust the science?

The RWDI modelling study was designed with input from the Ministry of Environment. The dispersion model (Calpuff/Calmet) is the model system routinely used for airshed management and regulatory purposes throughout the US and Canada. In addition, the RWDI study used test data from a 100 % rail-tie test burn (performed by a certified, independent third party and laboratory), a conservative approach when compared to the maximum limit of 50 % rail-ties requested in the permit amendment request.

Furthermore, in a health study completed by Intrinsik, an independent third party (see Appendix E for their report), they concluded that the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighboring area.

Also, please see Q&A # 1.7.1 for additional answers to this question.

1.8.5.3. The modelling study appears to use outdated data (from 2001) and fails to recognize other nearby industrial inputs to the air shed. Does this air quality monitoring study take into account the cumulative effects of all industrial inputs or only that of Atlantic Power? Further, this study predicts that burning rail ties will result in levels of nitrogen dioxide that exceed allowable limits in BC.

The dispersion model uses emission data from the WLPP, local topography, and one year of weather data to predict the path and concentration of those emissions as they leave the site. These predictions are then added to the currently measured ambient data at monitors in the airshed. All other sources, including industrial, residential, transportation, etc. are accounted for in the ambient measurements. The fact that the full emissions from the WLPP are input to the model, and not just the projected changes, explains how double counting can occur. Further, nitrogen dioxide emissions are not predicted to change materially with an increase in RRT.

Also, please see Q&A #'s 1.3.2, 1.7.1, 1.7.2 and 1.7.5 for additional answers to this question.

1.8.5.4. How much will dioxins and furan residues increase in the air around town?

From the RWDI Air Dispersion Modelling Report - Executive Summary and Table 8, (see Appendix D) the maximum predicted “Dioxin and furan concentrations were less than 0.01% of the regulatory objective (Ontario’s objective in the absence of a British Columbia objective).”

1.8.5.5. The RWDI report fails to use common language and model output mapping which is easily assessed by city residents.

We acknowledge that dispersion modelling reports take some time to interpret. However, we opted to provide the full report to the public. This Q&A document provides specific responses to resident’s questions.

1.8.5.6. The dispersion modeling output scale is too small for residents to assess the impact in their local area. The scale of the map in the report is 1:160 000, which is inadequate to evaluate neighbourhood scale effects. Can a map with greater resolution be produced such that local residents can read the modeled effects at a neighbourhood scale?

From the air dispersion model, contaminants were demonstrated to be below their respective AAQO’s or AAQC’s for 50% rail ties, except the 1-hour NO2 predicted concentrations were at or slightly above the air quality objective, but the adjustment for background potentially double counts the plant NOx emissions. The effect of double counting and other conservative assumptions leads to the conclusion that actual NO2 levels will be within the air quality objective and an assessment on a neighborhood level is not needed.

The design of the modelling study and the final report were agreed between the qualified professionals at RWDI and at Ministry of Environment. See previous answer.

Dispersion modelling was conducted over a 25 km by 25 km study area surrounding WLPP using CALPUFF 6.42 in full three-dimensional CALMET mode. This is a recommended approach under the *Guidelines for Air Dispersion Modelling in British Columbia* (British Columbia Ministry of Environment [B.C. MOE] 2008) for studies of this type. All aspects of the dispersion model set-up, including meteorological data (CALMET), land use data, terrain data, receptor grid and various other model assumptions were established as per the *Guidelines for Air Dispersion Modelling in British Columbia*. A detailed model plan for the dispersion modelling study area was submitted for review by B.C. MOE. The Ministry approved the plan with additional suggestions that have also been incorporated in the modelling.

1.8.5.7. Who would be in charge of measuring any toxic build up?

The Ministry of Environment, with financial support from local industry, is responsible for monitoring air contaminants. Monitoring of the plant’s stack is done on a continuous basis and results are available on the Ministry website. Previously completed stack tests by WLPP document that plant emissions have all been within the permit limits established by the MOE.

Please see Q&A #'s 1.3.3, 1.3.5 and 1.3.6 for additional answers to this question.

1.8.5.8. Does this take into consideration the residual buildup of toxins?

Yes. The model does include accumulated pollutants including worst cases where inversion conditions and/or calm winds limit dispersion.

Please see Q&A # 4.2.1 for additional answers to this question.

1.8.5.9. How would this buildup of toxins be measured?

The model, which was run in compliance with the Guidelines for Air Quality Dispersion Modelling in British Columbia, considered worst case scenarios. Existing ambient monitors can be used to verify model predictions.

Please see Q&A # 4.2.1 for additional answers to this question.

1.8.5.10. Would this eventually make Williams Lake a toxic place to live, raise children and breathe?

As discussed in Q&A # 1.7.1, AP engaged independent consultants to conduct both air modeling (RWDI) and human health evaluations (Intrinsik), both of which concluded that emissions from burning rail-ties at a 50 % mixture are within the applicable BC or Ontario provincial standards, and do not pose a risk to the environment or human health.

We refer you to the RWDI modelling report and Intrinsik report on health impacts for the results. All impacts in the community, including worst case scenarios, are predicted to be within B.C. Ambient Air Quality Objectives – Updated October 30, 2015

Also, please see the Q&A's in Sections 4.1 and 4.2 for additional answers to this question.

1.8.5.11. Has testing and modelling adequately considered the cumulative effects of all emissions in the air shed especially during inversion conditions which are common here at certain times of year? Is there a plan to reduce the amount of ties in the fuel mix under these conditions?

The RWDI modelling considered weather patterns for a full year, in this case 2012. Based on the results of the RWDI Air modeling, the modeling demonstrated that potential air quality effects due to inversions were not significant, and that there was no demonstrated need to alter and/or reduce the amount of ties during inversion conditions.

Also, please see Q&A #'s 1.1.6, 1.2.7, 1.8.1.2 and 1.8.1.6, for additional answers to this question.

1.8.5.12. The reference summary provided by Atlantic Power suggests that most toxic substances will be mitigated by treatment to be within allowed guidelines. Which substances do tests suggest will not be mitigated to this level? And what plans are in place to monitor and mitigate these substances?

From the air dispersion model, contaminants were below their respective AAQO's or AAQC's for 50% rail ties, except the 1-hour NO2 predicted concentrations were at or slightly above the air quality objective, but the adjustment for background potentially double counts the plant NOx emissions. The effect of double counting and other conservative assumptions leads to the conclusion that actual NO2 levels will be within the air quality objective.

The results indicate that emissions associated with all compounds evaluated are adequately mitigated by a combination of the plant's boiler design and its air pollution control system.

Also, and as previously noted, testing of the emissions from the stack will be conducted on a routine basis going forward, so as to ensure the lack of impact from the combustion of rail-ties.

1.8.5.13. The study by R.W.D.I. Air Inc. was commissioned by Atlantic Power. Is the Ministry of Environment also commissioning a control study to verify this information and expand the parameters to address some of our concerns in regard to airborne toxins that were not addressed?

The RWDI study was designed and completed following Ministry of Environment protocols and with input from the Ministry of Environment. The 2001 trial burning 100% RRT was also designed, with Ministry guidance, to identify all contaminants of concern.

2. Fuel Management

2.1. Rail Tie Quantities

2.1.1. The public notice fails to clearly describe both the volume and hazardous components of waste rail ties proposed for incineration at the power plant.

The Environmental Protection Notice is a brief outline of key amendments and was drafted following Ministry guidance. Here we refer to the application to "Raise the limit on waste rail ties as a proportion of the authorized fuel from the current 5% to 50%." Further detailed information has been provided in the form of these Q&A, in our Fact Sheet and, more specifically, in the Technical Assessment Report (separate Report submitted to the MOE).

2.1.2. An Atlantic Power information sheet suggests that 600,000 tonnes of wood waste is burned annually so, conceivably, up to 300,000 tonnes of treated rail ties could be burned on an annual basis. How many rail ties is this and how would they be shipped to the plant? It is likely that they would arrive by rail where they would be unloaded and transported by truck. Will this result in rail ties being stockpiled in the railway yard or at a nearby siding, and increased industrial traffic through the city?

600,000 tonnes of wood waste is the maximum quantity of wood waste that could be burned by WLPP. In recent years the total annual quantity of wood waste consumed has been closer to 400,000 tonnes. We expect the lower annual consumption to continue or be reduced further. We expect that the plant would consume between 55,000 and 85,000 tonnes of rail ties per year, up to a maximum of approximately 100,000 tonnes per year. 85,000 tonnes of rail ties per year would be equivalent to about 1.2 million rail ties per year (~14 whole ties per tonne).

The size of the whole tie pile would vary seasonally. On average, we expect an inventory of approximately 10,000 tonnes, but, to be conservative, it is estimated that approximately 20,000 tons of whole ties may be stored onsite for a limited period of time, in addition to a small quantity of shredded ties stored onsite in an enclosed bin or silo. The 20,000 tons of whole ties constitutes approximately 21 days of fuel supply, if the ties are being burned at a 50:50 mixture with other traditional wood fibre.

We envision rail ties being delivered as we require them. We would develop a rail tie storage area at the plant for whole ties. It would be close to the shredder, which is the piece of equipment that would take whole rail ties and 'shred' them into smaller pieces that would be mixed with other residual wood fibre before entering the plant on conveyors for combustion. We would maintain a limited supply of shredded rail ties at our site stored only for short periods of time so as not to create a fire hazard and minimize fugitive dust blowing off the plant site and any runoff from the shredded material.

Our project proposes to receive used rail ties at a rail yard location in an industrial area of the City. The ties will be loaded onto trucks and transported to our plant primarily by highway and then a short distance on Mackenzie Avenue North. Our project will not materially change the total truck deliveries to the plant site since the rail tie deliveries replace current residual wood waste deliveries. We envision rail ties being delivered as we require them with some storage of whole ties on the power plant site.

2.1.3. What quantity of rail ties would be on site at a given time?

The size of the whole-tie pile would vary seasonally. On average, we expect an inventory of approximately 10,000 tonnes, but this could range as high as 20,000 tonnes during peak periods (approximately 300,000 ties).

2.1.4. Your information states that only three days' worth of ties will be stored on site. Elsewhere it states that the amount is 20,000 tonnes or 300,000 rail ties. Is this still three days' worth of burning? I.e.: Will you burn about 100,000 rail ties in day? How many tonnes per day?

It is conservatively estimated that approximately 20,000 tons of whole ties may be stored onsite for a limited period of time, in addition to approximately three days of shredded ties stored onsite in an enclosed bin or silo. The 20,000 tons of whole ties constitutes approximately 21 days of fuel supply, if the ties are being burned at a 50:50 mixture with other traditional wood fibre.

2.2. Fire Prevention

2.2.1. How will spontaneous fires be prevented in tie chip piles?

Spontaneous combustion can occur when piles of shredded wood have been left for long periods of time (typically >3 months), and when certain other ambient conditions are met. The rail ties in this case will only be shredded as needed and will be maintained in a controlled environment in relatively small quantities (up to a 3 day supply).

2.2.2. The plant location is in the urban/wildland interface. Is there evidence that an irrigation and water deluge system would be effective at extinguishing a fire within 150,000 –300,000 ties?

The plant has an irrigation sprinkler system surrounding the fuel pile, a fire water loop with deluge stations around the perimeter, and qualified and trained staff to manage any potential fire situations. Although we have not experienced a fire requiring the deluge systems to be used, the deluge system is designed to manage a fire associated with the much larger wood waste pile.

2.2.3. What are the risks and contingency plans for fire risk for stored ties during wildfire events such as we experienced in 2010?

Please see Q&A # 2.2.2 for an answer to this question.

2.2.4. When passing the power plant each day, spot fires are visible and a continual occurrence in the fibre pile which currently contains some chipped rail ties in the mixed. What are the consequences with this fibre in the mix with regards to low temperature combustion?

There are no rail ties, chipped or whole at the WLPP currently and rail ties have not been used as fuel at the plant since 2010. The volume of shredded ties will be maintained at or less than a 3 day supply and these will be stored in a controlled environment, not in the fibre pile.

While small fires do occur in the larger wood stockpile, plant systems, including video camera monitoring and rapid response of plant operators with bulldozers and front end loaders, are effective in minimizing the significance of such fires.

2.3. Transportation, Receiving Rail Ties

2.3.1. Considering the proximity of neighbors (hockey rink, stockyards, homes), and the concern for dust and odour emissions, can you locate your storage and chipping facilities out of town?

Our project proposes to receive used rail ties at a railyard location in an industrial area of the City. The ties will be loaded onto trucks and transported to our plant primarily by highway and then a short distance on Mackenzie Avenue North. Traffic will not increase as a result of rail tie fuel offsetting other fuel deliveries. We will use slow speed shredding equipment to prepare the ties on site to minimize dust in addition to numerous other dust suppression design features previously discussed.

Also, please see Q&A #'s 1.5.2, 1.5.3, 2.4.3 and 2.5.3 for additional answers to this question.

2.4. Storage

2.4.1. What strategy will be use to prevent run-off from un-shredded and shredded ties stored on location?

The shredded ties represent larger concerns than the whole ties due to the increase in the overall surface area of the material. In order to reduce the risk of run-off, ties will only be shredded as needed and stored in small quantities in an enclosed bin or silo and will not be exposed to wind, rain or snow. The whole ties will be stored in a designated area on site, and will be managed in accordance with an updated Storm Water Management and Monitoring Plan (SWMMP). The SWMMP will conform to all provincial requirements and current best practices for storage of end-of-service whole rail ties. The provisions of the SWMMP will be finalized prior to the storage of any shredded and whole rail-ties onsite.

2.4.2. As PCP and creosote are toxic, how will leaching from stored ties be controlled, measured, and monitored to avoid contamination of the site?

Please see Q&A # 2.4.1 for an answer to this question.

2.4.3. What measures are in place to measure the consequences of off gassing from this fibre in the storage pile? Is this a potential health issue for your immediate neighbours?

This was a key concern from past years due to the large volume of chipped ties that was stored at a downtown location. Removal of the RRT processing from the downtown to the plant will allow us to maintain control over the shredding process. The inventory of shredded ties will be minimized with all shredded ties stored in a bin or silo.

Please see Q&A # 1.8.1.9 for additional answers to this question.

2.4.4. Fugitive dust from the storage area can far exceed any permitted source but cannot be practically measured. What is planned to ensure this does not occur at the power plant?

WLPP has prepared and submitted a Fugitive Dust Management Plan to the MOE. The Plan will be modified in the event the permit application is approved. This Plan specifies the controls and practices used by the plant in managing fugitive dusts that arise from both its operations, as well as adjacent properties. The Plan includes provisions for managing fugitives that can be generated by the various trucking, material transfer, fuel pile, roadway and ash handling activities that occur at the plant. This Plan includes actions to be taken when either plant-related or weather conditions warrant. In addition, we work with the MOE to meet their requirements in addressing any public complaints

Please see Q&A # 1.5.1 and 1.8.1.8 for additional answers to this question.

2.4.5. There is a history of contaminated creosote treating plants. How will leaching from stored ties be measured, monitored and dealt with so as not to contaminate foodchains, the site and groundwater with heavy metals and other toxic compounds?

There are a number of former and operating creosote treating plants that are contaminated. There is a significant difference between a creosote treating plant, where the liquid chemicals are applied under pressure and charges of wet rail way ties or utility poles are then taken from the treatment vessel out into the yard for storage, and end-of-service ties. End of service ties have experienced several decades of chemical loss mechanisms including exposure to the sun's UVs and radiation, freezing and leaching due to heat and precipitation. In addition, creosote treating plants of earlier years did not have final vacuum phases to remove excess liquid creosote from ties before removal from the vessel nor contained staging yards.

As noted above, shredded ties will be kept in an enclosed bin or silo, and whole ties will be stored in a designated area on site, and managed in accordance with an updated Storm Water Management and Monitoring Plan (SWMMP The provisions of the SWMMP will be in accordance with MOE requirements, and will be finalized prior to the storage of any shredded and whole rail-ties onsite

2.5. Shredding

2.5.1. How will toxic dust generated from the shredding process be managed to prevent inhalation and spread into environment?

The process will involve the use of a low speed shredder, not a high speed hog as had been used in the past during previous grinding activities. This process would emit very little fugitive dust; Management of fugitive emissions is a key element of the design process for the new rail tie (RRT) shredding system.

Please see Q&A # 1.5.1 and 1.8.1.8 for additional answers to this question.

2.5.2. Atlantic Power indicates that chipping of rail ties will occur at the plant site

a. Is this the only location where ties will be chipped and stored?

b. What management practices are in place to recover dust and/or chip deposited over the site?

Yes. Our plan is to install an extensive, permanent rail tie shredding system (see previous answer) at the power plant site. The system will include numerous measures to control fugitive dust such as covered belts. Similar to current operating practices, the plant staff will periodically clean up any of the limited amounts of dust and chips near the shredding equipment that are not addressed by the fugitive dust mitigation measures noted previously, and this material will be deposited in the shredded rail tie silo or bin.

2.5.3. The area where the creosote ties would be chipped is located within 1.5 km of residential areas. How will you prevent odour emissions from this process?

The rail ties being used for fuel will typically have been removed from service after 20-30 years or more and will be stored whole. Shredded rail ties will be stored in a silo or bin to minimize odours.

Also please see Q&A #'s 1.5.2, 1.5.3 and 1.8.1.9 for additional answers to this question.

2.6. Fuel Blending

2.6.1. How does Atlantic Power define the term "periodic basis" with regard to the desired intention to burn a 50/50 tie and untreated wood mix?

The amount of rail ties burned will vary on the supply and availability of the ties, as well as supply and availability of traditional biomass supply. We expect to burn an average concentration of rail ties of approximately 15%-25% on an annual basis. However, we are requesting the flexibility to go up to a 50/50 mix. The 50/50 ratio is being used as the basis for all modeling as a proactive measure.

Please see Q&A #'s 1.6.4 and 2.1.2 for additional answers to this question.

2.6.2. The amount of treated wood, in tonnes/day represented by 50% of the total fuel supply has not been defined. It is unknown how many days/year the plant typically

operates. The amount of treated wood in tonnes/day is required to better understand what a 50% concentration of treated wood in the fuel supply actually represents.

As previously discussed, we expect that the plant would consume between 55,000 and 85,000 tonnes of rail ties per year, up to a maximum of 100,000 tonnes per year. 85,000 tonnes of rail ties per year would be equivalent to about 1.2 million rail ties per year (~14 whole ties per tonne). In recent years the total annual quantity of wood waste consumed has been about 400,000 tonnes. We expect this lower annual consumption to continue or be reduced further.

We envision rail ties being delivered as we require them. We would develop a rail tie storage area at the plant for whole ties. It would be close to the shredder, which is the piece of equipment that would take whole rail ties and 'shred' them into smaller pieces that would be mixed with other residual wood fibre before entering the plant on conveyors for combustion. We would maintain a limited supply of shredded rail ties at our site stored only for short periods of time in a bin or silo, so as not to create a fire hazard and minimize fugitive dust blowing off the plant site and any runoff from the shredded material.

Our project proposes to receive used rail ties at a rail yard location in an industrial area of the City. The ties will be loaded onto trucks and transported to our plant primarily by highway and then a short distance on Mackenzie Avenue North. Our project will not materially change the total truck deliveries to the plant site since the rail tie deliveries replace current residual wood waste deliveries.

Please see Q&A # 2.1.2 for additional answers to this question.

2.6.3. If Atlantic Power were to get approval to burn more ties, what is the likelihood of Williams Lake becoming the primary rail tie disposal destination for Western Canada and/or beyond?

Our primary fuel source will always be our traditional fuel supply from the local mills. In the event that additional area mills are closed, no more than 50% of our fuel supply would come from rail ties as permitted. Furthermore, the availability of rail ties is also subject to supply and transportation limitations.

2.6.4. Is there a plan to reduce the amount of ties in the fuel mix during inversion conditions?

Please see Q&A # 1.8.5.11 for an answer to this question.

2.7. Boiler Operation

2.7.1. It is assumed that the operation of the facility is 24/7; however, it is likely that there are shutdowns for routine maintenance and potentially during an emergency.

a. Have there been any emergency shutdowns during operation of the Facility?

b. How long does it take for the Facility to be shut down?

c. **Is there any data available for combustion temperatures during a shutdown (until combustion is complete)?**

d. **What are the NOx concentrations recorded by the CEMs during this process?**

Yes, the facility operates 24/7. During planned maintenance shutdowns, fuel flow to the boiler is gradually reduced to empty the fuel feed bins for maintenance, and combustion parameters and emissions are normal during the shutdown which occurs over about 2 hours. During a recent (11/2) planned shutdown, flue gas temperatures in the economizer reduced by about 125 F over the 2 hour shutdown period, and NOx decreased from about 120 ppm to 40ppm.

An unplanned shutdown can occur, for example if the BC Hydro transmission system goes down or if a major piece of equipment fails. In these cases, the plant would trip (which means the steam turbine generator is electrically disconnected from the grid and the fuel flow to the boiler is stopped). Such an upset condition happens quickly, typically in less than a minute. Even with the fans shut down, air continues to flow to the boiler immediately after a trip and any fuel already in the boiler on the grate continues to combust.

There is only a small amount of RRT burning at any one time (<1 ton/min at the 50% limit). Because the RRT/regular wood fuel mixture on the grate is contained in the large metal furnace, the RRT will stay in place and burn out very quickly in matter of minutes. Plant trips are rare, but during a 2014 plant trip, flue gas temperatures were steady up to the point of the trip and then began a gradual decline. NOx was 110ppm immediately prior to the trip, and then also began a slow decline (5 minutes later it was 76ppm)

2.8. Combustion of Spill Absorbents

2.8.1. The existing clause requires written approval of the Director to incinerate hydrocarbon contaminated wood residues with no daily limit specified. The proposed changes will preauthorize acceptance at the power plant of up to 872 litres/day of commercial sorbents used in spill clean-ups for incineration. Why the proposed change to allow up to 872 liters/day of hydrocarbon contaminated absorbent materials originating from accidental spills without the written approval of the Director?

The provision to burn "hydrocarbon contaminated absorbent materials originating from accidental spills" up to a maximum of 872 liters/day is intended to allow for spill recovery materials to be disposed of in the energy system. These occurrences are rare, the volumes would normally be low and the high temperatures within our furnace ensure complete destruction. The only material change is that formal authorizations will not be required, offloading Ministry staff from this administrative function and allowing for spill clean-up material to be disposed of quickly.

Please see Q&A # 1.3.2 for additional answers to this question.

2.8.2. The amendment proposes to delete the provisions for continuous emission monitors audited in accordance with Environment Canada's EPS 1/PG/7 Protocols and Performance Specifications, for the reason that these protocols are intended for fossil fuel burning systems. In that treated railway ties, contaminated absorbent materials, and 872 liters/day of waste oil contains fossil fuels, can you

explain justification for deletion of the provisions mentioned, and describe what will be in place to suffice?

Please see Q&A #'s 1.3.1 and 1.3.2 for answers to this question.

2.9. Other Non-hazardous Biomass

2.9.1. What procedures will be in place to ensure demolition waste is clean and free of non-biomass ingredients such as asbestos-containing drywall filler, and what provisions are in place for particulate matter (PM) reduction?

The use of any contaminated (i.e. asbestos-containing drywall) construction and/or demolition wastes as fuel would be prohibited under the terms of the revised Permit Amendment. Furthermore, any construction and/or demolition wastes received for fuel would be subject to specific Contract terms prohibiting the supplier of such materials from including such materials in any shipments sent to the plant. In addition, such materials would be subject to onsite visual and remote video camera monitoring by the plant's operations staff, so as to prevent such materials from being introduced into the plants material handling system.

3. Ash

3.1.1. Atlantic Power indicates that the high boiler operating temperatures (and the emissions controls) are effective in removing contaminants of concern.

a. Have there been any analyses of the ash generated from the trial to determine residual (if any) amounts of PAH, PCP and metals?

b. What is the pH of the ash and have there been any leachate tests performed with the ash?

Table 8 of the 2001 test report (Appended to the RWDI report (see Appendix D)) shows the referenced constituents of the ash (dioxins/furans, PAH, chlorophenols, and total metals) which are all within the applicable standards. Section 5.0 of the 2001 test report indicates that "Extractable metals met the leachate quality criteria under the BC Special Waste Regulation and that pH ranged from 5.15 (final) to 9.73 (initial). The BC Special Waste Regulation has been replaced by the BC Hazardous Waste Regulation which can be found at http://www.bclaws.ca/civix/content/complete/statreg/414786120/03053/reg03053/1871199216/?xsl=/templates/browse.xsl

The leachate quality standards did not change between the two regulations.

3.1.2. While controlled combustion conditions can destroy dioxins and other chlorinated aromatic substances in treated ties, dioxins can reform within the convection zone of the boiler, which are assumed to be collected by the flue gas treatment system.

a. Are solids trapped by the emissions control consolidated with the boiler ash for disposal, or segregated for separate testing and disposal?

b. Have there been any analyses performed on solids recovered from the emissions control system?

All ash (bottom ash from the bottom of the boiler, ash from the mechanical collectors, and fly ash from the electrostatic precipitator) is consolidated for disposal at the project's ash landfill.

Also see Q&A # 3.1.1 for a further answer to this question

3.1.3. PLACE HOLDER

3.1.4. Atlantic Power identifies that the pollutant levels in the ash from rail ties, although somewhat higher than from traditional fuel sources, are still well within BC Regulations.

a. What analyses have been performed for ash samples?

b. To which regulation(s) is Atlantic Power comparing this data?

See Q&A #'s 3.1.1 and 3.1.2 answers to this question

3.1.5. If incomplete combustion does occur, how will the ash be treated differently from the current ash dumping process so that leaching into the soil and potentially the Williams Lake River below the dump site does not occur?

The potential for incomplete combustion would be highlighted by the boilers air monitors and visually detected at the submerged ash bunker. In the unlikely event that wood is not completely burned and is apparent in the ash, this ash would be collected by a loader and re-introduced back to the furnace.

3.1.6. The wood waste ash hauled to the ash dump site is so caustic it eats metal

The uptake of CO_2, mainly from precipitation, serves to neutralize ash in a relatively short period of time. This natural process of carbonation is what allows for the landfilling of ash and the common practice of using ash from traditional wood fibre as an agricultural fertilizer in most Canadian provinces.

The plant's ash landfill is subject to a Management Plan approved by the MOE. An engineering firm (AMEC Foster Wheeler) is contracted by the plant to oversee the activities associated with the ash landfill, and to prepare an Annual Report in accordance with the requirements of both the Discharge Permit for the Landfill (# 8809) as well as the Management Plan. The Discharge Permit and Management Plan contain specific requirements relative to the development and closure of the landfill; fugitive dust management; site preparation and restoration; surface runoff and erosion control; monitoring, sampling and analysis of groundwater, surface water, stability and settlement; quality assurance; and reporting. These mandates have been developed in conjunction with the MOE to ensure the operation of the landfill is protective of human health and the environment. The most recent sampling of the groundwater monitoring system did not indicate any levels of concern relative to groundwater contamination.

3.1.7. How do pollutant levels in the ash differ from those in untreated wood ash?

The pollutant levels in the ash from rail ties, although higher for some compounds than those from traditional fuel sources, are still extremely low. For example, dioxins and furans in 100% RRT ash were 788 picograms / gram. To put this in context, a picogram is 1/1,000,000,000,000 of one gram so the result was less than one part per billion (ppb), versus the limit of 100 ppb. The BC Hazardous Waste Regulation defines waste containing dioxin as "a waste containing a concentration greater than 100 parts per billion". PAHs and metals were not significantly higher when burning RRT and many of the metals were lower than the ash from the traditional wood fibre baseline.

3.1.8. Waste ash requires secure long term disposal and contaminant levels must be understood in the context of the relevant regulations. What BC regulations and standards are used to determine acceptable pollution from rail tie ash? As the current ash dump is close to capacity, will this assessment consider the location of a new landfill for ash containing rail tie contaminants?

As discussed below, the combustion ash is applied to the landfill and covered with a soil layer to prevent exposure to the environment. In addition, when the concentration of dioxins in the rail tie ash is compared to the applicable soil standard for dioxins (0.00035 mg/kg), it is concluded that the potential for significant human health and/or environmental impacts is negligible. It is anticipated that an updated Management Plan will be prepared and submitted to the MOE for review and approval. Any revisions needed to ensure the landfill activities are protective of human health and the environment will be incorporated at that time.

WLPP will apply to the MOE and the Ministry of Forestry, Lands and Natural Resources Operations (MFLNRO), prior to the landfill reaching full capacity, in accordance with the procedural requirements of both Ministries, to amend its current landfill permit to allow for any expansion of its current Landfill to accommodate future ash deposits.

Also see Q&A #’s 3.1.1 and 3.1.6 for additional answers to this question.

3.1.9. Table 8 of the 2001 Trial Report (see appendix D) indicates that rail tie ash contained 788pg/g of Dioxin/Furan or 33 times more than was present in the regular hog fuel ash (23.8pg/g). Table 8 also indicates there are ~40% more polycyclic aromatic hydrocarbons (PAH) in the rail tie ash than the regular ash. Their elevated presence in the waste ash stream warrants further investigation.

Although the levels of the dioxin/furans was higher in the rail-tie ash, when compared to the regular hog fuel ash, these levels are still protective of human health and the environment, and do not exceed the applicable limits for leaching content. A study conducted for the MOE (Organochlorine Contamination in Various Environmental Compartments-Hatfield Consultants Ltd-1991) concluded that the levels off dioxins/furans observed in combustion ash was not indicative of any significant concern for public exposure.

Ash is applied to the landfill and covered with a soil layer to prevent exposure to the environment. In addition, when the concentration of dioxins in the rail tie ash is compared to the applicable soil standard for dioxins (0.00035 mg/kg), it is concluded that the potential for significant human health and/or environmental impacts is negligible. An updated Management Plan will be prepared and submitted to the MOE for review and approval. Any revisions needed to ensure the landfill activities are protective of human health and the environment will be incorporated at that time.

Also see Q&A #’s 3.1.1 and 3.1.7 for additional answers to this question.

3.1.10. Performance bonding is warranted to ensure long term liabilities associated with the ash landfills are addressed.

If the BC Ministry of Environment implements performance bonding for forest and biomass sector power operations then this would apply to the WLPP landfill. Currently no such security has been required for wood residue, pulpmill dregs, pulpmill lime, wood ash, ash from traditional wood fibre /RRT mixed fuels. We are not aware of wood ash landfills that have resulted in contaminated groundwater or surrounding soils.

3.1.11. The properties and contents of wood ash, and the nature of the existing landfill site, present a significant risk to the aquatic environment.

All terms of the Landfill Permit will be adhered to for the protection of soil, groundwater and the aquatic environment.

4. Human Health

4.1. General

4.1.1. What are the expected health effects on the most vulnerable population: young children, asthmatics and immuno-compromised of the added emissions in the immediate term? The medium term? The long term? When we experience a temperature inversion, often in the fall?

As discussed above, the air modeling conducted by RWDI includes consideration of the occurrence of inversions in its modeling design, as per the MOE's guidelines. Based on the RWDI modeling outputs, Atlantic Power commissioned Intrinsik to complete a screening-level HHRA based on the results of an air dispersion modelling study of the emissions from the proposed increase in the volume of rail ties to be consumed annually at the WLPP. The primary aim of the screening-level HHRA was to identify and understand the potential health risks posed to the area residents as a result of the proposed changes in the WLPP emissions. In order to do so, consideration was given to the nature of the emissions, the nature of the exposures that might occur (i.e., amount, frequency and duration), and the nature of the potential health effects that may occur following exposure to the chemicals contained in the emissions.

By convention, the screening-level HHRA embraced a high degree of conservatism through the use of assumptions intentionally selected to represent worst-case or near worst-case conditions. Using this approach, any health risks identified in the screening-level HHRA were unlikely to be understated. Intrinsik concluded that the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighboring area.

The Intrinsik Assessment of Human Health Risks Associated with the Proposed Changes in the Emissions from the Williams Lake Power Plant can be found in Appendix E.

4.1.2. Williams Lake is located in a narrow deep valley which has strong temperature inversions. There is a probability, however small, that there could be the release of toxic chemicals into the valley with the burning of ties, due to such possibilities as inadequate monitoring, human error during the operation and machine malfunctions. If this event occurred there would be, especially during an inversion, a serious detrimental effect on the health of our residents.

See Q&A # 4.1.1 for an answer to this Question.

4.1.3. If there are adverse health effects, directly or indirectly, from the plant, could we realize just as many if not more jobs from another use of the existing wood fibre with fewer health effects?

As discussed in Q&A # 4.2.4, Intrinsik concluded that "the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighbouring areas."

See Q&A # 4.1.1 for an answer to this Question.

4.1.4. How will you ensure that drinking water sources are not contaminated?

As previously addressed, both the Williams Lake plant, as well as the landfill site, is subject to MOE Discharge Permit. In addition, the plant's Storm Water Management Plan and the landfill's Management Plan, contain provisions that are also designed to ensure that there are no adverse impacts to receiving waters, both surface water and ground water.

4.2. Long-term and Cumulative Effects

4.2.1. Has there been any work done to assess the expected cumulative effects of long-term emissions from rail-tie burning into the Williams Lake Airshed, which regularly experiences temperature inversions?

It is the Province's role to manage the airshed, and in doing so they impose standards which we must assess as part of our dispersion modelling. This modelling considered all meteorological conditions experienced by the airshed, including temperature inversions over the course of 2012 the representative year to be used in modeling, as designated by MOE.

The regulatory limits evaluated in the air modeling by RWDI are designed to be protective of human health and the environment. The RWDI study concluded that the emissions from the plant would be within allowable British Columbia and Ontario limits for the various compounds considered.

In addition, the Intrinsik study evaluated the long-term human health impacts. Apart from the assessment of the potential health risks related to the exposures to the chemical emissions that may occur *via* the primary pathway of inhalation, consideration also was given to the risks that may have occurred as a result of chemical fall-out or deposition from the air onto the ground, resulting in additional pathways of exposure (i.e., secondary pathways). For the purpose of the screening-level HHRA, concentrations of the non-gaseous chemicals (i.e., metals, PAHs and chlorinated compounds) were predicted in soil and compared with BC's Contaminated Sites Regulation (CSR) numerical soil standards and background soil concentrations in the Cariboo Region (Gov. BC 2014). Specifically, the predicted maximum annual average air concentrations of the non-gaseous COPC associated with the WLPP were assumed to deposit onto the ground at the maximum point of impingement over an 80 year period (i.e., the lifespan of a person, as per Health Canada 2012). The study concluded that the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in either short-term or long-term health risks to the neighboring area.

4.2.2. Williams Lake has an aging population, many with respiratory problems. If we run presently at an average of 82% of our allowed particulate emission targets, what are the health risks if we add dioxins, toxic hydrocarbons and pentachlorophenol to the air shed?

Table 6 of the RWDI report shows that the plant's impact due to particulate on ambient air quality with a 50% rail tie mixture, is less than 2% of the air quality objective. Combining the plant's emissions with the existing background emissions, total particulate matter is 26% of the annual average air quality objective while the 24 hour maximums are 82% for PM10 and PM2.5.

As stated above, the studies by RWDI and Intrinsik conclude there are no significant impacts to either human health or the environment from the proposed amendment.

Please see Q&A # 1.8.2.1 additional answers to this question

4.2.3. The treatment of railway ties with PCP raises the possibility of release of chlorinated hydrocarbons such as Dioxin which are very persistent, very toxic and subject to bioaccumulation in soil and water. How will this be measured and mitigated for soil and water in surrounding areas?

In the trial burn using 100 % RRT, dioxins and furans were measured at 788 picograms /gram. To put this in context, a picogram is 1/1,000,000,000,000 of one gram so the result was less than one ppb, which is less than the BC Hazardous Waste Regulation limit, which defines waste containing dioxin as “a waste containing a concentration greater than 100 parts per billion”.

As discussed above, with regards to the combustion ash, it is applied to the landfill and covered with a soil layer to prevent exposure to the environment. In addition, when the concentration of dioxins in the rail tie ash is compared to the applicable soil standard for dioxins (0.00035 mg/kg), it is concluded that the potential for significant human health and/or environmental impacts is negligible. In conjunction with the necessary permitting associated with the Landfill, an updated Management Plan for Landfill activities will be prepared and submitted to the MOE for review and approval. Any revisions needed to ensure the landfill activities are protective of human health and the environment will be incorporated at that time.

In addition, please see Q&A #’s 4.2.1 and 4.2.2, above, for answers to this question regarding human health and bioaccumulation.

4.2.4. It is unclear to us whether modeling adequately considered long term cumulative effects on soils and water including potential for bioaccumulation. We submit that potential long-term effects must be seriously and thoroughly assessed.

In order to ensure there are no adverse human health impacts associated with the burning of railroad ties, AP engaged a Qualified Professional (Intrinsik), a firm specializing in Health Heath Risk Assessment, out of Calgary, Alberta (AB).

They conducted a screening-level assessment to identify and understand the potential health impacts that could result from exposure to the emissions associated with the William Lake Power Plant change in fuel mix, with consideration given to the nature of the emissions, the nature of the exposures that might occur (i.e., amount, frequency and duration), and the nature of the health effects that are known to occur following “over-exposure” to the chemicals contained in the emissions (see Appendix E for their report). In addition, the assessment evaluated the nature of the exposures that residents might experience on a short-term (acute) and/or long-term (chronic) basis as a result of the changes to the fuel at the plant, and to determine the significance of these exposures from a human health perspective. The modeling calculated soil concentrations for various compounds of concern, and compared them to Contaminated Site Soil Standards. Based on their modeling and analyses, Intrinsik concluded that “the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighbouring areas.”

4.2.5. Have testing and modelling adequately considered longer term cumulative effects on soils and water including potential for bioaccumulation of chlorinated hydrocarbons?

Please see Q&A #'s 4.2.1, 4.2.3 and 4.2.4 for answers to this question regarding cumulative effects and bioaccumulation.

5. Miscellaneous

5.1. Alternatives to Railway Ties

5.1.1. Lack of natural fibre is sited as a long term concern yet we continue to burn millions of tonnes in the bush. Would it not be more efficient, both in transport/greenhouse gas emissions, and provide sustainable local employment (i.e. trucking from within the Cariboo) to explore increasing the use of accessible local waste wood directly from logging sites?

WLPP is attempting to diversity its fuel supply with economical alternatives to mitigate an expected decline in forestry and wood processing wastes to ensure the long term economic viability of the plant and its associated economic and environmental benefits to the Williams Lake community. Rail ties provide that diversification. Greater use of forestry wastes may be part of WLPP's long term plan, but traditionally this source of fuel is relatively expensive. If, in the future, the province provides incentives for the removal of this material the cost of this material could become more competitive.

Shredding and combusting rail ties to generate electricity at our plant helps solve the issue of rail ties accumulating over time at the side of rail lines, and eventually in landfills, which results in GHG emissions in the form of methane during decomposition.

Our proposal would see the rail ties collected and transported to Williams Lake. They would be carefully handled, stored and shredded and combusted at very high temperatures which result in emissions that are well below provincial standards. The fuel-handling system to be installed for railroad ties will also be capable of processing roadside logging debris. We see this as a long-term win for the environment and a way to sustain the jobs and economic activity at our plant.

5.2. Location

What are the alternatives to the Williams Lake site? Surely there is a facility whose geographical disposition area is less populated and more topographically suited for dispersal of treated railway ties.

Currently used rail ties are accumulating along the tracks throughout western Canada. The modelling study has indicated that Ambient Air Quality Standards will be met throughout the community when WLPP burns up to 50% rail ties. Further the Intrinsik report concludes there will be no adverse health impacts.

Please see Section 1 (Air), Q&A #'s 1.2, 1.3 and 1.8, as well as Section 4 (Human Health), Q&A #'s 4.1 and 4.2, for answers to this Question.

5.3. Community/Region

5.3.1. SO2 and NO2 emissions identified in the trial burn in the vicinity of the facility are already elevated near or above some of the AQOs presented in the RWDI Report

(See Appendix D). Could the estimated emissions to the local air shed limit the development of other industries that could produce TPM, SO2, NOx and PAH's?

The estimated impacts (developed with a conservative methodology) are in the vicinity of the plant. The vast majority of future potential industry in the airshed would not be likely to have significant impacts in the same areas. The long term management of airshed emissions and air quality is the responsibility of the BC MOE. This air dispersion modelling report was also provided to the BC Ministry for review and comment.

5.3.2. I am concerned that Williams Lake is the guinea pig for RRT disposal.

The use of rail-ties as a combustion fuel for biomass power plants is a well-developed technology and not experimental or prototypical. RRT has successfully served as the feedstock for a number of biomass facilities across North America for many years. . As discussed in Q&A # 1.3.5, please see an interview conducted by the Williams Lake Tribune, on August 4, 2015, with a plant representative from the French Island plant in Wisconsin, which summarizes their experience with burning rail-ties, wood waste and RDF. .

5.3.3. PLACEHOLDER

5.3.4. If our city ends up with a reputation of having a plant which burns railway ties and has possible negative impacts on health then potential new residents, including professionals, will rightfully decide to live elsewhere. I have great concerns for residential attraction and retention as well as a potential reduction in property values.

As discussed in Section 4.2.4, Intrinsik concluded that "the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighbouring areas."

Please see Section 1, Air (Q&A #'s 1.1 – 1.6) and Section 4, Human Health (Q&A #'s 4.1- 4.2) for answers to this question.

5.3.5. Waste Management Permit number 103943, issued to Aboriginal Cogeneration Corporation in Kamloops in 2010 for burning railroad ties to generate power specifically prohibits use of rail ties treated with pentachlorophenol as an authorized fuel along with a long list of other types of combustible wastes. Kamloops appears to be a much larger air shed than Williams Lake. Why should Atlantic Power be permitted to be burn chlorophenol treated rail ties in the in the William's Lake airshed?

We do not have information regarding the reason for the penta-chlorophenol prohibition for the referenced permit, for that proposed Project. With regards to the Williams Lake plant, our test in 2001 ((including penta-chlorophenol rail-ties per Table 8 of the test report) documents that the emissions associated with the test (while burning RRT at twice the maximum expected rate) were within provincial and/or Ontario standards for PAHs, the class of compounds which includes pentachlorophenols.

Please see QA # 1.2.5 for a further answer to this Question.

5.3.6. I would like to recommend that the amendment not be considered outside of a renewed commitment and direction from the Williams Lake Air Quality Roundtable and within the context of a revised Air Quality Management Plan. I believe that the risk to community health will be unacceptable if this proposal goes ahead outside of the context of a collaborative Management Plan that addresses documentable risks.

WLPP agrees with the importance of science-based airshed management. We cannot make commitments as to the future role of the Roundtable but if that group continues we will actively support it as before.

5.4. Greenhouse Initiative

5.4.1. An Economic Development group in Williams Lake is looking at the feasibility of developing a greenhouse operation to grow local vegetables and fruit and help diversify the local economy. Would Atlantic Power be willing to join this group?

Atlantic Power representatives have been part of this group since the idea was first proposed. It would involve our plant sending excess hot water through a pipe to help warm the greenhouses. We produce a large quantity of excess hot water in generating electricity at the plant and sending some to heat greenhouses would mean a reduction of our cooling requirements, which in turn would result in a reduction of the water we use each year.

5.5. Drinking Water

5.5.1. How sustainable is the Williams Lake drinking water supply while the WLPP uses “millions upon millions” of gallons per year?

Please see Q&A # 5.5.2 for an answer to this Question.

5.5.2. The original location for the power plant was to be out of town and on top of a mountain water system, not our limited aquifer treated drinking water, was to be used.

We do not have a comprehensive history of pre-design considerations for the WLPP. It may be that the benefit of replacing multiple beehive burners with one tightly controlled system with extremely low emissions outweighed an earlier plan that did not prove economically viable.

This project will not increase water usage. More than 90% of our water consumption is used in the power plant's cooling system. If the greenhouse project goes ahead, heat from the plant that goes to the greenhouse will decrease the amount of water that evaporates in the cooling tower, resulting in less make-up water needed for the plant's cooling system.

Additionally, under a recent curtailment agreement that is also expected to continue if we execute an Electricity Purchase Agreement (EPA) extension, we would not normally operate the plant during the hot summer months when our water needs would be the highest. This in itself has and will continue to have a significant impact on the water consumption rates at the plant during the times when the local aquifer is most used.

5.6. Alternative Uses for Wood Waste

5.6.1. There are now more options for the use of wood waste in general than there were when the WLPP was built. Is there a better use now for this material given the caustic nature of the ash, even from untreated wood?

The pH of the ash is neutralized by carbonation (CO_2 in rainwater and air) in a relatively short time. This natural process of carbonation is what allows for the safe landfilling of ash and the common practice of using ash from traditional wood fibre wood fuel as an agricultural fertilizer (lime substitute) in most Canadian provinces. The neutralization of acidic soils and the natural process of CO_2 uptake combine to reverse causticity and avoid negative environmental impacts.

We view the use of wood residue (a renewable fuel) in the production of green energy as a very positive alternative to energy produced from fossil fuels, In particular, end-of-service rail ties tend to accumulate along rail corridors over long periods of time, and converting them to energy is an environmental improvement.

APPENDIX D

RWDI Modelling Report

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Atlantic Power Corporation
Williams Lake Power Plant
Williams Lake, British Columbia

Final Report

Air Dispersion Modelling Study
RWDI #1500355
September 8, 2015

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EXECUTIVE SUMMARY

Study Objectives

The Williams Lake Power Plant (WLPP) is a biomass-fired generating facility located at Williams Lake, British Columbia. The biomass consumed at WLPP currently consists of wood waste from sawmill operations. WLPP consumed rail ties up to 4% of the total annual fuel supply between 2004-2010, and the current air permit allows up to 5%. WLPP is proposing to supplement the wood waste fuel with shredded rail ties to compensate for reduced wood waste supplies. Atlantic Power Corporation (Atlantic Power) retained RWDI AIR Inc. (RWDI) to complete an air dispersion modelling study of changes in the emissions from the power plant due to the inclusion of rail ties in the fuel mix, to inform an upcoming Ministry of the Environments (MOE) Permit 8808 amendment request to increase the amount of rail ties allowed for use as fuel at WLPP up to 50%.

The air dispersion modelling study was conducted over a 25 km by 25 km study area surrounding the WLPP facility using CALPUFF 6.42 in CALMET three-dimensional which is an approved model under the *Guidelines for Air Dispersion Modelling in British Columbia* (British Columbia Ministry of Environment [B.C. MOE] 2008) for studies of this type.

Emissions for particulate matter (TPM, PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), hydrogen chloride (HCl), dioxins and furans, PAHs, and metals (Pb, Sb, Cu, Mn, V, Zn, As, Cr, Co, Ni, Se, Te, Ti, Cd and Hg) were developed using stack testing results from 2001 with the fuel consisting of 100% rail ties. Oxides of nitrogen (NO_x) values were obtained from the permanently installed Continuous Emissions Monitoring (CEMs) system. The emissions during the 2001 test were below the project's air permit limits, and the particulate and NO_x emissions did not change significantly with the 100% rail tie test. Dioxin and furan concentrations were less than 0.01% of the regulatory objective (Ontario's objective in the absence of a British Columbia objective).

Predicted contaminant concentrations were analyzed at 100% rail ties, as well as the expected maximum operating concentration of 50% rail ties. Only the emissions from the power plant stack were considered for this study.

Predicted contaminant concentrations at and beyond the plant property line were compared to relevant provincial ambient air quality objectives (AAQO). Predicted concentrations of those contaminants without relevant B.C. objectives were compared to Ontario ambient air quality criteria (AAQC). Concentrations of NO_X were converted to concentrations of NO_2 using the OLM method as recommended by the *Guidelines for Air Dispersion Modelling in British Columbia.*

Background concentrations of PM_{10}, $PM_{2.5,}$ and NO_2 were obtained from the Columneetza monitoring station for the year 2012. With the addition of background concentration to the CALPUFF predicted concentrations, contaminants and averaging times assessed were below their respective AAQO's or AAQC's for 100% rail ties, with the exception of 1-hour SO_2 which was below its AAQC for 50% rail ties, the expected operating maximum. 1-hour NO_2 predicted concentrations were at or slightly above the air quality objective, but the conversion to NO_2 is based on the highest one hour ozone value for the year and the background value is derived from a station in town that may overestimate concentrations in the specific area where exceedances are predicted. As noted, the inclusion of rail ties in the fuel mix has no or very little effect on the plant NO_x emissions.

TABLE OF CONTENTS

Figures

Appendices

CONSULTING ENGINEERS & SCIENTISTS

1. INTRODUCTION

The Williams Lake Power Plant (WLPP) is a 66 MW biomass-fired generating facility located at Williams Lake, in south central British Columbia (B.C.). The biomass consumed at WLPP currently consists of wood waste from sawmill operations. WLPP consumed rail ties up to 4% of the total annual fuel supply between 2004-2010, and the current air permit allows up to 5%. WLPP is proposing to supplement the wood waste fuel with shredded rail ties to compensate for reduced wood waste supplies. Atlantic Power Corporation (Atlantic Power) retained RWDI to complete an air dispersion modelling study of changes in the emissions from the power plant due to the inclusion of rail ties in the fuel mix, to inform an upcoming Ministry of the Environments (MOE) Permit 8808 amendment request to increase the amount of rail ties allowed to be used as fuel at WLPP up to 50%.

The contaminants of interest for the assessment are those identified during a 2001 stack testing program at WLPP, with the power plant combusting 100% rail ties. Emissions for particulate matter (TPM), sulphur dioxide (SO_2), hydrogen chloride (HCl), dioxins and furans, PAHs, and metals (Pb, Sb, Cu, Mn, V, Zn, As, Cr, Co, Ni, Se, Te, Ti, Cd and Hg) were measured during that test. PM_{10} and $PM_{2.5}$ values were derived from the TPM measurements using published emission factors. Oxides of nitrogen (NOx) values were obtained from the permanently installed Continuous Emissions Monitoring (CEMs) system. The emission during the 2001 test were below the project's air permit limits, and the particulate and NOx emissions did not change significantly with the 100% rail tie test.

The impacts of emissions from WLPP were assessed using an air dispersion modelling study conducted over a 25 km by 25 km study area surrounding the facility using CALPUFF 6.42 driven with three-dimensional meteorological files developed using the CALMET pre-processor. This is a recommended approach under the *Guidelines for Air Dispersion Modelling in British Columbia* (British Columbia Ministry of Environment [B.C. MOE] 2008) for studies of this type.

CALPUFF predicted concentrations at and beyond the plant property line were compared to existing B.C. ambient air quality objectives (AAQOs). Predicted concentrations of those contaminants without relevant B.C. objectives were compared to Ontario ambient air quality criteria (AAQC) to provide a context of potential impacts. Concentrations of NO_X were converted to the equivalent NO_2 using the OLM method as recommended by the *Guidelines for Air Dispersion Modelling in British Columbia.*

The B.C. AAQO's and Ontario AAQC's are presented in Tables 1 and 2, respectively, for the various contaminants and averaging periods.

Table 1: B.C. Ambient Air Quality Objectives

Contaminant	Air Quality Objective (µg/m³)	Averaging Period
Total Particulate Matter	120	24 Hours
	60	Annual
PM_{10}	50	24 Hours
$PM_{2.5}$	25	24 Hours
	8	Annual
Sulphur Dioxide	200 [1]	1 Hour
Nitrogen Dioxide	188 [2]	1 Hour
	60	Annual

Notes: [1] Achievement based on annual 99th percentile of daily 1-hour maximum, over one year.
[2] Achievement based on annual 98th percentile of daily 1-hour maximum, over one year.

Table 2: Ontario Ambient Air Quality Criteria for Constituents Not addressed in B.C. Objectives

Contaminant	Air Quality Objective (µg/m³)	Averaging Period
Hydrogen Chloride	20	24 Hours
Dioxins and Furans	0.1 (pg TEQ/m³)	24 Hours
Total PAHs	0.00005	24 Hours
	0.00001	Annual
Lead	0.5	24 Hours
Antimony	25	24 Hours
Copper	50	24 Hours
Manganese	0.4	24 Hours
Vanadium	2	24 Hours
Zinc	120	24 Hours
Arsenic	0.3	24 Hours
Chromium	0.5	24 Hours
Cobalt	0.1	24 Hours
Nickel	0.04	Annual
Selenium	10	24 Hours
Tellurium	10	24 Hours
Titanium	120	24 Hours
Cadmium	0.025	24 Hours
	0.005	Annual
Mercury	2	24 Hours

2. METHODOLOGY

2.1 Emission Estimation

Emissions from the power plant stack for the operation of the generating facility combusting 100% rail ties were based on a 2001 stack testing program and CEMs data for NO_X collected during the stack testing.

The emission rate of each contaminant was calculated from the in-stack concentration and stack flow rate, as reported by the stack testing campaign. The stack testing program reported emissions of Total Particulate Matter (TPM) but did not report emissions of PM_{10} and $PM_{2.5}$ separately. The emissions of these contaminants were based on the emissions of Total Particulate Matter (TPM), which was reported, and applying the ratio of TPM to PM_{10} and $PM_{2.5}$ emission factors as provided in Table 1.6-1 of U.S. EPA's AP-42 Chapter 1.6 for emissions from wood residue combustion with electrostatic precipitator as a control device. The stack testing report is attached as Appendix A.

2.2 Dispersion Modelling

Dispersion modelling was conducted over a 25 km by 25 km study area surrounding WLPP using CALPUFF 6.42 in full three-dimensional CALMET mode. This is a recommended approach under the *Guidelines for Air Dispersion Modelling in British Columbia* (British Columbia Ministry of Environment [B.C. MOE] 2008) for studies of this type. All aspects of the dispersion model set-up, including meteorological data (CALMET), land use data, terrain data, receptor grid and various other model assumptions were established as per the *Guidelines for Air Dispersion Modelling in British Columbia*. The main components of the dispersion modeling are discussed below. A detailed model plan for the dispersion modelling study area was submitted for review by B.C. MOE. The Ministry approved the plan with additional suggestions that have also been incorporated in the modelling. Ministry comments and approval are provided in Appendix B.

2.3 Meteorology

Meteorological information is required by the CALPUFF air dispersion model to provide the transport and dispersion characteristics over the modelling domain. Meteorological characteristics vary with time (e.g., season and time of day) and location (e.g., height, terrain and land use). The CALMET meteorological pre-processing program was used to provide representative time and space varying meteorological parameters for the CALPUFF model. A horizontal grid resolution of 500m was applied in CALMET.

CALMET was applied for a 1-year model period of January 1, 2012 to December 31, 2012. CALMET was initialized using Weather Research and Forecasting (WRF) prognostic model output at a 4 km grid resolution obtained from the B.C. MOE province wide WRF data set.

The WRF outputs were supplemented with hourly observations from the Environment Canada station at the Williams Lake Airport as well as hourly observations from the B.C Ministry of Environment Glendale and the Canadian Tire meteorological stations located in Williams Lake. The locations of these stations are shown in Figure 1.

2.4 Terrain and Land Use Characterization

Terrain elevations for CALMET were extracted from B.C's. Electronic CDED terrain database and land use was obtained from Baseline Thematic Mapping data for B.C., as described in Section 9.4.4 of the B.C. MOE Guidelines. Gridded fields at 500m horizontal resolution were produced for terrain and land use as well as seasonally specific parameters of surface roughness (z_0), leaf area index, albedo, Bowen ratio, soil heat flux, and anthropogenic heat flux for input into CALPUFF.

2.5 Summary of CALMET Model Results

CALMET predicts meteorological conditions based on the combination of the two sources of meteorological observations (WRF model data and surface observation data). Predictions for wind conditions at Williams Lake Airport (Figure 2) showed similar wind patterns to those observed at the same location (Figure 3). Figure 4 shows the wind rose predicted by the model for the WLPP facility

CALMET predictions of atmospheric stability were examined in terms of the predicted frequencies of various Pasquill-Gifford (PG) stability classes by hour of day. The PG stability class scheme represents six levels of turbulence that can occur in the atmosphere. PG classes A, B and C are referred to as "unstable" and represent day-time periods when atmospheric turbulence is enhanced due to solar heating. PG classes E and F are referred to as "stable" and represent night-time periods when turbulence is suppressed due to surface cooling. PG class D (referred to as neutral) represents day- or night-time periods that are either overcast or characterized by high wind speed, mechanically-dominated conditions. Figure 5 shows the PG stability class frequency distribution as predicted by CALMET at the WLPP facility. As expected, stability classes A, B and C are limited to day-time periods, and classes E and F occur mainly during nighttime periods. PG classes D and F are the most frequently occurring classes.

2.6 CALPUFF

The air dispersion modelling study was conducted using CALPUFF 6.42 driven by the CALMET derived meteorology to predict the potential impacts of pollutants resulting from emissions from WLPP.

The CALPUFF model domain within which the potential impacts were predicted is a 25 km by 25 km study area centered on the WLPP facility. Puff transport and dispersion is computed within the CALPUFF model for the entire model domain. Model predictions are reported at discrete receptor locations within the dispersion modelling study area.

A Cartesian nested grid of receptors was defined within the study area, as per the *Guidelines for Air Quality Dispersion Modelling in British Columbia* (B.C. MOE 2008). Receptor spacing for the Cartesian grid is as follows:

- 20-m spacing along the property fenceline;
- 50-m spacing within 500 m of the WLPP sources;
- 250-m spacing within 2 km of the WLPP sources;
- 500-m spacing within 5 km of the WLPP sources; and
- 1,000-m spacing within 10 km of the WLPP sources.

Receptor locations are shown in Figure 1, with receptors within the facility site removed.

All technical options relating to the CALPUFF dispersion model were set according to the *Guidelines for Air Quality Dispersion Modelling in B.C.* (B.C. MOE 2008) or to model defaults. These include parameters and options such as the calculation of plume dispersion coefficients, the plume path coefficients used for terrain adjustments, exponents for the wind speed profile, and wind speed categories.

Emissions from the power plant stack were modelled as a constant point source at unit emission rate. The resulting predicted concentration was scaled by the actual emission rates of the various pollutants to arrive at the pollutant specific predicted concentration. Stack parameters including stack height, stack diameter, exit velocity, and exit temperature are summarized in Table 3. The location of the stack is shown in Figure 1.

The height and diameter of the stack were obtained from plant design drawings provided by WLPP, while the maximum flow rate and exit temperature were obtained from the stack testing report. .

Table 3: Point Source Stack Parameters

Emission Source	Description	Stack Height (m)	Stack Inner Diameter (m)	Exit Temperature (°C)	Exit Velocity (m/s)
S1	Power Plant Stack	60.69	3.5	142.66	19.15

Buildings located close to stacks (i.e., point sources) may influence the dispersion of emissions. Since the buildings at WLPP are relatively tall and close to the power plant stack, building downwash effects were assessed in the dispersion modeling. Building dimensions were based on plant design drawings provided by WLPP.

2.7 Post-Processing of Model Results

Maximum ground-level concentrations were initially predicted for each receptor with the power plant stack emitting a representative contaminant at unit emission rate. Post-processing of 1-hour, 24-hour and annual model results was conducted to determine required results for comparison with ambient air quality objectives or criteria over various averaging periods. The CALPOST post-processor was used to extract required metrics from the resulting binary files.

The resulting concentration at each receptor was then multiplied with the actual emission rates of the various pollutants to arrive at the pollutant specific concentration at each receptor, with the exception of NO_2 concentrations which is discussed below.

The emission rate of each contaminant was calculated from the in-stack concentration and stack flow rate, as reported by the stack testing campaign. The stack testing program did not report emissions of PM_{10} and $PM_{2.5}$; however the emissions of these contaminants were based on the emissions of Total Particulate Matter (TPM), which was reported, by using the ratio of TPM to PM_{10} and $PM_{2.5}$ emission factors as provided in Table 1.6-1 of U.S. EPA's AP-42 Chapter 1.6 for emissions from wood residue combustion with electrostatic precipitator as a control device.

Emissions of NO_X based on CEMs data recorded during the stack testing program also were modeled in CALPUFF. The resulting predicted concentrations of NO_X were converted to concentrations of NO_2 using the OLM method as recommended by the *Guidelines for Air Dispersion Modelling in British Columbia.* The maximum one hour ozone concentration observed by the Columneetza ambient monitoring station for the period of January 1, 2012 to December 31, 2012, 83.8 ppb, was used in the conversion of NO_X to NO_2 using the OLM method. The location of the monitoring station is shown in Figure 1. As noted, NO_x emissions did not change significantly for the 100% rail tie fuel, and therefore, the background NO_x levels already account for the existing plant emissions. By adding the background to the estimated emissions, the NO_x contribution from the plant is likely double counted in some instances.

The estimated emission rates of the pollutants emitted by the power plant stack are provided in Table 4. Sample calculations for NO_x and SO_2 are provided below the table.

Table 4: Contaminant Emission Rates

Contaminant	Emission Rate (g/s)
Total Particulate Matter	2.95E-01
PM_{10} [1]	2.19E-01
$PM_{2.5}$ [1]	1.91E-01
Sulphur Dioxide	2.26E+01
Hydrogen Chloride	7.81E+00
Oxides of Nitrogen [2]	4.76E+01
Dioxins and Furans	4.63E-10
Total PAHs	7.93E-06
Lead	8.49E-04
Antimony	4.92E-05
Copper	4.21E-04
Manganese	9.99E-04
Vanadium	1.29E-05
Zinc	2.74E-03
Arsenic	9.48E-05
Chromium	3.79E-05
Cobalt	6.77E-06
Nickel	1.66E-04
Selenium	4.92E-05
Tellurium	1.23E-04
Titanium	6.34E-05
Cadmium	2.90E-05
Mercury	4.78E-05
Chlorophenol	1.19E-05

Notes: [1] Based on total particulate measurements.
[2] From the plant CEMs.

2.7.1 Sample Calculation for SO_2

The calculation of the SO_2 emission rate is a direct unit conversion from the stack test values. Stack test results for SO_2 are given in Table 1 of Appendix A. There are three tests provided. The emissions for Test 1 are given by:

$$213\frac{mg}{Sm^3} \times 5920\frac{Sm^3}{3} \times \frac{1g}{1000mg} \times \frac{1min}{60s} = 21.016\frac{g}{s}$$

The same calculation was done for Test 2 and Test 3 (resulting in 24.125 g/s and 22.680 g/s, respectively). The three values were then averaged to obtain the value of 22.607 g/s given in Table 4.

2.7.2 Sample Calculation for NO_x

Test results for NO_x are given in Table 6 of Appendix A. There are four test results provided; the highest three were averaged to obtain the emission rate. For NO_x the units of measurement are converted from the stack test values of ppm in the flow to a mass emission rate. The STP conversion value in the Alberta Modelling Guidelines (AESRD, 2013) was used to convert values from ppm. For example from Test 2:

$$139ppm \times 40.8862\frac{\mu g/mol}{ppm * m^3} \times 46\frac{g}{mol} \times 11{,}210\frac{Am^3}{min} \times \frac{1g}{1e6\mu g} \times \frac{1min}{60s} = 48.84\frac{g}{s}$$

The same calculation was done for Test 3 and Test 4 (resulting in 46.23 g/s and 47.66 g/s, respectively). The three values were then averaged to obtain 47.58 g/s shown in Table 4.

The other emission rates given in Table 4 were calculated similarly.

The *Guidelines for Air Quality Dispersion Modelling in British Columbia* (B.C. MOE 2008) require that representative background concentrations be added to concentrations predicted by dispersion modelling for new sources to account for other emission sources in the study area. Ambient concentrations of NO_2, PM_{10} and $PM_{2.5}$ recorded at the Columneetza monitoring station operated by the B.C. MOE were used in this assessment, however since particulate emissions and NO_x emissions did not change significantly with the 100% rail tie fuel, the inclusion of the background emissions double counts some emissions. Figure 1 shows the location of the ambient monitoring station.

As per the *Guidelines for Air Quality Dispersion Modelling in British Columbia* (B.C. MOE 2008), the 98th to 100th percentile of historical monitoring data is to be added to maximum predicted concentrations. This methodology is conservative as it assumes that the maximum predicted concentration and the background concentration would occur at the same time even though, by definition, concentrations equal to or greater than the 98th percentile occur only 2% of the time and the maximum predicted concentration, by definition, would occur once during the modelled period.

The short-term PM_{10} and $PM_{2.5}$ 24-hour average background concentration was based on the 98th percentile of representative ambient air quality observations from B.C. MOE. The NO_2 1-hour average background concentration was based on the 98th percentile of daily 1-hour maximum concentrations. The annual average background concentration was based on the average of hourly observations. Background concentrations of TPM were not available from the Columneetza monitoring station. However, as TPM includes the smaller size fractions, background TPM would be at least as great as PM_{10}. Therefore the background PM_{10} concentration was used as an estimate of background TPM. Table 5 presents the ambient concentrations monitored by the Columneetza monitoring station.

Table 5: Representative Background Concentrations (in µg/m³)

Contaminant	Averaging Period	Background Concentration
NO_2	1-Hour	63.9
	Annual	16.5
PM_{10}	24-Hour	40.8
$PM_{2.5}$	24-Hour	20.2
	Annual	5

3. DISPERSION MODELLING RESULTS

The maximum predicted concentrations have been compared to B.C. AAQOs in Table 6. Comparisons to the B.C. AAQOs with the addition of monitored ambient data, where available, are shown in Table 7. Contaminants without B.C. AAQOs have been compared to Ontario AAQCs to provide a context to the predicted concentrations, and are presented in Table 8. Predicted contaminant concentrations were analyzed at 100% rail ties, as well as the expected maximum operating concentration of 50% rail ties. It was assumed that the emissions of contaminants of interest would be roughly proportional to the percentage of fuel ties, because the amount of material from the ties themselves will be linear, and the change in emissions from other material should not change the overall volume versus ties by more than a few percent.

Table 6: Modelling Results of Contaminants with B.C. AAQOs without Background Concentrations

Contaminant	Averaging Period	Maximum Predicted Concentration for 100% Rail Ties (µg/m³)	Maximum Predicted Concentration for 50% Rail Ties (µg/m³)	Air Quality Objective (µg/m³)	% of Objective 100% Rail Ties	% of Objective 50% Rail Ties
Total Particulate Matter	24 Hours	0.50	0.50	120	0.41%	0.41%
	Annual	0.08	0.08	60	0.13%	0.13%
PM_{10}	24 Hours	0.37	0.37	50	0.73%	0.73%
$PM_{2.5}$	24 Hours	0.32	0.32	25	1.28%	1.3%
	Annual	0.05	0.05	8	0.63%	0.63%
Sulphur Dioxide	1 Hour	226	113	200	113%	57 %
Nitrogen Dioxide	1 Hour	190	190	188	100%	100%
	Annual	12.0	12.0	60	20%	20%

Table 7: Modelling Results of Contaminants with B.C. AAQOs with Background Concentrations

Contaminant	Averaging Period	Maximum Predicted Concentration (µg/m³)	Background Concentration (µg/m³)	Predicted + Background Concentration (µg/m³)	Air Quality Objective (µg/m³)	% of Objective
Total Particulate Matter	24 Hours	0.50	40.8	41.3	120	34%
	Annual	0.08	15.4	15.5	60	26%
PM_{10} [1]	24 Hours	0.37	40.8	41.3	50	82%
$PM_{2.5}$ [2]	24 Hours	0.32	20.2	20.5	25	82%
	Annual	0.05	5.00	5.05	8	63%
Sulphur Dioxide (50% Rail Ties) [3]	1 Hour	113	--	113	200	57%
Sulphur Dioxide (100% Rail Ties) [3]	1 Hour	226	--	226	200	113%
Nitrogen Dioxide [4]	1 Hour	190	63.9	254	188	135%
	Annual	12.0	16.5	28.5	60	48 %

Notes: [1] 24 hour background concentration is the 98th percentile 24 hour average concentration.
[2] 24 hour background concentrations is the 98th percentile 24 hour average concentration. Annual background concentration is the average annual concentration.
[3] The maximum predicted concentration for SO_2 is shown for 50% and 100% rail ties. The emissions of the other contaminants do not change between the two combustion scenarios.
[4] 1 hour background concentration is the 98th percentile of daily maximum 1 hour average concentration. The 24 hour background concentration is the 98th percentile 24 hour average concentration. Inclusion of background concentrations double counts NO_2 contribution of the facility

Table 8: Modelling Results of Contaminants without B.C. AAQOs Compared to Ontario AAQCs for 100% Rail Ties

Contaminant	Averaging Period	Maximum Predicted Concentration (µg/m³)	Background Concentration (µg/m³)[2]	Predicted + Background Concentration (µg/m³)	Air Quality Objective (µg/m³)	% of Criteria
Hydrogen Chloride	24 Hours	13.11	--	13.11	20	66%
Dioxins and Furans (pg TEQ/m³)	24 Hours	<0.0000001	--	<0.0000001	0.1	<0.01%
Total PAHs	24 Hours	0.00001	--	0.00001	0.00005	27%
	Annual	0.000002	--	0.000002	0.00001	21%
Lead	24 Hours	0.00142	--	0.00142	0.5	0.28%
Antimony	24 Hours	0.00008	--	0.00008	25	<0.01%
Copper	24 Hours	0.00071	--	0.00071	50	<0.01%
Manganese	24 Hours	0.00168	--	0.00168	0.4	0.42%
Vanadium	24 Hours	0.00002	--	0.00002	2	<0.01%
Zinc	24 Hours	0.00460	--	0.00460	120	<0.01%
Arsenic	24 Hours	0.00016	--	0.00016	0.3	0.05%
Chromium	24 Hours	0.00006	--	0.00006	0.5	0.01%
Cobalt	24 Hours	0.00001	--	0.00001	0.1	0.01%
Nickel	Annual	0.00004	--	0.00004	0.04	0.11%
Selenium	24 Hours	0.00008	--	0.00008	10	<0.01%
Tellurium	24 Hours	0.00021	--	0.00021	10	<0.01%
Titanium	24 Hours	0.00011	--	0.00011	120	<0.01%
Cadmium	24 Hours	0.00005	--	0.00005	0.025	0.19%
	Annual	0.00001	--	0.00001	0.005	0.15%
Mercury	24 Hours	0.00008	--	0.00008	2	<0.01%
Chlorophenol [1]	24 Hours	0.00002	--	0.00002	20	<0.01%

Notes: [1] The maximum concentration of Chlorophenol is compared to the 24 hour Ontario AAQC for Pentachlorophenol. It is assumed that Chlorophenol is composed entirely of Pentachlorophenol.
[2] There are no data for background concentrations of these contaminants.

Results in Table 7 with no adjustment for double counting of WLPP emission in background concentrations show that contaminants with B.C. AAQOs are below their respective objectives for all averaging periods, except for NO_2 Spatial plots of dispersion modelling results are also presented (Figures 6 to 9) for SO_2 and NO_2 Model predictions of the maximum TSP, PM_{10} and $PM_{2.5}$ from the plant are all far below (less than 5%) of the applicable objectives and the spatial plots would be dominated by the background values. For brevity they are not shown.

From the SO_2 and NO_2 contour plots in Figures 6-8, it can be seen that the highest concentrations occur to the northwest or to the south east of the WLPP facility. This is in alignment with the general wind patterns of this area. Figure 6 shows SO_2 values with 50% rail ties to be below 57% of the AAQO in all areas.

The predicted annual average NO_2 concentration from 100% rail ties or from base fuel is shown in Figure 7. The maximum predicted annual average NO_2 concentration of 28.5 µg/m³ is less than half of the corresponding BC AAQO of 60 µg/m³.

When predicted 1-hour NO_2 from 100% rail ties or from base fuel is plotted without including the background values, as shown in Figure 8, the AAQO is only marginally exceeded, at 190 µg/m³ vs. the objective of 188, and the area of exceedances is limited to a few receptors near the fenceline.

Predicted 1-hour NO_2 from 100% rail ties or from base fuel including background with no adjustment for double counting of WLPP emissions is show in Figure 9. In this case the maximum predicted 98th percentile daily maximum concentration is 253.8 µg/m³, located adjacent to the fenceline to the northwest of the facility. Spatially the occurrence of exceedances of the AAQO is limited to an area within about one to two kilometers to the northwest of the facility and a smaller area within a few hundred meters to the southwest. The 1-hour NO_2 objective including background from 100% rail ties or from base fuel with no adjustment for double counting of WLPP emissions is exceeded up to 33% of days in the model year. The area of maximum frequency corresponds to the area of maximum predictions shown in Figure 10. 1-hour NO_2 predicted concentrations were above the air quality objective, but the adjustment for background includes periods when existing emissions from WLPP may be affecting the monitor. In addition, the NO_x to NO_2 conversion is based on the highest 1-hour ozone value observed for the year, and actual hourly ozone values are much lower for most of the year. As noted, the inclusion of rail ties in the fuel mix has no or very little effect on the plant NOx emissions. As such, 1-hour NO_2 concentrations at the ambient air quality monitoring station will likely remain essentially unchanged at the current background value of 34% of the AAQO.

4. SUMMARY AND CONCLUSIONS

CALPUFF dispersion model was conducted to predict ground level concentration changes that could result from for the WLPP facility combusting 100% or 50% rail ties. Contaminants were below their respective AAQO's or AAQC's for 100% rail ties, with the exception of 1-hour SO_2 which was below its AAQC for 50% rail ties, the expected operating maximum. 1-hour NO_2 predicted concentrations were at or slightly above the air quality objective, but the adjustment for background potentially double counts the plant emissions. As noted, the inclusion of rail ties in the fuel mix has no or very little effect on the plant NOx emissions.

5. REFERENCES

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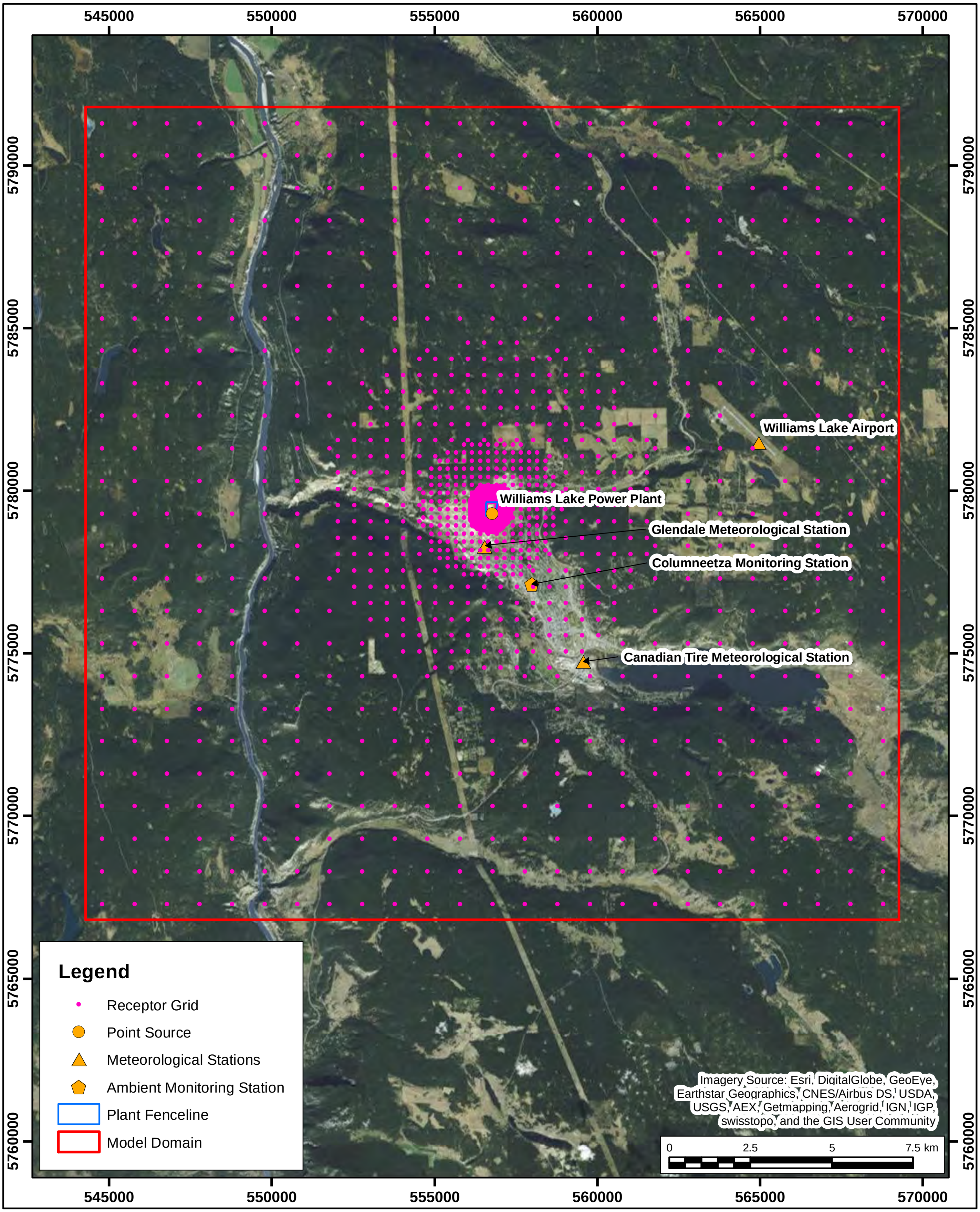
FIGURES



Model Domain with Receptor Grid

Map Projection: NAD 1983 UTM Zone 10N.

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

Drawn by:	NBN	Figure:	1
Approx. Scale:			1:160,000
Date Revised:			June 29, 2015

RWDI

Figure 2: CALMET Predicted Wind Rose at Williams Lake Airport for 2012 Model Period

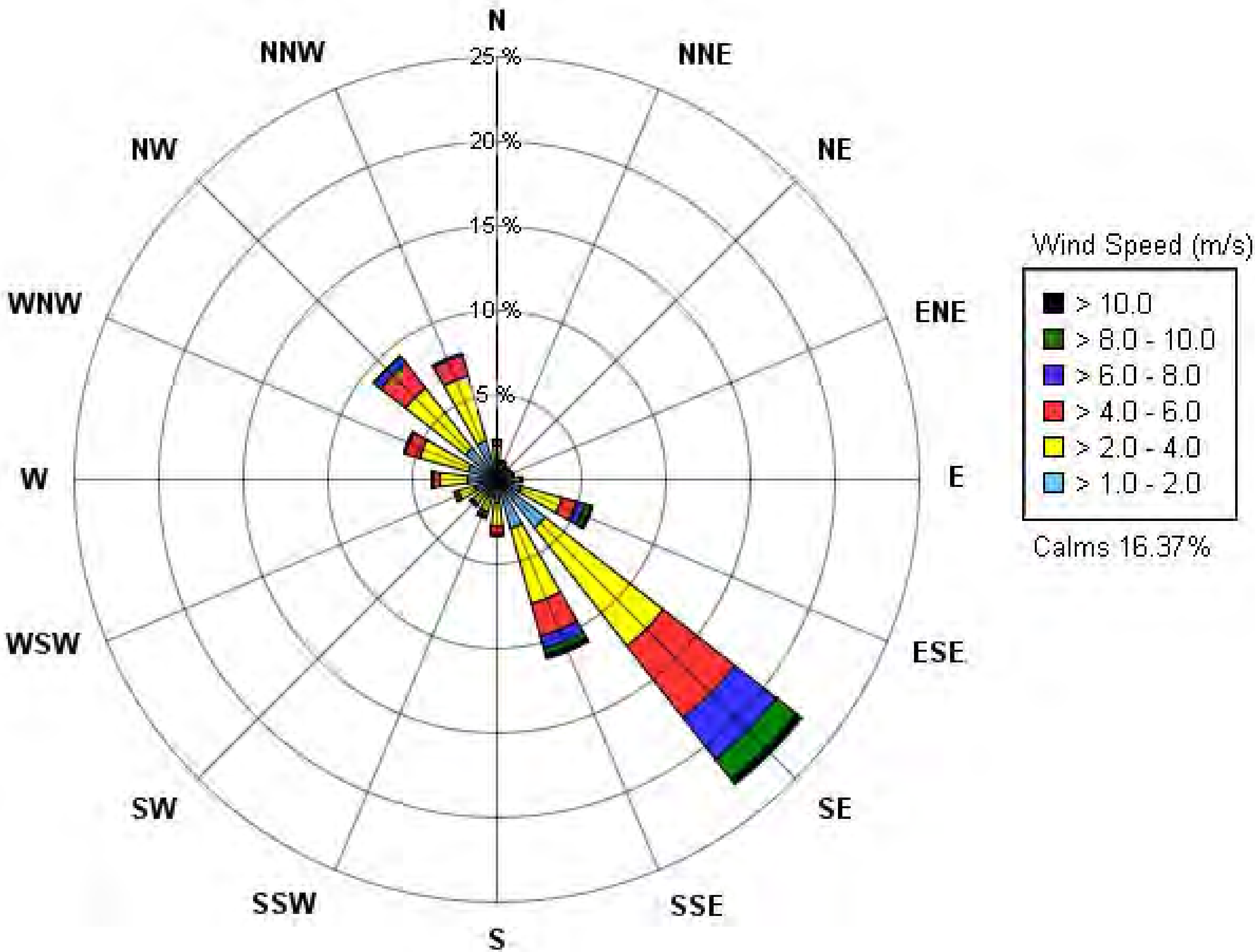


Figure 3: Observed Wind Rose at Williams Lake Airport for 2012 Model Period

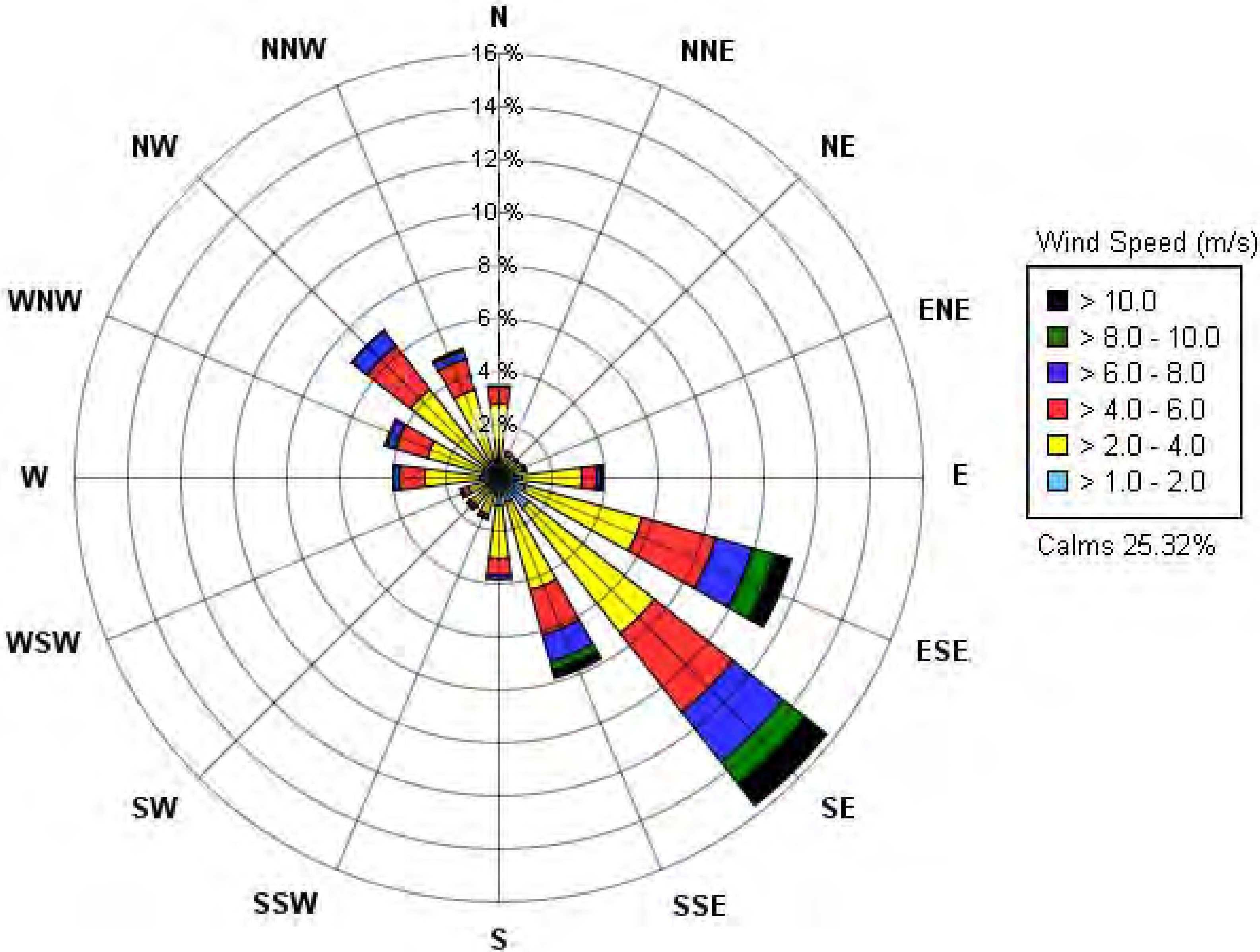


Figure 4: CALMET Predicted Wind Rose at WLPP for 2012 Model Period

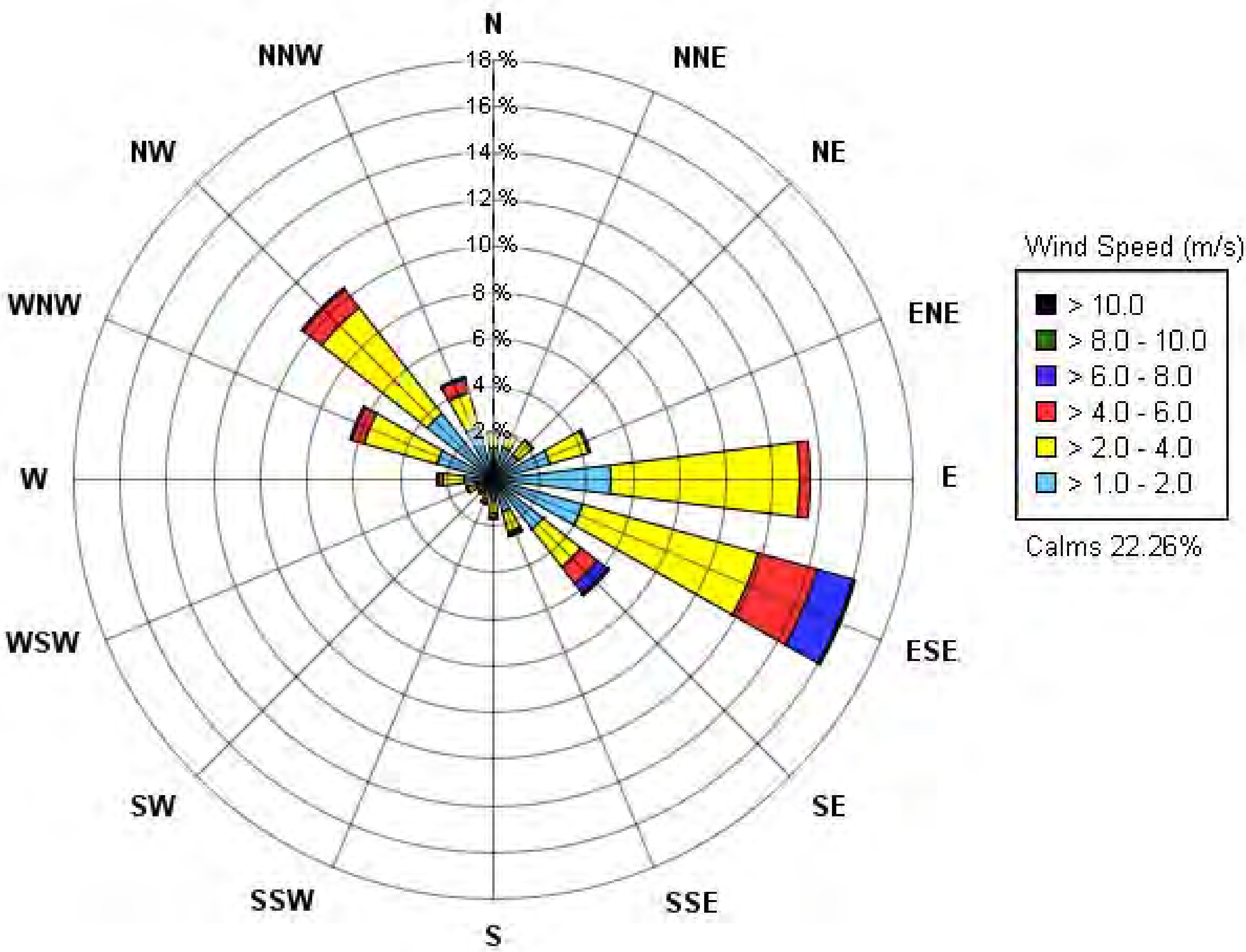
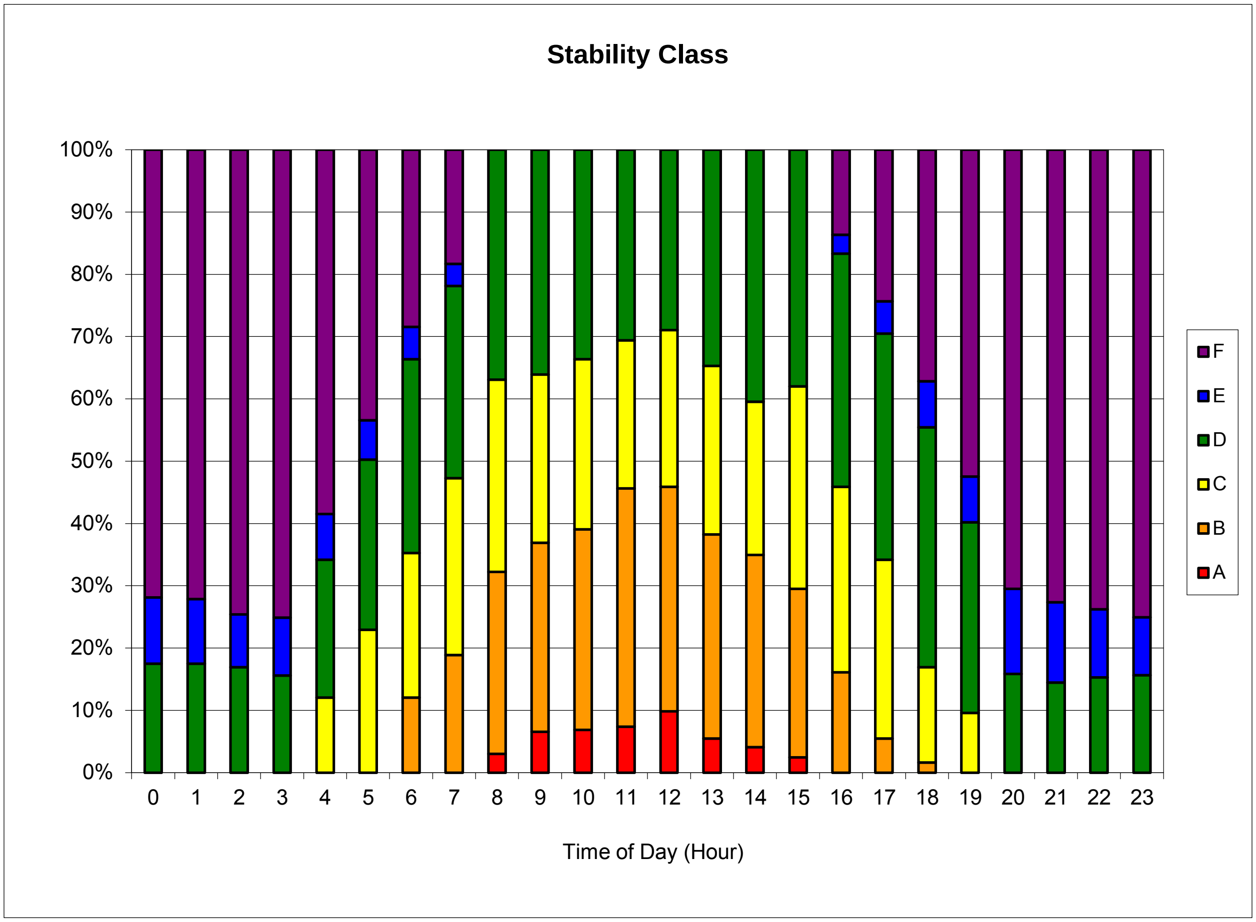
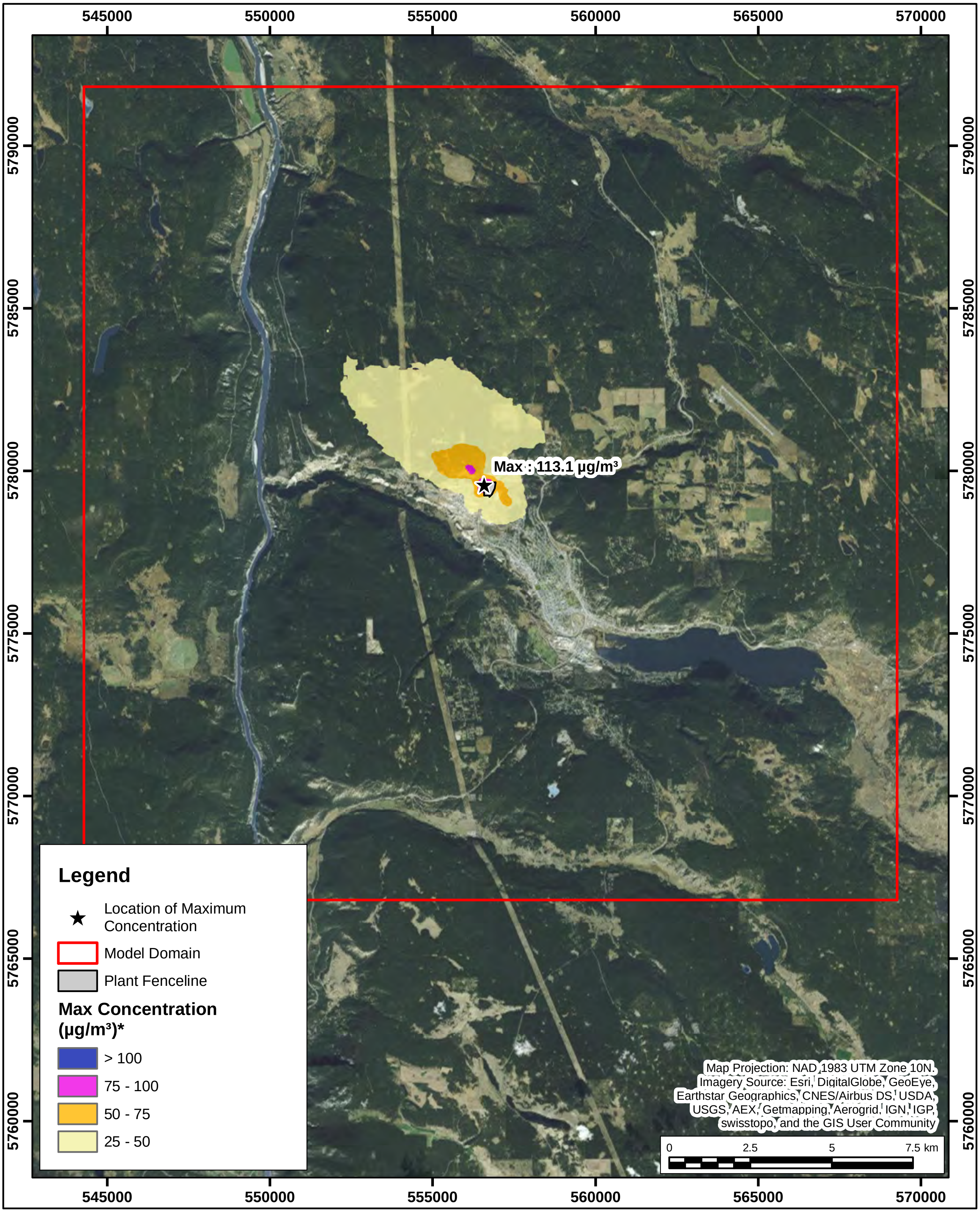


Figure 5:

PG CALMET Predicted Stability Class by Time of Day at WLPP for 2012 Model Year





Predicted Ninety-Ninth Percentile Peak Daily 1-Hour Maximum SO_2 Including Ambient Background Value for 50% Rail Ties

*1-hr SO_2 Interim Provincial Air Quality Objective = 200 µg/m³ (BC MOE 2014)

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

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Approx. Scale:	1:160,000
Date Revised:	June 30, 2015

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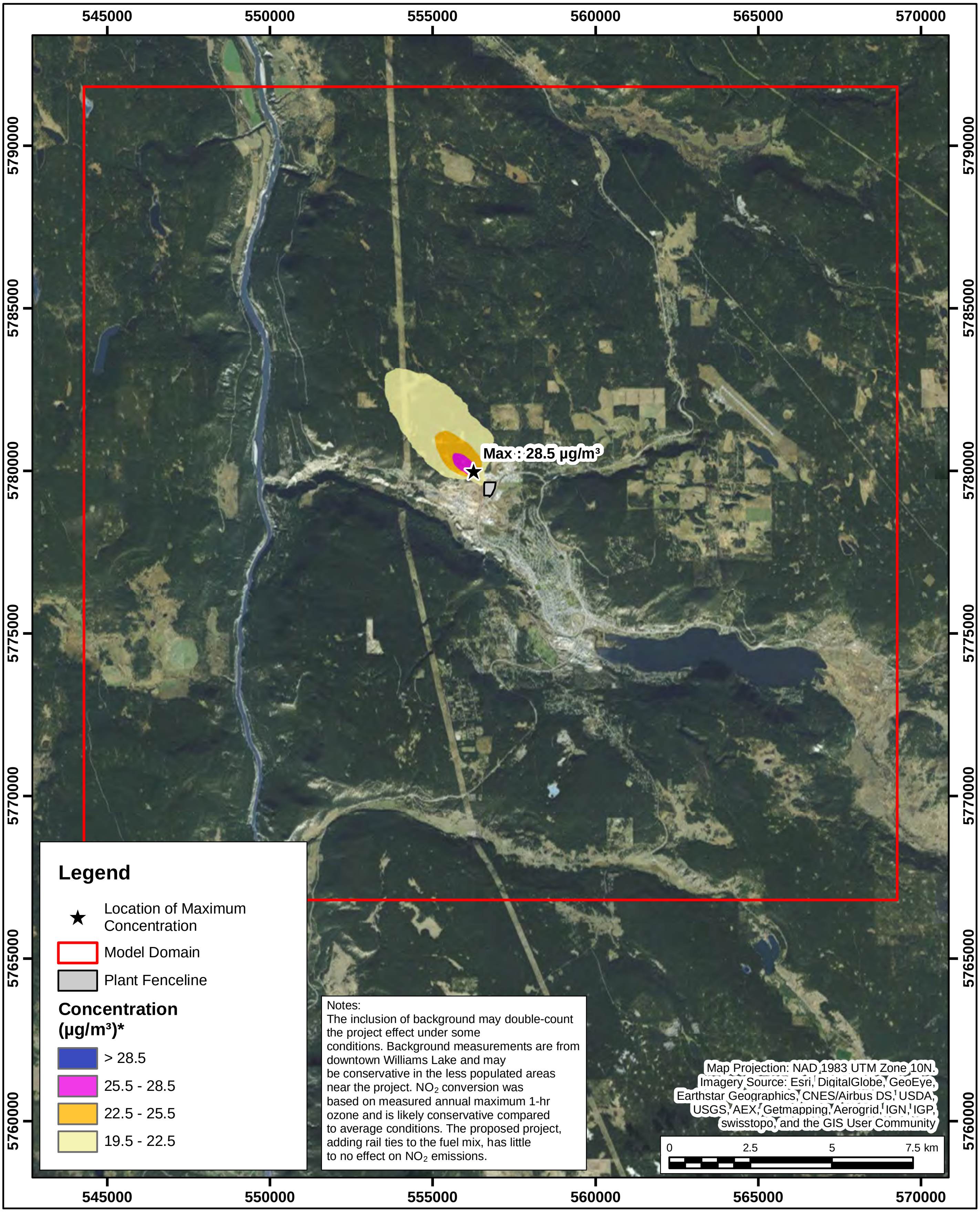


Predicted Annual Average NO_2 Concentrations Including Ambient Background Value for 100% Rail Ties or Base Fuel

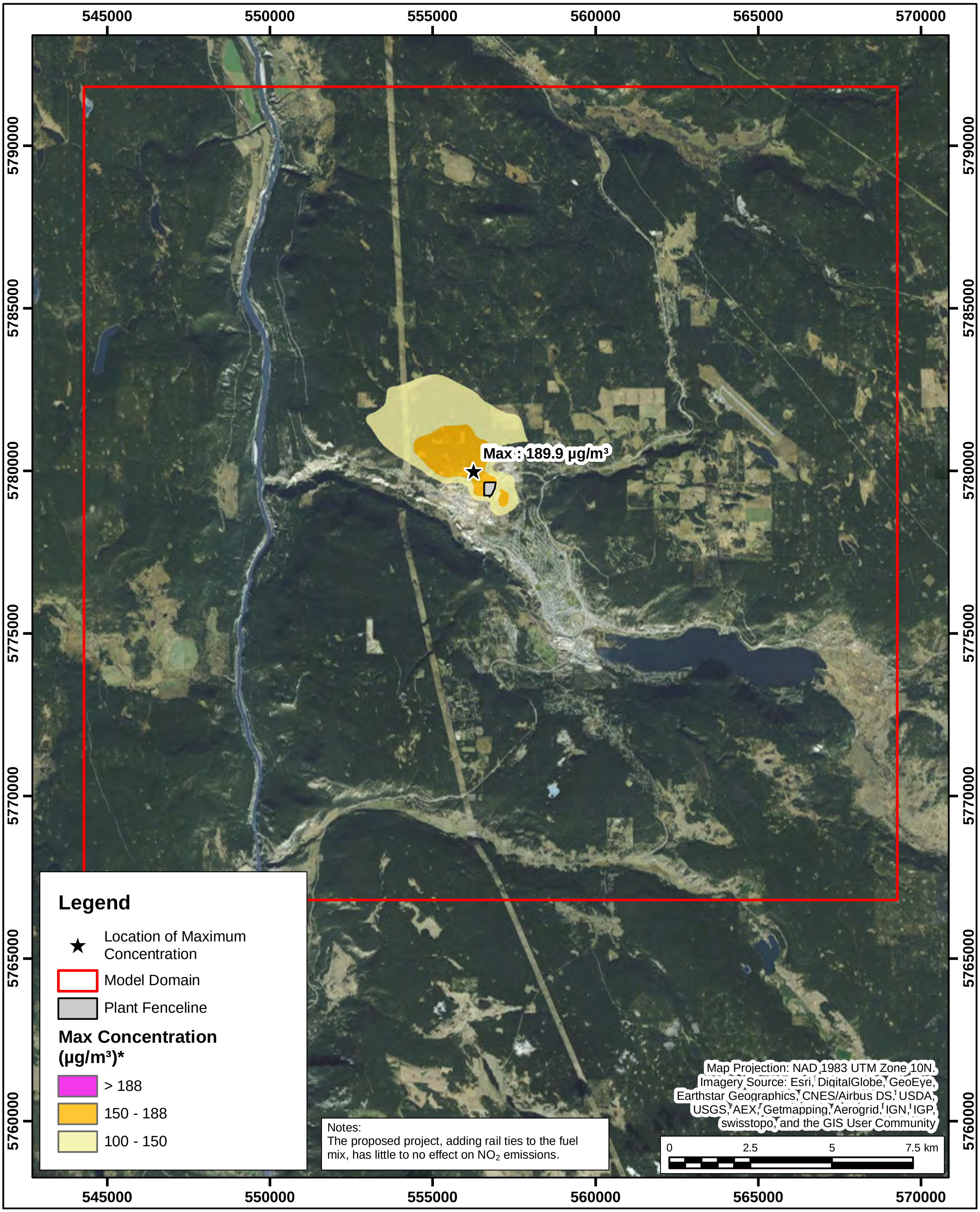
*1-hr NO_2 Interim Provincial Air Quality Objective = 188 µg/m³ (BC MOE 2014)

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

Drawn by: NBN	Figure: 7
Approx. Scale:	1:160,000
Date Revised:	Sept. 4, 2015



Predicted Ninety-Eighth Percentile Peak Daily 1-Hour Maximum NO_2 Without Ambient Background Value for 100% Rail Ties or Base Fuel

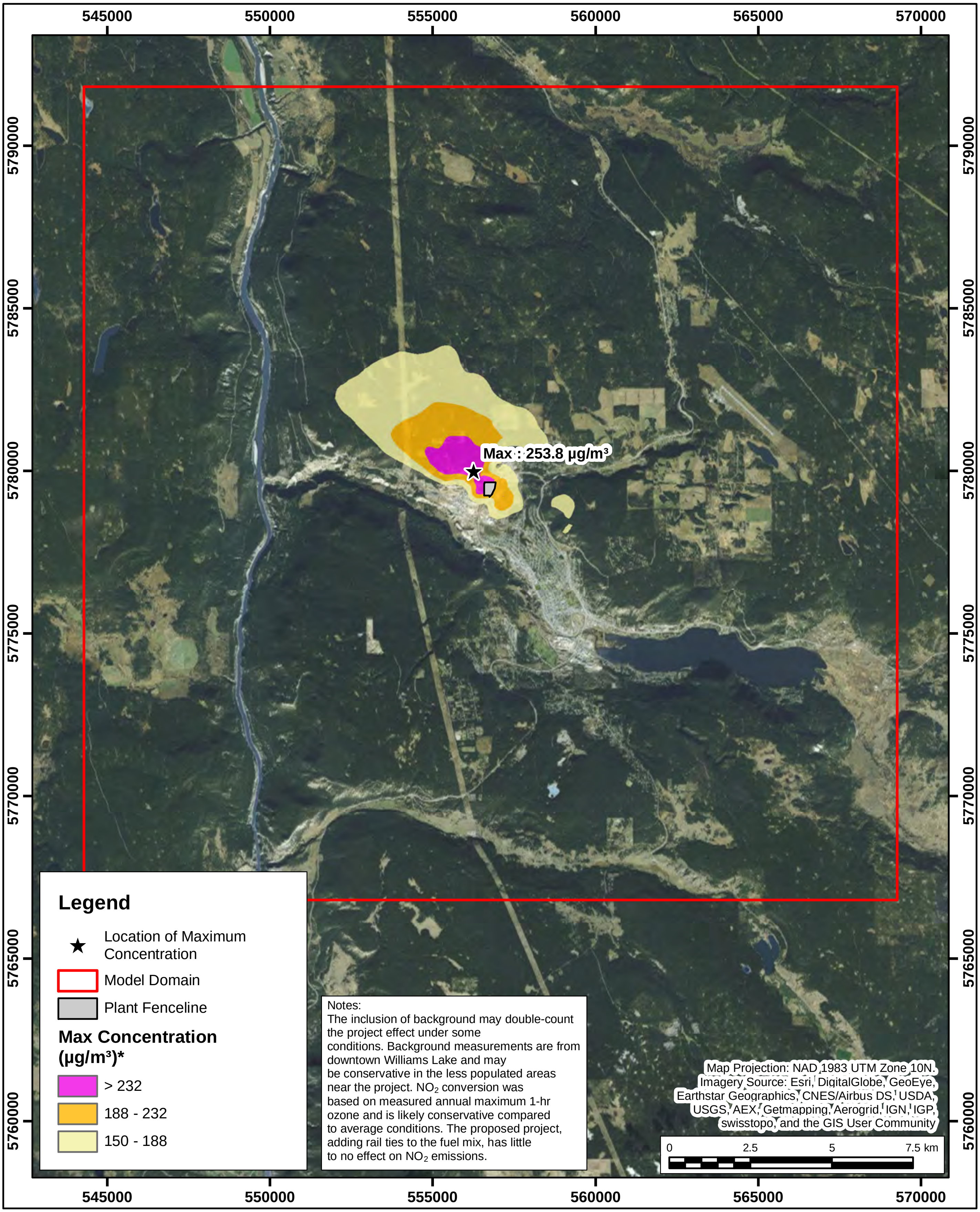
*1-hr NO_2 Interim Provincial Air Quality Objective = 188 µg/m³ (BC MOE 2014)

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

Drawn by: NBN	Figure: 8
Approx. Scale:	1:160,000
Date Revised:	Sept. 4, 2015



Predicted Ninety-Eighth Percentile Peak Daily 1-Hour Maximum NO_2 Including Ambient Background Value for 100% Rail Ties or Base Fuel

*1-hr NO_2 Interim Provincial Air Quality Objective = 188 µg/m³ (BC MOE 2014)

Williams Lake Power Plant - Williams Lake, BC

Project #1500355

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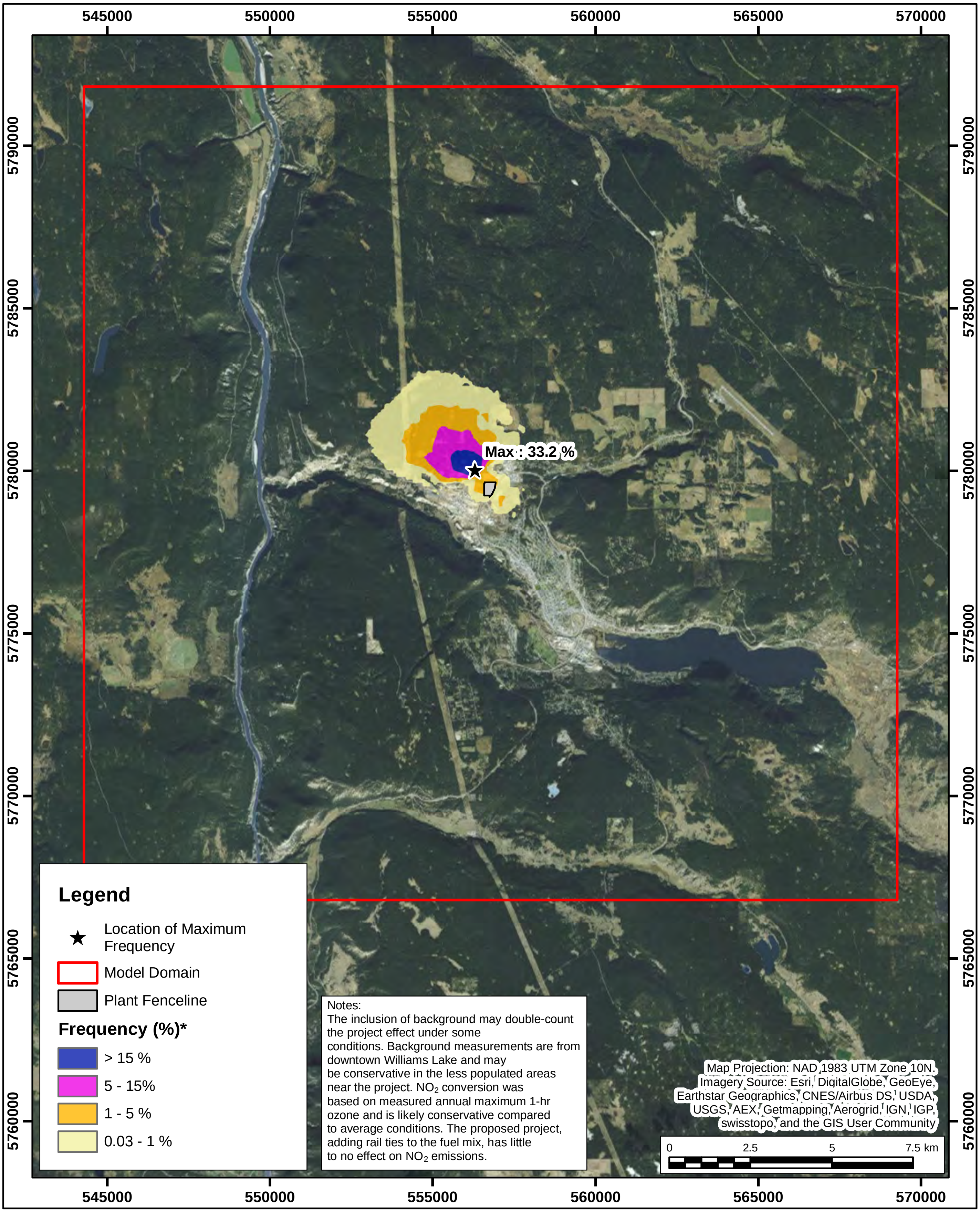
Approx. Scale:	1:160,000
Date Revised:	Sept. 4, 2015

RWDI



Predicted Frequency of Exceedance of 1-Hour NO_2 Objective Including Ambient Background Value

*1-hr NO_2 Interim Provincial Air Quality Objective = 188 µg/m³ (BC MOE 2014)

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

Drawn by: NBN	Figure: 10
Approx. Scale:	1:160,000
Date Revised:	Sept. 4, 2015

APPENDIX A

TRANSCANADA POWER

EMISSION SURVEY REPORT

Regular Wood Waste and Railtie Wood Waste

(April 2001 Survey)
Final Report

Prepared for

TRANSCANADA POWER

Calgary, Alberta

Prepared by

A. LANFRANCO AND ASSOCIATES INC.

Langley, B. C.

November 2001

CERTIFICATION

The field monitoring conducted for this survey was conducted by certified stack test technicians as required by the B.C. MELP stack testing code. The field crew consisted of:

Mr. M. Holm (certified), Mr. D. Doucette (certified) and Mr. J. Mushtuk (certified).

The report was prepared by Mr. Holm and Mr. Mushtuk using reporting principles and guidelines generally required and accepted by MELP. Mr. A. Lanfranco performed a review of the report for content and format.

The field crew and A. Lanfranco and Associates Inc. certify that the test methods used were EPA or MELP reference methods for the parameters investigated.

Michael Holm ____________________

Darren Doucette ____________________

Report reviewed by:

A. Lanfranco ____________________

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY OF RESULTS

The following table presents the duplicate baseline test and the triplicate railtie test average results for the Williams Lake power plant stack for emission tests conducted on April 3 to 6, 2001.

Parameter		Baseline Results (@ 11% O_2)	Railtie Results (@ 11% O_2)	Provincial Requirements
Particulate	(mg/Sm^3)	6.2	2.3	20 @ 11% O_2
	(Kg/hr)	3.4	1.1	n/a
Trace Metals				
	Class I ug/Sm^3 (sum)	0.050	0.040	3.6 for each metal @ 11% O_2
	Class II ug/Sm^3 (sum)	0.0028	0.0023	0.7 for each metal @ 11% O_2
	Class III ug/Sm^3 (sum)	0.0026	0.0011	0.15 for each metal @ 11% O_2
PCDD & PDCF TEQ (ng/Sm^3)		0.0013	0.0034	0.1 to 0.5*
PAH (ug/Sm^3)		0.063	0.058	5*
Chlorophenols (ug/Sm^3)		0.010	0.091	1*
Sulphur Oxides as SO_2 (mg/Sm^3)		1.0	172	180
Hydrogen Chloride (mg/Sm^3)		< 0.1	59.8	50
Flow rate (Sm^3/min.)		5870	5710	6000 Prov. Permit for power plant
Oxygen (Vol. %)		6.0	8.2	n/a

	Baseline Results (@ 7% O_2)	Railtie Results (@ 7% O_2)	Permit Limit (@7% O_2)
Particulate (mg/Sm^3)	8.6	3.2	51

All above results are expressed at standard conditions of 25°C and 101.3 kPa (dry).

Results expressed at 11% O_2 are a requirement of the BC MOE Special Waste Regulations, while the Williams Lake power plant's air pollution permit is expressed at 7% O_2.

* typical or proposed Emission Criteria for Municipal Solid Waste Incinerators. These limits are not enforceable by the provincial government at present.

1.0 INTRODUCTION

TransCanada Power of Calgary, Alberta has retained A. Lanfranco and Associates Inc. of Langley, B.C. to conduct an emission survey at TransCanada's power plant facility located in Williams Lake, B.C.

The purpose of the emission survey is to document and report the concentrations of specific air pollutants and other operating parameters and emission characteristics from the main stack associated with the combustion of normal woodwaste (baseline tests) and during the combustion of 100% railties.

The pollutants under investigation were: Particulate Matter, Trace Metals, Hydrogen Chloride, Sulphur Oxides, polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDD/PCDF), polyaromatic hydrocarbons, and Chlorophenols.

The monitoring was a requirement of B.C. Ministry of Water, Air and Land Protection. A representative of MWLAP was on-site during most of the test program.

This report documents the methods used and results determined for stack samples from the co-generation stack collected on April 3 to 6, 2001. This sampling program also complies with TransCanada Power's stack monitoring requirement for the first half of 2001 in regards to their air pollution permit No. PA-8808.

2.0 PROCESS DESCRIPTION

The TransCanada Power cogeneration facility operates a Babcock and Wilcox woodwaste fired boiler to produce electricity from steam generation and turbine operation. Some of the energy produced by the system is used to operate the plant while the excess is sold commercially. Maximum gross energy output is about 75 MW.

Fluegases generated by the woodwaste combustion unit are cleaned primarily by multiclones and secondarily by an Environmental Elements Corporation (five field) electrostatic precipitator (ESP) prior to discharge to the atmosphere via a 3.45 meter diameter smokestack.

Baseline tests were conducted with standard woodwaste while the railtie tests were conducted with chipped railties supplied by CN Rail.

3.0 METHODOLOGY

The sampling and analytical methods used throughout this survey conform to the procedures outlined in the B.C. "Source Testing Code for Measurement of Particulates from Stationary Sources", the B.C. Air Analytical Manual, and the US EPA Code of Federal Regulations (CFR) 40, Part 60. Specifically, the methods used were:

Parameter	Reference Method
Sample and velocity traverse points	EPA Method 1
Velocity and flowrate	EPA Method 2
Gas molecular weight (O_2/CO_2)	EPA Method 3
Fluegas Moisture	EPA Method 4
Particulate Matter, Trace Metals	EPA Method 5/EPA Method 29
Dioxin/furan	EPS 1/RM/2
HCl	EPS 1/RM/1
SOx	EPA Method 6

3.1 Preparation Techniques

The preparation, cleaning, and proofing of the sampling equipment and materials is an integral part of the quality assurance/quality control (QA/QC) component of each stack survey. Following are details of the cleaning and proofing of relevant sample train components.

Organic Train Glassware

1. Washed twice with industrial strength cleaner/detergent
2. Rinsed with generous amounts of deionized H_2O
3. Rinsed three times with methylene chloride
4. Rinsed three times with hexane
5. Rinsed three times with acetone
6. Oven baked at 300°C overnight
7. Rinsed three times with hexane (saved for proofing)
8. Rinsed three times with acetone (saved for proofing)

Amberlite XAD-2

1. Rinsed and extracted with deionized H_2O
2. Soxhlet extraction with methanol, methylene chloride and toluene (22 hrs each)

3. Nitrogen purge
4. Oven dried @ 50°C
5. Approx. 40 gram aliquot saved for proofing
6. Individual sample traps packed and spiked with surrogate regime

Organic filters

1. Soxhlet extraction (16 hrs) with toluene
2. Nitrogen drying
3. Save 1 filter for proofing

Metal Train Glassware

1. Hot detergent wash with brushing
2. Rinse with 0.1 N HNO_3
3. Copious rinsing with deionized H_2O
4. Oven drying at 105°C

Metal Train Filters

1. Overnight extraction with 1:1 nitric acid
2. Overnight rinsing with deionized H_2O
3. Drying for 2 hrs @ 105°C, desiccation and weighing
4. Save 1 filter for blank

Other Glassware

1. Hot detergent wash with brushing
2. Copious deionized H_2O rinses

3.2 Sampling Techniques

Following are brief descriptions of the reference method sampling techniques utilized to collect the various samples. The techniques employed for isokinetic sampling of particulate/metals and dioxin/furan from this source were consistent and complied with the previously referenced stack testing methods.

EPA Method 1 - Sampling Site and Traverse Points

The stack sampling location for the co-generation stack was located > 7 diameters downstream and > 2 diameters upstream of the nearest flow disturbances. From this criteria, a measured stack diameter of 138 inches, and Figure 1-1 of EPA Method 1, a 12 point sampling regime, where 3 points along 4 - 90° traverses were sampled for each isokinetic stack test.

EPA Method 2 - Stack Gas Velocity and Volumetric Flowrate

At each traverse point a series of measurements including stack temperature, velocity pressure, static pressure, and sampling rate were recorded. Velocity and static pressures were measured with a calibrated S-type pitot tube mounted alongside the sample probe. Stack temperatures were measured with a calibrated K-type chromel-alumel thermocouple with a control console mounted digital readout. Cyclonic flow angles were measured using the null velocity technique.

EPA Method 3 - Molecular Weight by Gas Analysis

Stack gas molecular weight was determined by use of Fyrite analyzers for corrections of pollutant concentrations to 11% O_2 for special waste and corrected to 7% O_2 for compliance . (see specifications later in this section)

EPA Method 4 - Moisture Content

Stack gas moisture content was determined from the measured condensed water vapour which was collected in the impinger (cold box) section of the sampling trains, and the gas volume sampled corrected to standard conditions of 25°C and 101.3 KPa (dry).

The contaminants investigated during this survey were collected with four independent sampling trains as follows:

EPS Method 1/RM/2 - Dioxin/Furan

This sample train was assembled and leak checked at the laboratory the night prior to testing. Prior to sampling initiation, the stack train was assembled as shown in Figure 1 and leak checked to code specifications. The probe (quartz lined) and filter module were heated to 120 +/- 15°C and crushed ice was placed around the impingers. Iced water was circulated in the condenser and in a cooling jacket around the XAD cartridge. Once the sampling system achieved the appropriate temperatures the probe tip was positioned at point No.1, isokinetic sampling was performed using the Ko orifice constant sampling procedure. A set of recordings was taken every five minutes until 3 or 4 sets of readings for each sample point of traverse one was achieved. The sample pump was shut off and the sample module with attached probe was withdrawn from the stack. The system was repositioned at point No. 1 of the next traverse and an additional 45 to 60 minutes of sampling commenced. This regime was continued until all sample ports had been sampled. The total sample volume for each PCDD/PCDF test was about 3.5 to 4.0 m^3, with the exception of Railtie Test 3 at 2.8 m^3.

At the conclusion of the final traverse sampling the train was final leak checked and the probe was disassembled from the hot box/sample module.

Any open ends of the sampling module and probe assembly were immediately sealed with pre-cleaned aluminium foil or teflon tape, and leak checks were conducted with only teflon tape touching the open ends.

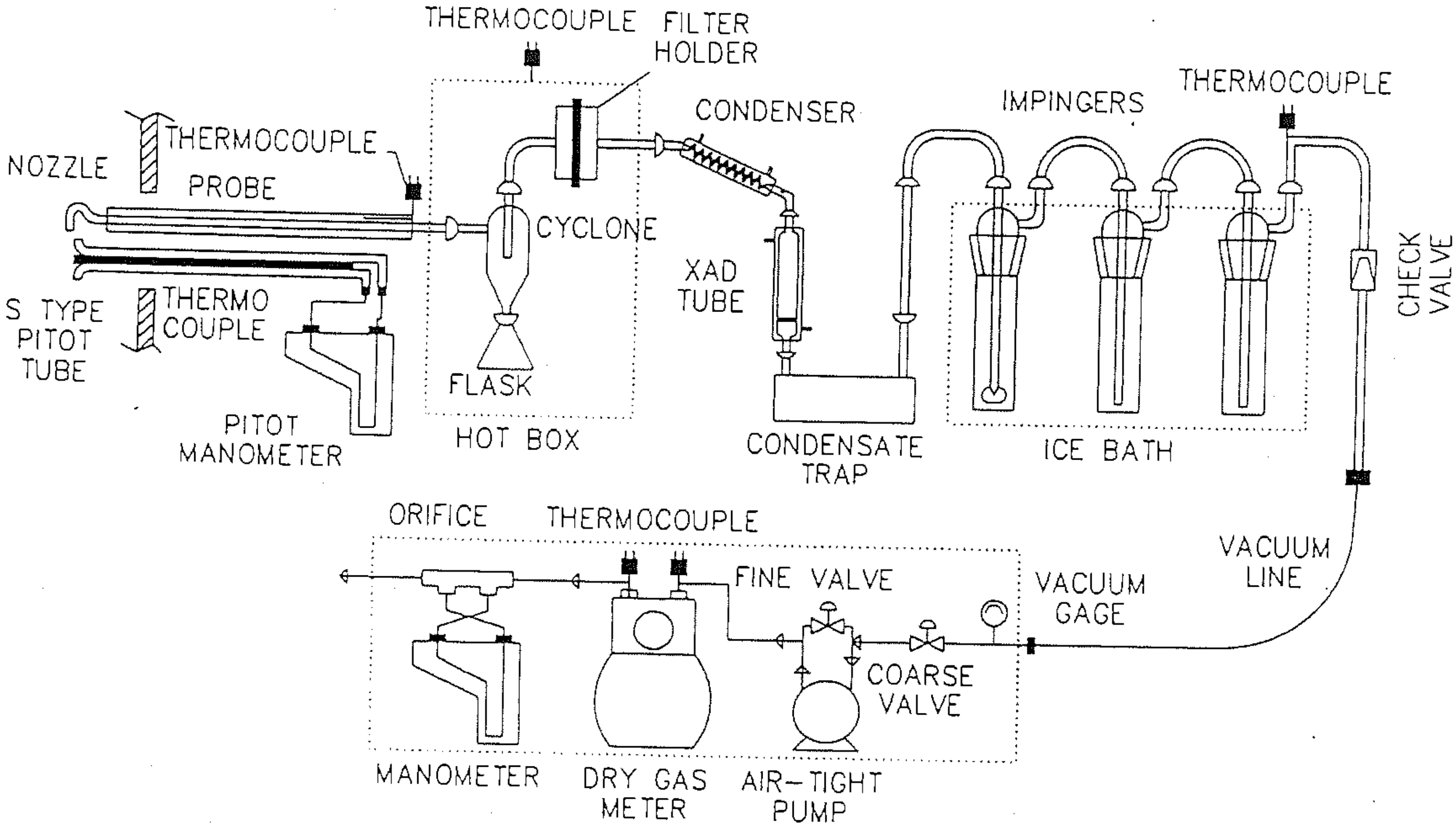


FIGURE 1 SEMI-VOLATILE ORGANICS SAMPLING TRAIN

At the conclusion of each test the sample module and probe were lowered from the stack location and were in transport to the laboratory without delay. Approximately one hour elapsed from sample conclusion to sample delivery at the sample recovery "laboratory".

EPA Method 5/29 - Particulate, Trace Metals

This train was a normal Method 29 train (Fig. 6) except special (low metal) microquartz glass filters were utilized and the impinger components were:

Incinerator Stack Impingers
100 ml 5% HNO_3 in 10% H_2O_2
100 ml 5% HNO_3 in 10% H_2O_2
100 ml 4% $KMnO_4$ in 10% H_2SO_4
100 ml 4% $KMnO_4$ in 10% H_2SO_4
100 ml distilled H_2O
200 g silica gel

The train was operated isokinetically, sampling a total of 12 points on 4 - 90° traverses for 5 minutes each, resulting in final sample volumes of about 1.3 dscm. Data recordings were conducted at 5 minute intervals. The train utilized a five foot quartz probe and nozzle.

EPS Method 1/RM/1 - HCl

This sample train was equipped with a heated glass probe to prevent condensation and a glass wool particulate removal plug. The impingers in Method 26 were modified to larger volumes for complete gas/liquid contact, and the sample rate was modified to about 10 l/min as allowed by implication in EPS Method 1/RM/1, where non-isokinetic sampling is allowed at rates greater than 10 l/min in large impingers. Each of the first two impingers contained 2 - 100 ml portions of dionized water. An empty impinger and a silica gel impinger completed the collection train.

Samples were collected with dry gas sample volumes measured with a calibrated dry gas litre meter.

EPA Method 6 - SO_x

This train was equipped with a heated glass probe, a glass wool particulate removal plug, and an impinger section with 2 - 100 ml 3% H_2O_2 impingers. Samples were collected for one hour at about 9 l/min. Particulate was removed with glass wool at the probe tip, and gas sample volumes were measured with a calibrated dry gas meter.

3.3 Analytical and Sample Recovery Techniques

Following sampling for PCDD/PCDF, the sample train was sealed and transported to the field laboratory for sample recovery. At the laboratory the sample train was disassembled and six components were identified for each train (Fig. 2). The recovery of each sample is described below:

1. Sample Filter: The exposed sample filter was removed from its holder with clean tweezers, placed on a sheet of aluminium foil, folded inside the foil and sealed in a glass petri dish. This was labelled component 1 of each test.

2. Front/Back Half Washings: This included a thorough acetone/methylene chloride rinsing and brushing of the sample nozzle, probe liner, and connecting glassware prior to the filter. These washings were collected in a pre-cleaned one litre amber sample bottle with a teflon lined lid. This was labelled component 2 of each test. The back half of the filter holder and glassware connecting the filter holder to the condenser were rinsed and soaked with acetone and methylene chloride with the solvents added to the component 2 sample bottle.

3. Amberlite XAD-2 Resin Trap: The resin trap was sealed with teflon tape, covered with aluminium foil and placed kept at about 4 °C prior to shipment to the analytical laboratory. This was labelled component 3 of each test.

4. Impinger Condensate: The condensate contained in the condensate trap, plus water and condensate from the impingers was measured for volume and discarded.

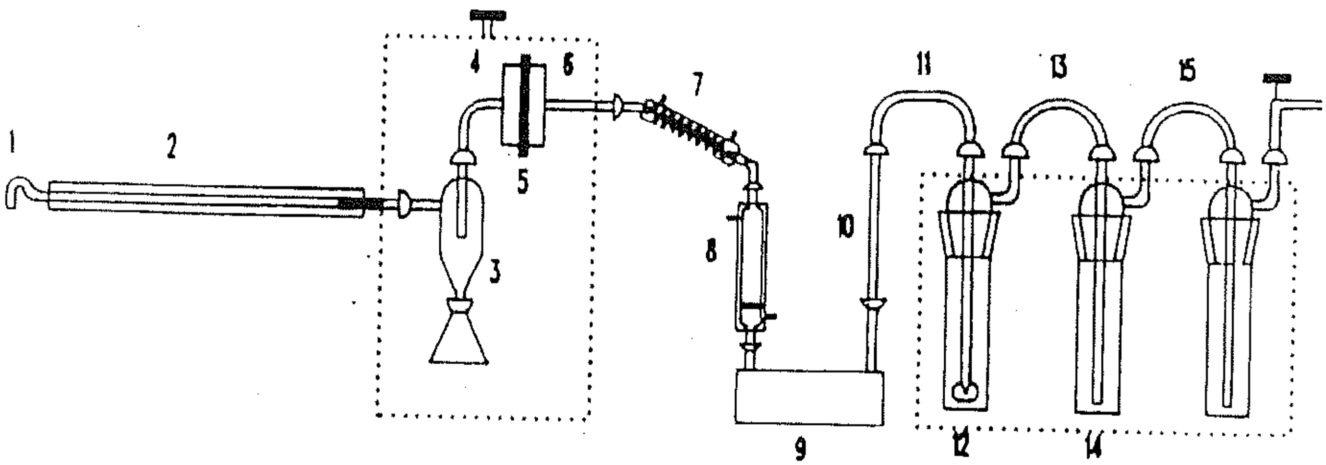
5. Final Rinse: All components of the sample train from the nozzle to the XAD were rinsed and/or soaked three times with toluene into an amber bottle (teflon lid) which was labelled component of each test.

All samples were labelled appropriately and placed in a cold room at 4°C until analysis was initiated. Each bottle containing solvent was marked with the liquid level and the lid was sealed with triplicate wraps of teflon tape.

3.3.1 Organic Sample Analysis

The organic analysis of the sample train components involved an extremely complex series of procedures as detailed in the analytical manuals.

Following is a description, in very simplified terms, of the basic procedures used to process the sample train components (see Fig. 3 and 4).



Container or Sample	Component(s)	Recovery Procedure
1	1, 2, 3, 4	Wash and brush 3 times each with hexane (H) and acetone (A). Rinse 3 times each with H and A.
2	5	Remove carefully from holder. Place on pre-cleaned foil. Fold in half. Place in pre-cleaned glass petri dish.
3	6, 7	Soak 5 minutes each with H and A. Rinse 3 times each with H and A.
4	8	Cap ends and wrap in foil.
5	9, 12	Empty contents into container and rinse each 3 times with HPLC water.
6	6 to 15 except 8	Rinse 3 times each with H and A.

Mark liquid levels on all bottles.
All sample containers are pre-cleaned amber glass bottles with pre-cleaned Teflon lid liners.

FIGURE 2 SEMI-VOLATILE ORGANICS RECOVERY PROCEDURES

FIGURE 3. EXTRACTION SCHEMATIC FOR FRONT HALF TRAIN AND PROCESS SAMPLES.

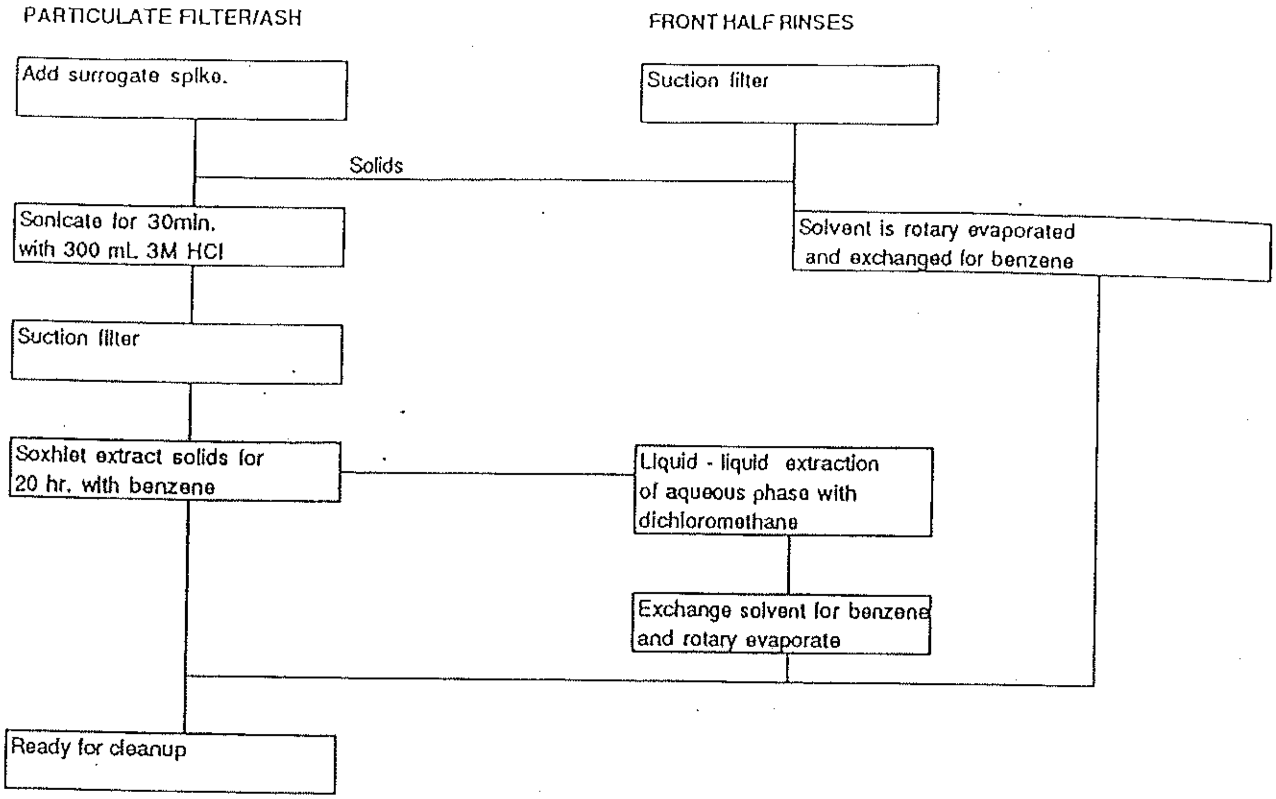
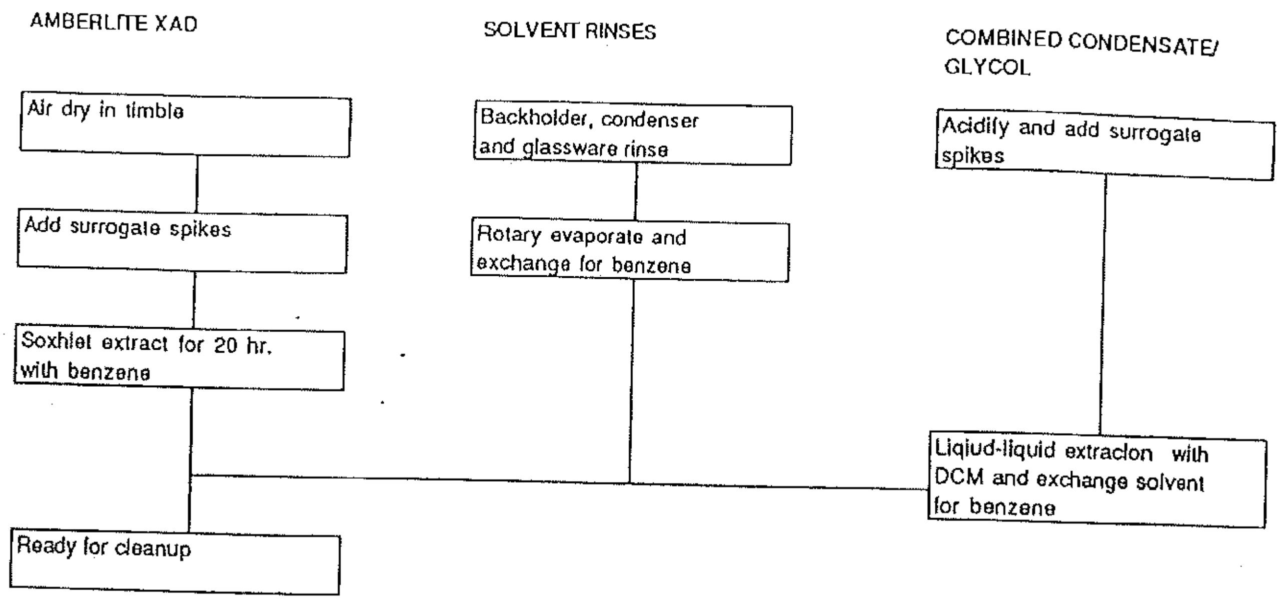


FIGURE 4. EXTRACTION SCHEMATIC FOR BACK HALF TRAIN SAMPLES



Initially the sample components are separated into liquid (containers 2) or solid phases (containers 1 and 3). Solid samples are extracted with various solvents (usually toluene), sometimes under acid conditions. The liquid sample (container 2) is concentrated with a rotary evaporator, with the final concentrate added to the filter and XAD components. At this point, an internal standard solution is added to the sample for QA/QC recovery determinations. This combined sample is Soxhlet extracted with toluene for at least 16 hours, and then concentrated to 5 to 10 ml.

The toluene rinse has internal standards added, with subsequent concentration by rotary evaporation.

The extract volumes are fractionated, cleaned-up ... analytical instrumentation (Fig. 5).

— where 100ml of
PAR 5 - acetone was used

PAR 6 - The Contents of Impingers 1 and 2 were measured for volume and transferred to a Polyethylene sample Container.

3.3.2 Particulate/Trace Metals, Sample Re...

The particulate sample filters were removed from th... ...ezers, with material retained on the gasket recovered with a nylo... ...folded and placed in an identified plastic petri dish labelled Conta...

Sample clean-up of the probe and front half glassw... ...ducted with sequential rinses and brushings with acetone collecte... ...ollowing the acetone rinse the probe and glassware were rinsed wit...

Impingers 1 and 2 were measured for volume and transferred with 100 ml 0.1 N HNO_3 to a polyethylene sample container. Impingers 3, 4, and 5 were transferred to another polyethylene container using 100 ml potassium permanganate and water rinses. HCl rinses of the permanganate impingers were not conducted as visible deposits were effectively removed by the earlier rinsings.

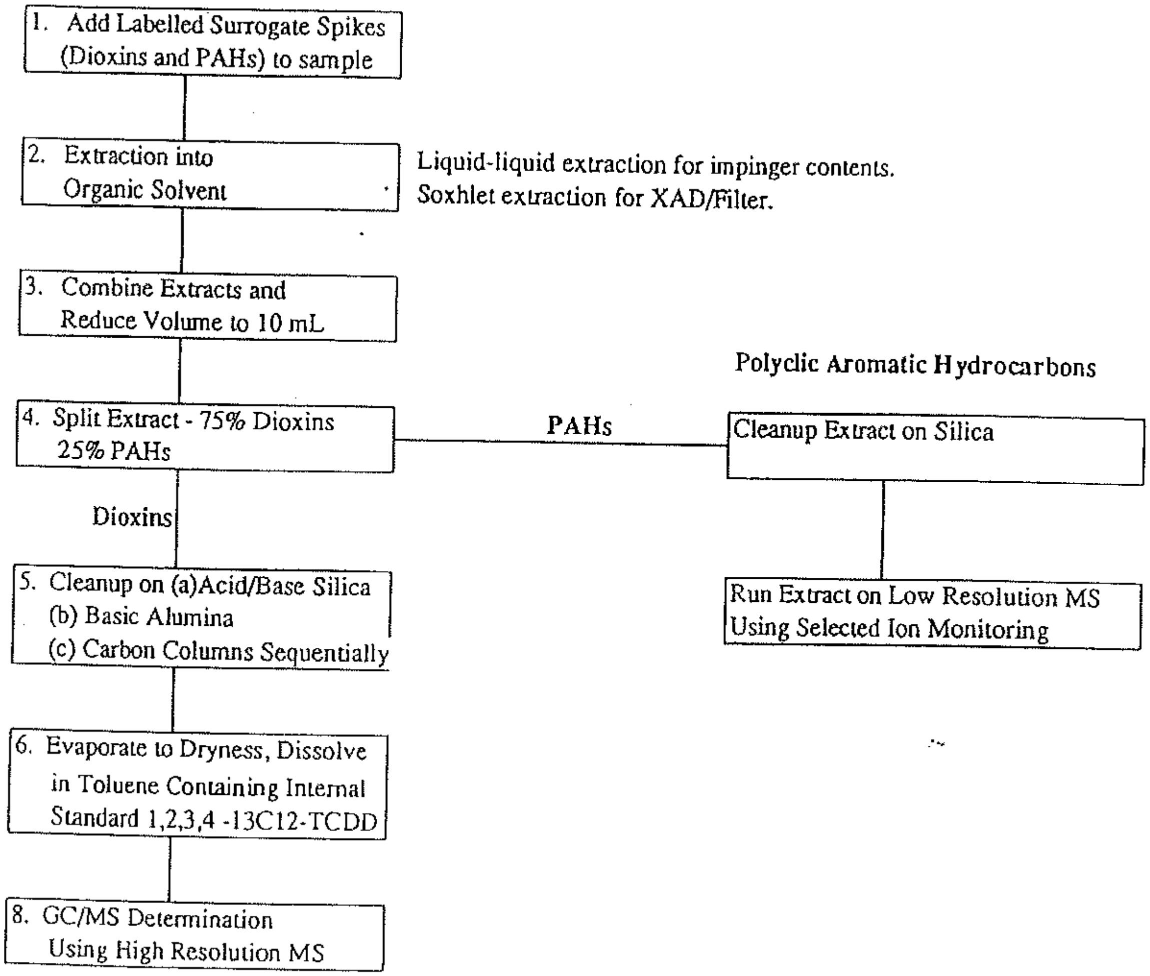
Silica gel from the final impinger was transferred to its original container for final weighing.

Blank filters and solutions for each component of the particulate metals test were collected and labelled appropriately.

Gravimetric Analysis

At A. Lanfranco and Associates Langley, B.C. laboratory, the sample filters were desiccated to constant weight and weighed as per EPA Method 5. Probe and front-half acetone rinsings were evaporated at ambient temperature in tared, precleaned 250 ml glass beakers, with subsequent weighing to constant weight. Blank filters and acetone were carried through the gravimetric process.

Figure 5. Schematic of Analytical Methodology for Chlorinated Dibenzo(p)Dioxins and Dibenzofurans/ Polycylic Aromatic Hydrocarbons in MM5 Trains



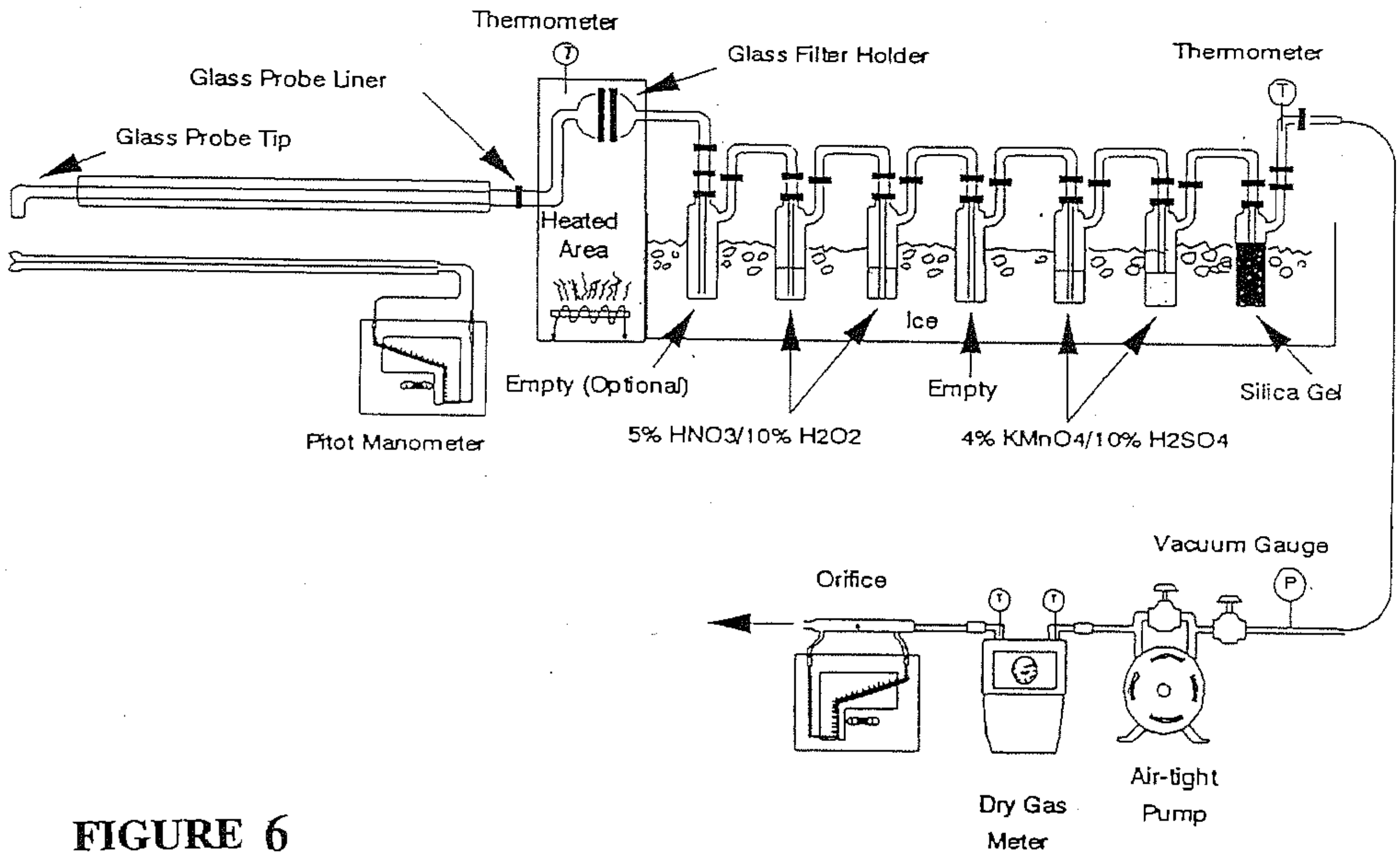


FIGURE 6

Multiple Metals Sampling Train

Trace Metals Analysis

Following the gravimetric analysis, the filters and wash residues, along with the back half liquid samples were forwarded to Norwest Laboratories in Langley, B.C. for analysis of Trace Metals. The samples and appropriate blanks were digested with acids and analyzed for heavy metals by ICAP procedures. Impingers 3, 4 and 5, for Hg, were analyzed at Norwest using flameless atomic absorption.

3.3.3 HCl/SO_x Recovery/Analysis

Sample solutions from the impingers of the HCl and SO_x trains were transferred to polyethylene sample bottles with distilled water rinses. The liquid levels were marked and the lids sealed for transportation.

Chloride analysis of the HCl samples were conducted at Norwest laboratories using ion chromatography techniques as detailed in EPA Method 26. A. Lanfranco and Associates Inc. conducted the SO_x analysis using the barium thorin titration procedure.

Reference materials, blanks and spiked blanks were analyzed to validate all laboratory analyses.

3.4 Quality Assurance / Quality Control (QA/QC) Techniques

The QA/QC component of this survey was designed to exceed the requirements normally instituted by the regulatory agency. Prior to the survey, and in cooperation with US EPA, a series of EPA Audit samples were obtained. The audit samples available (from 1999) were procured for HCl and SO_2. The EPA audit sample designations are:

HCl	-	ERA CRM 9978
SOx	-	EPA C8003
Metals	-	QCP TMS 1

Additionally, QA/QC of this survey was accomplished by the following mechanisms.

1. Pre and Post test leak checks
2. Calibration of volume measuring and monitoring instrumentation
3. Proofing of organic glassware and supplies
4. Analysis of all blank solutions and materials
5. Spiking and recovery analysis of organic trains
6. Use of acid cleaned microquartz filters
7. Duplicate analysis of selected samples
8. Reference material analysis with samples
9. Labelling and record-keeping

4.0 RESULTS

Most of the stack testing results were calculated using a "STACK" computer program developed for EPA and Canadian requirements. Standard conditions used in the program are 77 °F and 29.92" Hg (dry basis)

Corrections to 11% O_2 were calculated by multiplying the determined stack concentrations by;

$$\frac{20.9-11.0}{20.9-\text{ measured } O_2}$$

Corrections to 7% O_2 were calculated by multiplying the determined stack concentrations by;

$$\frac{20.9-7.0}{20.9-\text{ measured } O_2}$$

Hydrogen chloride, Sulphur Oxides and trace metals determinations were conducted by EPA approved calculation techniques, from laboratory analytical data and standardized sample volumes.

Table 1 presents particulate and acid gas data for baseline/railtie tests. Tables 2 and 3 present trace metals data for baseline/railtie tests. Table 4 presents detailed dioxin/furan data, and Tables 5 and 5a independently present PAH and chlorophenol data for baseline and railtie tests. Table 6 presents the plant operated CEM data for some gases and load.

Tables 4 presents PCDD/PCDF data in terms of actual amounts detected and toxic equivalents. In addition, all dioxin/furan results were recovery corrected according to surrogate recovery efficiencies determined for each organic analysis. Surrogates added and the recoveries determined are listed in the analytical data presented in the Appendices.

Table 7 presents the gravimetric data for the particulate/metals tests and Table 8 presents fuel and ash summary analysis.

Table 1 Particulate / Acid Gas Emission Results

Parameter		Baseline Test 1	Baseline Test 2	Rail Tie Test 1	Rail Tie Test 2	Rail Tie Test 3
Test Date		April 3/01	April 4/01	April 4/01	April 5/01	April 6/01
Test Time		13:22-14:30	09:30-10:36	16:00-17:06	15:22-16:28	11:50-12:56
Duration		60	60	60	60	60
Particulate	(mg/Sm^3 @ 11% O_2)	8.5	3.8	6.1	0.5	0.2
	(mg/Sm^3 @ 7% O_2)	11.9	5.3	8.6	0.8	0.3
	(mg/Sm^3)	12.4	5.9	8.1	0.7	0.2
	(Kg/hr)	4.58	2.12	2.88	0.23	0.08
Hydrogen Chloride	(mg/Sm^3 @ 11% O_2)	< 0.1	< 0.1	51.1	75.8	52.4
	(mg/Sm^3)	< 0.1	< 0.1	69.1	93.4	81.5
Sulphur Oxides	(mg/Sm^3 @ 11% O_2)	0.9	1.0	157	203	156
	(mg/Sm^3)	1.4	1.6	213	250	243
Flowrate	(Sm^3/min)	6170	5990	5920	5790	5600
	(Am^3/min)	11660	11750	11210	11090	10860
Oxygen	(Vol. %)	6.5	5.4	7.8	9.0	7.8
Carbon Dioxide	(Vol. %)	14.3	15.3	12.8	12.0	13.0
Moisture	(Vol. %)	20.4	21.9	19.6	20.6	21.0
Temperature	(°C)	142	149	147	140	141
Isokineticity	(Average %)	103.3	105.2	99.8	100.9	104.5

Table 2 Baseline Trace Metals Emission Results

Metal	Test 1 (mg/dscm) (@ 11% O2)	Test 2 (mg/dscm) (@ 11% O2)
Class I		
Pb	0.0088	0.0067
Sb	< 0.0007	< 0.0007
Cu	0.0042	0.0028
Mn	0.015	0.0067
V	0.0001	0.000096
Zn	0.041	0.014
Sum of Class I	0.069	0.030
Class II		
As	< 0.0007	< 0.0007
Cr	0.0021	0.00034
Co	0.00010	0.000043
Ni	0.0011	0.00040
Se	0.0010	0.00048
Te	< 0.001	< 0.001
Sum of Class II	0.0043	0.0013
Class III		
Tl	0.0011	0.00039
Cd	0.00040	0.00020
Hg	0.0020	0.0013
Sum of Class III	0.0034	0.0018

Table 3 Railtie Trace Metals Emission Results

Metal	Test 1 Railtie (mg/dscm) (@ 11% O2)	Test 2 Railtie (mg/dscm) (@ 11% O2)	Test 3 Railtie (mg/dscm) (@ 11% O2)
Class I			
Pb	0.0098	0.0080	0.0028
Sb	< 0.0008	< 0.0008	< 0.0008
Cu	0.0036	0.0024	0.0042
Mn	0.019	0.0028	0.0016
V	0.00012	0.00014	0.000055
Zn	0.050	0.0072	0.0072
Sum of Class I	0.082	0.021	0.016
Class II			
As	0.0012	0.00068	< 0.0008
Cr	0.00073	0.00014	< 0.00004
Co	0.000061	0.000061	0.000043
Ni	0.0017	0.00090	0.0014
Se	< 0.0008	< 0.0008	< 0.0008
Te	< 0.002	< 0.002	< 0.002
Sum of Class II	0.0036	0.0018	0.0014
Class III			
Tl	0.0011	0.00030	0.00010
Cd	0.00051	0.000084	0.000088
Hg	0.00069	0.00025	0.00020
Sum of Class III	0.0024	0.00063	0.00039

TABLE 4 Detailed PCDD/PCDF Emission Results

Component	TEF	Test 1 (Baseline) Analyzed (ng)	Test 1 (Baseline) TEQ (ng)	Test 1 (Railtie) Analyzed (ng)	Test 1 (Railtie) TEQ (ng)	Test 2 (Railtie) Analyzed (ng)	Test 2 (Railtie) TEQ (ng)	Test 3 (Railtie) Analyzed (ng)	Test 3 (Railtie) TEQ (ng)
2378 TCDD	1.0000	0.0042	0.0042	0.0038	0.0038	0.0054	0.0054	0.0000	0.0000
12378 PCDD	0.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
123478 HxCDD	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0035	0.0004
123678 HxCDD	0.1000	0.0000	0.0000	0.0077	0.0008	0.0120	0.0012	0.0037	0.0004
123789 HxCDD	0.1000	0.0000	0.0000	0.0110	0.0011	0.0000	0.0000	0.0000	0.0000
1234678 HpCDD	0.0100	0.0000	0.0000	0.0460	0.0005	0.0560	0.0006	0.0270	0.0003
OCDD	0.0010	0.0310	0.0000	0.0710	0.0001	0.1300	0.0001	0.0000	0.0000
2378 TCDF	0.1000	0.0320	0.0032	0.0820	0.0082	0.0820	0.0082	0.0260	0.0026
12378 PCDF	0.0500	0.0000	0.0000	0.0150	0.0008	0.0180	0.0009	0.0067	0.0003
23478 PCDF	0.5000	0.0000	0.0000	0.0000	0.0000	0.0220	0.0110	0.0000	0.0000
123478 HxCDF	0.1000	0.0000	0.0000	0.0000	0.0000	0.0130	0.0013	0.0086	0.0009
123678 HxCDF	0.1000	0.0000	0.0000	0.0110	0.0011	0.0110	0.0011	0.0049	0.0005
234678 HxCDF	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
123789 HxCDF	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1234678 HpCDF	0.0100	0.0000	0.0000	0.0190	0.0002	0.0190	0.0002	0.0000	0.0000
1234789 HpCDF	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OCDF	0.0010	0.0000	0.0000	0.0000	0.0000	0.0120	0.0000	0.0083	0.0000
Summed PCDD & PCDF TEQ (ng)			0.0074		0.0164		0.0300		0.0053
Sample Volume (dscm)			3.9966		3.8288		3.8787		2.8474
PCDD & PCDF TEQ	**ng/dscm**		0.0019		0.0043		0.0077		0.0019
PCDD & PCDF TEQ	**ng/dscm (@11% O2)**		**0.0013**		**0.0030**		**0.0061**		**0.0012**
PCDD & PCDF TEQ	**grams/day**		0.00002		0.00004		0.00007		0.00001
Flowrate (dscm/min)			5871		5755		5888		5472
Oxygen (Vol. %)			6.3		6.9		8.3		5.6
Carbon Dioxide (Vol. %)			14.1		13.7		12.1		14.8
Moisture (Vol. %)			19.8		20.5		19.7		22.0
Temperature (oC)			151		148		141		139
Isokinetic Variation (%)			103.3		100.9		99.9		105.2

TABLE 5 PAH/CP EMISSION RESULTS

Client: TransCanada Power
Date: April 3 2001
Jobsite: Williams Lake B.C.
Source: Power Boiler

BASELINE TEST

Component	TEST 1 Analyzed ug	
Acenaphthene	0.0160	
Acenaphthylene	0.06	
Anthracene	ND	
Benz(a)anthracene	ND	
Benzo(a)pyrene	ND	
Benzo(b) fluoranthene	ND	
Benzo(e)pyrene	ND	
Benzo(g,h,i)perylene	ND	
Benzo(k)fluoranthene	ND	
Chrysene	ND	
Dibenz(a,h)anthracene	ND	
Fluoranthene	0.07	
Fluorene	ND	
Indeno(1,2,3-c,d)pyrene	ND	
Naphthalene	artifact	
Perylene	ND	
Phenanthrene	0.14	
Pyrene	0.096	
Total PAH (ug)	**0.38**	
Total Chlorophenols (ug)	0.061	

TABLE 5 PAH/CP EMISSION RESULTS (con't)

Client: TransCanada Power
Date: April 3 2001
Jobsite: Williams Lake B.C.
Source: Power Boiler

	TEST 1
Total CP (ug)	**0.061**
Total PAH (ug)	**0.38**
Sample Volume (dscm)	**3.997**
PAH (ug/dscm @ 11% O2)	**0.063**
PAH (ug/dscm)	0.095
CP (ug/dscm @ 11% O2)	**0.010**
Particulate (mg/m3 @ 12 % CO2) est.*	6
CO (ppm)	10
Flowrate (dscm/min)	6080
Temperature (C)	146
O2 (Vol % dry)	6
CO2 (Vol % dry)	14.8
H20 (Vol %)	21.2
Isokinetic Variation (%)	104

* estimated from filter particulate weight

TABLE 5a PAH/CP EMISSION RESULTS

Client: Transcanada Power
Date: April 4/5/6 2001 RAILTIE TESTS
Jobsite: Williams Lake B.C.
Source: Power Boiler

Component	TEST 1 Analyzed ug	TEST 2 Analyzed ug	TEST 3 Analyzed ug
Acenaphthene	ND	0.0460	0.0500
Acenaphthylene	ND	0.007	0.015
Anthracene	0.0350	ND	0.0430
Benz(a)anthracene	0.0100	ND	ND
Benzo(a)pyrene	ND	ND	ND
Benzo(b) fluoranthene	ND	ND	0.0230
Benzo(e)pyrene	ND	0.0120	ND
Benzo(g,h,i)perylene	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND
Chrysene	ND	0.0090	0.0210
Dibenz(a,h)anthracene	ND	ND	ND
Fluoranthene	0.07	0.039	0.043
Fluorene	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ND	ND	ND
Naphthalene	artifact	artifact	artifact
Perylene	ND	ND	ND
Phenanthrene	0.23	ND	0.096
Pyrene	0.039	0.028	0.041
Total PAH (ug)	**0.38**	**0.14**	**0.33**
Total Chlorophenols (ug)	**0.385**	**0.733**	**0.235**

TABLE 5a PAH/CP EMISSION RESULTS (con't)

Client: Transcanada Power
Date: April 4/5/6 2001
Jobsite: Williams Lake B.C.
Source: Power Boiler

	TEST 1	TEST 2	TEST 3
Total CP (ug)	**0.385**	**0.733**	**0.235**
Total PAH (ug)	**0.38**	**0.14**	**0.33**
Sample Volume (dscm)	**3.829**	**3.879**	**2.847**
PAH (ug/dscm @ 11% O2)	**0.071**	**0.029**	**0.075**
PAH (ug/dscm)	0.100	0.036	0.117
CP (ug/dscm @ 11% O2)	**0.071**	**0.148**	**0.053**
Particulate (mg/m3 @ 12 % CO2) est.*	6	< 1	< 1
CO (ppm)	10	10	10
Flowrate (dscm/min)	5760	5890	5470
Temperature (C)	148	141	139
O2 (Vol % dry)	6.9	8.3	5.6
CO2 (Vol % dry)	13.7	12.1	14.8
H20 (Vol %)	20.5	19.7	22
Isokinetic Variation (%)	101	100	105

* estimated from filter particulate weight

Table 6 PROCESS and CEM DATA

Date/Time	Opacity (%)	NOx (ppm)	CO (ppm)	O2 (%)	Load (MW)
April 3 1448-1938	2.6	126	142	5.3	64
April 4 1115-1549	2.5	139	63	6.1	61
April 5 0912-1428	2.1	133	60	7.2	56
April 6 0822-1135	2.1	140	51	5.1	61

Table 7 Gravimetric Data

Test No.	Filter Particulate (mg)	Washings Particulate (mg)	Total Particulate (mg)
Baseline 1	7.5	9.1	16.6
Baseline 2	3.8	4.0	7.8
Railtie 1	4.6	5.5	10.1
Railtie 2	0.3	0.5	0.8
Railtie 3	0.0	0.3	0.3

Table 8 Fuel and Ash Summary Analytical Data

Sample Type	PCDD/PCDF (pg/g)	PAH (ng/g)	Chlorophenols (ng/g)	Metals (ug/g)
Regular Hog Fuel	1.0 TEQ	12353	30.3	N/A
Railtie Composite (3 days)	4040 TEQ	7361000	72093	N/A
Regular Ash	23.8	899	not quantifiable*	see next
Railtie Ash	788	1267	not quantifiable*	page

* these samples were run twice without recovery of spiked compounds; thus quantification could not confidently be done.

N/A = not analyzed

File No. M9632r

RESULTS OF ANALYSIS - Solid

Sample ID		L3383-5 Baseline	L3383-10 Fly Ash Comp.
Sample Date			
Sample Time			
ALS ID		*1*	*2*
Physical Tests			
Moisture	%	66.7	42.9
Total Metals			
Aluminum	T-Al	14900	19000
Antimony	T-Sb	<40	<20
Arsenic	T-As	<200	<100
Barium	T-Ba	485	335
Beryllium	T-Be	<1	<0.5
Bismuth	T-Bi	<20	<10
Cadmium	T-Cd	<4	3
Calcium	T-Ca	66200	37200
Chromium	T-Cr	28	67
Cobalt	T-Co	8	10
Copper	T-Cu	35	840
Iron	T-Fe	14100	60000
Lead	T-Pb	<100	316
Lithium	T-Li	6	6
Magnesium	T-Mg	12300	8580
Manganese	T-Mn	2920	1500
Mercury	T-Hg	0.045	0.238
Molybdenum	T-Mo	<8	9
Nickel	T-Ni	28	62
Phosphorus	T-P	2460	1900
Potassium	T-K	13300	7400
Selenium	T-Se	<100	<50
Silver	T-Ag	<4	<2
Strontium	T-Sr	289	198
Thallium	T-Tl	<100	<50
Tin	T-Sn	<20	<10
Titanium	T-Ti	1050	1120
Vanadium	T-V	37	64
Zinc	T-Zn	429	686

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
n/a = no certified values available.
< = Less than the detection limit indicated.

4.1 QA/QC Results

Pre and Post Test Leak Checks

Each test is required to be leak checked prior to, and following the test. The leak checks must show a leak rate of less than 0.02 cfm. All tests passed the code leak check requirements. Evidence of the leak checks is shown on each data sheet of appendix 4.

Equipment Calibrations

The dry gas meters used to measure the stack gas sampled volume were calibrated before and after the field tests. The before/after calibration factors agreed within 1% for both dry gas meters used. See App. 5.

Proofing of Dioxin Glassware and Supplies

Although not required by EPA Method 23, it is our practise to verify that the glassware and sorbent used in dioxin tests is free of contamination. Proofs of the glassware and XAD are included in the analytical data of appendix 3.

Analysis of Blank Materials and Reagents

All blank materials and reagents yielded very low or non-detectable levels of target species.

Spiking and Recovery of Dioxin/Furan Surrogates

The recovery of the nine labelled internal standards ranged from 59 to 110%, thus complying with Method 23 requirements of 40 to 130%. Spiked surrogate recoveries ranged from 98 to 117%, also complying with method performance specifications of 70 to 130%. In addition, all data was recovery corrected for each congener.

Spiking and Recovery Assessments of Inorganic Samples

Blanks of all reagents used for sample collection were spiked to known contaminant concentrations and analyzed with the source samples. Normally a high and low spike was conducted. The various recoveries are reported on the analytical data in appendix 2. In summary the results are:

	High Spike % Recovery	Low Spike % Recovery
HCl	103 %	
Hg	95 %	79%
PCDD/PCDF	59 to 110 % for 9 compounds	

Audit Sample Analysis

EPA or EC audit samples were analyzed for HCl (ERA CRM), and SO_2 (C8003/M6-052). Results are

	Analyzed Value	Audit Value
ERA CRM (Lot 9978)	122 mg/l	122 mg/l
C8003/M6-052	230 (mg/dscm)(1st analysis) 234 (mg/dscm (repeat analysis)	250 mg/dscm

		Analyzed Value	Audit Value
QCP-TMS-1	Lead	833 ug/ml	810 ug/ml
	Cadmium	112	110
	Zinc	459	439

Chain of Custody

All samples were in the possession of the stack test team until relinquishing to a representative of the analytical laboratory. The samples were inspected on arrival from the field, and the shipping containers were observed to be sealed on arrival, with no apparent tampering or sample loss in shipment.

5.0 DISCUSSION OF RESULTS

This survey was a comprehensive investigation into the emission characteristics of the boiler during the firing o. normal hog fuel and chipped railroad ties.

The analytical results of the two fuels as provided in Table 8, shows the significant amount of PAH and Chlorophenols (CP) in the railroad ties, while relatively little (<0.2% of railtie amount) of either compound group was found in the regular hog fuel.

Trace metal emissions were similar for both fuel types, and all trace metal emissions were well below BC Special Waste guidelines.

The emission results showed very little dioxin emissions regardless of fuel, suggesting the boiler and APC system was capable of destroying the PAH and CP associated with the fuel.

A composite Railtie ash sample was also analyzed for total and extractable metal content. Extractable metals met the leachate quality criteria under the B.C. Special Waste Regulations. pH ranged from 5.15 (final) to 9.73 (initial).

SO_x and HCl were almost non-detectable for the regular hog fuel tests, however during the Railtie tests SO_x and HCl were found at levels very close to or above BC Special Waste guidelines.

The QA/QC program was successful in demonstrating good analytical accuracy as shown with sample spikes and reference standards, in proving the avoidance of sample contamination as evidenced by low blank analysis, in showing excellent pollutant capture efficiency, and in proving no precontamination of dioxin trains as shown in the proof analysis of XAD and glassware (appendix 3).

The emission monitoring was conducted by certified emission testing technologists, using calibrated test equipment. No significant problems were encountered in sample collection or analysis (ash CP excepted), and sampling of each sequence only commenced with the approval of TransCanada personnel.

The results, therefore, are reported with confidence and are considered to be an accurate representation of fluegas pollutant and diluent characteristics for the process conditions maintained on the test dates.

APPENDIX 1

COMPUTER OUTPUTS OF MEASURED AND CALCULATEDDATA

STANDARD VOLUME / GAS CONCENTRATION WORKSHEET

Plant:	Trans Canada Power	**Tested for:**	HCl
Location:	Stack	**DGM ID:**	LM - 3
Barometric:	27.7	**DGM Y:**	0.9889
Date:	Apr. 3 - 6, 2001		

Results Corrected to **11.0 % O2**

RUN	TIME	DRY GAS METER Reading (m3)	Temp In (Avg. oF)	Temp Out (Avg. oF)	Avg. Delta H (inches H20)	CONSTANTS Y Factor	Pb (In. Hg)	Volume Std. (m3 std.)	RESULTS Lab Result (mg of HCl)	Concentration (mg HCl/m3)	Oxygen (Vol. %)	HCl (mg/m3) Concentration (@ 11% O2)
1 (baseline)	14:07	41.7403	59.6	58.7	0.0	0.9889	27.70	0.54188	0.040	0.07	6.0	0.05
Apr. 3/01	15:07	42.3125	-	-	-	-	-					
2 (baseline)	16:30	42.8801	63.4	63.7	0.0	0.9889	27.70	0.53009	0.034	0.06	7.4	0.05
Apr. 3/01	18:08	43.4446	-	-	-	-	-					
3 (rail ties)	13:15	44.5682	61.7	63.1	0.0	0.9889	27.68	0.58185	40.21	69.1	7.5	51.1
Apr. 4/01	14:33	45.1869	-	-	-	-	-					
4 (rail ties)	12:20	45.8724	50.7	52.7	0.0	0.9889	27.32	0.56354	52.66	93.4	8.7	75.8
Apr. 5/01	13:20	46.4671	-	-	-	-	-					
5 (rail ties)	10:20	47.0635	60.0	61.3	0.0	0.9889	27.21	0.54513	44.43	81.5	5.5	52.4
Apr. 6/01	11:20	47.6512	-	-	-	-	-					

STANDARD VOLUME / GAS CONCENTRATION WORKSHEET

Plant:	Trans Canada Power	**Tested for:**	SOx
Location:	Stack	**DGM ID:**	LM - 3
Barometric:	27.7	**DGM Y:**	0.9889
Date:	Apr. 3 - 6, 2001		

Results Corrected to **11.0 % O2**

RUN	TIME	DRY GAS METER Reading (m3)	Temp In (Avg. oF)	Temp Out (Avg. oF)	Avg. Delta H (inches H20)	CONSTANTS Y Factor	Pb (in. Hg)	RESULTS Volume Std. (m3 std.)	Lab Result (mg of SOx)	Concentration (mg SOx/m3)	Oxygen (Vol. %)	SOx (mg/m3) Concentration (@ 11% O2)
1 (baseline)	15:20	42.3179	59.3	60.8	0.0	0.9889	27.70	0.52600	0.72	1.4	5.7	0.89
Apr. 3/01	16:20	42.8743	-	-	-	-	-					
2 (baseline)	18:10	43.4491	71.5	72.5	0.0	0.9889	27.70	0.46678	0.76	1.6	5.3	1.0
Apr. 3/01	19:10	43.9542	-	-	-	-	-					
3 (rail ties)	12:00	43.9745	66.9	66.1	0.0	0.9889	27.68	0.54876	116.7	213	7.5	157
Apr. 4/01	13:00	44.5626	-	-	-	-	-					
4 (rail ties)	11:15	45.2590	58.7	61.9	0.0	0.9889	27.32	0.56364	140.9	250	8.7	203
Apr. 5/01	12:15	45.8638	-	-	-	-	-					
5 (rail ties)	9:15	46.4731	56.1	57.0	0.0	0.9889	27.21	0.54740	132.8	243	5.5	156
Apr. 6/01	10:15	47.0586	-	-	-	-	-					

Client:	TransCanada Power	**Date:**	April 3, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	1 - Baseline
Source:	Power Generation Stack	**Run Time:**	13:22 - 14:30

Particulate Concentration:		12.37 mg/dscm	0.0054 gr/dscf
		6.55 mg/Acm	0.0029 gr/Acf
		8.5 mg/dscm (@ 11% O2)	0.0037 gr/dscf (@ 11% O2)
Particulate Emission Rate:		4.58 Kg/hr	10.096 lb/hr
Sample Gas Volume:		1.3425 dscm	47.410 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		103.3 %	
Flue Gas Characteristics			
	Moisture:	20.35 %	
	Temperature	141.9 oC	287.4 oF
	Flow	6172.3 dscm/min	217975 dscf/min
		102.87 dscm/sec	3632.9 dscf/sec
		11660.4 Acm/min	411787 Acf/min
	Velocity	20.140 m/sec	66.07 f/sec
	Gas Analysis	6.45 % O2	14.25 % CO2
		30.538 Mol. Wt (g/gmole) Dry	27.986 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

Client:	TransCanada Power	**Date:**	April 3, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	1 - Baseline
Source:	Power Generation Stack	**Run Time:**	13:22 - 14:30

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2585
Pitot Factor	0.8402
Baro. Press. (in. Hg)	27.70
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.0075
Washings (grams)	0.0091
Impinger (grams)	0.0000
Total (grams)	0.0166

Gas Analysis (Vol. %):

	CO2	O2
	13.00	7.00
	14.00	7.00
	15.00	6.00
	15.00	5.80
Average =	14.25	6.45

Condensate Collection:

Impinger 1 (grams)	168.0
Impinger 2 (grams)	66.0
Impinger 3 (grams)	7.0
Impinger 4 (grams)	3.0
Impinger 5 (grams)	0.0
Impinger 6 (grams)	8.4
Total Gain (grams)	252.4

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	467.344											
1	1	5.0	471.350	0.770	2.06	77	68	2	250	240	41	287	40.9	103.0
	2	10.0	475.750	0.920	2.46	81	69	2	250	240	41	289	20.2	103.2
	3	15.0	479.960	0.840	2.24	83	69	2	250	240	41	289	6.1	103.1
		0.0	479.960											
2	1	5.0	483.720	0.670	1.79	81	69	2	250	240	41	286	40.9	103.0
	2	10.0	487.780	0.780	2.08	84	69	2	250	240	41	290	20.2	103.1
	3	15.0	491.710	0.730	1.95	85	70	2	250	240	41	287	6.1	102.7
		0.0	491.710											
3	1	5.0	496.430	1.050	2.80	83	70	2	250	240	41	287	40.9	103.3
	2	10.0	501.140	1.050	2.80	86	70	2	250	240	41	286	20.2	102.7
	3	15.0	505.630	0.930	2.50	86	70	2	250	240	41	286	6.1	104.0
		0.0	505.630											
4	1	5.0	510.280	1.000	2.69	84	71	2	250	240	41	288	40.9	104.1
	2	10.0	514.830	0.960	2.58	87	72	2	250	240	41	288	20.2	103.6
	3	15.0	519.200	0.880	2.37	87	72	2	250	240	41	286	6.1	103.7
			Average:	0.882	2.360	83.7	69.9	2.0	250.0	240.0	41.0	287.4		103.3

Client:	TransCanada Power	**Date:**	April 4, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	2 - Baseline
Source:	Power Generation Stack	**Run Time:**	09:30 - 10:36

Particulate Concentration:		5.89 mg/dscm	0.0026 gr/dscf
		3.00 mg/Acm	0.0013 gr/Acf
		3.8 mg/dscm (@ 11% O2)	0.0016 gr/dscf (@ 11% O2)
Particulate Emission Rate:		2.12 Kg/hr	4.664 lb/hr
Sample Gas Volume:		1.3252 dscm	46.801 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		105.2 %	
Flue Gas Characteristics			
	Moisture:	21.87 %	
	Temperature	149.2 oC	300.6 oF
	Flow	5990.1 dscm/min	211541 dscf/min
		99.84 dscm/sec	3525.7 dscf/sec
		11747.4 Acm/min	414860 Acf/min
	Velocity	20.290 m/sec	66.57 f/sec
	Gas Analysis	5.38 % O2	15.25 % CO2
		30.655 Mol. Wt (g/gmole) Dry	27.888 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

Client:	TransCanada Power	**Date:**	April 4, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	2 - Baseline
Source:	Power Generation Stack	**Run Time:**	09:30 - 10:36

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2585
Pitot Factor	0.8402
Baro. Press. (in. Hg)	27.68
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.0038
Washings (grams)	0.0040
Impinger (grams)	0.0000
Total (grams)	0.0078

Gas Analysis (Vol. %):

	CO2	O2
	16.00	5.00
	16.00	4.50
	14.00	6.50
	15.00	5.50
Average =	15.25	5.38

Condensate Collection:

Impinger 1 (grams)	152.0
Impinger 2 (grams)	84.0
Impinger 3 (grams)	22.0
Impinger 4 (grams)	6.0
Impinger 5 (grams)	1.0
Impinger 6 (grams)	7.9
Total Gain (grams)	272.9

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Temperatures Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	705.210											
1	1	5.0	709.820	1.030	2.70	83	74	2	250	240	41	311	40.9	104.9
	2	10.0	714.490	1.050	2.75	90	78	2	250	240	41	306	20.2	103.8
	3	15.0	719.050	0.960	2.56	91	77	2	250	240	41	302	6.1	105.7
		0.0	719.050											
2	1	5.0	722.850	0.670	1.79	89	77	2	250	240	41	300	40.9	105.3
	2	10.0	726.920	0.730	1.95	93	78	2	250	240	41	301	20.2	107.6
	3	15.0	730.540	0.640	1.71	90	75	2	250	240	41	298	6.1	102.5
		0.0	730.540											
3	1	5.0	734.390	0.730	1.90	71	58	2	250	240	41	298	40.9	105.7
	2	10.0	738.840	0.980	2.55	74	58	2	250	240	41	299	20.2	105.4
	3	15.0	742.910	0.820	2.13	75	58	2	250	240	41	297	6.1	105.0
		0.0	742.910											
4	1	5.0	747.350	0.970	2.52	72	58	2	250	240	41	297	40.9	105.7
	2	10.0	751.890	1.020	2.65	76	59	2	250	240	41	299	20.2	105.1
	3	15.0	756.230	0.930	2.42	76	59	2	250	240	41	299	6.1	105.2
			Average:	0.878	2.303	81.7	67.4	2.0	250.0	240.0	41.0	300.6		105.2

Client:	TransCanada Power	**Date:**	April 4, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	3 - Rail Ties
Source:	Power Generation Stack	**Run Time:**	16:00 - 17:06

Particulate Concentration:		8.12 mg/dscm	0.0035 gr/dscf
		4.29 mg/Acm	0.0019 gr/Acf
		6.1 mg/dscm (@ 11% O2)	0.0027 gr/dscf (@ 11% O2)
Particulate Emission Rate:		2.88 Kg/hr	6.358 lb/hr
Sample Gas Volume:		1.2440 dscm	43.933 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		99.8 %	
Flue Gas Characteristics			
	Moisture:	19.63 %	
	Temperature	146.5 oC	295.7 oF
	Flow	5920.1 dscm/min	209070 dscf/min
		98.67 dscm/sec	3484.5 dscf/sec
		11214.4 Acm/min	396036 Acf/min
	Velocity	19.369 m/sec	63.55 f/sec
	Gas Analysis	7.75 % O2	12.75 % CO2
		30.350 Mol. Wt (g/gmole) Dry	27.925 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

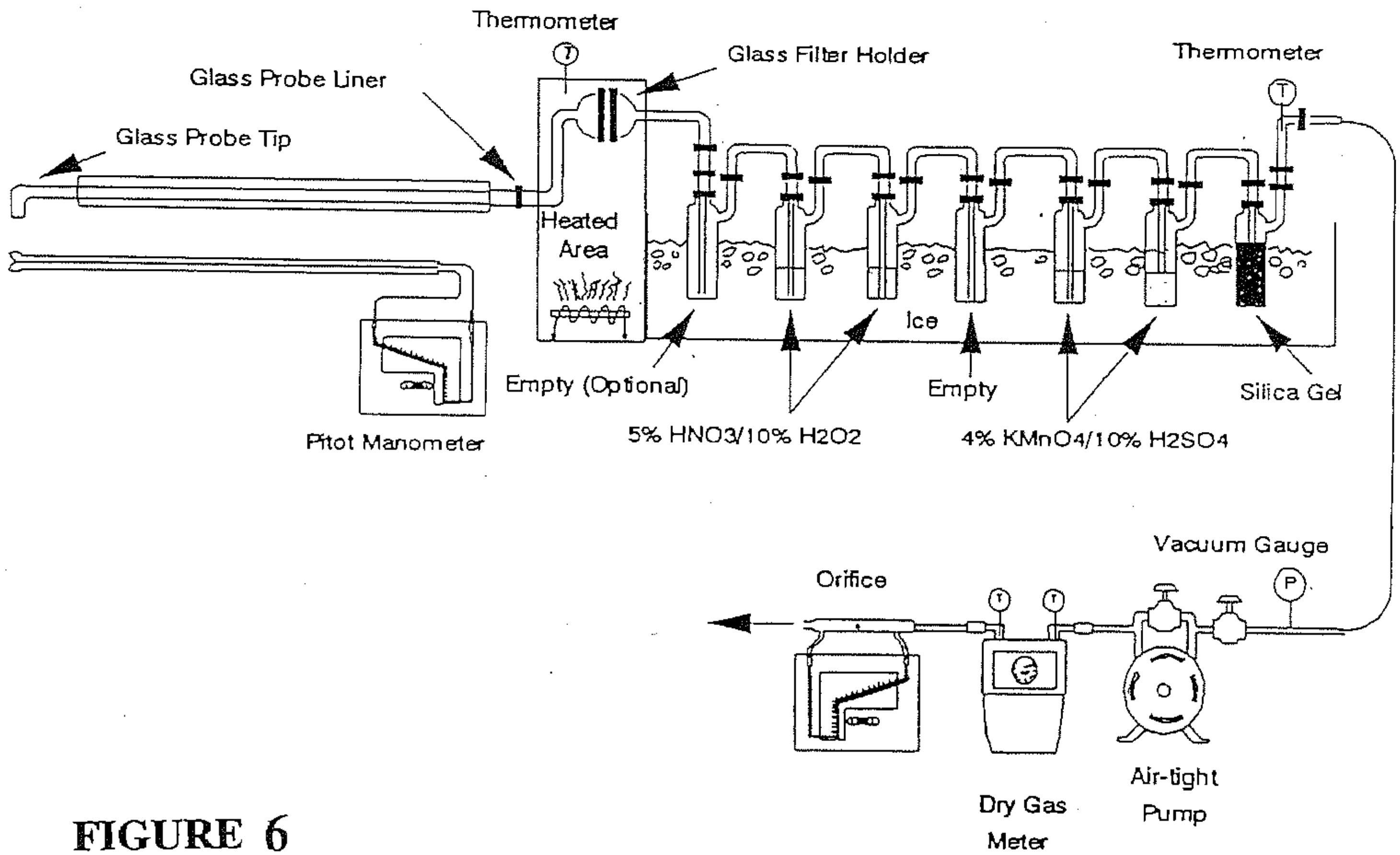


FIGURE 6

Multiple Metals Sampling Train

TABLE 4 Detailed PCDD/PCDF Emission Results

Component	TEF	Test 1 (Baseline) Analyzed (ng)	Test 1 (Baseline) TEQ (ng)	Test 1 (Railtie) Analyzed (ng)	Test 1 (Railtie) TEQ (ng)	Test 2 (Railtie) Analyzed (ng)	Test 2 (Railtie) TEQ (ng)	Test 3 (Railtie) Analyzed (ng)	Test 3 (Railtie) TEQ (ng)
2378 TCDD	1.0000	0.0042	0.0042	0.0038	0.0038	0.0054	0.0054	0.0000	0.0000
12378 PCDD	0.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
123478 HxCDD	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0035	0.0004
123678 HxCDD	0.1000	0.0000	0.0000	0.0077	0.0008	0.0120	0.0012	0.0037	0.0004
123789 HxCDD	0.1000	0.0000	0.0000	0.0110	0.0011	0.0000	0.0000	0.0000	0.0000
1234678 HpCDD	0.0100	0.0000	0.0000	0.0460	0.0005	0.0560	0.0006	0.0270	0.0003
OCDD	0.0010	0.0310	0.0000	0.0710	0.0001	0.1300	0.0001	0.0000	0.0000
2378 TCDF	0.1000	0.0320	0.0032	0.0820	0.0082	0.0820	0.0082	0.0260	0.0026
12378 PCDF	0.0500	0.0000	0.0000	0.0150	0.0008	0.0180	0.0009	0.0067	0.0003
23478 PCDF	0.5000	0.0000	0.0000	0.0000	0.0000	0.0220	0.0110	0.0000	0.0000
123478 HxCDF	0.1000	0.0000	0.0000	0.0000	0.0000	0.0130	0.0013	0.0086	0.0009
123678 HxCDF	0.1000	0.0000	0.0000	0.0110	0.0011	0.0110	0.0011	0.0049	0.0005
234678 HxCDF	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
123789 HxCDF	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1234678 HpCDF	0.0100	0.0000	0.0000	0.0190	0.0002	0.0190	0.0002	0.0000	0.0000
1234789 HpCDF	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OCDF	0.0010	0.0000	0.0000	0.0000	0.0000	0.0120	0.0000	0.0083	0.0000

		Test 1 (Baseline)	Test 1 (Railtie)	Test 2 (Railtie)	Test 3 (Railtie)
Summed PCDD & PCDF TEQ (ng)		0.0074	0.0164	0.0300	0.0053
Sample Volume (dscm)		3.9966	3.8288	3.8787	2.8474
PCDD & PCDF TEQ	**ng/dscm**	0.0019	0.0043	0.0077	0.0019
PCDD & PCDF TEQ	**ng/dscm (@11% O2)**	**0.0013**	**0.0030**	**0.0061**	**0.0012**
PCDD & PCDF TEQ	**grams/day**	0.00002	0.00004	0.00007	0.00001
Flowrate (dscm/min)		5871	5755	5888	5472
Oxygen (Vol. %)		6.3	6.9	8.3	5.6
Carbon Dioxide (Vol. %)		14.1	13.7	12.1	14.8
Moisture (Vol. %)		19.8	20.5	19.7	22.0
Temperature (oC)		151	148	141	139
Isokinetic Variation (%)		103.3	100.9	99.9	105.2

STANDARD VOLUME / GAS CONCENTRATION WORKSHEET

Plant:	Trans Canada Power	**Tested for:**	HCl
Location:	Stack	**DGM ID:**	LM - 3
Barometric:	27.7	**DGM Y:**	0.9889
Date:	Apr. 3 - 6, 2001		

Results Corrected to **11.0 % O2**

RUN	TIME	DRY GAS METER Reading (m3)	Temp In (Avg. oF)	Temp Out (Avg. oF)	Avg. Delta H (inches H20)	CONSTANTS Y Factor	Pb (In. Hg)	Volume Std. (m3 std.)	RESULTS Lab Result (mg of HCl)	Concentration (mg HCl/m3)	Oxygen (Vol. %)	HCl (mg/m3) Concentration (@ 11% O2)
1 (baseline)	14:07	41.7403	59.6	58.7	0.0	0.9889	27.70	0.54188	0.040	0.07	6.0	0.05
Apr. 3/01	15:07	42.3125	-	-	-	-	-					
2 (baseline)	16:30	42.8801	63.4	63.7	0.0	0.9889	27.70	0.53009	0.034	0.06	7.4	0.05
Apr. 3/01	18:08	43.4446	-	-	-	-	-					
3 (rail ties)	13:15	44.5682	61.7	63.1	0.0	0.9889	27.68	0.58185	40.21	69.1	7.5	51.1
Apr. 4/01	14:33	45.1869	-	-	-	-	-					
4 (rail ties)	12:20	45.8724	50.7	52.7	0.0	0.9889	27.32	0.56354	52.66	93.4	8.7	75.8
Apr. 5/01	13:20	46.4671	-	-	-	-	-					
5 (rail ties)	10:20	47.0635	60.0	61.3	0.0	0.9889	27.21	0.54513	44.43	81.5	5.5	52.4
Apr. 6/01	11:20	47.6512	-	-	-	-	-					

STANDARD VOLUME / GAS CONCENTRATION WORKSHEET

Plant:	Trans Canada Power	**Tested for:**	SOx
Location:	Stack	**DGM ID:**	LM - 3
Barometric:	27.7	**DGM Y:**	0.9889
Date:	Apr. 3 - 6, 2001		

Results Corrected to **11.0 % O2**

RUN	TIME	DRY GAS METER Reading (m3)	Temp In (Avg. oF)	Temp Out (Avg. oF)	Avg. Delta H (inches H20)	CONSTANTS Y Factor	Pb (in. Hg)	Volume Std. (m3 std.)	RESULTS Lab Result (mg of SOx)	Concentration (mg SOx/m3)	Oxygen (Vol. %)	SOx (mg/m3) Concentration (@ 11% O2)
1 (baseline)	15:20	42.3179	59.3	60.8	0.0	0.9889	27.70	0.52600	0.72	1.4	5.7	0.89
Apr. 3/01	16:20	42.8743	-	-	-	-	-					
2 (baseline)	18:10	43.4491	71.5	72.5	0.0	0.9889	27.70	0.46678	0.76	1.6	5.3	1.0
Apr. 3/01	19:10	43.9542	-	-	-	-	-					
3 (rail ties)	12:00	43.9745	66.9	66.1	0.0	0.9889	27.68	0.54876	116.7	213	7.5	157
Apr. 4/01	13:00	44.5626	-	-	-	-	-					
4 (rail ties)	11:15	45.2590	58.7	61.9	0.0	0.9889	27.32	0.56364	140.9	250	8.7	203
Apr. 5/01	12:15	45.8638	-	-	-	-	-					
5 (rail ties)	9:15	46.4731	56.1	57.0	0.0	0.9889	27.21	0.54740	132.8	243	5.5	156
Apr. 6/01	10:15	47.0586	-	-	-	-	-					

Client:	TransCanada Power	**Date:**	April 3, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	1 - Baseline
Source:	Power Generation Stack	**Run Time:**	13:22 - 14:30

Particulate Concentration:		12.37 mg/dscm	0.0054 gr/dscf
		6.55 mg/Acm	0.0029 gr/Acf
		8.5 mg/dscm (@ 11% O2)	0.0037 gr/dscf (@ 11% O2)
Particulate Emission Rate:		4.58 Kg/hr	10.096 lb/hr
Sample Gas Volume:		1.3425 dscm	47.410 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		103.3 %	
Flue Gas Characteristics			
	Moisture:	20.35 %	
	Temperature	141.9 oC	287.4 oF
	Flow	6172.3 dscm/min	217975 dscf/min
		102.87 dscm/sec	3632.9 dscf/sec
		11660.4 Acm/min	411787 Acf/min
	Velocity	20.140 m/sec	66.07 f/sec
	Gas Analysis	6.45 % O2	14.25 % CO2
		30.538 Mol. Wt (g/gmole) Dry	27.986 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

Client:	TransCanada Power	**Date:**	April 3, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	1 - Baseline
Source:	Power Generation Stack	**Run Time:**	13:22 - 14:30

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2585
Pitot Factor	0.8402
Baro. Press. (in. Hg)	27.70
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.0075
Washings (grams)	0.0091
Impinger (grams)	0.0000
Total (grams)	0.0166

Gas Analysis (Vol. %):

	CO2	O2
	13.00	7.00
	14.00	7.00
	15.00	6.00
	15.00	5.80
Average =	14.25	6.45

Condensate Collection:

Impinger 1 (grams)	168.0
Impinger 2 (grams)	66.0
Impinger 3 (grams)	7.0
Impinger 4 (grams)	3.0
Impinger 5 (grams)	0.0
Impinger 6 (grams)	8.4
Total Gain (grams)	252.4

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Temperatures Impinger (oF)	Temperatures Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	467.344											
1	1	5.0	471.350	0.770	2.06	77	68	2	250	240	41	287	40.9	103.0
	2	10.0	475.750	0.920	2.46	81	69	2	250	240	41	289	20.2	103.2
	3	15.0	479.960	0.840	2.24	83	69	2	250	240	41	289	6.1	103.1
		0.0	479.960											
2	1	5.0	483.720	0.670	1.79	81	69	2	250	240	41	286	40.9	103.0
	2	10.0	487.780	0.780	2.08	84	69	2	250	240	41	290	20.2	103.1
	3	15.0	491.710	0.730	1.95	85	70	2	250	240	41	287	6.1	102.7
		0.0	491.710											
3	1	5.0	496.430	1.050	2.80	83	70	2	250	240	41	287	40.9	103.3
	2	10.0	501.140	1.050	2.80	86	70	2	250	240	41	286	20.2	102.7
	3	15.0	505.630	0.930	2.50	86	70	2	250	240	41	286	6.1	104.0
		0.0	505.630											
4	1	5.0	510.280	1.000	2.69	84	71	2	250	240	41	288	40.9	104.1
	2	10.0	514.830	0.960	2.58	87	72	2	250	240	41	288	20.2	103.6
	3	15.0	519.200	0.880	2.37	87	72	2	250	240	41	286	6.1	103.7
			Average:	0.882	2.360	83.7	69.9	2.0	250.0	240.0	41.0	287.4		103.3

Client:	TransCanada Power	**Date:**	April 4, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	2 - Baseline
Source:	Power Generation Stack	**Run Time:**	09:30 - 10:36

Particulate Concentration:		5.89 mg/dscm	0.0026 gr/dscf
		3.00 mg/Acm	0.0013 gr/Acf
		3.8 mg/dscm (@ 11% O2)	0.0016 gr/dscf (@ 11% O2)
Particulate Emission Rate:		2.12 Kg/hr	4.664 lb/hr
Sample Gas Volume:		1.3252 dscm	46.801 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		105.2 %	
Flue Gas Characteristics			
	Moisture:	21.87 %	
	Temperature	149.2 oC	300.6 oF
	Flow	5990.1 dscm/min	211541 dscf/min
		99.84 dscm/sec	3525.7 dscf/sec
		11747.4 Acm/min	414860 Acf/min
	Velocity	20.290 m/sec	66.57 f/sec
	Gas Analysis	5.38 % O2	15.25 % CO2
		30.655 Mol. Wt (g/gmole) Dry	27.888 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

Client:	TransCanada Power	**Date:**	April 4, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	2 - Baseline
Source:	Power Generation Stack	**Run Time:**	09:30 - 10:36

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2585
Pitot Factor	0.8402
Baro. Press. (in. Hg)	27.68
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.0038
Washings (grams)	0.0040
Impinger (grams)	0.0000
Total (grams)	0.0078

Gas Analysis (Vol. %):

	CO2	O2
	16.00	5.00
	16.00	4.50
	14.00	6.50
	15.00	5.50
Average =	15.25	5.38

Condensate Collection:

Impinger 1 (grams)	152.0
Impinger 2 (grams)	84.0
Impinger 3 (grams)	22.0
Impinger 4 (grams)	6.0
Impinger 5 (grams)	1.0
Impinger 6 (grams)	7.9
Total Gain (grams)	272.9

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Temperatures Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	705.210											
1	1	5.0	709.820	1.030	2.70	83	74	2	250	240	41	311	40.9	104.9
	2	10.0	714.490	1.050	2.75	90	78	2	250	240	41	306	20.2	103.8
	3	15.0	719.050	0.960	2.56	91	77	2	250	240	41	302	6.1	105.7
		0.0	719.050											
2	1	5.0	722.850	0.670	1.79	89	77	2	250	240	41	300	40.9	105.3
	2	10.0	726.920	0.730	1.95	93	78	2	250	240	41	301	20.2	107.6
	3	15.0	730.540	0.640	1.71	90	75	2	250	240	41	298	6.1	102.5
		0.0	730.540											
3	1	5.0	734.390	0.730	1.90	71	58	2	250	240	41	298	40.9	105.7
	2	10.0	738.840	0.980	2.55	74	58	2	250	240	41	299	20.2	105.4
	3	15.0	742.910	0.820	2.13	75	58	2	250	240	41	297	6.1	105.0
		0.0	742.910											
4	1	5.0	747.350	0.970	2.52	72	58	2	250	240	41	297	40.9	105.7
	2	10.0	751.890	1.020	2.65	76	59	2	250	240	41	299	20.2	105.1
	3	15.0	756.230	0.930	2.42	76	59	2	250	240	41	299	6.1	105.2
			Average:	0.878	2.303	81.7	67.4	2.0	250.0	240.0	41.0	300.6		105.2

Client:	TransCanada Power	**Date:**	April 4, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	3 - Rail Ties
Source:	Power Generation Stack	**Run Time:**	16:00 - 17:06

Particulate Concentration:		8.12 mg/dscm	0.0035 gr/dscf
		4.29 mg/Acm	0.0019 gr/Acf
		6.1 mg/dscm (@ 11% O2)	0.0027 gr/dscf (@ 11% O2)
Particulate Emission Rate:		2.88 Kg/hr	6.358 lb/hr
Sample Gas Volume:		1.2440 dscm	43.933 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		99.8 %	
Flue Gas Characteristics			
	Moisture:	19.63 %	
	Temperature	146.5 oC	295.7 oF
	Flow	5920.1 dscm/min	209070 dscf/min
		98.67 dscm/sec	3484.5 dscf/sec
		11214.4 Acm/min	396036 Acf/min
	Velocity	19.369 m/sec	63.55 f/sec
	Gas Analysis	7.75 % O2	12.75 % CO2
		30.350 Mol. Wt (g/gmole) Dry	27.925 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

Client:	TransCanada Power	**Date:**	April 4, 2001
Jobsite:	Williams Lake ; B.C.	**Run:**	3 - Rail Ties
Source:	Power Generation Stack	**Run Time:**	16:00 - 17:06

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2585
Pitot Factor	0.8402
Baro. Press. (in. Hg)	27.68
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.0046
Washings (grams)	0.0055
Impinger (grams)	0.0000
Total (grams)	0.0101

Gas Analysis (Vol. %):

	CO2	O2
	13.00	7.50
	12.00	8.50
	13.00	7.50
	13.00	7.50
Average =	12.75	7.75

Condensate Collection:

Impinger 1 (grams)	182.0
Impinger 2 (grams)	30.0
Impinger 3 (grams)	2.0
Impinger 4 (grams)	1.0
Impinger 5 (grams)	0.0
Impinger 6 (grams)	8.6
Total Gain (grams)	223.6

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	908.250											
1	1	5.0	912.610	0.920	2.36	86	79	2	250	240	41	295	40.9	100.2
	2	10.0	917.160	1.000	2.57	92	81	2	250	240	41	295	20.2	99.6
	3	15.0	921.430	0.880	2.26	95	82	2	250	240	41	294	6.1	99.1
		0.0	921.430											
2	1	5.0	925.800	0.900	2.33	91	83	2	250	240	41	296	40.9	100.7
	2	10.0	930.300	0.960	2.49	98	83	2	250	240	41	295	20.2	99.8
	3	15.0	934.470	0.820	2.12	99	83	2	250	240	41	293	6.1	99.7
		0.0	934.470											
3	1	5.0	937.820	0.530	1.37	95	83	2	250	240	41	292	40.9	99.8
	2	10.0	941.670	0.700	1.81	98	85	2	250	240	41	296	20.2	99.7
	3	15.0	945.380	0.650	1.68	98	85	2	250	240	41	295	6.1	99.6
		0.0	945.380											
4	1	5.0	949.140	0.670	1.74	93	85	2	250	240	41	297	40.9	100.0
	2	10.0	953.480	0.890	2.31	99	85	2	250	240	41	300	20.2	100.0
	3	15.0	957.490	0.760	1.97	99	85	2	250	240	41	300	6.1	99.9
			Average:	0.807	2.084	95.3	83.3	2.0	250.0	240.0	41.0	295.7		99.8

Client:	TransCanada Power	**Date:**	April 5, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	4 - Rail Ties
Source:	Power Generation Stack	**Run Time:**	15:22 - 16:28

Particulate Concentration:		0.65 mg/dscm	0.0003 gr/dscf
		0.34 mg/Acm	0.0001 gr/Acf
		0.5 mg/dscm (@ 11% O2)	0.0002 gr/dscf (@ 11% O2)
Particulate Emission Rate:		0.23 Kg/hr	0.498 lb/hr
Sample Gas Volume:		1.2316 dscm	43.494 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		100.9 %	
Flue Gas Characteristics			
	Moisture:	20.60 %	
	Temperature	140.2 oC	284.4 oF
	Flow	5794.8 dscm/min	204645 dscf/min
		96.58 dscm/sec	3410.8 dscf/sec
		11089.5 Acm/min	391627 Acf/min
	Velocity	19.154 m/sec	62.84 f/sec
	Gas Analysis	9.00 % O2	12.00 % CO2
		30.280 Mol. Wt (g/gmole) Dry	27.750 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

Client:	TransCanada Power	**Date:**	April 5, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	4 - Rail Ties
Source:	Power Generation Stack	**Run Time:**	15:22 - 16:28

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2585
Pitot Factor	0.8402
Baro. Press. (in. Hg)	27.32
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.0003
Washings (grams)	0.0005
Impinger (grams)	0.0000
Total (grams)	0.0008

Gas Analysis (Vol. %):

	CO2	O2
	12.00	9.00
	12.00	9.00
	12.00	9.00
Average =	12.00	9.00

Condensate Collection:

Impinger 1 (grams)	194.0
Impinger 2 (grams)	31.0
Impinger 3 (grams)	2.0
Impinger 4 (grams)	0.0
Impinger 5 (grams)	0.0
Impinger 6 (grams)	8.1
Total Gain (grams)	235.1

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	152.400											
1	1	5.0	156.910	0.940	2.52	72	77	2	250	240	41	281	40.9	103.4
	2	10.0	161.210	0.870	2.31	88	78	2	250	240	41	285	20.2	101.1
	3	15.0	165.440	0.850	2.25	88	78	2	250	240	41	285	6.1	100.6
		0.0	165.440											
2	1	5.0	169.210	0.670	1.78	85	78	2	250	240	41	286	40.9	101.2
	2	10.0	173.300	0.790	2.09	88	78	2	250	240	41	284	20.2	100.8
	3	15.0	177.200	0.720	1.91	89	78	2	250	240	41	284	6.1	100.5
		0.0	177.200											
3	1	5.0	180.580	0.540	1.43	86	76	2	250	240	41	285	40.9	101.0
	2	10.0	184.230	0.630	1.67	90	77	2	250	240	41	286	20.2	100.6
	3	15.0	187.760	0.590	1.56	91	78	2	250	240	41	283	6.1	100.1
		0.0	187.760											
4	1	5.0	192.290	0.970	2.57	85	78	2	250	240	41	285	40.9	101.2
	2	10.0	196.940	1.020	2.70	93	78	2	250	240	41	285	20.2	100.6
	3	15.0	201.180	0.850	2.25	93	78	2	250	240	41	284	6.1	100.3
			Average:	0.787	2.087	87.3	77.7	2.0	250.0	240.0	41.0	284.4		100.9

Client:	TransCanada Power	**Date:**	April 6, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	5 - Rail Ties
Source:	Power Generation Stack	**Run Time:**	11:50 - 12:56

Particulate Concentration:		0.24 mg/dscm	0.0001 gr/dscf
		0.13 mg/Acm	0.0001 gr/Acf
		0.2 mg/dscm (@ 11% O2)	0.0001 gr/dscf (@ 11% O2)
Particulate Emission Rate:		0.08 Kg/hr	0.160 lb/hr
Sample Gas Volume:		1.2326 dscm	43.531 dscf
Total Sample Time:		60.0 minutes	
Average Isokineticity:		104.5 %	
Flue Gas Characteristics			
	Moisture:	21.03 %	
	Temperature	141.4 oC	286.6 oF
	Flow	5603.1 dscm/min	197875 dscf/min
		93.39 dscm/sec	3297.9 dscf/sec
		10856.1 Acm/min	383381 Acf/min
	Velocity	18.751 m/sec	61.52 f/sec
	Gas Analysis	7.75 % O2	13.00 % CO2
		30.390 Mol. Wt (g/gmole) Dry	27.784 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

Client:	TransCanada Power	**Date:**	April 6, 2001
Jobsite:	Williams Lake , B.C.	**Run:**	5 - Rail Ties
Source:	Power Generation Stack	**Run Time:**	11:50 - 12:56

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2585
Pitot Factor	0.8402
Baro. Press. (in. Hg)	27.21
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.0000
Washings (grams)	0.0003
Impinger (grams)	0.0000
Total (grams)	0.0003

Gas Analysis (Vol. %):

	CO2	O2
	13.00	7.50
	13.00	7.50
	13.00	8.00
	13.00	8.00
Average =	13.00	7.75

Condensate Collection:

Impinger 1 (grams)	201.0
Impinger 2 (grams)	30.0
Impinger 3 (grams)	2.0
Impinger 4 (grams)	0.0
Impinger 5 (grams)	0.0
Impinger 6 (grams)	8.5
Total Gain (grams)	241.5

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Temperatures Impinger (oF)	Temperatures Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	328.420											
1	1	5.0	332.640	0.840	2.23	66	56	2	250	240	41	288	40.9	105.8
	2	10.0	337.020	0.910	2.41	73	60	2	250	240	41	286	20.2	104.3
	3	15.0	340.970	0.730	1.93	73	61	2	250	240	41	286	6.1	104.8
		0.0	340.970											
2	1	5.0	345.390	0.920	2.44	68	60	2	250	240	41	287	40.9	105.3
	2	10.0	349.920	0.970	2.57	75	61	2	250	240	41	288	20.2	104.4
	3	15.0	354.080	0.820	2.17	75	61	2	250	240	41	288	6.1	104.2
		0.0	354.080											
3	1	5.0	357.430	0.530	1.40	69	59	2	250	240	41	283	40.9	104.6
	2	10.0	361.110	0.640	1.70	72	61	2	250	240	41	288	20.2	104.5
	3	15.0	364.610	0.580	1.54	73	60	2	250	240	41	287	6.1	104.3
		0.0	364.610											
4	1	5.0	368.060	0.580	1.48	70	60	2	250	240	41	284	40.9	102.8
	2	10.0	372.040	0.750	1.99	73	60	2	250	240	41	287	20.2	104.4
	3	15.0	375.940	0.720	1.91	73	60	2	250	240	41	287	6.1	104.4
			Average:	0.749	1.981	71.7	59.9	2.0	250.0	240.0	41.0	286.6		104.5

Client:	Trans Canada Power	**Date:**	April 3, 2001
Jobsite:	William's Lake, B.C.	**Run:**	1 PCDD/PCDF (Baseline)
Source:	Stack	**Run Time:**	14:48 - 19:38

Concentration:		0.00 mg/dscm	0.0000 gr/dscf
		0.00 mg/Acm	0.0000 gr/Acf
		0.00 mg/dscm (@ 11% O2)	0.0000 gr/dscf (@ 11% O2)
Emission Rate:		0.00 Kg/hr	0.000 lb/hr
Sample Gas Volume:		3.9966 dscm	141.138 dscf
Total Sample Time:		240.0 minutes	
Average Isokineticity:		103.3 %	
Flue Gas Characteristics			
	Moisture:	19.82 %	
	Temperature	150.6 oC	303.1 oF
	Flow	5871.1 dscm/min	207338 dscf/min
		97.85 dscm/sec	3455.6 dscf/sec
		11355.3 Acm/min	401013 Acf/min
	Velocity	19.613 m/sec	64.35 f/sec
	Gas Analysis	6.30 % O2	14.10 % CO2
		30.508 Mol. Wt (g/gmole) Dry	27.943 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

A. Lan. .co and Associates Inc. - Emission Report

Client: Trans Canada Power
Jobsite: William's Lake, B.C.
Source: Stack

Date: April 3, 2001
Run: 1 PCDD/PCDF
Run Time: 14:48 - 19:38

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2288
Pitot Factor	0.8394
Baro. Press. (in. Hg)	27.70
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	20.0

Collection:

Filter (grams)	0.0000
Washings (grams)	0.0000
Impinger (grams)	0.0000
Total (grams)	0.0000

Gas Analysis (Vol. %):

	CO2	O2
	14.10	6.30
	14.10	6.30
	14.10	6.30
Average =	14.10	6.30

Condensate Collection:

Impinger 1 (grams)	450.0
Impinger 2 (grams)	293.0
Impinger 3 (grams)	14.0
Impinger 4 (grams)	11.8
Total Gain (grams)	768.8

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Temperatures Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	520.031											
1	0	5.0	523.210	0.770	1.27	76	69	2	250	250	50	305	6.1	105.4
		10.0	526.430	0.770	1.27	95	90	2	250	250	50	305	6.1	102.9
		15.0	529.680	0.750	1.28	105	95	2	250	250	50	304	6.1	103.8
		20.0	532.910	0.730	1.26	109	97	2	250	250	50	310	6.1	104.4
	1	25.0	536.440	0.870	1.51	108	97	2	250	250	50	308	20.2	104.5
		30.0	540.100	0.940	1.64	108	96	2	250	250	50	306	20.2	104.3
		35.0	543.770	0.940	1.64	108	96	2	250	250	50	306	20.2	104.6
		40.0	547.350	0.900	1.56	109	96	2	250	250	50	305	20.2	104.1
	2	45.0	550.880	0.870	1.50	109	96	2	250	250	50	307	40.9	104.5
		50.0	554.470	0.910	1.57	108	96	2	250	250	50	306	40.9	103.9
		55.0	558.110	0.920	1.59	108	97	2	250	250	50	308	40.9	104.9
		60.0	561.740	0.920	1.59	109	97	2	250	250	50	310	40.9	104.6
		0.0	561.740											
2	0	5.0	564.810	0.570	0.99	104	95	2	250	250	50	308	6.1	112.8
		10.0	567.770	0.610	1.06	106	96	2	250	250	50	309	6.1	104.9
		15.0	570.770	0.630	1.09	107	95	2	250	250	50	309	6.1	104.6
		20.0	573.720	0.610	1.06	107	95	2	250	250	50	309	6.1	104.6
	1	25.0	576.920	0.720	1.25	107	95	2	250	250	50	308	20.2	104.4
		30.0	580.200	0.750	1.30	107	96	5	250	250	50	307	20.2	104.7
		35.0	583.420	0.730	1.26	107	95	2	250	250	50	307	20.2	104.2
		40.0	586.660	0.730	1.26	107	96	2	250	250	50	307	20.2	104.8
	2	45.0	589.760	0.680	1.18	108	96	2	250	250	50	305	40.9	103.6
		50.0	592.870	0.670	1.16	107	97	2	250	250	50	304	40.9	104.7
		55.0	595.940	0.660	1.14	107	97	2	250	250	50	305	40.9	104.2
		60.0	599.010	0.660	1.14	107	97	2	250	250	50	305	40.9	104.2
		0.0	599.010											
3	0	5.0	602.690	0.950	1.64	103	98	2	250	250	50	305	6.1	104.5
		10.0	606.080	0.800	1.38	107	97	2	250	250	50	304	6.1	104.5
		15.0	609.340	0.750	1.30	107	97	2	250	250	50	302	6.1	103.6
		20.0	612.510	0.700	1.21	92	91	2	250	250	50	284	6.1	105.0
	1	25.0	615.770	0.820	1.37	97	93	2	250	250	50	288	20.2	99.4
		30.0	619.000	0.770	1.29	100	94	2	250	250	50	290	20.2	101.4
		35.0	622.250	0.770	1.31	102	94	2	250	250	50	292	20.2	102.0
		40.0	625.730	0.840	1.45	103	94	2	250	250	50	293	20.2	104.6
	2	45.0	629.120	0.840	1.45	103	94	2	250	250	50	292	40.9	101.8
		50.0	632.470	0.820	1.39	104	93	2	250	250	50	294	40.9	101.9
		[illegible]	[illegible]											

		55.0	635.820	0.820	1.39	104	93	2	250	250	50	294	40.9	101.9
		60.0	639.180	0.820	1.39	104	93	2	250	250	50	294	40.9	102.3
		0.0	639.180											
4	0	5.0	642.800	0.990	1.68	105	94	2	250	250	50	303	6.1	100.8
		10.0	646.440	0.980	1.67	105	94	2	250	250	50	302	6.1	101.8
		15.0	650.140	1.040	1.77	105	94	2	250	250	50	304	6.1	100.6
		20.0	653.740	0.980	1.67	105	94	2	250	250	50	305	6.1	100.8
	1	25.0	657.360	0.960	1.63	105	94	2	250	250	50	305	20.2	102.4
		30.0	660.880	0.950	1.62	106	94	2	250	250	50	305	20.2	100.0
		35.0	664.510	0.990	1.68	106	94	2	250	250	50	306	20.2	101.1
		40.0	668.120	0.980	1.67	106	94	2	250	250	50	306	20.2	101.1
	2	45.0	671.550	0.880	1.49	106	94	2	250	250	50	305	40.9	101.3
		50.0	674.890	0.840	1.43	106	94	2	250	250	50	305	40.9	100.9
		55.0	678.240	0.840	1.43	106	93	2	250	250	50	305	40.9	101.3
		60.0	681.540	0.830	1.41	105	93	2	250	250	50	305	40.9	100.5
			Average:	0.818	1.402	104.7	94.4	2.1	250.0	250.0	50.0	303.1		103.3

Client:	Trans Canada Power	**Date:**	April 4, 2001
Jobsite:	William's Lake, B.C.	**Run:**	1 PCDD/PCDF (Railtie)
Source:	Stack	**Run Time:**	11:15 - 15:49

Concentration:	0.00 mg/dscm	0.0000 gr/dscf
	0.00 mg/Acm	0.0000 gr/Acf
	0.00 mg/dscm (@ 11% O2)	0.0000 gr/dscf (@ 11% O2)
Emission Rate:	0.00 Kg/hr	0.000 lb/hr
Sample Gas Volume:	3.8288 dscm	135.214 dscf
Total Sample Time:	240.0 minutes	
Average Isokineticity:	100.9 %	

Flue Gas Characteristics

Moisture:	20.51 %	
Temperature	148.1 oC	298.6 oF
Flow	5755.3 dscm/min	203247 dscf/min
	95.92 dscm/sec	3387.5 dscf/sec
	11064.7 Acm/min	390750 Acf/min
Velocity	19.111 m/sec	62.70 f/sec
Gas Analysis	6.90 % O2	13.70 % CO2
	30.468 Mol. Wt (g/gmole) Dry	27.911 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	RUN: BASELINE TRANS CANADA POWER 03-APR-0	AXYS FILE:	L3385-1 i
CLIENT:	A. LanFranco and Associates	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	PH-SG-07/Ver.2
SAMPLE TYPE:	Sample Train	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	CONCENTRATION IN	ng/sample
		PAH RUN ID:	PH171189.D

Compound	Lab Flag[1]	Concentration	SDL
Naphthalene		1800	2.6
Acenaphthylene		57	2.6
Acenaphthene		16	2.6
Fluorene	NDR	21	4.9
Phenanthrene		140	1.9
Anthracene	NDR	19	2.2
Fluoranthene		70	1.9
Pyrene		96	1.9
Benz[a]anthracene	NDR	15	3.0
Chrysene	NDR	11	3.4
Benzo[b/j]fluoranthenes	ND		12
Benzo[k]fluoranthene	ND		12
Benzo[e]pyrene	ND		7.9
Benzo[a]pyrene	ND		11
Perylene	ND		11
Dibenz[ah]anthracene	ND		11
Indeno[1,2,3-cd]pyrene	ND		9.2
Benzo[ghi]perylene	NDR	13	11
Dimethyl Naphthalenes		51	2.6
2-Methylfluorene	ND		3.7
Benzo[ghi]fluoranthene	ND		2.4
7,12-Dimethyl Benz[a]Anthracen	NDR	110	76
Benzo[a]Fluorene	ND		3.7
Benzo[b]Fluorene	ND		3.7
Dibenzo[a,h]Acridine	ND		9.9
Dibenzo[a,j]Acridine	ND		9.6
7H Dibenzo[c,g]Carbazole	ND		38
Dibenzo[a,i]Pyrene	ND		15
1-Methylpyrene	ND		3.7
1,6-Dinitropyrene	ND		75
1,8-Dinitropyrene	ND		75

Field Surrogate	Determined	Expected	% Recovery
Anthracene d-10	1951	2024	96

Labeled Compound	% Recovery
Naphthalene d-8	47
Acenaphthylene d-8	53
Phenanthrene d-10	65
Fluoranthene d-10	73
Benz(a)anthracene d-12	73
Chrysene d-12	68
Benzo(b,k)Fluoranthene d-12	64
Benzo(a)pyrene d-12	67
Perylene d-12	76
Dibenzo(ah)anthracene d-14	59
Indeno(123cd)pyrene d-12	59
Benzo(ghi)perylene d-12	60
2,6-Dimethylnaphthalene d-12	66

(1) ND = not detected; NDR = peak detected, but did not meet quantification criteria
(2) SDL = Sample Detection Limit
(3) Concentrations are recovery corrected
(4) Data have not been blank corrected

Approved: ____________
QA Chemist

AXYS ANALYTICAL SERVICES LTD P.O. BOX 2219, 2045 MILLS RD. WEST, SIDNEY, B.C., CANADA V8L 3S8 TEL (250) 655-5800 FAX (250) 655-5811

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 1 TRANS CANADA POWER 04-APR-0	AXYS FILE:	L3385-2 I
CLIENT:	A. LanFranco and Associates	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	PH-SG-07/Ver.2
SAMPLE TYPE:	Sample Train	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	CONCENTRATION IN	ng/sample
		PAH RUN ID:	PH171190.D

Compound	Lab Flag[1]	Concentration	SDL
Naphthalene		1700	8.5
Acenaphthylene	NDR	14	12
Acenaphthene	NDR	39	10
Fluorene	NDR	57	3.0
Phenanthrene		230	3.0
Anthracene		35	3.6
Fluoranthene		70	3.9
Pyrene		39	4.0
Benz[a]anthracene		9.5	7.3
Chrysene	ND		9.8
Benzo[b/j]fluoranthenes	ND		14
Benzo[k]fluoranthene	ND		14
Benzo[e]pyrene	ND		13
Benzo[a]pyrene	ND		18
Perylene	ND		15
Dibenz[ah]anthracene	ND		6.2
Indeno[1,2,3-cd]pyrene	ND		5.6
Benzo[ghi]perylene	ND		6.6
Dimethyl Naphthalenes		97	3.6
2-Methylfluorene	ND		13
Benzo[ghi]fluoranthene	ND		5.9
7,12-Dimethyl Benz[a]Anthracen	ND		110
Benzo[a]Fluorene	NO		4.2
Benzo[b]Fluorene	ND		4.2
Dibenzo[a,h]Acridine	ND		7.7
Dibenzo[a,j]Acridine	ND		7.5
7H Dibenzo[c,g]Carbazole	ND		49
Dibenzo[a,l]Pyrene	ND		14
1-Methylpyrene	NDR	4.3	4.2
1,6-Dinitropyrene	ND		48
1,8-Dinitropyrene	ND		48

Field Surrogate	Determined	Expected	% Recovery
Anthracene d-10	1205	2024	60

Labeled Compound	% Recovery
Naphthalene d-8	27
Acenaphthylene d-8	26
Phenanthrene d-10	67
Fluoranthene d-10	75
Benz(a)anthracene d-12	71
Chrysene d-12	69
Benzo(b,k)Fluoranthene d-12	68
Benzo(a)pyrene d-12	49
Perylene d-12	69
Dibenzo(ah)anthracene d-14	68
Indeno(123cd)pyrene d-12	71
Benzo(ghi)perylene d-12	72
2,6-Dimethylnaphthalene d-12	57

(1) ND = not detected; NDR = peak detected, but did not meet quantification criteria
(2) SDL = Sample Detection Limit
(3) Concentrations are recovery corrected
(4) Data have not been blank corrected

Approved: [signature]
QA Chemist

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 1 TRANS CANADA POWER 04-Apr-01	AXYS FILE:	L3385-2
		DATE:	24-May-2001
CLIENT:	A. Lanfranco & Associates Inc.	METHOD NO.:	DX-SG-01/Ver.4
CLIENT NO.:	2585	INSTRUMENT:	GC-HRMS
SAMPLE TYPE:	Train	CONCENTRATION IN:	pg/sample
SAMPLE SIZE:	1 sample		

Dioxins	Concentration	(SDL)	Furans	Concentration	(SDL)
T4CDD - Total	100	2.7	T4CDF - Total	530	1.8
2,3,7,8	3.8	2.7	2,3,7,8	82	1.8
P5CDD - Total	33	1.5	P5CDF - Total	220	2.8
1,2,3,7,8	NDR(7.9)	1.5	1,2,3,7,8	15	2.8
			2,3,4,7,8	NDR(23)	2.8
H6CDD - Total	110	3.0	H6CDF - Total	65	3.0
1,2,3,4,7,8	NDR(5.7)	3.0	1,2,3,4,7,8	NDR(10)	3.0
1,2,3,6,7,8	7.7	3.0	1,2,3,6,7,8	11	3.0
1,2,3,7,8,9	11	3.0	2,3,4,6,7,8	NDR(11)	3.0
			1,2,3,7,8,9	ND	3.0
H7CDD - Total	100	5.0	H7CDF - Total	27	5.0
1,2,3,4,6,7,8	46	5.0	1,2,3,4,6,7,8	19	5.0
			1,2,3,4,7,8,9	ND	5.0
O8CDD	71	8.0	O8CDF	ND	8.0

Surrogate Standards	% Recovery	Field Standards	% Recovery
13C-T4CDF	80	13C6-1,2,3,4-TCDD	106
13C-T4CDD	84	13C-1,2,3,4,7,8,9-HpCDF	99.2
13C-P5CDF	79		
13C-P5CDD	110		
13C-H6CDF	88		
13C-H6CDD	100		
13C-H7CDF	88		
13C-H7CDD	82		
13C-O8CDD	81		

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8-TCDD TEQs (ND=1/2 DL)	18.1	pg/sample
2,3,7,8-TCDD TEQs (ND=0) =	16.4	pg/sample

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: ____________
QA Chemist

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	RUN: BASELINE TRANS CANADA POWER 03-Apr-01	AXYS FILE:	L3385-1
		DATE:	24-May-2001
CLIENT:	A. Lanfranco & Associates Inc.	METHOD NO.:	DX-SG-01/Ver.4
CLIENT NO.:	2585	INSTRUMENT:	GC-HRMS
SAMPLE TYPE:	Train	CONCENTRATION IN:	pg/sample
SAMPLE SIZE:	1 sample		

Dioxins	Concentration	(SDL)	Furans	Concentration	(SDL)
T4CDD - Total	29	4.0	T4CDF - Total	240	2.0
2,3,7,8	4.2	4.0	2,3,7,8	32	2.0
P5CDD - Total	13	1.6	P5CDF - Total	15	2.9
1,2,3,7,8	NDR(1.9)	1.6	1,2,3,7,8	NDR(4.2)	2.9
			2,3,4,7,8	NDR(3.6)	2.9
H6CDD - Total	12	3.0	H6CDF - Total	ND	3.0
1,2,3,4,7,8	ND	3.0	1,2,3,4,7,8	ND	3.0
1,2,3,6,7,8	ND	3.0	1,2,3,6,7,8	ND	3.0
1,2,3,7,8,9	ND	3.0	2,3,4,6,7,8	ND	3.0
			1,2,3,7,8,9	ND	3.0
H7CDD - Total	ND	5.0	H7CDF - Total	ND	5.0
1,2,3,4,6,7,8	NDR(7.6)	5.0	1,2,3,4,6,7,8	ND	5.0
			1,2,3,4,7,8,9	ND	5.0
O8CDD	31	8.0	O8CDF	ND	8.0

Surrogate Standards	% Recovery	Field Standards	% Recovery
13C-T4CDF	80	13C6-1,2,3,4-TCDD	111
13C-T4CDD	79	13C-1,2,3,4,7,8,9-HpCDF	103
13C-P5CDF	76		
13C-P5CDD	100		
13C-H6CDF	78		
13C-H6CDD	91		
13C-H7CDF	80		
13C-H7CDD	82		
13C-O8CDD	81		

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8-TCDD TEQs (ND=1/2 DL)	9.75	pg/sample
2,3,7,8-TCDD TEQs (ND=0) =	7.43	pg/sample

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: [signature]
QA Chemist

A. Lanfranco and Associates Inc. - Emission Report

Client:	Trans Canada Power	**Date:**	April 4, 2001
Jobsite:	William's Lake, B.C.	**Run:**	1 PCDD/PCDF
Source:	Stack	**Run Time:**	11:15 - 15:49

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2288
Pitot Factor	0.8394
Baro. Press. (in. Hg)	27.68
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	20.0

Collection:

Filter (grams)	0.0000
Washings (grams)	0.0000
Impinger (grams)	0.0000
Total (grams)	0.0000

Gas Analysis (Vol. %):

	CO2	O2
	13.70	6.90
	13.70	6.90
	13.70	6.90
Average =	13.70	6.90

Condensate Collection:

Impinger 1 (grams)	589.0
Impinger 2 (grams)	125.0
Impinger 3 (grams)	1.0
Impinger 4 (grams)	11.8
Total Gain (grams)	726.8

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	756.650											
1	0	5.0	760.270	1.060	1.64	72	72	2	250	250	50	297	6.1	102.0
		10.0	763.880	1.050	1.64	82	70	2	250	250	50	299	6.1	101.6
		15.0	767.470	1.030	1.61	85	71	2	250	250	50	300	6.1	101.7
		20.0	771.080	1.040	1.64	87	71	2	250	250	50	301	6.1	101.6
	1	25.0	774.750	1.070	1.69	89	72	2	250	250	50	300	20.2	101.5
		30.0	778.460	1.080	1.71	91	74	2	250	250	50	299	20.2	101.7
		35.0	782.170	1.080	1.71	92	75	2	250	250	50	299	20.2	101.5
		40.0	785.870	1.060	1.69	93	76	2	250	250	50	300	20.2	102.1
	2	45.0	789.170	0.840	1.34	93	76	2	250	250	50	299	40.9	102.1
		50.0	792.440	0.830	1.32	93	76	2	250	250	50	299	40.9	101.8
		55.0	795.720	0.830	1.32	94	77	2	250	250	50	298	40.9	101.8
		60.0	798.990	0.830	1.32	94	78	2	250	250	50	299	40.9	101.5
		0.0	798.990											
2	0	5.0	801.430	0.460	0.73	93	82	2	250	250	50	298	6.1	101.2
		10.0	804.220	0.600	0.97	96	82	2	250	250	50	301	6.1	101.3
		15.0	806.970	0.580	0.93	97	83	2	250	250	50	301	6.1	101.4
		20.0	809.740	0.580	0.93	97	83	2	250	250	50	303	6.1	102.3
	1	25.0	812.750	0.690	1.11	97	83	2	250	250	50	302	20.2	101.9
		30.0	815.750	0.700	1.23	97	84	2	250	250	50	302	20.2	100.7
		35.0	818.770	0.680	1.09	97	83	2	250	250	50	301	20.2	102.9
		40.0	821.680	0.650	1.05	97	83	2	250	250	50	301	20.2	101.4
	2	45.0	824.600	0.650	1.05	96	83	2	250	250	50	298	40.9	101.6
		50.0	827.480	0.630	1.01	96	83	2	250	250	50	297	40.9	101.7
		55.0	830.350	0.630	1.01	96	83	2	250	250	50	297	40.9	101.4
		60.0	833.290	0.660	1.06	96	83	2	250	250	50	296	40.9	101.4
		0.0	833.290											
3	0	5.0	836.050	0.600	0.94	89	83	2	250	250	50	299	6.1	100.7
		10.0	838.850	0.620	0.97	92	83	2	250	250	50	300	6.1	100.3
		15.0	841.640	0.620	0.97	94	83	2	250	250	50	297	6.1	99.5
		20.0	844.420	0.620	0.97	94	83	2	250	250	50	296	6.1	99.1
	1	25.0	847.330	0.650	1.01	93	83	2	250	250	50	296	20.2	101.4
		30.0	850.180	0.650	1.01	93	83	2	250	250	50	296	20.2	99.3
		35.0	853.110	0.680	1.06	94	82	2	250	250	50	295	20.2	99.8
		40.0	856.020	0.670	1.05	94	82	2	250	250	50	295	20.2	99.8
	2	45.0	859.060	0.730	1.14	83	79	2	250	250	50	291	20.2	99.6
		50.0	862.250	0.800	1.25	88	79	2	250	250	50	294	40.9	101.0

		55.0	865.440	0.800	1.25	90	79	2	250	250	50	296	40.9	100.9
		60.0	868.620	0.810	1.26	91	79	2	250	250	50	296	40.9	99.9
		0.0	868.620											
4	0	5.0	872.080	0 950	1.48	93	81	2	250	250	50	299	6.1	100.2
		10.0	875.470	0.900	1.40	95	81	2	250	250	50	300	6.1	100.8
		15.0	878.830	0.900	1.40	96	83	2	250	250	50	299	6.1	99.5
		20.0	882.200	0.890	1.39	96	83	2	250	250	50	298	6.1	100.3
	1	25.0	885.440	0 850	1.33	97	83	2	250	250	50	300	20.2	98.7
		30.0	888.750	0.880	1.37	96	83	2	250	250	50	300	20.2	99.2
		35.0	892.140	0.880	1.37	96	83	2	250	250	50	301	20.2	101.7
		40.0	895.470	0.880	1.37	96	83	2	250	250	50	300	20.2	99.8
	2	45.0	898.550	0.750	1.17	96	83	2	250	250	50	300	40.9	100.0
		50.0	901.660	0 740	1.15	96	84	2	250	250	50	300	40.9	101.5
		55.0	904.700	0.760	1.18	96	83	2	250	250	50	299	40.9	97.9
		60.0	907.800	0.760	1.19	90	83	2	250	250	50	298	40.9	100.4
			Average:	0.785	1.239	92.9	80.3	2.0	250.0	250.0	50.0	298.6		100.9

Client:	Trans Canada Power	**Date:**	April 5, 2001
Jobsite:	William's Lake, B.C.	**Run:**	2 PCDD/PCDF (Railtie)
Source:	Stack	**Run Time:**	09:12 - 14:28

Concentration:	0.00 mg/dscm	0.0000 gr/dscf
	0.00 mg/Acm	0.0000 gr/Acf
	0.00 mg/dscm (@ 11% O2)	0.0000 gr/dscf (@ 11% O2)
Emission Rate:	0.00 Kg/hr	0.000 lb/hr
Sample Gas Volume:	3.8787 dscm	136.975 dscf
Total Sample Time:	240.0 minutes	
Average Isokineticity:	99.9 %	

Flue Gas Characteristics

Moisture:	19.72 %	
Temperature	140.8 oC	285.5 oF
Flow	5888.1 dscm/min	207939 dscf/min
	98.14 dscm/sec	3465.6 dscf/sec
	11159.8 Acm/min	394109 Acf/min
Velocity	19.275 m/sec	63.24 f/sec
Gas Analysis	8.30 % O2	12.10 % CO2
	30.268 Mol. Wt (g/gmole) Dry	27.849 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

A. Lanfr and Associates Inc. - Emission Report

Client: Trans Canada Power
Jobsite: William's Lake, B.C.
Source: Stack

Date: April 5, 2001
Run: 2 PCDD/PCDF
Run Time: 09:12 - 14:28

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2288
Pitot Factor	0.8394
Baro. Press. (in. Hg)	27.32
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point.	20.0

Collection:

Filter (grams)	0.0000
Washings (grams)	0.0000
Impinger (grams)	0.0000
Total (grams)	0.0000

Gas Analysis (Vol. %):

	CO2	O2
	12.10	8.30
	12.10	8.30
	12.10	8.30
Average =	12.10	8.30

Condensate Collection:

Impinger 1 (grams)	599.0
Impinger 2 (grams)	88.0
Impinger 3 (grams)	3.0
Impinger 4 (grams)	10.8
Total Gain (grams)	700.8

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	0.293											
1	0	5.0	3.570	0.880	1.36	70	65	1	250	250	50	289	6.1	99.8
		10.0	6.850	0.880	1.36	73	62	1	250	250	50	290	6.1	100.0
		15.0	10.220	0.930	1.44	74	62	1	250	250	50	290	6.1	99.8
		20.0	13.580	0.930	1.44	74	61	1	250	250	50	288	6.1	99.5
	1	25.0	17.140	1.040	1.61	73	59	1	250	250	50	286	20.2	99.9
		30.0	20.640	1.020	1.58	77	63	1	250	250	50	287	20.2	98.5
		35.0	24.240	1.050	1.63	77	63	1	250	250	50	288	20.2	99.9
		40.0	27.770	1.000	1.56	78	63	1	250	250	50	286	20.2	100.1
	2	45.0	31.120	0.900	1.40	78	64	1	250	250	50	285	40.9	100.0
		50.0	34.380	0.860	1.34	78	64	1	250	250	50	284	40.9	99.4
		55.0	37.780	0.920	1.44	78	64	1	250	250	50	285	40.9	100.4
		60.0	41.130	0.900	1.40	78	64	1	250	250	50	283	40.9	99.8
		0.0	41.130											
2	0	5.0	43.680	0.530	0.83	73	70	1	250	250	50	287	6.1	99.1
		10.0	46.310	0.550	0.86	76	71	1	250	250	50	288	6.1	100.0
		15.0	48.830	0.520	0.81	76	69	1	250	250	50	287	6.1	98.6
		20.0	51.380	0.520	0.81	78	70	1	250	250	50	288	6.1	99.6
	1	25.0	54.220	0.640	1.00	80	70	1	250	250	50	288	20.2	99.9
		30.0	57.050	0.640	1.00	82	70	1	250	250	50	285	20.2	99.1
		35.0	59.780	0.600	0.94	83	71	1	250	250	50	286	20.2	98.6
		40.0	62.530	0.610	0.95	84	71	1	250	250	50	286	20.2	98.4
	2	45.0	65.400	0.660	1.03	84	72	1	250	250	50	286	40.9	98.7
		50.0	68.230	0.630	0.99	84	73	1	250	250	50	286	40.9	99.5
		55.0	71.060	0.630	0.99	84	73	1	250	250	50	287	40.9	99.6
		60.0	73.860	0.620	0.97	83	72	1	250	250	50	286	40.9	99.4
		0.0	73.860											
3	0	5.0	76.670	0.630	0.98	77	69	1	250	250	50	285	6.1	99.7
		10.0	79.460	0.620	0.97	78	68	1	250	250	50	285	6.1	99.8
		15.0	82.350	0.670	1.05	77	64	1	250	250	50	286	6.1	100.0
		20.0	85.190	0.650	1.01	76	64	1	250	250	50	285	6.1	99.8
	1	25.0	88.250	0.750	1.18	75	63	1	250	250	50	284	20.2	100.3
		30.0	91.320	0.750	1.18	76	63	1	250	250	50	283	20.2	100.5
		35.0	94.410	0.770	1.20	77	64	1	250	250	50	283	20.2	99.6
		40.0	97.550	0.770	1.20	78	65	1	250	250	50	284	20.2	101.1
	2	45.0	100.580	0.760	1.19	77	64	1	250	250	50	285	40.9	98.4
		50.0	103.670	0.760	1.19	77	64	1	250	250	50	284	40.9	100.3

		55.0	106.880	0.810	1.26	77	63	1	250	250	50	283	40.9	101.0
		60.0	109.970	0.780	1.22	77	64	1	250	250	50	284	40.9	99.0
		0.0	109.970											
4	0	5.0	113.490	0.990	1.54	69	62	2	250	250	50	283	6.1	101.1
		10.0	116.950	0.960	1.50	74	63	2	250	250	50	285	6.1	100.5
		15.0	120.360	0.940	1.47	77	63	2	250	250	50	284	6.1	99.7
		20.0	123.810	0.950	1.48	77	63	2	250	250	50	283	6.1	100.3
	1	25.0	127.300	0.980	1.53	77	64	2	250	250	50	285	20.2	99.9
		30.0	130.810	0.980	1.53	77	64	2	250	250	50	285	20.2	100.5
		35.0	134.220	0.940	1.47	71	61	2	250	250	50	285	20.2	100.5
		40.0	137.640	0.930	1.45	74	61	2	250	250	50	285	20.2	101.1
	2	45.0	140.990	0.900	1.40	74	61	2	250	250	50	284	40.9	100.6
		50.0	144.300	0.880	1.37	74	61	2	250	250	50	284	40.9	100.5
		55.0	147.630	0.890	1.39	74	61	2	250	250	50	284	40.9	100.5
		60.0	150.990	0.900	1.40	74	61	2	250	250	50	284	40.9	100.9
			Average:	0.800	1.248	76.9	65.1	1.3	250.0	250.0	50.0	285.5		99.9

Client:	Trans Canada Power	**Date:**	April 6, 2001
Jobsite:	William's Lake, B.C.	**Run:**	3 PCDD/PCDF (Railtie)
Source:	Stack	**Run Time:**	08:22 - 11:35

Concentration:	0.00 mg/dscm	0.0000 gr/dscf
	0.00 mg/Acm	0.0000 gr/Acf
	0.00 mg/dscm (@ 11% O2)	0.0000 gr/dscf (@ 11% O2)
Emission Rate:	0.00 Kg/hr	0.000 lb/hr
Sample Gas Volume:	2.8474 dscm	100.555 dscf
Total Sample Time:	180.0 minutes	
Average Isokineticity:	105.2 %	

Flue Gas Characteristics

Moisture:	21.98 %	
Temperature	138.8 oC	281.8 oF
Flow	5472.2 dscm/min	193251 dscf/min
	91.20 dscm/sec	3220.9 dscf/sec
	10662.1 Acm/min	376533 Acf/min
Velocity	18.416 m/sec	60.42 f/sec
Gas Analysis	5.60 % O2	14.80 % CO2
	30.592 Mol. Wt (g/gmole) Dry	27.825 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
Imperial: 77 deg F, 29.92 in.Hg

A. Lanfrai and Associates Inc. - Emission Report

Client:	Trans Canada Power	**Date:**	April 6, 2001
Jobsite:	William's Lake, B.C.	**Run:**	3 PCDD/PCDF
Source:	Stack	**Run Time:**	08:22 - 11:35

Control Unit (Y)	0.9810
Nozzle Diameter (in.)	0.2288
Pitot Factor	0.8394
Baro. Press. (in. Hg)	27.21
Static Press. (in. Hg)	-0.25
Stack Height (ft)	200
Stack Diameter (in.)	138.0
Stack Area (sq.ft.)	103.869
Minutes Per Reading	5.0
Minutes Per Point	15.0

Collection:

Filter (grams)	0.0000
Washings (grams)	0.0000
Impinger (grams)	0.0000
Total (grams)	0.0000

Gas Analysis (Vol. %):

	CO2	O2
	14.80	5.60
	14.80	5.60
	14.80	5.60
Average =	14.80	5.60

Condensate Collection:

Impinger 1 (grams)	505.0
Impinger 2 (grams)	70.0
Impinger 3 (grams)	2.0
Impinger 4 (grams)	13.1
Total Gain (grams)	590.1

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Box (oF)	Temperatures Probe (oF)	Impinger (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	218.598											
1	0	5.0	221.810	0.820	1 31	55	52	4	250	250	50	280	6.1	106.2
		10.0	225.100	0.870	1.39	63	54	4	250	250	50	281	6.1	104.7
		15.0	228.350	0.840	1.34	63	53	4	250	250	50	282	6.1	105.4
	1	20.0	231.510	0.800	1.28	63	52	4	250	250	50	281	20.2	105.0
		25.0	234.720	0.830	1.33	63	51	4	250	250	50	279	20.2	104.7
		30.0	237.950	0.830	1.33	64	51	4	250	250	50	279	20.2	105.3
	2	35.0	241.050	0.770	1.23	66	52	4	250	250	50	277	40.9	104.4
		40.0	244 170	0.780	1.25	66	52	4	250	250	50	277	40.9	104.4
		45.0	247.280	0.780	1.25	66	52	4	250	250	50	278	40.9	104.2
		0 0	247.280											
2	0	5.0	250.080	0.620	0 99	60	51	4	250	250	50	276	6.1	105.7
		10.0	252.920	0.650	1.04	66	53	4	250	250	50	279	6.1	104.1
		15.0	255.630	0.590	0.94	69	55	4	250	250	50	281	6.1	103.9
	1	20.0	258.520	0.650	1.04	70	56	3	250	250	50	282	20.2	105.5
		25.0	261.530	0.710	1.15	71	57	3	250	250	50	281	20.2	104.9
		30.0	264 500	0.680	1 10	73	58	3	250	250	50	280	20.2	105.3
	2	35.0	267.390	0 670	1.09	72	59	3	250	250	50	280	40.9	103.2
		40.0	270.420	0.720	1.17	73	59	3	250	250	50	280	40.9	104.3
		45.0	273.410	0.700	1.13	73	59	3	250	250	50	280	40.9	104.4
		0.0	273.410											
2	0	5.0	275.880	0.480	0 78	65	59	2	250	250	50	282	6.1	105.0
		10.0	278.350	0.480	0.78	72	62	3	250	250	50	283	6.1	104.1
		15 0	280.770	0.450	0 74	73	64	3	250	250	50	284	6.1	105.1
	1	20.0	283 540	0.600	0.98	73	63	3	250	250	50	286	20.2	104.5
		25.0	286 300	0.570	0.93	73	63	3	250	250	50	287	20.2	106.9
		30.0	289 100	0.600	0.98	72	62	3	250	250	50	285	20.2	105.7
	2	35 0	291.990	0.650	1.07	72	61	3	250	250	50	284	40.9	104.9
		40.0	294.880	0.650	1.07	71	60	3	250	250	50	284	40.9	105.1
		45.0	297 800	0 650	1.07	71	60	3	250	250	50	284	40.9	106.2
		0.0	297 800											
2	0	5.0	301 120	0.850	1.39	66	57	4	250	250	50	283	6.1	106.4
		10 0	304.440	0.850	1 39	71	58	4	250	250	50	285	6.1	105.9
		15.0	307.850	0.890	1.46	72	59	4	250	250	50	285	6.1	106.2
	1	20 0	311.300	0.920	1.51	72	59	4	250	250	50	284	20 2	105.6
		25 0	314 820	0 950	1 56	73	59	4	250	250	50	284	20 2	105 9

		30.0	318.310	0.940	1.55	73	59	4	250	250	50	284	20.2	105.6
	2	35.0	321.580	0.820	1.34	73	60	4	250	250	50	282	40.9	105.6
		40.0	324.790	0.800	1.31	72	60	4	250	250	50	283	40.9	105.1
		45.0	328.040	0.800	1.31	72	60	4	250	250	50	282	40.9	106.4
			Average:	0.729	1.183	68.9	57.3	3.6	250.0	250.0	50.0	281.8		105.2

APPENDIX 2

ANALYTICALDATA

FILTER WEIGHTS

Contract: 2585

LIMS: L3385-1 to -5

Receive Date: 16-Apr-01

Weighing Date: 24-Apr-01

Analyst: Teresa Rawsthorne

Description: Weights of the filter disks upon arrival. Disks were weighed 'as is', without drying.

LIMS #	Client ID	Filter weight
L3385-1	Run: Baseline	0.4621 g
L3385-2	Run: Rail Tie 1	0.4584 g
L3385-3	Run: Rail Tie 2	0.4363 g
L3385-4	Run: Rail Tie 3	0.4278 g
L3385-5	Run: Blank	0.4254 g

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 2 TRANS CANADA POWER 05-Apr-01	AXYS FILE:	L3385-3
		DATE:	24-May-2001
CLIENT:	A. Lanfranco & Associates Inc.	METHOD NO.:	DX-SG-01/Ver.4
CLIENT NO.:	2585	INSTRUMENT:	GC-HRMS
SAMPLE TYPE:	Train	CONCENTRATION IN:	pg/sample
SAMPLE SIZE:	1 sample		

Dioxins	Concentration	(SDL)	Furans	Concentration	(SDL)
T4CDD - Total	120	4.3	T4CDF - Total	550	2.4
2,3,7,8	5.4	4.3	2,3,7,8	82	2.4
P5CDD - Total	72	1.5	P5CDF - Total	250	4.6
1,2,3,7,8	NDR(11)	1.5	1,2,3,7,8	18	4.6
			2,3,4,7,8	22	4.6
H6CDD - Total	100	3.0	H6CDF - Total	85	3.0
1,2,3,4,7,8	NDR(6.6)	3.0	1,2,3,4,7,8	13	3.0
1,2,3,6,7,8	12	3.0	1,2,3,6,7,8	11	3.0
1,2,3,7,8,9	NDR(13)	3.0	2,3,4,6,7,8	NDR(14)	3.0
			1,2,3,7,8,9	ND	3.0
H7CDD - Total	120	5.0	H7CDF - Total	27	5.0
1,2,3,4,6,7,8	56	5.0	1,2,3,4,6,7,8	19	5.0
			1,2,3,4,7,8,9	ND	5.0
O8CDD	130	8.0	O8CDF	12	8.0

Surrogate Standards	% Recovery	Field Standards	% Recovery
13C-T4CDF	62	13C6-1,2,3,4-TCDD	117
13C-T4CDD	65	13C-1,2,3,4,7,8,9-HpCDF	98.8
13C-P5CDF	67		
13C-P5CDD	110		
13C-H6CDF	67		
13C-H6CDD	78		
13C-H7CDF	75		
13C-H7CDD	69		
13C-O8CDD	75		

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8-TCDD TEQs (ND=1/2 DL)	31	pg/sample
2,3,7,8-TCDD TEQs (ND=0) =	30	pg/sample

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: ____________
QA Chemist

DX001D-1

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 3 TRANS CANADA POWER 06-Apr-01	AXYS FILE:	L3385-4
		DATE:	24-May-2001
CLIENT:	A. Lanfranco & Associates Inc.	METHOD NO.:	DX-SG-01/Ver.4
CLIENT NO.:	2585	INSTRUMENT:	GC-HRMS
SAMPLE TYPE:	Train	CONCENTRATION IN:	pg/sample
SAMPLE SIZE:	1 sample		

Dioxins	Concentration	(SDL)	Furans	Concentration	(SDL)
T4CDD - Total	25	3.9	T4CDF - Total	220	2.7
2,3,7,8	ND	3.9	2,3,7,8	26	2.7
P5CDD - Total	22	2.5	P5CDF - Total	64	2.3
1,2,3,7,8	NDR(4)	2.5	1,2,3,7,8	6.7	2.3
			2,3,4,7,8	NDR(12)	2.3
H6CDD - Total	45	3.0	H6CDF - Total	34	3.0
1,2,3,4,7,8	3.5	3.0	1,2,3,4,7,8	8.6	3.0
1,2,3,6,7,8	3.7	3.0	1,2,3,6,7,8	4.9	3.0
1,2,3,7,8,9	NDR(4.8)	3.0	2,3,4,6,7,8	NDR(6.5)	3.0
			1,2,3,7,8,9	ND	3.0
H7CDD - Total	50	5.0	H7CDF - Total	ND	5.0
1,2,3,4,6,7,8	27	5.0	1,2,3,4,6,7,8	NDR(8.8)	5.0
			1,2,3,4,7,8,9	ND	5.0
O8CDD	NDR(75)	8.0	O8CDF	8.3	8.0

Surrogate Standards	% Recovery	Field Standards	% Recovery
13C-T4CDF	59	13C6-1,2,3,4-TCDD	103
13C-T4CDD	62	13C-1,2,3,4,7,8,9-HpCDF	97.7
13C-P5CDF	66		
13C-P5CDD	92		
13C-H6CDF	61		
13C-H6CDD	71		
13C-H7CDF	64		
13C-H7CDD	66		
13C-O8CDD	63		

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8-TCDD TEQs (ND=1/2 DL)	8.98	pg/sample
2,3,7,8-TCDD TEQs (ND=0) =	5.34	pg/sample

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: ______________
QA Chemist

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 2 TRANS CANADA POWER 05-APR-0	AXYS FILE:	L3385-3 I
CLIENT:	A. LanFranco and Associates	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	PH-SG-07/Ver.2
SAMPLE TYPE:	Sample Train	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	CONCENTRATION IN	ng/sample
		PAH RUN ID:	PH171191.D

Compound	Lab Flag[1]	Concentration	SDL
Naphthalene		2000	8.9
Acenaphthylene		7.3	2.2
Acenaphthene		46	2.9
Fluorene	NDR	8.5	2.1
Phenanthrene	NDR	140	6.0
Anthracene	NDR	24	7.1
Fluoranthene		39	3.1
Pyrene		28	3.1
Benz[a]anthracene	NDR	9.0	4.2
Chrysene		8.8	5.6
Benzo[b/j]fluoranthenes	NDR	22	9.9
Benzo[k]fluoranthene	ND		9.9
Benzo[e]pyrene		12	6.6
Benzo[a]pyrene	ND		9.0
Perylene	ND		9.1
Dibenz[ah]anthracene	ND		9.3
Indeno[1,2,3-cd]pyrene	NDR	7.5	5.4
Benzo[ghi]perylene	ND		6.3
Dimethyl Naphthalenes		150	2.9
2-Methylfluorene	ND		8.3
Benzo[ghi]fluoranthene	ND		3.6
7,12-Dimethyl Benz[a]Anthracen	ND		92
Benzo[a]Fluorene	ND		4.3
Benzo[b]Fluorene	ND		4.3
Dibenzo[a,h]Acridine	ND		11
Dibenzo[a,j]Acridine	ND		11
7H Dibenzo[c,g]Carbazole	ND		35
Dibenzo[a,i]Pyrene	ND		16
1-Methylpyrene	ND		4.3
1,6-Dinitropyrene	ND		80
1,8-Dinitropyrene	ND		80

Field Surrogate	Determined	Expected	% Recovery
Anthracene d-10	1834	2024	91

Labeled Compound	% Recovery
Naphthalene d-8	32
Acenaphthylene d-8	44
Phenanthrene d-10	62
Fluoranthene d-10	73
Benz(a)anthracene d-12	71
Chrysene d-12	65
Benzo(b,k)Fluoranthene d-12	61
Benzo(a)pyrene d-12	63
Perylene d-12	72
Dibenzo(ah)anthracene d-14	59
Indeno(123cd)pyrene d-12	65
Benzo(ghi)perylene d-12	66
2,6-Dimethylnaphthalene d-12	51

(1) ND = not detected; NDR = peak detected, but did not meet quantification criteria
(2) SDL = Sample Detection Limit
(3) Concentrations are recovery corrected
(4) Data have not been blank corrected

Approved: ______ QA Chemist

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 3 TRANS CANADA POWER 06-APR-0	AXYS FILE:	L3385-4 i
CLIENT:	A. LanFranco and Associates	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	PH-SG-07/Ver.2
SAMPLE TYPE:	Sample Train	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	CONCENTRATION IN	ng/sample
		PAH RUN ID:	PH171192.D

Compound	Lab Flag[1]	Concentration	SDL
Naphthalene		1800	8.2
Acenaphthylene		15	2.4
Acenaphthene		50	1.9
Fluorene	NDR	30	2.4
Phenanthrene		96	5.5
Anthracene	NDR	11	6.5
Fluoranthene		43	1.5
Pyrene		41	1.5
Benz[a]anthracene	NDR	8.6	3.1
Chrysene		21	4.2
Benzo[b/j]fluoranthenes		23	11
Benzo[k]fluoranthene	ND		11
Benzo[e]pyrene	ND		6.9
Benzo[a]pyrene	ND		9.4
Perylene	ND		9.9
Dibenz[ah]anthracene	ND		11
Indeno[1,2,3-cd]pyrene	ND		7.3
Benzo[ghi]perylene	ND		8.4
Dimethyl Naphthalenes		160	3.3
2-Methylfluorene	ND		4.9
Benzo[ghi]fluoranthene	ND		4.3
7,12-Dimethyl Benz[a]Anthracen	NDR	140	110
Benzo[a]Fluorene	ND		3.3
Benzo[b]Fluorene	ND		3.3
Dibenzo[a,h]Acridine	ND		9.9
Dibenzo[a,j]Acridine	ND		9.6
7H Dibenzo[c,g]Carbazole	ND		45
Dibenzo[a,l]Pyrene	ND		16
1-Methylpyrene		4.5	3.3
1,6-Dinitropyrene	ND		47
1,8-Dinitropyrene	ND		47

Field Surrogate	Determined	Expected	% Recovery
Anthracene d-10	1921	2024	95

Labeled Compound	% Recovery
Naphthalene d-8	36
Acenaphthylene d-8	59
Phenanthrene d-10	68
Fluoranthene d-10	77
Benz(a)anthracene d-12	77
Chrysene d-12	69
Benzo(b,k)Fluoranthene d-12	66
Benzo(a)pyrene d-12	72
Perylene d-12	79
Dibenzo(ah)anthracene d-14	60
Indeno(123cd)pyrene d-12	66
Benzo(ghi)perylene d-12	66
2,6-Dimethylnaphthalene d-12	63

(1) ND = not detected; NDR = peak detected, but did not meet quantification criteria
(2) SDL = Sample Detection Limit
(3) Concentrations are recovery corrected
(4) Data have not been blank corrected

Approved: ____________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	RUN: BASELINE TRANS CANADA POWER 03-APR-01	AXYS FILE:	L3385-1
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-E-06/Ver.2
SAMPLE TYPE:	Train	INSTRUMENT:	GC-MS
		RUN ID:	CP171209.D
SAMPLE SIZE:	1 sample	CONCENTRATION IN:	ng/sample

Compound	Concentration	SDL
2,4,6-Trichlorophenol	42	1.1
2,3,6-Trichlorophenol	ND	0.94
2,3,5-Trichlorophenol	ND	0.99
2,4,5-Trichlorophenol	NDR 2.2	1.1
2,3,4-Trichlorophenol	ND	1
3,4,5-Trichlorophenol	ND	1.1
2,3,5,6-Tetrachlorophenol	ND	1.3
2,3,4,6-Tetrachlorophenol	15	0.98
2,3,4,5-Tetrachlorophenol	ND	1
Pentachlorophenol	3.6	2.2

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	62
2,4,5-Trichlorophenol-13C	63
2,3,4,5-Tetrachlorophenol-13C	100
Pentachlorophenol-13C	87

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.

Approved: Klp

QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 1 TRANS CANADA POWER 04-APR-01	AXYS FILE:	L3385-2
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-E-06/Ver.2
SAMPLE TYPE:	Train	INSTRUMENT:	GC-MS
		RUN ID:	CP171210.D
SAMPLE SIZE:	1 sample	CONCENTRATION IN:	ng/sample

Compound	Concentration	SDL
2,4,6-Trichlorophenol	340	4.3
2,3,6-Trichlorophenol	ND	3.7
2,3,5-Trichlorophenol	ND	3.9
2,4,5-Trichlorophenol	NDR 3.4	1.3
2,3,4-Trichlorophenol	3.4	1.2
3,4,5-Trichlorophenol	ND	1.2
2,3,5,6-Tetrachlorophenol	ND	1.2
2,3,4,6-Tetrachlorophenol	21	0.9
2,3,4,5-Tetrachlorophenol	3.5	0.92
Pentachlorophenol	17	3.9

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	21
2,4,5-Trichlorophenol-13C	47
2,3,4,5-Tetrachlorophenol-13C	97
Pentachlorophenol-13C	67

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.

Approved: ____________________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 2 TRANS CANADA POWER 05-APR-01	AXYS FILE:	L3385-3
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-E-06/Ver.2
SAMPLE TYPE:	Train	INSTRUMENT:	GC-MS
		RUN ID:	CP171211.D
SAMPLE SIZE:	1 sample	CONCENTRATION IN:	ng/sample

Compound	Concentration	SDL
2,4,6-Trichlorophenol	620	1.9
2,3,6-Trichlorophenol	ND	1.7
2,3,5-Trichlorophenol	3.3	1.7
2,4,5-Trichlorophenol	15	2.1
2,3,4-Trichlorophenol	11	2
3,4,5-Trichlorophenol	ND	2.1
2,3,5,6-Tetrachlorophenol	ND	1.3
2,3,4,6-Tetrachlorophenol	60	1
2,3,4,5-Tetrachlorophenol	3.1	1
Pentachlorophenol	21	1.9

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	62
2,4,5-Trichlorophenol-13C	59
2,3,4,5-Tetrachlorophenol-13C	100
Pentachlorophenol-13C	78

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.

Approved: ______________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	RUN: RAIL TIE 3 TRANS CANADA POWER 06-APR-01	AXYS FILE:	L3385-4
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-E-06/Ver.2
SAMPLE TYPE:	Train	INSTRUMENT:	GC-MS
		RUN ID:	CP171212.D
SAMPLE SIZE:	1 sample	CONCENTRATION IN:	ng/sample

Compound	Concentration	SDL
2,4,6-Trichlorophenol	200	2.5
2,3,6-Trichlorophenol	ND	2.1
2,3,5-Trichlorophenol	ND	2.2
2,4,5-Trichlorophenol	6.5	1.6
2,3,4-Trichlorophenol	NDR 3.3	1.5
3,4,5-Trichlorophenol	ND	1.6
2,3,5,6-Tetrachlorophenol	ND	1.5
2,3,4,6-Tetrachlorophenol	21	1.1
2,3,4,5-Tetrachlorophenol	NDR 1.3	1.1
Pentachlorophenol	6.7	3.5

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	48
2,4,5-Trichlorophenol-13C	53
2,3,4,5-Tetrachlorophenol-13C	100
Pentachlorophenol-13C	80

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.

Approved: ____________
QA Chemist

NORWEST LABS

Agri-Food & Environmental Group
Calgary Edmonton Winnipeg Lethbridge Surrey

Analytical Report

#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Bill to: Al Lanfranco & Associates
Report to: Al Lanfranco & Associates

100A, 20120 - 64 Avenue
Langley, BC, Canada
V2Y 1M8
Attn: Al LanFranco
Sampled By:

Project ID:
Name: Trans Canada Power
Location: Williams Lake
LSD:
P.O.:
Acct. Code: 61338

NWL Lot ID: 113449
Control Number: E 22450
Date Received: Apr 11, 2001
Date Reported: Apr 23, 2001
Report Number: 162110

Aggregate Organic Constituents

Analyte / Units / Detection Limit

NWL Number	Date Sampled	Sample Information	Volume Volume mL 1
113449-1		TC Power HG-1 Baseline 3/4/01	430
113449-2		TC Power HG-2 Baseline 4/4/01	430
113449-3		TC Power HG-3 4/4/01	405
113449-4		TC Power HG-4 5/4/01	380
113449-5		TC Power HG-5 6/4/01	370
13449-6		TC Power HCl-1 Baseline 3/4/01	352
113449-7		TC Power HCl-2 Baseline 3/4/01	369
113449-8		TC Power HCl-3 4/4/01	394
113449-9		TC Power HCl-4 5/4/01	331
113449-10		TC Power HCl-5 6/4/01	359
113449-11		Hg Blank	310
113449-12		HCl Blank	435
113449-13		HCl Blank for Spike (10 ppm)	355

Air Quality

Analyte / Units / Detection Limit

NWL Number	Date Sampled	Sample Information	Chloride Water Soluble ug 3
113449-6		TC Power HCl-1 Baseline 3/4/01	39
113449-7		TC Power HCl-2 Baseline 3/4/01	33
113449-8		TC Power HCl-3 4/4/01	39100
113449-9		TC Power HCl-4 5/4/01	51200
113449-10		TC Power HCl-5 6/4/01	43200
113449-12		HCl Blank	20
113449-13		HCl Blank for Spike (10 ppm)	<20

NORWEST LABS
Agri-Food & Environmental Group
Calgary Edmonton Winnipeg Lethbridge Surrey

#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
Phone: (604) 514-3322
Fax: (604) 514-3323

Analytical Report

Bill to: Al Lanfranco & Associates
Report to: Al Lanfranco & Associates

100A, 20120 - 64 Avenue
Langley, BC, Canada
V2Y 1M8
Attn: Al LanFranco
Sampled By:

Project ID:
Name: Trans Canada Power
Location: Williams Lake
LSD:
P.O.:
Acct. Code: 61338

NWL Lot ID: 113449
Control Number: E 22450
Date Received: Apr 11, 2001
Date Reported: Apr 23, 2001
Report Number: 162110

Air Quality Metals

NWL Number	Date Sampled	Sample Information	Analyte / Units / Detection Limit: Mercury, Strong Acid Extractable, ug, 0.005
113449-1		TC Power HG-1 Baseline 3/4/01	3.85
113449-2		TC Power HG-2 Baseline 4/4/01	2.63
113449-3		TC Power HG-3 4/4/01	0.93
113449-4		TC Power HG-4 5/4/01	0.338
13449-5		TC Power HG-5 6/4/01	0.302
113449-11		Hg Blank	0.031

Chloride QC
Sample #13 spiked with 10 ppm Cl.
Reading = 10.3 ppm = 103% Recovery

ERA CRM (Lot 9978) Cl = 122 ppm
Mean value given as 122 ppm
Mercury QC
Sample 11 spiked with 1 ppm Hg. Recovery was 79%.
Sample 2 also spiked. Recovery was 95%.
Report HG as ug/bottle. Measure and report volume +/- 2ml. Report HCl as mg/bottle. Report and measure volume +/- 2ml. TB 12-Apr-01

Approved by:

NORWEST LABS
Agri-Food & Environmental Group
Calgary Edmonton Winnipeg Lethbridge Surrey

Analytical Report

#104, 19575-55 A Ave.
Surrey, BC. V3S 8P8
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Fax: (604) 514-3323

Bill to: Al Lanfranco & Associates
Report to: Al Lanfranco & Associates

100A, 20120 - 64 Avenue
Langley, BC, Canada
V2Y 1M8
Attn: Al LanFranco

Sampled By:

Project ID:
Name: Trans Canada Power
Location: Williams Lake
LSD:
P.O.:
Acct. Code: 61337

NWL Lot ID: 113460
Control Number: E 22451
Date Received: Apr 11, 2001
Date Reported: Apr 20, 2001
Report Number: 165200

		NWL Number:	113460-1	113460-2	113460-3	
		Sample Date:				
		Sample Description:	TC Power PW-1 Baseline & Metals-1 Baseline (Beaker #M27) 3/4/01	TC Power PW-2 Baseline & Metals-2 Baseline (Beaker #B25) 4/4/01	TC Power PW-3 & Metals-3 (Beaker #M5) 4/4/01	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Air Quality Metals						
Aluminum	Strong Acid Extractable	ug	87.8	53.1	61.4	0.5
Antimony	Strong Acid Extractable	ug	<1	<1	<1	1
Arsenic	Strong Acid Extractable	ug	<1	<1	2	1
Barium	Strong Acid Extractable	ug	11.4	7.22	9.37	0.03
Beryllium	Strong Acid Extractable	ug	<0.02	<0.02	<0.02	0.03
Bismuth	Strong Acid Extractable	ug	<1	<1	<1	1
Cadmium	Strong Acid Extractable	ug	0.871	0.504	.944	0.03
Calcium	Strong Acid Extractable	ug	826	356	679	0.5
Chromium	Strong Acid Extractable	ug	5.34	2	2.5	0.05
Cobalt	Strong Acid Extractable	ug	0.2	0.09	0.1	0.05
Copper	Strong Acid Extractable	ug	10.1	7.66	7.79	0.05
Iron	Strong Acid Extractable	ug	94.6	50.1	105	0.1
Lead	Strong Acid Extractable	ug	18.5	15.2	17.4	0.3
Lithium	Strong Acid Extractable	ug	<0.3	<0.3	0.3	0.3
Magnesium	Strong Acid Extractable	ug	105	58.1	108	0.5
Manganese	Strong Acid Extractable	ug	31.4	15.3	32.1	0.05
Mercury	Strong Acid Extractable	ug	0.008	<0.005	0.244	0.005
Molybdenum	Strong Acid Extractable	ug	0.6	<0.5	<0.5	0.5
Nickel	Strong Acid Extractable	ug	2.9	1.5	3.4	0.05
Phosphorus	Strong Acid Extractable	ug	85.1	54.9	100	3
Potassium	Strong Acid Extractable	ug	806	380	772	15
Selenium	Strong Acid Extractable	ug	2	1	<1	1
Silicon	Strong Acid Extractable	ug	5.1	4	13	3
Silver	Strong Acid Extractable	ug	0.2	0.1	0.1	0.1
Sodium	Strong Acid Extractable	ug	572	237	411	3
Strontium	Strong Acid Extractable	ug	3.2	2	3.2	0.3
Sulphur	Strong Acid Extractable	ug	360	522	83000	10
Tellurium	Strong Acid Extractable	ug	<2	<2	<2	2
Thallium	Strong Acid Extractable	ug	0.45	0.15	0.35	0.2
Thorium	Strong Acid Extractable	ug	<0.3	<0.3	<0.3	0.3
Tin	Strong Acid Extractable	ug	4.7	4.3	7.8	0.3
Titanium	Strong Acid Extractable	ug	2.5	1.2	2.3	0.05

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Calgary Edmonton Winnipeg Lethbridge Surrey

Analytical Report

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Surrey, BC. V3S 8P8
Phone: (604) 514-3322
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Bill to: Al Lanfranco & Associates
Report to: Al Lanfranco & Associates

100A, 20120 - 64 Avenue
Langley, BC, Canada
V2Y 1M8
Attn: Al LanFranco

Sampled By:

Project ID:
Name: Trans Canada Power
Location: Williams Lake
LSD:
P.O.:
Acct. Code: 61337

NWL Lot ID: 113460
Control Number: E 22451
Date Received: Apr 11, 2001
Date Reported: Apr 20, 2001
Report Number: 165200

		NWL Number:	113460-1	113460-2	113460-3	
		Sample Date:				
		Sample Description:	TC Power PW-1 Baseline & Metals-1 Baseline (Beaker #M27) 3/4/01	TC Power PW-2 Baseline & Metals-2 Baseline (Beaker #B25) 4/4/01	TC Power PW-3 & Metals-3 (Beaker #M5) 4/4/01	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Air Quality Metals - Continued						
Uranium	Strong Acid Extractable	ug	<3	<3	<3	3
Vanadium	Strong Acid Extractable	ug	0.2	0.2	0.2	0.05
Zinc	Strong Acid Extractable	ug	92	40.1	94.6	0.03
Zirconium	Strong Acid Extractable	ug	0.7	0.7	0.69	0.3

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100A, 20120 - 64 Avenue
Langley, BC, Canada
V2Y 1M8
Attn: Al LanFranco

Sampled By:

Project ID:
Name: Trans Canada Power
Location: Williams Lake
LSD:
P.O.:
Acct. Code: 61337

NWL Lot ID: 113460
Control Number: E 22451
Date Received: Apr 11, 2001
Date Reported: Apr 20, 2001
Report Number: 165200

		NWL Number:	113460-4	113460-5	113460-6	
		Sample Date:				
		Sample Description:	TC Power PW-4 & Metals-4 (Beaker #212) 5/4/01	TC Power PW-5 & Metals-5 (Beaker #4) 6/4/01	Blank PW-Probe Wash & Blank Metals (Beaker #B10)	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Air Quality Metals						
Aluminum	Strong Acid Extractable	ug	32	26	18	0.5
Antimony	Strong Acid Extractable	ug	<1	<1	<1	1
Arsenic	Strong Acid Extractable	ug	1	<1	<1	1
Barium	Strong Acid Extractable	ug	3.42	3.02	2.51	0.03
Beryllium	Strong Acid Extractable	ug	<0.02	<0.02	<0.02	0.03
Bismuth	Strong Acid Extractable	ug	1	<1	<1	1
Cadmium	Strong Acid Extractable	ug	0.22	0.24	0.096	0.03
Calcium	Strong Acid Extractable	ug	143	128	81.2	0.5
Chromium	Strong Acid Extractable	ug	1.5	1.3	1.3	0.05
Cobalt	Strong Acid Extractable	ug	0.09	0.07	<0.05	0.05
Copper	Strong Acid Extractable	ug	5.44	8.85	1.9	0.05
Iron	Strong Acid Extractable	ug	45.5	39.6	8.1	0.1
Lead	Strong Acid Extractable	ug	13.1	5.77	1.2	0.3
Lithium	Strong Acid Extractable	ug	<0.3	<0.3	<0.3	0.3
Magnesium	Strong Acid Extractable	ug	19	19	11	0.5
Manganese	Strong Acid Extractable	ug	5.64	4.05	1.45	0.05
Mercury	Strong Acid Extractable	ug	0.056	0.056	<0.005	0.005
Molybdenum	Strong Acid Extractable	ug	<0.5	<0.5	<0.5	0.5
Nickel	Strong Acid Extractable	ug	2	2.9	0.67	0.05
Phosphorus	Strong Acid Extractable	ug	43	41	54	3
Potassium	Strong Acid Extractable	ug	110	85	30	15
Selenium	Strong Acid Extractable	ug	<1	<1	<1	1
Silicon	Strong Acid Extractable	ug	5.2	<2	5	3
Silver	Strong Acid Extractable	ug	0.1	0.5	0.1	0.1
Sodium	Strong Acid Extractable	ug	126	152	193	3
Strontium	Strong Acid Extractable	ug	0.78	0.5	<0.3	0.3
Sulphur	Strong Acid Extractable	ug	56900	49600	569	10
Tellurium	Strong Acid Extractable	ug	<2	<2	<2	2
Thallium	Strong Acid Extractable	ug	<0.15	<0.15	<0.5	0.2
Thorium	Strong Acid Extractable	ug	<0.3	<0.3	<0.3	0.3
Tin	Strong Acid Extractable	ug	4.5	4.7	5.47	0.3
Titanium	Strong Acid Extractable	ug	0.84	0.57	0.4	0.05
ranium	Strong Acid Extractable	ug	<3	<3	<3	3

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Analytical Report

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100A, 20120 - 64 Avenue
Langley, BC, Canada
V2Y 1M8
Attn: Al LanFranco

Sampled By:

Project ID:
Name: Trans Canada Power
Location: Williams Lake
LSD:
P.O.:
Acct. Code: 61337

NWL Lot ID: 113460
Control Number: E 22451
Date Received: Apr 11, 2001
Date Reported: Apr 20, 2001
Report Number: 165200

		NWL Number:	113460-4	113460-5	113460-6	
		Sample Date:				
		Sample Description:	TC Power PW-4 & Metals-4 (Beaker #212) 5/4/01	TC Power PW-5 & Metals-5 (Beaker #4) 6/4/01	Blank PW-Probe Wash & Blank Metals (Beaker #B10)	
Analyte		**Units**	**Results**	**Results**	**Results**	**Detection Limit**
Air Quality Metals - Continued						
Vanadium	Strong Acid Extractable	ug	0.2	0.09	<0.05	0.05
Zinc	Strong Acid Extractable	ug	22.2	23.4	11.6	0.03
Zirconium	Strong Acid Extractable	ug	0.4	0.59	1.1	0.3

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	BASELINE WILLIAMS LAKE 03-APR-01 REGULAR FUEL	AXYS FILE:	L3383-1
CLIENT:	A. Lanfranco & Associates	DATE:	28/May/2001
CLIENT NO.:	2585		
SAMPLE TYPE:	Pulp	METHOD NO.:	DX-P-01/Ver.4
SAMPLE SIZE:	1.23 g (dry)	INSTRUMENT:	GC-HRMS
		CONCENTRATION IN:	pg/g

Dioxins	Concentration	(SDL)	Furans	Concentration	(SDL)
T4CDD - Total	ND	0.8	T4CDF - Total	ND	0.8
2,3,7,8	ND	0.8	2,3,7,8	ND	0.8
P5CDD - Total	ND	0.8	P5CDF - Total	ND	0.8
1,2,3,7,8	ND	0.8	1,2,3,7,8	ND	0.8
			2,3,4,7,8	ND	0.8
H6CDD - Total	4.4	2.4	H6CDF - Total	9.5	2.4
1,2,3,4,7,8	ND	2.4	1,2,3,4,7,8	ND	2.4
1,2,3,6,7,8	NDR(2.9)	2.4	1,2,3,6,7,8	ND	2.4
1,2,3,7,8,9	ND	2.4	2,3,4,6,7,8	ND	2.4
			1,2,3,7,8,9	ND	2.4
H7CDD - Total	88	4.1	H7CDF - Total	56	4.1
1,2,3,4,6,7,8	49	4.1	1,2,3,4,6,7,8	12	4.1
			1,2,3,4,7,8,9	ND	4.1
O8CDD	310	6.5	O8CDF	64	6.5

Surrogate Standards	% Recovery
13C-T4CDF	56
13C-T4CDD	63
13C-P5CDF	57
13C-P5CDD	68
13C-H6CDF	56
13C-H6CDD	63
13C-H7CDF	66
13C-H7CDD	66
13C-O8CDD	66

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8 - TCDD TEQs (ND=1/2 DL) = 2.73 pg/g

2,3,7,8 - TCDD TEQs (ND=0) = 0.99 pg/g

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: ____________________
QA Chemist

DX001A

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	RAIL TIE COMPOSITE WILLIAMS LAKE COMPOSITE OF RAIL TIE 1,2,3, Treated Wood	AXYS FILE:	L3383-
CLIENT:	A. Lanfranco & Associates	DATE:	28/Ma)
CLIENT NO.:	2585		
SAMPLE TYPE:	Pulp	METHOD NO.:	DX-P-(
SAMPLE SIZE:	14.2 g (dry)	INSTRUMENT:	GC-HF
		CONCENTRATION IN:	pg/g

Dioxins	Concentration	(SDL)	Furans	Concentration
T4CDD - Total	35	0.2	T4CDF - Total	97
2,3,7,8	2.6	0.2	2,3,7,8	11
P5CDD - Total	350	0.1	P5CDF - Total	2000
1,2,3,7,8	66	0.1	1,2,3,7,8	57
			2,3,4,7,8	60
H6CDD - Total	28000	5.7	H6CDF - Total	45000
1,2,3,4,7,8	700	5.7	1,2,3,4,7,8	1300
1,2,3,6,7,8	8300	5.7	1,2,3,6,7,8	390
1,2,3,7,8,9	880	5.7	2,3,4,6,7,8	610
			1,2,3,7,8,9	450
H7CDD - Total	240000 *	530	H7CDF - Total	160000 *
1,2,3,4,6,7,8	130000 *	530	1,2,3,4,6,7,8	32000 *
			1,2,3,4,7,8,9	2200 *
O8CDD	950000 *	44	O8CDF	160000 *

Surrogate Standards	% Recovery
13C-T4CDF	57
13C-T4CDD	52
13C-P5CDF	50
13C-P5CDD	55
13C-H6CDF	42
13C-H6CDD	62
13C-H7CDF	N/A
13C-H7CDD	N/A
13C-O8CDD	N/A

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8 - TCDD TEQs (ND=1/2 DL) = 4040

2,3,7,8 - TCDD TEQs (ND=0) = 4040

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

* = From analysis of 1000-times dilution; not recovery corrected - consider as minimum values.

NA = Additional aliquot of quantification standards added to 1000-times dilution; surrogate %recovery not applicable.

Approved: ____________________
QA Chemist

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	BASELINE WILLIAMS LAKE 03-APR-01 REGULAR FUEL	AXYS FILE:	L3383-1 NK
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	29/May/2001
CLIENT NO.:	2585	METHOD NO.:	PH-A-07/Ver.2
SAMPLE TYPE:	Pulp	INSTRUMENT:	GC-MS
		RUN ID:	PH171222.D
SAMPLE SIZE:	9.45 g (dry)	CONCENTRATION IN:	ng/g

Compounds		Concentration *	SDL
Naphthalene		5700	3.1
Acenaphthylene		58	0.85
Acenaphthene		3200	1.1
Fluorene		1700	0.9
Phenanthrene		1400	2.5
Anthracene		250	3.2
Fluoranthene		45	2.1
Pyrene	NDR	34	1.8
Benz[a]anthracene		ND	2.3
Chrysene		ND	2.6
Benzofluoranthenes	NDR	15.0	3.3
Benzo[e]pyrene		ND	1.8
Benzo[a]pyrene		ND	2.4
Perylene		ND	3.8
Dibenz[ah]anthracene		ND	5
Indeno[1,2,3-cd]pyrene	NDR	4.9	2.2
Benzo[ghi]perylene		ND	2.8

Surrogate Standards	% Recovery
Naphthalene d-8	N/A
Acenaphthylene d-8	N/A
Phenanthrene d-10	N/A
Fluoranthene d-10	N/A
Benz[a]anthracene d-12	N/A
Chrysene d-12	N/A
Benzo[b,k]fluoranthene d-12	N/A
Benzo[a]pyrene d-12	N/A
Perylene d-12	N/A
Dibenz[ah]anthracene d-14	N/A
Indeno[1,2,3-cd]pyrene d-12	N/A
Benzo[ghi]perylene d-12	N/A

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected
5. * Concentrations are not recovery corrected
6. Surrogate recoveries not applicable due to large dilution and a aliquot of surrogate standards.

Approved: ____________________
QA Chemist

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	RAIL TIE COMPOSITE WILLIAMS LAKE COMPOSITE OF RAILTIE 1,2,3: TREATED WOOD	AXYS FILE:	L3383-9 N2K
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	29/May/2001
CLIENT NO.:	2585	METHOD NO.:	PH-A-07/Ver.2
SAMPLE TYPE:	Pulp	INSTRUMENT:	GC-MS
SAMPLE SIZE:	7.79 g (dry)	RUN ID:	PH171247.D
		CONCENTRATION IN:	ng/g

Compounds	Concentration *	SDL
Naphthalene	190000	690
Acenaphthylene	13000	780
Acenaphthene	730000	680
Fluorene	660000	2100
Phenanthrene	2100000	1600
Anthracene	990000	1800
Fluoranthene	1200000	1600
Pyrene	800000	2100
Benz[a]anthracene	190000	2000
Chrysene	240000	2700
Benzofluoranthenes	89000	7800
Benzo[e]pyrene	55000	9900
Benzo[a]pyrene	72000	9900
Perylene	14000	12000
Dibenz[ah]anthracene	ND	15000
Indeno[1,2,3-cd]pyrene	ND	18000
Benzo[ghi]perylene	18000	17000

Surrogate Standards	% Recovery
Naphthalene d-8	N/A
Acenaphthylene d-8	N/A
Phenanthrene d-10	N/A
Fluoranthene d-10	N/A
Benz[a]anthracene d-12	N/A
Chrysene d-12	N/A
Benzo[b,k]fluoranthene d-12	N/A
Benzo[a]pyrene d-12	N/A
Perylene d-12	N/A
Dibenz[ah]anthracene d-14	N/A
Indeno[1,2,3-cd]pyrene d-12	N/A
Benzo[ghi]perylene d-12	N/A

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected
5. * Concentrations are not recovery corrected
6. Surrogate recoveries not applicable due to large dilution and a aliquot of surrogate standards.

Approved: ____________________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	BASELINE WILLIAMS LAKE 03-APR-01 REGULAR FUEL	AXYS FILE:	L3383-1
CLIENT:	A. Lanfranco and Associates	DATE:	30-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-S-01/Ver.3
SAMPLE TYPE:	Pulp	INSTRUMENT:	GC-MS
		RUN ID:	CP160745.D
SAMPLE SIZE:	5.65 g (dry)	CONCENTRATION IN:	ng/g

Compound	Concentration	SDL
2,4,6-Trichlorophenol	ND	1.2
2,3,6-Trichlorophenol	ND	1.0
2,3,5-Trichlorophenol	ND	1.0
2,4,5-Trichlorophenol	ND	0.2
2,3,4-Trichlorophenol	NDR 0.4	0.2
3,4,5-Trichlorophenol	ND	0.2
2,3,5,6-Tetrachlorophenol	1.3	0.4
2,3,4,6-Tetrachlorophenol	6.0	0.3
2,3,4,5-Tetrachlorophenol	ND	0.3
Pentachlorophenol	23	1.6

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	45
2,4,5-Trichlorophenol-13C	37
2,3,4,5-Tetrachlorophenol-13C	39
Pentachlorophenol-13C	28

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.

Approved: ______________________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	RAIL TIE COMPOSITE WILLIAMS LAKE COMPOSITE OF RAIL TIE 1,2,3: TREATED WOOD	AXYS FILE:	L3383-9 NI
CLIENT:	A. Lanfranco and Associates	DATE:	30-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-S-01/Ver.3
SAMPLE TYPE:	Pulp	INSTRUMENT:	GC-MS
		RUN ID:	CP171249.D
SAMPLE SIZE:	5.48 g (dry)	CONCENTRATION IN:	ng/g

Compound	Concentration	SDL
2,4,6-Trichlorophenol	12	2.0
2,3,6-Trichlorophenol	13	1.7
2,3,5-Trichlorophenol	130	1.8
2,4,5-Trichlorophenol	55	2.9
2,3,4-Trichlorophenol	3.1	2.9
3,4,5-Trichlorophenol	390	3.2
2,3,5,6-Tetrachlorophenol	X	
2,3,4,6-Tetrachlorophenol	X	
2,3,4,5-Tetrachlorophenol	X	
Pentachlorophenol	X	

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	59
2,4,5-Trichlorophenol-13C	44
2,3,4,5-Tetrachlorophenol-13C	X
Pentachlorophenol-13C	X

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.
5. X = Results reported separately

Approved: ______________________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	RAIL TIE COMPOSITE WILLIAMS LAKE COMPOSITE OF RAIL TIE 1,2,3: TREATED WOOD	AXYS FILE:	L3383-9 NK
CLIENT:	A. Lanfranco and Associates	DATE:	30-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-S-01/Ver.3
SAMPLE TYPE:	Pulp	INSTRUMENT:	GC-MS
		RUN ID:	CP171248.D
SAMPLE SIZE:	5.48 g (dry)	CONCENTRATION IN:	ng/g

Compound	Concentration *	SDL
2,4,6-Trichlorophenol		
2,3,6-Trichlorophenol		
2,3,5-Trichlorophenol		
2,4,5-Trichlorophenol		
2,3,4-Trichlorophenol		
3,4,5-Trichlorophenol		
2,3,5,6-Tetrachlorophenol	890	120
2,3,4,6-Tetrachlorophenol	3600	76
2,3,4,5-Tetrachlorophenol	ND	83
Pentachlorophenol	67000	310

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	
2,4,5-Trichlorophenol-13C	
2,3,4,5-Tetrachlorophenol-13C	N/A
Pentachlorophenol-13C	N/A

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.
5. * Data are not recovery corrected.
6. N/A: Surrogate recoveries not applicable due to dilution and additional aliquot of surrogate standards.

Approved: ____________________
QA Chemist

DX001B

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	BASELINE WILLIAMS LAKE 03-APR-01 FLY ASH	AXYS FILE:	L3383-5
CLIENT:	A. Lanfranco and Associates	DATE:	22-May-2001
CLIENT NO.:	2585	METHOD NO.:	DX-A-01/Ver.6
SAMPLE TYPE:	Ash	INSTRUMENT:	GC-HRMS
SAMPLE SIZE:	1.72 g (dry)	CONCENTRATION IN:	pg/g
% MOISTURE:	66		

Dioxins	Concentration	SDL	Furans	Concentration	SDL
T4CDD - Total	58	0.58	T4CDF - Total	770	1.7
2,3,7,8	6.8	0.58	2,3,7,8	96	1.7
P5CDD - Total	10	0.58	P5CDF - Total	99	0.58
1,2,3,7,8	2.7	0.58	1,2,3,7,8	8.3	0.58
			2,3,4,7,8	8.6	0.58
H6CDD - Total	5.6	1.7	H6CDF - Total	2.7	1.7
1,2,3,4,7,8	ND	1.7	1,2,3,4,7,8	ND	1.7
1,2,3,6,7,8	ND	1.7	1,2,3,6,7,8	ND	1.7
1,2,3,7,8,9	ND	1.7	2,3,4,6,7,8	ND	1.7
			1,2,3,7,8,9	ND	1.7
H7CDD - Total	ND	2.9	H7CDF - Total	ND	2.9
1,2,3,4,6,7,8	ND	2.9	1,2,3,4,6,7,8	ND	2.9
			1,2,3,4,7,8,9	ND	2.9
O8CDD	ND	4.7	O8CDF	ND	4.7

Labeled Compound	% Recovery
13C-T4CDF	65
13C-T4CDD	67
13C-P5CDF	65
13C-P5CDD	81
13C-H6CDF	77
13C-H6CDD	74
13C-H7CDF	64
13C-H7CDD	63
13C-O8CDD	64

2,3,7,8 - TCDD TEQs (Using WHO 1998 TEFs)

2,3,7,8 - TCDD TEQs (ND=1/2 DL) = 24.5 pg/g

2,3,7,8 - TCDD TEQs (ND=0) = 23.8 pg/g

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: ______________
QA Chemist

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	FLY ASH COMPOSITE WILLIAMS LAKE COMPOSITE OF L3383-6 TO -8, Fly Ash	AXYS FILE:	L3383-10
CLIENT:	A. Lanfranco and Associates	DATE:	22/May/2001
CLIENT NO.:	2585	METHOD NO.:	DX-A-01/Ver.6
SAMPLE TYPE:	Ash	INSTRUMENT:	GC-HRMS
SAMPLE SIZE:	3.07 g (dry)	CONCENTRATION IN:	pg/g
% MOISTURE:	40		

Dioxins	Concentration	SDL	Furans	Concentration	SDL
T4CDD - Total	3800	1.5	T4CDF - Total	7800	17
2,3,7,8	82	1.5	2,3,7,8	1200	17
P5CDD - Total	4500	0.79	P5CDF - Total	4700	13
1,2,3,7,8	210	0.79	1,2,3,7,8	230	13
			2,3,4,7,8	430	13
H6CDD - Total	5800	2.5	H6CDF - Total	1800	2.6
1,2,3,4,7,8	200	2.5	1,2,3,4,7,8	170	2.6
1,2,3,6,7,8	260	2.5	1,2,3,6,7,8	200	2.6
1,2,3,7,8,9	350	2.5	2,3,4,6,7,8	160	2.6
			1,2,3,7,8,9	16	2.6
H7CDD - Total	2900	2.2	H7CDF - Total	450	1.6
1,2,3,4,6,7,8	1400	2.2	1,2,3,4,6,7,8	240	1.6
			1,2,3,4,7,8,9	52	1.6
O8CDD	1300	2.6	O8CDF	58	2.6

Labeled Compound	% Recovery
13C-T4CDF	51
13C-T4CDD	48
13C-P5CDF	49
13C-P5CDD	59
13C-H6CDF	58
13C-H6CDD	57
13C-H7CDF	47
13C-H7CDD	49
13C-O8CDD	41

2,3,7,8 - TCDD TEQs (Using WHO 1998 TEFs)

2,3,7,8 - TCDD TEQs (ND=1/2 DL) = 788 pg/g

2,3,7,8 - TCDD TEQs (ND=0) = 788 pg/g

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: ____________________
QA Chemist

ALS Environmental

CHEMICAL ANALYSIS REPORT

Date: June 4, 2001

ALS File No. M9632r

Report On: 2585 Solids Analysis

Report To: **Axys Analytical Services Ltd.**
P.O. Box 2219
2045 Mills Road
Sidney, BC
V8L 3S8

Attention: **Ms. Diane Lusznniak**

Received: May 15, 2001

ALS ENVIRONMENTAL
per:

Leanne Harris, B.Sc. - Project Chemist
Brent C. Mack, B.Sc. - Project Chemist

AURORA LABORATORY SERVICES LTD.
1988 Triumph Street, Vancouver, BC Canada V5L 1K5
Phone: 604-253-4188 Fax: 604-253-6700 Website: www.alsenviro.com

Formerly ASL Analytical Service Laboratories Ltd.

File No. M9632r

REMARKS

The detection limits for some total metals were increased for the sample identified as "L3383-5 Baseline" due to high moisture content in this sample.

An extensive quality assurance/quality control program is routinely incorporated with the sample analysis. This program includes the analysis of quality control samples to define precision and accuracy, and to demonstrate contamination control for the type of samples and parameters under investigation. Quality control samples may include method blanks, sample replicates, certified and standard reference materials, and analyte or matrix spikes. For this sample submission, the following quality control analyses were carried out:

- Method Blanks (n=1);
- Laboratory Replicates (n=1);
- Reference Materials (n=1);

The quality control data are reported at the end of this report. This data indicated the following:

> Method Blank, Laboratory Replicate and Reference Material data for all parameters analysed demonstrated that precision, accuracy, and contamination control met acceptance criteria.

MESS-3 is a Marine Sediment Reference Material Certified for Trace Metals in Sediment by the National Research Council of Canada.

The MESS-3 Found Values along with the MESS-3 Lab and Certified Values are included in the following data tables. The MESS-3 Lab values are corrected for Laboratory Bias based on the method of digestion. The MESS-3 Certified Values are based on a rigorous Four Acid Digestion involving Hydrochloric, Nitric, Hydrofluoric, and Perchloric Acid, rather than on the 1:1 Nitric and Hydrochloric Acid Digestion used for these samples.

File No. M9632r

RESULTS OF ANALYSIS - Quality Control

Sample ID		Method Blank	MESS-3 Found Value	Mess-3 Lab	Mess-3 Cert
Sample Date					
Sample Time					
ALS ID		*MBlk*	*MESS-3*	*MESS-3 LAB*	*MESS-3 CERT*
Total Metals					
Aluminum	T-Al	<50	50900	n/a	n/a
Antimony	T-Sb	<20	<20	<20	1.02
Arsenic	T-As	<100	<100	<50	21.2
Barium	T-Ba	<1	573	n/a	n/a
Beryllium	T-Be	<0.5	1.7	1.74	2.30
Bismuth	T-Bi	<10	<10	n/a	n/a
Cadmium	T-Cd	<2	<2	<2	0.24
Calcium	T-Ca	<50	14600	n/a	n/a
Chromium	T-Cr	<2	69	68.9	105
Cobalt	T-Co	<2	13	12.0	14.4
Copper	T-Cu	<1	34	33.5	33.9
Iron	T-Fe	<50	48600	n/a	n/a
Lead	T-Pb	<50	<50	<50	21.1
Lithium	T-Li	<2	65	59.2	73.6
Magnesium	T-Mg	<50	16800	n/a	n/a
Manganese	T-Mn	<1	308	303	324
Mercury	T-Hg	<0.005	0.088	0.093	0.091
Molybdenum	T-Mo	<4	<4	<4	2.78
Nickel	T-Ni	<5	42	41.7	46.9
Phosphorus	T-P	<50	1160	n/a	n/a
Potassium	T-K	<200	14400	n/a	n/a
Selenium	T-Se	<50	<50	<50	0.72
Silver	T-Ag	<2	<2	<2	0.18
Strontium	T-Sr	<0.5	91.4	90.7	129
Thallium	T-Tl	<50	<50	<50	0.90
Tin	T-Sn	<10	<10	<10	2.50
Titanium	T-Ti	<1	89	n/a	n/a
Vanadium	T-V	<2	174	175	243
Zinc	T-Zn	<1	140	144	159

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
n/a = no certified values available.
< = Less than the detection limit indicated.

File No. M9632r

Appendix 1 - QUALITY CONTROL - Replicates

Solid		L3383-10 Fly Ash Comp.	L3383-10 Fly Ash Comp. QC # 240208
Physical Tests			
Moisture	%	42.9	43.6
Total Metals			
Aluminum	T-Al	19000	20900
Antimony	T-Sb	<20	<20
Arsenic	T-As	<100	<100
Barium	T-Ba	335	374
Beryllium	T-Be	<0.5	<0.5
Bismuth	T-Bi	<10	<10
Cadmium	T-Cd	3	4
Calcium	T-Ca	37200	40100
Chromium	T-Cr	67	74
Cobalt	T-Co	10	11
Copper	T-Cu	840	918
Iron	T-Fe	60000	68800
Lead	T-Pb	316	339
Lithium	T-Li	6	7
Magnesium	T-Mg	8580	9300
Manganese	T-Mn	1500	1600
Mercury	T-Hg	0.238	0.261
Molybdenum	T-Mo	9	10
Nickel	T-Ni	62	68
Phosphorus	T-P	1900	2040
Potassium	T-K	7400	7940
Selenium	T-Se	<50	<50
Silver	T-Ag	<2	<2
Strontium	T-Sr	198	208
Thallium	T-Tl	<50	<50
Tin	T-Sn	<10	<10
Titanium	T-Ti	1120	1260
Vanadium	T-V	64	71
Zinc	T-Zn	686	719

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
n/a = no certified values available.
< = Less than the detection limit indicated.

File No. M9632r

Appendix 2 - METHODOLOGY

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample:	14 days
Reference:	Puget

For more detail see ALS Environmental "Collection & Sampling Guide"

Metals in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 Method 3050B or Method 3051, published by the United States Environmental Protection Agency (EPA). The sample is manually homogenized and a representative subsample of the wet material is weighed. The sample is then digested by either hotplate or microwave oven using a 1:1 ratio of nitric acid and hydrochloric acid. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series) and/or inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample/Extract:	6 months (Mercury = 28 days)
Reference:	EPA

For more detail see ALS Environmental "Collection & Sampling Guide"

End Of Report

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	BASELINE WILLIAMS LAKE 03-APR-01 FLY ASH	AXYS FILE:	L3383-5
CLIENT:	A. Lanfranco & Associates	DATE:	05-Jun-2001
CLIENT NO.:	2585	METHOD NO.:	PH-A-07/Ver.2
SAMPLE TYPE:	Ash	INSTRUMENT:	GC-MS
		RUN ID:	PH171349.D
SAMPLE SIZE:	1.93 g (dry)	CONCENTRATION IN:	ng/g

Compounds		Concentration	SDL
Naphthalene		600	3.6
Acenaphthylene		51	1.5
Acenaphthene		ND	2.0
Fluorene	NDR	7.6	2.0
Phenanthrene		140	1.4
Anthracene		14	1.4
Fluoranthene		32	1.0
Pyrene		47	1.0
Benz[a]anthracene		3.0	1.8
Chrysene		12	1.4
Benzofluoranthenes		ND	6.6
Benzo[e]pyrene		ND	24
Benzo[a]pyrene		ND	31
Perylene		ND	32
Dibenz[ah]anthracene		ND	95
Indeno[1,2,3-cd]pyrene		ND	110
Benzo[ghi]perylene		ND	70

Surrogate Standards	% Recovery
Naphthalene d-8	30
Acenaphthylene d-8	57
Phenanthrene d-10	71
Fluoranthene d-10	66
Benz[a]anthracene d-12	31
Chrysene d-12	50
Benzo[b,k]fluoranthene d-12	16
Benzo[a]pyrene d-12	10
Perylene d-12	10
Dibenz[ah]anthracene d-14	4
Indeno[1,2,3-cd]pyrene d-12	2
Benzo[ghi]perylene d-12	3

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected
5. Concentrations are recovery corrected

Approved: ______________________________
QA Chemist

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	FLY ASH COMPOSITE WILLIAMS LAKE COMPOSITE RAIL TIE 1,2,3 FLY ASH	AXYS FILE:	L3383-10
CLIENT:	A. Lanfranco & Associates	DATE:	05-Jun-2001
CLIENT NO.:	2585	METHOD NO.:	PH-A-07/Ver.2
SAMPLE TYPE:	Ash	INSTRUMENT:	GC-MS
		RUN ID:	PH171350.D
SAMPLE SIZE:	3.13 g (dry)	CONCENTRATION IN:	ng/g

Compounds		Concentration	SDL
Naphthalene		740	0.98
Acenaphthylene		80	1.1
Acenaphthene		2.7	0.89
Fluorene		ND	0.71
Phenanthrene		170	0.75
Anthracene		29	0.79
Fluoranthene		87	0.59
Pyrene		150	0.58
Benz[a]anthracene	NDR	6.1	0.48
Chrysene		9.2	0.5
Benzofluoranthenes	NDR	7.9	1.4
Benzo[e]pyrene		ND	7.0
Benzo[a]pyrene		ND	8.8
Perylene		ND	10
Dibenz[ah]anthracene		ND	11
Indeno[1,2,3-cd]pyrene		ND	25
Benzo[ghi]perylene		ND	18

Surrogate Standards	% Recovery
Naphthalene d-8	24
Acenaphthylene d-8	40
Phenanthrene d-10	68
Fluoranthene d-10	82
Benz[a]anthracene d-12	63
Chrysene d-12	73
Benzo[b,k]fluoranthene d-12	45
Benzo[a]pyrene d-12	32
Perylene d-12	32
Dibenz[ah]anthracene d-14	14
Indeno[1,2,3-cd]pyrene d-12	10
Benzo[ghi]perylene d-12	9

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Data have not been blank corrected
5. Concentrations are recovery corrected

Approved: ______________________

QA Chemist

File No. M9632

RESULTS OF ANALYSIS - Solid

Sample ID		L3383-5 Baseline	L3383-10 Fly Ash Comp.
Sample Date			
Sample Time			
ALS ID		*1*	*2*
Physical Tests			
Moisture	%	66.7	42.9
Total Metals			
Aluminum	T-Al	14900	19000
Antimony	T-Sb	<40	<20
Arsenic	T-As	<200	<100
Barium	T-Ba	485	335
Beryllium	T-Be	<1	<0.5
Bismuth	T-Bi	<20	<10
Cadmium	T-Cd	<4	3
Calcium	T-Ca	66200	37200
Chromium	T-Cr	28	67
Cobalt	T-Co	8	10
Copper	T-Cu	35	840
Iron	T-Fe	14100	60000
Lead	T-Pb	<100	316
Lithium	T-Li	6	6
Magnesium	T-Mg	12300	8580
Manganese	T-Mn	2920	1500
Mercury	T-Hg	0.045	0.238
Molybdenum	T-Mo	<8	9
Nickel	T-Ni	28	62
Phosphorus	T-P	2460	1900
Potassium	T-K	13300	7400
Selenium	T-Se	<100	<50
Silver	T-Ag	<4	<2
Strontium	T-Sr	289	198
Thallium	T-Tl	<100	<50
Tin	T-Sn	<20	<10
Titanium	T-Ti	1050	1120
Vanadium	T-V	37	64
Zinc	T-Zn	429	686

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

File No. M9632

Appendix 1 - QUALITY CONTROL - Replicates

Solid		L3383-10 Fly Ash Comp.	L3383-10 Fly Ash Comp. QC # 240208
Physical Tests			
Moisture	%	42.9	43.6
Total Metals			
Aluminum	T-Al	19000	20900
Antimony	T-Sb	<20	<20
Arsenic	T-As	<100	<100
Barium	T-Ba	335	374
Beryllium	T-Be	<0.5	<0.5
Bismuth	T-Bi	<10	<10
Cadmium	T-Cd	3	4
Calcium	T-Ca	37200	40100
Chromium	T-Cr	67	74
Cobalt	T-Co	10	11
Copper	T-Cu	840	918
Iron	T-Fe	60000	68800
Lead	T-Pb	316	339
Lithium	T-Li	6	7
Magnesium	T-Mg	8580	9300
Manganese	T-Mn	1500	1600
Mercury	T-Hg	0.238	0.261
Molybdenum	T-Mo	9	10
Nickel	T-Ni	62	68
Phosphorus	T-P	1900	2040
Potassium	T-K	7400	7940
Selenium	T-Se	<50	<50
Silver	T-Ag	<2	<2
Strontium	T-Sr	198	208
Thallium	T-Tl	<50	<50
Tin	T-Sn	<10	<10
Titanium	T-Ti	1120	1260
Vanadium	T-V	64	71
Zinc	T-Zn	686	719

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

File No. M9632

RESULTS OF ANALYSIS - Quality Control

Sample ID		Method Blank	MESS-3 Found Value
Sample Date			
Sample Time			
ALS ID		*MBlk*	*MESS-3*
Total Metals			
Aluminum	T-Al	<50	50900
Antimony	T-Sb	<20	<20
Arsenic	T-As	<100	<100
Barium	T-Ba	<1	573
Beryllium	T-Be	<0.5	1.7
Bismuth	T-Bi	<10	<10
Cadmium	T-Cd	<2	<2
Calcium	T-Ca	<50	14600
Chromium	T-Cr	<2	69
Cobalt	T-Co	<2	13
Copper	T-Cu	<1	34
Iron	T-Fe	<50	48600
Lead	T-Pb	<50	<50
Lithium	T-Li	<2	65
Magnesium	T-Mg	<50	16800
Manganese	T-Mn	<1	308
Mercury	T-Hg	<0.005	0.088
Molybdenum	T-Mo	<4	<4
Nickel	T-Ni	<5	42
Phosphorus	T-P	<50	1160
Potassium	T-K	<200	14400
Selenium	T-Se	<50	<50
Silver	T-Ag	<2	<2
Strontium	T-Sr	<0.5	91.4
Thallium	T-Tl	<50	<50
Tin	T-Sn	<10	<10
Titanium	T-Ti	<1	89
Vanadium	T-V	<2	174
Zinc	T-Zn	<1	140

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

File No. M9632

Appendix 2 - METHODOLOGY

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample:	14 days
Reference:	Puget

For more detail see ALS Environmental "Collection & Sampling Guide"

Metals in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 Method 3050B or Method 3051, published by the United States Environmental Protection Agency (EPA). The sample is manually homogenized and a representative subsample of the wet material is weighed. The sample is then digested by either hotplate or microwave oven using a 1:1 ratio of nitric acid and hydrochloric acid. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series) and/or inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become "environmentally available." By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample/Extract:	6 months (Mercury = 28 days)
Reference:	EPA

For more detail see ALS Environmental "Collection & Sampling Guide"

End Of Report

Project	2585 Solid Analysis
Report to	Axys Analytical Services Ltd.
ALS File No.	N4146
Date Received	8/8/01
Date:	8/17/01

RAILTIE ASH
BC SWEP PROCEDURE

RESULTS OF ANALYSIS

Sample ID	L3383-10	Method Blank
Date Sampled		
Time Sampled		
ALS Sample ID	1	MBlk
Nature	Solid	Quality Control
Physical Tests		
Moisture %	43.1	-
Initial SWEP pH	9.73	-
Final SWEP pH	5.15	-
Extractable Metals		
Arsenic As	<0.2	<0.2
Barium Ba	0.2	<0.05
Boron B	1.1	<0.1
Cadmium Cd	0.09	<0.01
Chromium Cr	<0.01	<0.01
Copper Cu	1.01	<0.01
Lead Pb	0.29	<0.05
Mercury Hg	<0.00005	<0.00005
Selenium Se	<0.2	<0.2
Silver Ag	<0.01	<0.01
Zinc Zn	10.2	<0.05

Footnotes: < = Less than the detection limit indicated.
Results are expressed as milligrams per litre, as per the requirements of the Special Waste Regulations, B.C. Reg.63/88.

APPENDIX 3

QA/QC RESULTS

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	LAB BLANK	AXYS FILE:	WG4351-101
		DATE:	24-May-2001
CLIENT:	A. Lanfranco & Associates Inc.	METHOD NO.:	DX-SG-01/Ver.4
CLIENT NO.:	2585	INSTRUMENT:	GC-HRMS
SAMPLE TYPE:	Blank	CONCENTRATION IN:	pg/sample
SAMPLE SIZE:	1 sample		

Dioxins	Concentration	(SDL)	Furans	Concentration	(SDL)
T4CDD - Total	ND	4.9	T4CDF - Total	ND	1.6
2,3,7,8	ND	4.9	2,3,7,8	ND	1.6
P5CDD - Total	3.3	1.6	P5CDF - Total	2.4	1.5
1,2,3,7,8	3.3	1.6	1,2,3,7,8	2.4	1.5
			2,3,4,7,8	ND	1.5
H6CDD - Total	3.6	3.0	H6CDF - Total	8.1	3.0
1,2,3,4,7,8	ND	3.0	1,2,3,4,7,8	4.2	3.0
1,2,3,6,7,8	NDR(3.8)	3.0	1,2,3,6,7,8	ND	3.0
1,2,3,7,8,9	NDR(5.8)	3.0	2,3,4,6,7,8	ND	3.0
			1,2,3,7,8,9	3.9	3.0
H7CDD - Total	ND	5.0	H7CDF - Total	ND	5.0
1,2,3,4,6,7,8	NDR(6)	5.0	1,2,3,4,6,7,8	ND	5.0
			1,2,3,4,7,8,9	ND	5.0
O8CDD	NDR(22)	8.0	O8CDF	NDR(11)	8.0

Surrogate Standards	% Recovery
13C-T4CDF	64
13C-T4CDD	64
13C-P5CDF	72
13C-P5CDD	110
13C-H6CDF	75
13C-H6CDD	84
13C-H7CDF	73
13C-H7CDD	70
13C-O8CDD	56

Field Standards	% Recovery
13C6-1,2,3,4-TCDD	N/A
13C-1,2,3,4,7,8,9-HpCDF	N/A

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8-TCDD TEQs (ND=1/2 DL)	6.33	pg/sample
2,3,7,8-TCDD TEQs (ND=0) =	2.59	pg/sample

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: [signature]
QA Chemist

ANALYSIS REPORT
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS

CLIENT SAMPLE I.D.:	RUN: BLANK TRANS CANADA POWER 05-Apr-01	AXYS FILE:	L3385-5
		DATE:	24-May-2001
CLIENT:	A. Lanfranco & Associates Inc.	METHOD NO.:	DX-SG-01/Ver.4
CLIENT NO.:	2585	INSTRUMENT:	GC-HRMS
SAMPLE TYPE:	Train	CONCENTRATION IN:	pg/sample
SAMPLE SIZE:	1 sample		

Dioxins	Concentration	(SDL)	Furans	Concentration	(SDL)
T4CDD - Total	ND	5.7	T4CDF - Total	ND	2.7
2,3,7,8	ND	5.7	2,3,7,8	ND	2.7
P5CDD - Total	ND	2.8	P5CDF - Total	1.8	1.5
1,2,3,7,8	ND	2.8	1,2,3,7,8	1.8	1.5
			2,3,4,7,8	ND	1.5
H6CDD - Total	7.6	3.0	H6CDF - Total	ND	3.0
1,2,3,4,7,8	ND	3.0	1,2,3,4,7,8	ND	3.0
1,2,3,6,7,8	NDR(3.5)	3.0	1,2,3,6,7,8	ND	3.0
1,2,3,7,8,9	ND	3.0	2,3,4,6,7,8	ND	3.0
			1,2,3,7,8,9	ND	3.0
H7CDD - Total	20	5.0	H7CDF - Total	ND	5.0
1,2,3,4,6,7,8	9.4	5.0	1,2,3,4,6,7,8	ND	5.0
			1,2,3,4,7,8,9	ND	5.0
O8CDD	23	8.0	O8CDF	ND	8.0

Surrogate Standards	% Recovery	Field Standards	% Recovery
13C-T4CDF	65	13C6-1,2,3,4-TCDD	112
13C-T4CDD	72	13C-1,2,3,4,7,8,9-HpCDF	107
13C-P5CDF	71		
13C-P5CDD	93		
13C-H6CDF	74		
13C-H6CDD	84		
13C-H7CDF	67		
13C-H7CDD	62		
13C-O8CDD	65		

2,3,7,8 - TCDD TEQs (Using NATO I-TEFs)

2,3,7,8-TCDD TEQs (ND=1/2 DL)	5.35	pg/sample
2,3,7,8-TCDD TEQs (ND=0) =	0.208	pg/sample

1. SDL = Sample Detection Limit
2. ND = Not detected
3. NDR = Peak detected but did not meet quantification criteria
4. Concentrations are recovery corrected.

Approved: [signature]
QA Chemist

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	Spiked Matrix	AXYS FILE:	WG4381-102
CLIENT:	A. LanFranco and Associates	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	PH-SG-07/Ver.2
SAMPLE TYPE:	Filter	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	CONCENTRATION IN	ng/sample
		PAH RUN ID:	PH171184.D

Compound	Determined	Expected	% Recovery
Naphthalene	5300	4000	132
Acenaphthylene	4400	3900	112
Acenaphthene	4300	3900	109
Fluorene	4900	3900	124
Phenanthrene	5100	3900	131
Anthracene	3300	4000	84
Fluoranthene	5100	4100	125
Pyrene	5100	4000	127
Benz[a]anthracene	4500	3900	115
Chrysene	5200	4000	131
Benzo[b/j/k]fluoranthenes	10000	8000	128
Benzo[e]pyrene	4700	3900	122
Benzo[a]pyrene	4100	3900	106
Perylene	4300	4000	108
Dibenz[ah]anthracene	4800	3900	122
Indeno[1,2,3-cd]pyrene	4600	3800	119
Benzo[ghi]perylene	4800	3800	125
Dimethyl Naphthalenes	5000	4000	127
Field Surrogate			
d10-Anthracene	2000	2000	100

Labeled Compound	% Recovery
Naphthalene d-8	57
Acenaphthylene d-8	68
Phenanthrene d-10	76
Fluoranthene d-10	79
Benz(a)anthracene d-12	78
Chrysene d-12	74
Benzo(b,k)Fluoranthene d-12	69
Benzo(a)pyrene d-12	74
Perylene d-12	80
Dibenzo(ah)anthracene d-14	58
Indeno(123cd)pyrene d-12	64
Benzo(ghi)perylene d-12	67
2,6-Dimethylnaphthalene d-12	79

Approved: QA Chemist

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	LAB BLANK	AXYS FILE:	WG4381-101 i
CLIENT:	A. LanFranco and Associates	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	PH-SG-07/Ver.2
SAMPLE TYPE:	Filter	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	CONCENTRATION IN	ng/sample
		PAH RUN ID:	PH171187.D

Compound	Lab Flag[1]	Concentration	SDL
Naphthalene	NDR	21	6.7
Acenaphthylene	NDR	4.1	1.9
Acenaphthene	ND		6.1
Fluorene	NDR	69	1.7
Phenanthrene	NDR	17	5.0
Anthracene	ND		6.0
Fluoranthene	NDR	18	2.0
Pyrene	NDR	8.9	2.0
Benz[a]anthracene		6.1	5.2
Chrysene	NDR	28	7.8
Benzo[b/j]fluoranthenes	ND		9.4
Benzo[k]fluoranthene	ND		9.4
Benzo[e]pyrene	ND		5.7
Benzo[a]pyrene	ND		7.8
Perylene	ND		8.2
Dibenz[ah]anthracene	ND		8.1
Indeno[1,2,3-cd]pyrene	ND		7.9
Benzo[ghi]perylene	ND		8.8
Dimethyl Naphthalenes		87	3.0
2-Methylfluorene	ND		4.9
Benzo[ghi]fluoranthene	ND		4.5
7,12-Dimethyl Benz[a]Anthracen	ND		120
Benzo[a]Fluorene	ND		5.2
Benzo[b]Fluorene	NDR	16	5.2
Dibenzo[a,h]Acridine	ND		7.6
Dibenzo[a,j]Acridine	ND		7.4
7H Dibenzo[c,g]Carbazole	ND		23
Dibenzo[a,i]Pyrene	ND		8.2
1-Methylpyrene	NDR	11	5.2
1,6-Dinitropyrene	ND		45
1,8-Dinitropyrene	ND		45

Labeled Compound	% Recovery
Naphthalene d-8	47
Acenaphthylene d-8	64
Phenanthrene d-10	69
Fluoranthene d-10	72
Benz(a)anthracene d-12	80
Chrysene d-12	73
Benzo(b,k)Fluoranthene d-12	66
Benzo(a)pyrene d-12	76
Perylene d-12	79
Dibenzo(ah)anthracene d-14	61
Indeno(123cd)pyrene d-12	67
Benzo(ghi)perylene d-12	67
2,6-Dimethylnaphthalene d-12	64

(1) ND = not detected; NDR = peak detected, but did not meet quantification criteria
(2) SDL = Sample Detection Limit
(3) Concentrations are recovery corrected

Approved: ____________
QA Chemist

C

PAH ANALYSIS REPORT

CLIENT SAMPLE I.D.:	RUN: BLANK TRANS CANADA POWER 05-APR-01	AXYS FILE:	L3385-5 I
CLIENT:	A. LanFranco and Associates	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	PH-SG-07/Ver.2
SAMPLE TYPE:	Sample Train	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	CONCENTRATION IN	ng/sample
		PAH RUN ID:	PH171188.D

Compound	Lab Flag[1]	Concentration	SDL
Naphthalene		460	4.2
Acenaphthylene	NDR	4.7	3.0
Acenaphthene		20	2.8
Fluorene	ND		1.3
Phenanthrene		43	2.7
Anthracene		12	3.2
Fluoranthene		19	1.8
Pyrene		16	1.8
Benz[a]anthracene	NDR	7.7	3.2
Chrysene	ND		4.8
Benzo[b/j]fluoranthenes	ND		8.4
Benzo[k]fluoranthene	ND		8.4
Benzo[e]pyrene	ND		5.1
Benzo[a]pyrene	ND		7.0
Perylene	ND		7.6
Dibenz[ah]anthracene	ND		7.2
Indeno[1,2,3-cd]pyrene	ND		5.8
Benzo[ghi]perylene	ND		6.8
Dimethyl Naphthalenes		120	1.9
2-Methylfluorene	ND		3.6
Benzo[ghi]fluoranthene	ND		3.8
7,12-Dimethyl Benz[a]Anthracen	NDR	140	130
Benzo[a]Fluorene	ND		3.1
Benzo[b]Fluorene	ND		3.1
Dibenzo[a,h]Acridine	ND		5.9
Dibenzo[a,j]Acridine	ND		5.7
7H Dibenzo[c,g]Carbazole	ND		41
Dibenzo[a,i]Pyrene	ND		13
1-Methylpyrene	ND		3.1
1,6-Dinitropyrene	ND		52
1,8-Dinitropyrene	ND		52

Field Surrogate	Determined	Expected	% Recovery
Anthracene d-10	2160	2024	107

Labeled Compound	% Recovery
Naphthalene d-8	27
Acenaphthylene d-8	39
Phenanthrene d-10	62
Fluoranthene d-10	72
Benz(a)anthracene d-12	80
Chrysene d-12	72
Benzo(b,k)Fluoranthene d-12	67
Benzo(a)pyrene d-12	75
Perylene d-12	80
Dibenzo(ah)anthracene d-14	61
Indeno(123cd)pyrene d-12	67
Benzo(ghi)perylene d-12	65
2,6-Dimethylnaphthalene d-12	45

(1) ND = not detected; NDR = peak detected, but did not meet quantification criteria
(2) SDL = Sample Detection Limit
(3) Concentrations are recovery corrected
(4) Data have not been blank corrected

Approved: [signature]
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	Spiked Matrix	AXYS FILE:	WG4376-102
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-E-06/Ver.2
SAMPLE TYPE:	Filter	INSTRUMENT:	GC-MS
		RUN ID:	CP171207.D
SAMPLE SIZE:	1 sample	CONCENTRATION IN:	ng/sample

Compound	Determined	Expected	% Recovery
2,4,6-Trichlorophenol	260	210	124
2,3,6-Trichlorophenol	270	200	135
2,3,5-Trichlorophenol	360	210	171
2,4,5-Trichlorophenol	190	200	95
2,3,4-Trichlorophenol	270	220	123
3,4,5-Trichlorophenol	300	210	143
2,3,5,6-Tetrachlorophenol	150	200	75
2,3,4,6-Tetrachlorophenol	120	220	55
2,3,4,5-Tetrachlorophenol	220	210	105
Pentachlorophenol	240	200	120

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	9
2,4,5-Trichlorophenol-13C	9
2,3,4,5-Tetrachlorophenol-13C	8
Pentachlorophenol-13C	3

Approved: ______________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	LAB BLANK	AXYS FILE:	WG4376-101
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-E-06/Ver.2
SAMPLE TYPE:	Filter	INSTRUMENT:	GC-MS
SAMPLE SIZE:	1 sample	RUN ID:	CP171208.D
		CONCENTRATION IN:	ng/sample

Compound	Concentration	SDL
2,4,6-Trichlorophenol	ND	5.7
2,3,6-Trichlorophenol	ND	4.9
2,3,5-Trichlorophenol	NDR 13	5.2
2,4,5-Trichlorophenol	ND	3.9
2,3,4-Trichlorophenol	NDR 31	3.7
3,4,5-Trichlorophenol	ND	3.9
2,3,5,6-Tetrachlorophenol	ND	8.9
2,3,4,6-Tetrachlorophenol	ND	6.7
2,3,4,5-Tetrachlorophenol	ND	6.8
Pentachlorophenol	ND	11

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	14
2,4,5-Trichlorophenol-13C	11
2,3,4,5-Tetrachlorophenol-13C	11
Pentachlorophenol-13C	6

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit

Approved: ______________
QA Chemist

CHLOROPHENOLIC ANALYSIS REPORT

CP005

CLIENT SAMPLE I.D.:	RUN: BLANK TRANS CANADA POWER 05-APR-01	AXYS FILE:	L3385-5
CLIENT:	A. Lanfranco & Associates Inc.	DATE:	28-May-2001
CLIENT NO.:	2585	METHOD NO.:	CP-E-06/Ver.2
SAMPLE TYPE:	Train	INSTRUMENT:	GC-MS
		RUN ID:	CP171213.D
SAMPLE SIZE:	1 sample	CONCENTRATION IN:	ng/sample

Compound	Concentration	SDL
2,4,6-Trichlorophenol	20	0.84
2,3,6-Trichlorophenol	ND	0.73
2,3,5-Trichlorophenol	ND	0.77
2,4,5-Trichlorophenol	ND	1.8
2,3,4-Trichlorophenol	ND	1.7
3,4,5-Trichlorophenol	ND	1.7
2,3,5,6-Tetrachlorophenol	ND	1.5
2,3,4,6-Tetrachlorophenol	12	1.1
2,3,4,5-Tetrachlorophenol	ND	1.2
Pentachlorophenol	3.8	2.9

Surrogate Standard	% Recovery
2,4,6-Trichlorophenol-13C	88
2,4,5-Trichlorophenol-13C	64
2,3,4,5-Tetrachlorophenol-13C	86
Pentachlorophenol-13C	69

1. ND = Not detected
2. NDR = Peak detected but did not meet quantification criteria
3. SDL = Sample detection limit
4. Data have not been blank corrected.

Approved: ______________________
QA Chemist

APPENDIX 4

FIELD DATA SHEETS and PROCESS DATA

PLANT	TransCanada Power - Williams Lk
RUN No.	1-2 HCl [illegible]
LOCATION	Stack
DATE	04/03/01
OPERATOR	
SAMPLE UNIT	
CONTROL UNIT / Y	LM-3
AMBIENT TEMP., °F	
BAROMETRIC PRESSURE, IN. Hg	27.70
ASSUMED MOISTURE, Bw	

PROBE TIP DIAMETER, IN.		
PROBE LENGTH, FT / Cp		
PROBE HEATER SETTING		
INITIAL LEAK TEST	0.003	0.003
FINAL LEAK TEST	0.003	0.003
METER TEMP. COMP.	NC	

HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	
FILTER NUMBER	
STACK DIAMETER	
STACK HEIGHT	
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
0	1407	41.7403				58	57							
10						58	57						10	6
20						59	58							
30						60	59						4	6
40						60	59							
50						61	60							
60	1507	42.3125				61	61						14.5	6.0
0	16:30	42.8801				58	60							
10						59	60					308	14	4
20						60	61					309		
30						61	63					307	14	4
40						63	63					305		
7:10 50						71	69					285	10.5	10.5
60	18:08	43.4446				72	70					292	13	7
												293		

stop off fuel wood

start @ 7:48

PLANT	Tonawanda Power - Williams Lk.
RUN No.	1-2 SOx Baseline
LOCATION	Stack
DATE	04/03/07
OPERATOR	
SAMPLE UNIT	
CONTROL UNIT / Y	LM-3
AMBIENT TEMP., °F	
BAROMETRIC PRESSURE, IN. Hg	27.70
ASSUMED MOISTURE, Bw	

PROBE TIP DIAMETER, IN.		
PROBE LENGTH, FT / Cp		
PROBE HEATER SETTING		
	1	2
INITIAL LEAK TEST	0.005	0.003
FINAL LEAK TEST	0.003	0.003
METER TEMP. COMP.		

HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	
FILTER NUMBER	
STACK DIAMETER	
STACK HEIGHT	
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol %	Fyrites O_2 Vol %
	15:20	42.3179												
1														
2						53	57					306	15	5.5
3						60	60					306		
4						62	62					310		
5						61	62					310	15	5.5
6	16:20	42.8743				60	62					308		
						60	62					307	14.5	6.0
0	18:10	43.4491												
1						71	73					293		
2						70	72					294	14	6
3						71	72					296		
4						70	72					300	16	5.0
5						71	73					305	16	5.0
6	19:10	43.9542				71	73					306		
						71	73					307		

PLANT Tl Canada Power - Williams Lake
RUN No 3-5 HCl Rail Ties
LOCATION Stack
DATE 04/04/01 - 04/05/01
OPERATOR
SAMPLE UNIT
CONTROL UNIT / Y LM-3
AMBIENT TEMP., °F
BAROMETRIC PRESSURE, IN. Hg 27.68
ASSUMED MOISTURE, Bw

PROBE TIP DIAMETER, IN.
PROBE LENGTH, FT / Cp
PROBE HEATER SETTING

	3	4	5
INITIAL LEAK TEST	0.002	0.003	0.002
FINAL LEAK TEST	0.002	0.003	0.002

METER TEMP. COMP.

HEATER BOX SETTING
ASSUMED MOL. WT (Dry)
ASSUMED MOL. WT (Wet)
STATIC PRESSURE, IN. H_2O
FILTER NUMBER
STACK DIAMETER
STACK HEIGHT
UPSTREAM DIAMETERS
DOWNSTREAM DIAMETERS

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol %	Fyrites O_2 Vol. %
0	13:15	44.5682												
1					Atmos	62	63			250		296		
2						62	63					299	12	9
3						62	63					297		
4						62	64					296	12	8.5
5						62	64					295		
6	14:33	45.1869				60	62					291	15	5
						62	63					296		
stop 4:05 start 4:25	April 5/01 Run 4 BP: 27.32													
0	12:20	45.8724												
1					Atmos	50	54			250		291		
2						49	50					286	11	9
3						50	53					286		
4						52	54					284	12	8.5
5						49	52					285		
6	13:20	46.4671				53	53					283	12	8.5
						52	53					284		
	April 6/01 Run 5 BP 27.21													
0	10:20	47.0635												
1					Atmos	55	56			250		287		
2						55	57					286	15	5.5
3						55	58					284		
4						60	61					284	15	5.5
5						63	64					285		
6	11:20	47.6512				64	67					285	15	5.5
						66	67					284		

307   190 106   4.9665   21.3797 . 1.095 . .0154 . .9889 = ~~23.507~~

PLANT	TransCanada Power- Williams Lk
RUN No.	3 SOx - Rail Ties
LOCATION	Stack
DATE	04/04/01 - 04/05/01 - 04/06/01
OPERATOR	
SAMPLE UNIT	
CONTROL UNIT / Y	LM-3
AMBIENT TEMP., °F	
BAROMETRIC PRESSURE, IN. Hg	27.68
ASSUMED MOISTURE, Bw	

	3	4	5
PROBE TIP DIAMETER, IN.			
PROBE LENGTH, FT / Cp			
PROBE HEATER SETTING			
INITIAL LEAK TEST	0.003	0.003	0.002
FINAL LEAK TEST	0.003	0.003	0.002
METER TEMP. COMP.			

HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	
FILTER NUMBER	
STACK DIAMETER	
STACK HEIGHT	
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol %	Fyrites O_2 Vol %
0	12:00	43.9745												
1					Atmos	64	63							
2						65	66			250		298	12.5	7.0
3						66	66					291		
4						67	66					298		
5						68	67					302	15	5.5
6	13:00	44.5626				69	67					296		
						69	68					298		
												298	15	5.5
	April 5/01 Run-4													
	BP- 27.32													
0	11:15	45.2590												
1					Atmos	57	57			250				
2						59	60					287	12	8.5
3						63	64					288		
4						60	63					288	12	8.5
5						58	63					288		
6	12:15	45.8638				57	63					287		
						57	63					287	12	8.5
												287		
	April 16/01 Run5													
	BP 27.81													
0	09:15	46.4731												
1					Atmos	52	50			250				
2						55	53					277		
3						57	55					282	14.5	6.0
4						58	58					280		
5						57	61					280	15.0	5.5
6	10:15	47.0586				57	61					285		
						57	61					285	15.0	5.5
												286		

5.205 203 20.6764 1.0946 x 1.0154 1889 = 22.8302

1.65 = 1.71 1.13

PLANT	Trans Canada Co-gen	PROBE TIP DIAMETER, IN. .224	HEATER BOX SETTING
RUN No.	1 Plorn Baseline	PROBE LENGTH, FT / Cp 5' .8394	ASSUMED MOL. WT. (Dry)
LOCATION	Stack	PROBE HEATER SETTING	ASSUMED MOL. WT. (Wet)
DATE	April 3/01		STATIC PRESSURE, IN. H_2O -.25
OPERATOR	MTH	INITIAL LEAK TEST .019 @ 15"	FILTER NUMBER
SAMPLE UNIT			STACK DIAMETER 134"
CONTROL UNIT / Y	0190C .981	FINAL LEAK TEST .008 @ 15"	STACK HEIGHT 150'
AMBIENT TEMP., °F			UPSTREAM DIAMETERS
BAROMETRIC PRESSURE, IN. Hg	27.70	METER TEMP. COMP.	DOWNSTREAM DIAMETERS
ASSUMED MOISTURE, Bw	1%		

Point	Clock Time	Dry Gas Meter Ft^3	Co	Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %	
	1448	520.031													
1a		523.21		.77	1.27	76	69	2	225	260	46	305	14.5	6.0	(5.2)
b		526.43		.77	1.27	95	90	2	265	268	47	305			
c		529.68	201	.75	1.28	105	95	2	261	265	47	304			
d		532.91		.73	1.26	109	97	2	275	230	49	310			
2a		536.44	126	.87	1.51	108	97	2	275	230	46	308			(5.3)
b		540.10		.94	1.64	108	96	2	271	238	45	306			
c		543.77	172	.94	1.64	108	96	2	238	240	46	308			5.2
d		547.35	175	.90	1.56	109	96	2	274	235	49	305	14.0	6.0	(4.1)
3a		550.88		.87	1.50	109	96	2	230	259	51	307			
b		554.47		.91	1.57	108	96	2	251	233	50	306			
c		558.11		.92	1.59	108	97	2	247	262	50	308			
d	1548	561.74		.92	1.59	109	97	2	242	261	50	310			
4a	1556	564.81		.57	.699	104	95	2	236	244	48	308			
b		567.77	167	.61	1.06	106	96	2	243	238	50	305	14.5	5.5	(5.-)
c		570.77		.63	1.09	107	95	2	243	254	53	309			
d		573.72		.61	1.06	107	95	2	240	251	52	309			
5a		576.92	175	.72	1.25	107	95	2	238	245	41	308			
b		580.20		.75	1.30	107	96	2	251	242	41	307			
c		583.42	164	.73	1.26	107	95	2	246	235	40	307			(5.2)
d		586.66		.73	1.26	107	96	2	249	240	40	307	14.0	6.0	
6a		589.76	166	.68	1.18	108	96	2	232	225	43	305			(4.9)
b		592.87		.67	1.16	107	97	2	236	252	43	304			
c		595.94		.66	1.14	107	97	2	242	252	42	305			
d	1654	599.01		.66	1.14	107	97	2	231	255	42	305			
4.06				.471								608			
				21.19											

36.173

1.73 1.8 1.1 .724 1.61

PLANT	[illegible]
RUN No.	1 [illegible]
LOCATION	
DATE	April 3/[illegible]
OPERATOR	
SAMPLE UNIT	
CONTROL UNIT / Y	
AMBIENT TEMP., °F	
BAROMETRIC PRESSURE, IN. Hg	
ASSUMED MOISTURE, Bw	

PROBE TIP DIAMETER, IN.	
PROBE LENGTH, FT / Cp	
PROBE HEATER SETTING	
INITIAL LEAK TEST	
FINAL LEAK TEST	
METER TEMP. COMP.	

HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	
FILTER NUMBER	
STACK DIAMETER	
STACK HEIGHT	
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

Point	Clock Time	Dry Gas Meter Ft^3	CO	Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
	1658	599.01												
7a		602.69		.95	1.64	103	95	2	244	275	40	305		
b		606.08		.80	1.34	107	97	2	245	275	37	304	10.5	10.5
c	1713 stop *	609.34		.75	1.30	107	97	2	250	270	35	302		
d	start 1749	612.51	157	.70	1.21	92	91	2	234	228	50	294	13.0	7.0
8a		615.77		.82	1.37	97	93	2	244	265	44	288		
b		619.00	152	.77	1.29	100	94	2	240	237	46	290		
c		622.25		.77	1.31	102	94	2	247	246	47	292		
d		625.73	245	.84	1.45	103	94	2	250	250	46	293		
9a		629.12		.84	1.45	103	93	2	251	200	47	292		
b		632.47		.82	1.39	104	93	2	239	242	47	294	14.0	6.0
c		635.92		.82	1.39	104	93	2	240	239	47	294		
d	1834	639.18		.82	1.39	104	93	2	244	238	41	294		
										~~4~~		~~303~~		
10a	1838	642.80		.99	1.68	105	94	2	229	236	49	303		
b		646.44	894	.98	1.62	105	94	2	236	237	48	302	16	5.0
c		650.14		1.04	1.72	105	94	2	238	238	44	304		
d		653.74		.98	1.67	105	94	2	242	237	48	305		
11a		657.36	285	.96	1.63	105	94	2	241	235	47	305		
b		660.84		.95	1.62	106	94	2	251	240	47	305		
c		664.51		.99	1.68	106	94	2	255	242	47	306		
d		668.12		.98	1.67	106	94	2	256	241	48	306	16	5.0
12a		671.55		.88	1.49	106	94	2	257	243	48	305		
b		674.89		.84	1.43	106	94	2	258	242	49	305		
c		678.24		.84	1.43	106	93	2	248	241	49	305		
d	1934	681.54		.83	1.41	105	93	2	247	240	50	305		

* lost [illegible] for 10 min

8
14
10
9
14

3

PLANT	Canada Cogen	PROBE TIP DIAMETER, IN.	.2288
RUN NO.	Indian [illegible] Rail tie	PROBE LENGTH, FT / Cp	8' .8357
LOCATION	Stack	PROBE HEATER SETTING	
DATE	April 4/01		
OPERATOR	MJL	INITIAL LEAK TEST	.015 @ 15"
SAMPLE UNIT			
CONTROL UNIT / Y	0895C	FINAL LEAK TEST	.010 @ 15"
AMBIENT TEMP., °F			
BAROMETRIC PRESSURE, IN. Hg	27.64	METER TEMP. COMP.	
ASSUMED MOISTURE, Bw			

53 156 158 159 72 1080 .61

HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	-.25
FILTER NUMBER	
STACK DIAMETER	138"
STACK HEIGHT	180'
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

756.40

Point	Clock Time	Dry Gas Meter Ft^3	Cp	Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol %	Fyrites O_2 Vol %	
	11:15	756.650													
1		760.27	100	1.06	1.64	75	72	2	225	225	37	297	16.0	5.0	(4.4)
		763.88		1.05	1.64	82	70	2	260	243	41	299			
		767.47		1.03	1.61	85	71	2	275	262	41	300			
		771.08	94	1.04	1.64	87	71	2	271	272	40	301			(5.0)
2		774.75		1.07	1.69	89	72	2	225	252	40	300			
		778.46		1.08	1.71	91	74	2	271	247	40	299			
		782.17	80	1.03	1.71	92	75	2	264	231	41	299			(6.3)
		785.87		1.06	1.69	93	76	2	269	233	41	300			
3		789.17		0.84	1.34	93	76	2	270	235	41	299			
		792.44	65	0.83	1.32	93	76	2	271	254	40	298			(5.4)
		795.72		0.83	1.32	94	77	2	262	239	40	298			
	12:15	798.99	75	0.83	1.32	94	78	2	260	242	40	299	12.5	7.0	(5.7)
4	12:18	801.43		0.46	0.73	93	82		255	251	36	298			
		804.22	83	0.60	0.97	96	82	2	248	283	35	301			(5.0)
		806.97		0.58	0.93	97	83	2	250	271	36	301	15.0	5.5	
		809.74		0.58	0.93	97	83	2	242	270	37	303			
		812.75	89	0.69	1.11	97	83	2	255	254	37	302			(6.1)
		815.75		0.70	1.23	97	81	2	250	251	38	302			
		818.77		0.68	1.09	97	83	2	254	234	39	301			
		821.68		0.65	1.05	97	83	2	254	241	39	301	15	5.5	
1		824.60	102	0.65	1.05	96	83	2	256	230	37	298			(7.2)
		827.48		0.63	1.01	96	83	2	257	225	38	297			
		830.35	112	0.63	1.01	96	83	2	252	239	38	297			(7.1)
	13:14	833.29		0.66	1.06	96	83	2	231	246	38	296			

156 10 130

PLANT	Tjarel Canada	PROBE TIP DIAMETER, IN.		HEATER BOX SETTING	
RUN No.	2 dioxin coal Ci kal/tel	PROBE LENGTH, FT / Cp		ASSUMED MOL. WT. (Dry)	
LOCATION	stack	PROBE HEATER SETTING		ASSUMED MOL. WT. (Wet)	
DATE				STATIC PRESSURE, IN. H_2O	
OPERATOR		INITIAL LEAK TEST		FILTER NUMBER	
SAMPLE UNIT				STACK DIAMETER	
CONTROL UNIT / Y		FINAL LEAK TEST		STACK HEIGHT	
AMBIENT TEMP., °F				UPSTREAM DIAMETERS	
BAROMETRIC PRESSURE, IN. Hg		METER TEMP. COMP.		DOWNSTREAM DIAMETERS	
ASSUMED MOISTURE, Bw	21 %				

Point	Clock Time	Dry Gas Meter Ft³		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %	
	1326	~~830~~ 833.29	Cp												
7c		836.05		0.60	0.94	89	83	2	237	228	35	299			
s		838.85	106	0.62	0.97	92	83	2	251	230	37	300			
c		841.64		0.67	0.97	94	83	2	245	240	37	297	12	9.	(83,
d		844.42		0.62	0.97	94	83	2	253	242	40	296			
8c		847.33		0.65	1.01	93	83	2	257	237	41	296			
s		850.18		0.65	1.01	93	83	2	242	238	41	296	12	8.5	
c		853.11		0.68	1.06	94	82	2	240	241	40	295			
d	Stop 1406	856.02	75	0.67	1.05	94	82	2	243	242	42	295			
9c	Start 1426	859.06		0.73	1.14	83	79	2	244	225	38	291			(5.2
s		862.25	90	0.80	1.25	88	79	2	242	238	39	294	15.0	6.0	
c		865.44		0.80	1.25	90	79	2	237	236	35	296			(4.
d	1446	868.62		0.81	1.26	91	79	2	238	220	39	296			
10c	1449	872.08		0.95	1.48	93	81	2	240	252	40	299			
s		875.47		0.90	1.40	95	81	2	238	251	41	300			
c		878.83	160	0.90	1.40	96	83	2	248	245	39	299			
d		882.20		0.89	1.39	96	83	2	252	248	39	298	14.0	6.5	4.9
11c		885.44		0.85	1.33	97	83	2	251	242	39	300			
s		888.75		0.88	1.37	96	83	2	260	242	38	300			
c		892.14		0.88	1.37	96	83	2	262	257	38	301			
d		895.42		0.88	1.37	96	83	2	258	252	37	300			
12c		898.55	107	0.78	1.17	96	83	2	257	245	38	300			(12
s		901.66		0.74	1.15	96	84	2	258	247	38	300	12	9	
c		904.70		0.76	1.18	96	83	2	247	258	38	299			
d	1549	907.80		0.76	1.19	90	83	2	248	252	38	298			
	Final	90													

1.5 1.57

PLANT	Trans Canada Cogen
RUN No.	3 Dioxin (2 rec'd. frc.)
LOCATION	Stack
DATE	April 5/01
OPERATOR	MJH
SAMPLE UNIT	
CONTROL UNIT / Y	0895C .981
AMBIENT TEMP., °F	
BAROMETRIC PRESSURE, IN. Hg	27.32
ASSUMED MOISTURE, Bw	19
PROBE TIP DIAMETER, IN.	.2288
PROBE LENGTH, FT / Cp	5E .8394
PROBE HEATER SETTING	
INITIAL LEAK TEST	.013 @ 15"
FINAL LEAK TEST	.018 @ 15"
METER TEMP. COMP.	
HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	-.25
FILTER NUMBER	
STACK DIAMETER	138"
STACK HEIGHT	150'
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

int. 000.013

Point	Clock Time	Dry Gas Meter Ft^3	Cc	Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %	
	0912	000.293													
1a		3.57		.88	1.36	70	65	1	200	275	33	~~282~~ 287			
b		6.85	79	.88	1.36	73	62	1	171	275	33	290			
c		10.22		.93	1.44	74	62	1	235	275	34	290			5-6
d		13.58		.93	1.44	74	61	1	226	270	33	290	13.0	8.0	
2a		17.14		1.04	1.61	73	59	1	235	230	33	288			
b		20.64	76	1.02	1.58	77	63	1	235	230	33	286			
c		24.24		1.05	1.63	77	63	1	236	237	33	287			5-4
d		27.77		1.00	1.56	77	63	1	234	237	33	288			
3a		31.12	65	0.90	1.40	78	63	1	238	234	33	286			
b		34.38		0.86	1.34	78	64	1	240	234	32	285	14.0	6.5	
c		37.78		0.92	1.44	78	64	1	246	228	33	284			
d	1012	41.13		0.90	1.40	78	64	1	246	238	34	285			
									238	231	35	283			
4a	1118	43.68	99	0.53	0.83	73	70	1	225	226	36	287	12.0	8.5	
b		46.31		0.55	0.86	76	71	1	237	225	36	288			(8-2)
c		48.83		0.52	0.81	76	69	1	235	227	36	287			
d		51.38		0.52	0.81	78	70	1	241	252	36	288			
5a		54.22	91	0.64	1.00	80	70	1	226	242	35	288	12.0	8.5	
b		57.05		0.64	1.00	82	70	1	227	239	34	285			(7-2)
c		59.78		0.60	0.94	83	71	1	240	211	35	286			
d		62.53		0.61	0.95	84	71	1	241	232	35	286			
6a		65.40		0.66	1.03	84	72	1	237	231	35	286			
b		68.23	97	0.63	0.99	84	73	1	238	242	35	286	12.0	8.5	
c		71.06		0.63	0.99	84	73	1	240	238	36	287			(7.8)
d		73.86		0.62	0.97	83	72		240	240	35	286			

1.6 75 1.17

PLANT	Trans Canly	PROBE TIP DIAMETER, IN.	
RUN No.	3 Blowin cart (2 rail tie)	PROBE LENGTH, FT / Cp	HEATER BOX SETTING
LOCATION	stack	PROBE HEATER SETTING	ASSUMED MOL. WT. (Dry)
DATE			ASSUMED MOL. WT. (Wet)
OPERATOR		INITIAL LEAK TEST	STATIC PRESSURE, IN. H_2O
SAMPLE UNIT			FILTER NUMBER
CONTROL UNIT / Y		FINAL LEAK TEST	STACK DIAMETER
AMBIENT TEMP., °F			STACK HEIGHT
BAROMETRIC PRESSURE, IN Hg		METER TEMP. COMP.	UPSTREAM DIAMETERS
ASSUMED MOISTURE, Bw			DOWNSTREAM DIAMETERS

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %	
	1223	73.86	Co												
7,		76.67		0.63	0.98	77	69	1	227	225	40	285			
1		79.46	91	0.62	0.97	78	68	1	233	225	35	285	-		(7.4)
		82.35		0.67	1.05	77	64	1	228	240	36	286			
8,		85.19		0.65	1.01	76	64	1	225	238	36	285			
8,		88.25	103	0.75	1.18	75	63	1	238	239	36	284	11	9.0	(8.0)
2		91.32		0.75	1.18	76	63	1	240	238	35	283			
		94.41		0.77	1.20	77	64	1	227	230	34	283			
		97.55		0.77	1.20	78	65	1	228	233	35	284	12.0	8.5	
9,		100.58		0.76	1.19	77	64	1	225	225	35	285			
		103.67	108	0.76	1.19	77	64	1	238	225	35	284			
		106.88		0.81	1.26	77	63	1	243	276	35	283			
		109.97		0.78	1.22	77	64	1	225	225	34	281			
10,	1328	113.49	113	0.99	1.54	69	62	2	273	225	35	283			(8.5)
		116.95		0.96	1.50	74	63	2	259	264	35	285	12.0	8.5	
		120.36		0.94	1.47	77	63	2	241	234	34	284			
	stop 1351	123.81		0.95	1.48	77	63	2	240	238	35	283			
11,	start 1357	127.30		0.98	1.53	77	64	2	238	228	35	285			
		130.81		0.98	1.53	77	64	2	272	229	35	285			
		134.22		0.94	1.47	71	61	2	263	233	34	285			
		137.64	95	0.93	1.45	74	61	2	264	235	34	285			(7.9)
12,		140.99		0.90	1.40	74	61	2	250	266	34	284			
		144.30		0.88	1.37	74	61	2	269	265	34	284	11	9.0	
		147.63	89	0.89	1.39	74	61	2	247	271	35	284			
	1428	150.99		0.90	1.40	74	61	2	250	270	33	284			
		final value = 151.172													

Blank Volume = 0.83 cf

15 ~~2~~

160 @ .60 :14
1.2

PLANT	Grand Canada	
RUN No.	4 Azn (3 m/4 hr)	
LOCATION	Stack	
DATE	April 6/01	
OPERATOR		
SAMPLE UNIT		
CONTROL UNIT / Y	DB 8C	
AMBIENT TEMP., °F		
BAROMETRIC PRESSURE, IN Hg	27.21	
ASSUMED MOISTURE, Bw		
PROBE TIP DIAMETER, IN.	.2288	
PROBE LENGTH, FT / Cp	5'	.8394
PROBE HEATER SETTING		
INITIAL LEAK TEST	.015 @ 15"	
FINAL LEAK TEST	.012 @ 15"	
METER TEMP. COMP.		
HEATER BOX SETTING		
ASSUMED MOL. WT. (Dry)		
ASSUMED MOL. WT. (Wet)		
STATIC PRESSURE, IN. H_2O	-.25	
FILTER NUMBER		
STACK DIAMETER	138	
STACK HEIGHT		
UPSTREAM DIAMETERS		
DOWNSTREAM DIAMETERS		

Point	Clock Time	Dry Gas Meter Ft^3	CO	Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %	
	8:22	218.598													
1a		221.81	69	0.82	1.31	55	52	4	237	249	33	282	15.0	5.05	5.
b		225.10		0.87	1.39	63	54	4	240	252	36	281			
c		228.35	83	0.74	1.34	63	53	4	263	262	34	282			
2a		231.51		0.80	1.28	63	52	4	264	266	33	281			(6.8)
b		234.72		0.83	1.33	63	51	4	251	278	33	279			
c		237.95		0.83	1.33	64	51	4	255	228	34	278			
3a		241.05	85	0.77	1.27	66	52	4	243	245	37	277	15.0	5.0	(6.8)
b		244.17		0.78	1.25	66	52	4	245	243	37	277			
c		247.28		0.78	1.25	66	52	4	244	238	33	278			
4a	912	250.08	75	0.62	0.99	60	51	4	231	225	35	276			(5.6)
b		252.92		0.65	1.04	66	53	4	224	225	35	279			
c		255.63		0.59	0.94	69	55	4	259	234	35	281			
5a		258.52	65	0.65	1.04	70	56	3	229	245	35	282	14.5	6.0	(5.4)
b		261.53		0.71	1.15	71	57	3	232	273	36	281			
c		264.50		0.68	1.10	73	58	3	235	228	37	280			
6a		267.39		0.67	1.09	72	59	3	225	282	36	280			
b		270.42	73	0.72	1.17	73	59	3	238	248	36	280	15.0	5.5	(4.1)
c	957	273.41		0.70	1.13	73	59	3	236	249	36	280			

15 min/pt
5 min/pt

Yeo 1.64

- PLANT: [illegible] Canada
- RUN No.: 4/cont.
- LOCATION
- DATE
- OPERATOR
- SAMPLE UNIT
- CONTROL UNIT / Y
- AMBIENT TEMP., °F
- BAROMETRIC PRESSURE, IN. Hg
- ASSUMED MOISTURE, Bw
- PROBE TIP DIAMETER, IN.
- PROBE LENGTH, FT / Cp
- PROBE HEATER SETTING
- INITIAL LEAK TEST
- FINAL LEAK TEST
- METER TEMP. COMP.
- HEATER BOX SETTING
- ASSUMED MOL. WT. (Dry)
- ASSUMED MOL. WT. (Wet)
- STATIC PRESSURE, IN. H_2O
- FILTER NUMBER
- STACK DIAMETER
- STACK HEIGHT
- UPSTREAM DIAMETERS
- DOWNSTREAM DIAMETERS

Point	Clock Time	Dry Gas Meter Ft^3	ω	Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %	
	1002	273.41													
7c		275.84		0.48	0.78	65	59	2	234	257	36	289			
3		278.35	79	0.48	0.78	72	62	3	232	272	32	283			(5.0)
2		280.77		0.45	0.74	73	64	3	244	289	33	284			
8c		283.54	64	0.60	0.98	73	63	3	247	282	35	285	15.0	5.5	
1		286.30		0.57	0.93	73	63	3	242	280	36	287			
2		289.10		0.60	0.98	72	62	3	240	238	35	285			
9c		291.99		0.65	1.07	72	61	3	234	239	35	284			
3		294.88		0.65	1.07	71	60	3	255	226	35	284	14.0	6.5	
2	1047	297.80		0.65	1.07	76	60	3	256	224	35	284			
10c	1050	301.12		0.85	1.39	66	57	4	232	228	35	283			
1		304.44	86	0.85	1.39	71	58	4	235	229	35	285			
2		307.85		0.89	1.46	72	59	4	238	262	36	285	15	5.5	(6.5)
11c		311.30		0.92	1.51	72	59	4	234	248	35	284			
3		314.82		0.95	1.56	73	59	4	239	251	35	284			
2		318.31	69	0.94	1.55	73	59	4	240	251	35	284			
12c		321.58		0.82	1.34	73	60	4	241	238	35	282	15	5.5	(5.7)
3	1135	324.79	69	0.80	1.31	72	60	4	244	239	35	283			
2		328.04		0.80	1.31	72	60	4	246	244	35	282			(5.5)

2.65 300 2.67 240 (2.69 90)

PLANT	Trh. Canady Power - Will. IL.
RUN No.	1 Metals / Partic
LOCATION	Stack (baseline)
DATE	Apr 3/01
OPERATOR	DJD
SAMPLE UNIT	
CONTROL UNIT / Y	D895C .9810
AMBIENT TEMP., °F	
BAROMETRIC PRESSURE, IN. Hg	27.70
ASSUMED MOISTURE, Bw	18
PROBE TIP DIAMETER, IN.	#269 .2585
PROBE LENGTH, FT / Cp	6A .8402
PROBE HEATER SETTING	
INITIAL LEAK TEST	.016 @15
FINAL LEAK TEST	.012@15
METER TEMP. COMP.	
HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	-0.25
FILTER NUMBER	7A
STACK DIAMETER	138"
STACK HEIGHT	165'
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
	13:22	467.344												
1		471.35	33	.77	2.06	77	68	2	239	241	37	287		
2		475.75	[illegible]	.92	2.46	81	69	2	242	248	36	289		
3	13:37	479.96	96	.84	2.24	83	69	2	245	249	35	289	13.0	7.0
4	13:39	483.72	73	.67	1.79	81	69	2	258	248	35	286		
5		487.78	78	.78	2.08	84	69	2	261	242	34	290		
6	13:54	491.71	71	.73	1.95	85	70	2	260	247	36	287	14.0	7.0
7	13:58	496.43	43	1.05	2.80	83	70	2	279	250	36	287		
8		501.14	14	1.05	2.80	86	70	2	274	259	35	286		
9	14:13	505.63	63	.93	2.50	86	70	2	274	260	36	286	15.0	6.0
10	14:15	510.28	28	1.00	2.69	84	71	2	283	250	36	288	15.0	5.8
11		514.83	83	.96	2.58	87	72	2	274	256	36	288		
12	14:30	519.20	20	.88	2.37	87	72	2	280	252	36	286		
		51.85												

2.62 2.60 = 300 2.64 310 / 2.67 300 / 2.69 300

PLANT	TRANS Canada Power
RUN No.	2 Metals / Partic
LOCATION	Stack (baseline)
DATE	Apr. 4/01
OPERATOR	DJO
SAMPLE UNIT	
CONTROL UNIT / Y	D 895C .9810
AMBIENT TEMP., °F	
BAROMETRIC PRESSURE, IN. Hg	27.68
ASSUMED MOISTURE, Bw	18

PROBE TIP DIAMETER, IN.	# 269 .2585
PROBE LENGTH, FT / Cp	6A .8402
PROBE HEATER SETTING	
INITIAL LEAK TEST	.016 @ 15"
FINAL LEAK TEST	.014 @ 15"
METER TEMP. COMP.	

HEATER BOX SETTING	
ASSUMED MOL. WT. (Dry)	
ASSUMED MOL. WT. (Wet)	
STATIC PRESSURE, IN. H_2O	-0.25
FILTER NUMBER	# 17
STACK DIAMETER	138"
STACK HEIGHT	165'
UPSTREAM DIAMETERS	
DOWNSTREAM DIAMETERS	

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
	09:30	705.21												
1		709.82	83	1.03	2.70	83	74	2	278	242	44	311	16.0	5.0
2		714.49	49	1.08	2.75	90	78	2	274	276	53	306		
3	09:45	719.05	05	.96	2.56	91	77	2	280	277	53	302		
4	09:47	722.85	85	.67	1.79	89	77	2	281	247	54	300	16.0	4.5
5		726.42	42	.73	1.95	93	78	2	279	248	55	301		
6	10:02	730.54	54	.64	1.71	90	75	2	270	245	53	298		
7	10:04	734.39	39	.73	1.90	71	58	2	261	247	55	298	14.0	6.5
8		738.84	84	.98	2.55	74	58	2	264	267	53	299		
9	10:19	742.91	91	.82	2.13	75	58	2	263	280	53	297		
10	10:21	747.36	35	.97	2.52	72	58	2	263	279	52	297		
11		751.89	89	1.02	2.65	76	59	2	258	276	50	299	15.0	5.5
12	10:36	756.23	23	.93	2.42	76	59	2	257	273	50	299		
		51.02												

1 2.57 300/2.59 = 300

PLANT Trans Canada Power
RUN No. 3 Metals /Partic
LOCATION Stack (Rail ties)
DATE Apr 4 /01
OPERATOR DJO
SAMPLE UNIT
CONTROL UNIT / Y D895C .9810
AMBIENT TEMP., °F
BAROMETRIC PRESSURE, IN. Hg 27.68
ASSUMED MOISTURE, Bw 18

PROBE TIP DIAMETER, IN. #269 .2585
PROBE LENGTH, FT / Cp 6A .8402
PROBE HEATER SETTING
INITIAL LEAK TEST .018 @15"
FINAL LEAK TEST .018 @15"
METER TEMP. COMP.

HEATER BOX SETTING
ASSUMED MOL. WT. (Dry)
ASSUMED MOL. WT. (Wet)
STATIC PRESSURE, IN. H_2O -0.25
FILTER NUMBER 74
STACK DIAMETER 138"
STACK HEIGHT 165'
UPSTREAM DIAMETERS
DOWNSTREAM DIAMETERS

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
	16:00	908.25												
1		912.61	61	.92	2.36	86	79	2	265	266	46	295	13.0	7.5
2		917.16	16	1.00	2.57	92	81	2	278	274	44	295		
3	16:15	921.43	43	.88	2.26	95	82	2	277	283	46	294		
4	16:17	925.80	80	.90	2.33	91	83	2	265	259	44	296		
5		930.30	30	.96	2.49	98	83	2	264	261	43	295	12.0	8.5
6	16:32	934.47	47	.82	2.12	99	83	2	260	261	43	293		
7	16:34	937.82	82	.53	1.37	95	83	2	262	249	44	292	13.0	7.5
8		941.67	67	.70	1.81	98	85	2	268	248	44	296		
9	16:49	945.38	38	.65	1.68	98	85	2	270	248	45	295		
10	16:51	949.14	14	.67	1.74	93	85	2	258	249	40	297		
11		953.48	47	.89	2.31	99	85	2	243	246	41	300	13.0	7.5
12	17:06	957.49		.76	1.97	99	85	2	248	247	41	300		
		49.24												

~.60 ~ 1.08 @ 290 | 2.75 300 / 2.51 ~ 300 / 2.59 @ 7 300 / 2.65 @ 285 / 269 @ 275 /

PLANT Trans Canada Power
RUN No. 4 Metals / Partic.
LOCATION Stack (Rail ties)
DATE Apr 5/01
OPERATOR DJP
SAMPLE UNIT
CONTROL UNIT / Y D895C .9810
AMBIENT TEMP., °F
BAROMETRIC PRESSURE, IN. Hg 27.32
ASSUMED MOISTURE, Bw 20

PROBE TIP DIAMETER, IN. #269 .2585
PROBE LENGTH, FT / Cp 6A .8402
PROBE HEATER SETTING
INITIAL LEAK TEST .006 @ 15"
FINAL LEAK TEST .006 @ 15"
METER TEMP. COMP.

HEATER BOX SETTING
ASSUMED MOL. WT. (Dry)
ASSUMED MOL. WT. (Wet)
STATIC PRESSURE, IN. H_2O -0.25
FILTER NUMBER #12
STACK DIAMETER 138"
STACK HEIGHT 165'
UPSTREAM DIAMETERS
DOWNSTREAM DIAMETERS

25 min del. starting @ then

Point	Clock Time	Dry Gas Meter Ft³		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet 82°F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
	15:22	152.40												
1		156.91	51	.94	2.52	[illegible]	[illegible] 77	2	252	274	40	2[illegible]1		
2		161.21	28	.87	2.3[illegible]	88	78	2	269	251	41	285	12.0	9.0
3	15:37	165.44	44	.85	2.25	88	78	2	275	247	42	285		
4	15:39	169.21	21	.67	1.78	85	78	2	272	258	41	286	12.0	9.0
5		173.30	30	.79	2.09	88	78	2	270	275	42	284		
6	15:[illegible]4	177.20	20	.72	1.91	89	78	2	267	273	42	284		
7	15:56	180.58	58	.54	1.43	86	76	2	2[illegible]3	2[illegible]1	42	285		
8		184.23	23	.63	1.67	90	77	2	275	247	40	286		
9	16:11	187.76	76	.59	1.56	91	78	2	283	253	40	283	12.0	9.0
10	16:13	192.29		.97	2.57	85	78	2	276	244	40	285		
11		196.94		1.02	2.70	93	78	2	278	249	40	295		
12	16:28	201.18		.85	2.25	93	78	2	274	252	40	284		

/ [illegible] / 2.69 ± 275

PLANT	Trans Canada Power	PROBE TIP DIAMETER, IN.	# 269 .2582
RUN No.	5 Metals / Partic.	PROBE LENGTH, FT / Cp	6A .8402
LOCATION	Stack (Rail Ties)	PROBE HEATER SETTING	
DATE	Apr. 6/01	INITIAL LEAK TEST	.012 @ 15"
OPERATOR	DJP	FINAL LEAK TEST	.012 @ 15"
SAMPLE UNIT		METER TEMP. COMP.	
CONTROL UNIT / Y	D895C .9810	HEATER BOX SETTING	
AMBIENT TEMP., °F		ASSUMED MOL. WT. (Dry)	
BAROMETRIC PRESSURE, IN. Hg	27.21	ASSUMED MOL. WT. (Wet)	
ASSUMED MOISTURE, Bw	.18	STATIC PRESSURE, IN. H_2O	-0.25
		FILTER NUMBER	7A
		STACK DIAMETER	138"
		STACK HEIGHT	165'
		UPSTREAM DIAMETERS	
		DOWNSTREAM DIAMETERS	

Point	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Inlet °F	Dry Gas Temp. Outlet °F	Pump Vac. IN. Hg Gauge	Temperature °F Box	Temperature °F Probe	Temperature °F Impinger Exit	Temperature °F Stack	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
	11:50	328.42												
1		332.64	64	.84	2.23	66	56	2	275	245	42	288	13.0	7.5
2		337.02	02	.91	2.41	73	60	2	255	242	38	286		
3	12:05	340.97	95	.73	1.93	73	61	2	250	240	40	286		
4	12:07	345.39	39	.92	2.44	68	60	2	276	244	39	287		
5		349.92	92	.97	2.57	75	61	2	281	246	39	288	13.0	7.5
6	12:22	354.08	08	.82	2.17	75	61	2	274	249	39	288		
7	12:24	357.43	43	.53	1.40	69	59	2	275	247	40	283		
8		361.11		.64	1.70	72	61	2	282	271	41	288	13.0	8.0
9	12:39	364.61		.58	1.54	73	60	2	282	274	42	287		
10	12:41	368.06	06	.56	1.48	70	60	2	279	272	41	284		
11		372.04		.75	1.99	73	60	2	274	268	41	287	13.0	8.0
12	12:56	375.94		.72	1.91	73	60	2	271	274	41	287		

Date / Time	Opacity (%)	Nox (ppm)	O2 (%)	CO (ppm)	CO2 (%)
April 3 - 14:48 - 19:38	2.6	126	5.3	142	15.2
April 4 - 11:15 - 15:49	2.5	139	6.1	63	14.0
April 5 - 9:12 - 14:28	2.1	133	7.2	60	12.5
April 6 - 8:22 - 11:35	2.1	140	5.1	51	14.6

Power (MW)
64
61
56
61

APPENDIX 5

CALIBRATIONDATA

A. LANFRANCO and ASSOCIATES INC.

DRY GAS METER CALIBRATION FORM

Date:	Nov.29,2000
Tech. I.D.:	Mark L
Console I.D.:	d895C

Parameter Summary	Run No. 1	Run No. 2	Run No. 3
Ta = Ambient (Wet Test Meter) temp.	59.0	60.0	59.0
ΔP = Press. diff. @ Wet Test Meter	-0.90	-1.20	-1.70
Pb = Atmospheric Pressure	29.45	29.45	29.45
Pv = Vapour Pressure at Temp. Ta	0.5035	0.5218	0.5035
ΔH = Press. diff. @ Orifice	1.0	2.0	3.0
Ti = Dry Test inlet Temp.	80.8	89.3	92.5
To = Dry Test outlet Temp.	67.5	75.8	77.8
Ri = Initial Dry Test vol.	963.168	988.796	0.551
Rf = Final Dry Test vol.	971.577	1000.551	14.943
Vi = Initial Wet Test vol.	5518.781	5543.790	5555.152
Vf = Final Wet Test vol.	5527.058	5555.152	5569.030
Pw = Pb + (ΔP / 13.6)	29.3838	29.3618	29.3250
Pd = Pb + (ΔH / 13.6)	29.5235	29.5971	29.6706
Tw = Ta + 460	519.0	520.0	519.0
Td = [(Ti + To) / 2] + 460	534.2	542.6	545.2
Bw = Pv / Pb	0.01710	0.01772	0.01710
Wet Test Meter Factor (WTF)	0.9950		
CALCULATED VALUE (Y)	0.9860	0.9778	0.9790

AVERAGE (Y) = **0.9810**

Calibration Equation: Y = [((Vf-Vi)*WTF) / (Rf-Ri)] * [(Pw/Pd)*(Td/Tw)] * (1-Bw)

AUTHORIZATION

M Lanfranco

Calibration Section

A. LANFRANCO and ASSOCIATES INC.

ORIFICE METER CALIBRATION FORM

Date:	Nov.29,2000
Tech. I.D.:	Mark L
Console I.D.:	d895C

Parameter Summary	Run No. 1	Run No. 2	Run No. 3
Md = Mol. Wet Dry Air	28.96	28.96	28.96
Pb = Atmospheric Press.	29.45	29.45	29.45
Y = Dry Gas Meter Calibration	0.9810	0.9810	0.9810
ΔH = Press. Diff. @ Orifice	1.0	2.0	3.0
Ri = Initial Dry Test Vol.	963.168	988.796	0.551
Rf = Final Dry Test Vol.	971.577	1000.551	14.943
ΔT = Measured Interval (minutes)	15.0	15.0	15.0
Qm = Y * (Rf - Ri) / ΔT	0.54993	0.76875	0.94121
Tm = To + 460	527.5	535.8	537.8
Pm = Pb + (ΔH/13.6)	29.524	29.597	29.671
CALCULATED VALUE (Ko)	0.7001	0.6875	0.6869

AVERAGE (Ko) = $\boxed{0.6915}$

Calibration Equation: Ko = Qm / (Tm/Pm * ΔH/Md)^0.5

AUTHORIZATION

M Lanfranco

Calibration Section

A. LANFRANCO and ASSOCIATES INC.

DRY GAS METER CALIBRATION FORM

Date:	Dec.1,2000
Tech. I.D.:	Mark L
Console I.D.:	LM-3

Parameter Summary	Run No. 1	Run No. 2	Run No. 3
Ta = Ambient (Wet Test Meter) temp.	60.0	60.0	60.0
ΔP = Press. diff. @ Wet Test Meter	-0.30	-0.20	-0.20
Pb = Atmospheric Pressure	29.50	29.50	29.50
Pv = Vapour Pressure at Temp. Ta	0.5218	0.5218	0.5802
ΔH = Press. diff. @ Orifice	0.0	0.0	0.0
Ti = Dry Test inlet Temp.	68.0	72.5	74.3
To = Dry Test outlet Temp.	66.0	70.5	72.3
Ri = Initial Dry Test vol.	1345.127	1350.261	1353.605
Rf = Final Dry Test vol.	1349.831	1353.605	1355.512
Vi = Initial Wet Test vol.	5728.273	5733.428	5736.747
Vf = Final Wet Test vol.	5733.000	5736.747	5738.618
Pw = Pb + (ΔP / 13.6)	29.4779	29.4853	29.4853
Pd = Pb + (ΔH / 13.6)	29.5000	29.5000	29.5000
Tw = Ta + 460	520.0	520.0	520.0
Td = [(Ti + To) / 2] + 460	527.0	531.5	533.3
Bw = Pv / Pb	0.01769	0.01769	0.01967
Wet Test Meter Factor (WTF)	0.9950		
<u>CALCULATED VALUE (Y)</u>	0.9947	0.9911	0.9810

AVERAGE (Y) = **0.9889**

Calibration Equation: Y = [((Vf-Vi)*WTF) / (Rf-Ri)] * [(Pw/Pd)*(Td/Tw)] * (1-Bw)

AUTHORIZATION

M. Lanfranco

Calibration Section

A. LANFRANCO and ASSOCIATES INC.

S - TYPE PITOT CALIBRATION FORM

Date: Nov. 24/00
Technician: M. Aiken
Pitot I.D.: A.L. 6A
Nozzle I.D.: 0.250

Approx. Wind Vel.	Ref. Pitot Vel. Pressure		S-Type Pitot Vel. Press.		Pitot Coefficient
Ft/sec.	ΔPref.	Cref. SQRT(ΔPref.)	ΔPs	SQRT(ΔPs)	Cp
25.49	0.150	0.38343	0.210	0.45826	0.83670
39.49	0.360	0.59400	0.500	0.70711	0.84004
52.24	0.630	0.78579	0.880	0.93808	0.83765
64.15	0.950	0.96493	1.300	1.14018	0.84630

AVERAGE Cp = 0.8402

Calibration Equation: $Cp = C_{ref.} * SQRT(\Delta P_{ref.}/\Delta Ps)$

$C_{ref.}$ = 0.99

Where:
$\Delta P_{ref.}$ = velocity pressure measured by reference pitot

$C_{ref.}$ = coefficient of reference pitot

ΔPs = velocity pressure measured by S - type pitot

Cp = coefficient of S - type pitot

AUTHORIZATION

Mike Aiken

CALIBRATION SECTION

S - TYPE PITOT CALIBRATION FORM

Date: Nov. 28/00
Technician: M. Aiken
Pitot I.D.: A.L. 5E
Nozzle I.D.: 0.250

Approx. Wind Vel.	Ref. Pitot Vel. Pressure		S-Type Pitot Vel. Press.		Pitot Coefficient
Ft/sec.	Δ Pref.	Cref. SQRT(Δ Pref.)	Δ Ps	SQRT(Δ Ps)	Cp
25.49	0.150	0.38343	0.210	0.45826	0.83670
40.57	0.380	0.61028	0.530	0.72801	0.83828
53.07	0.650	0.79816	0.890	0.94340	0.84605
65.82	1.000	0.99000	1.400	1.18322	0.83670

AVERAGE Cp = 0.8394

Calibration Equation: $Cp = C_{ref.} * SQRT\ (\Delta P_{ref.}/\Delta Ps)$ $C_{ref.} = 0.99$

Where:
$\Delta P_{ref.}$ = velocity pressure measured by reference pitot

$C_{ref.}$ = coefficient of reference pitot

ΔPs = velocity pressure measured by S - type pitot

Cp = coefficient of S - type pitot

AUTHORIZATION

Merv Aiken

CALIBRATION SECTION

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Technician: M. Holm
Date: Jan. 2, 2001

Barometric Pressure: 29.89
Land Elevation: 30 feet

Signature: M Holm

TEMPERATURE DEVICE CALIBRATIONS

Device I.D.	Mercury In Glass Thermometer Temp.			Temperature Device Reading		
	Ice Bath (°C)	Boiling Water (°C)	Hot Oil (°F)	Ice Bath (°F)	Boiling Water (°F)	Hot Oil (°F)
N31 D895C	0.0	100.1				
N31 D836C	0.0	100.1	398	35	213	399
N31 D621C	0.1	100.2	395	27	207	395
N31-200TC	0.1	100.1	398	33	212	403
NAPP31 D979C	0.1	100.0	396	31	211	399
NAPP40	0.0	100.2	399	32	213	405
PM-100	0.1	100.0	395	28	210	399
BEI	-0.1	100.0	396	32	211	398
FORDING C241	0.0	100.1	400	34	212	403
Harmac D423	-0.1	100.0	400	33	213	402
UEI-1 DT150	0.2	100.3	400	32	212	407
UEI-2 DT150	0.1	100.2	401	32	212	404
KM-1 KM330	0.0	100.0	400	30	211	403
Fyrite Pro-1	0.1	100.1	400	29	211	403
Fyrite Pro-2	0.1	100.1	401	30	212	403
PCA	0.1	100.1	399	27	206	390
Jenco-1	0.0	100.1	398	32	213	404
Jenco-2	-0.1	100.0	398	32	216	408
Jenco-3	0.1	100.2	399	32	212	403
Jenco-4	0.0	100.0	399	33	214	407
KM450-1	0.1	100.1	398	32	212	406

K-TYPE THERMOCOUPLE CALIBRATIONS

Probe/TC ID	Hg Thermometer Temp (°C)	UEI-1 Readout Temp (°F)	Probe/TC ID	Hg Thermometer Temp (°C)	UEI-1 Readout Temp (°F)
3B	100.5	212.7	12B	100.2	210.9
3C	101.0	213.0	TC 3-3	100.6	212.0
4A	100.5	212.3	TC 4-3	100.8	212.8
4B	101.2	213.9	TC 4-4	100.7	214.0
5A	100.4	211.7	TC 5-4	100.0	211.7
5B	100.6	212.6	TC 5-5	100.1	212.5
5C	100.9	211.6	TC 5-6	101.6	213.9
5E	101.0	212.8	TC 6-4	100.7	212.5
6A	100.5	211.6	TC 10-3	101.1	211.0
6B	100.2	211.7	TC 10-4	101.0	213.3
6C	100.6	212.8	TC Marshall	100.5	212.6
7C	101.1	211.4	5' Fording	100.6	212.5
8A	100.4	212.1			
8B	101.2	213.2			
10A	100.0	212.5			
10B	100.8	213.0			
11A	99.9	212.6			
12A	101.1	213.0			

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

NOZZLE DIAMETER CALIBRATION FORM

Technician: Michael Holm
Date: 2-Jan-01

Signature: Michael Holm

Nozzle ID	Dia. #1 (inches)	Dia. #2 (inches)	Dia. #3 (inches)	Difference (inches)	Average Diameter (inches)	Average Area (ft^2)
I	0.1665	0.1630	0.1650	0.0035	0.1648	0.0001482
II	0.1740	0.1735	0.1745	0.0010	0.1740	0.0001651
III	0.1800	0.1775	0.1780	0.0025	0.1785	0.0001738
XXIX	0.1875	0.1845	0.1855	0.0030	0.1858	0.0001884
XXXI	0.1860	0.1890	0.1850	0.0040	0.1867	0.0001900
XXX	0.1855	0.1890	0.1860	0.0035	0.1868	0.0001904
XVIII	0.2015	0.2040	0.2020	0.0025	0.2025	0.0002237
IV	0.2190	0.2165	0.2190	0.0025	0.2182	0.0002596
0.233	0.2310	0.2275	0.2280	0.0035	0.2288	0.0002856
V	0.2445	0.2440	0.2465	0.0025	0.2450	0.0003274
XX	0.2510	0.2505	0.2510	0.0005	0.2508	0.0003432
XXI	0.2525	0.2525	0.2540	0.0015	0.2530	0.0003491
XXVIII	0.2540	0.2545	0.2520	0.0025	0.2535	0.0003505
#269	0.2590	0.2585	0.2580	0.0010	0.2585	0.0003645
0.265	0.2605	0.2595	0.2590	0.0015	0.2597	0.0003678
0.275	0.2625	0.2600	0.2610	0.0025	0.2612	0.0003720
VI	0.2640	0.2650	0.2620	0.0030	0.2637	0.0003792
VII	0.2750	0.2755	0.2735	0.0020	0.2747	0.0004115
0.284	0.2830	0.2865	0.2870	0.0040	0.2855	0.0004446
XXVII	0.2900	0.2930	0.2895	0.0035	0.2908	0.0004613
XXII	0.2920	0.2940	0.2900	0.0040	0.2920	0.0004650
XIV	0.2950	0.2970	0.2990	0.0040	0.2970	0.0004811
XXXVII	0.3230	0.3250	0.3245	0.0020	0.3242	0.0005731
XXXVIII	0.3245	0.3260	0.3275	0.0030	0.3260	0.0005796
XXXVI	0.3275	0.3280	0.3290	0.0015	0.3282	0.0005874
XXVI	0.3305	0.3300	0.3310	0.0010	0.3305	0.0005958
IX	0.3620	0.3625	0.3630	0.0010	0.3625	0.0007167
0.362	0.3620	0.3660	0.3620	0.0040	0.3633	0.0007200
X	0.3670	0.3680	0.3710	0.0040	0.3687	0.0007413
#278	0.3855	0.3880	0.3895	0.0040	0.3877	0.0008197
XI	0.4040	0.4045	0.4075	0.0035	0.4053	0.0008961
XII	0.4160	0.4120	0.4150	0.0040	0.4143	0.0009363
XV	0.4315	0.4320	0.4315	0.0005	0.4317	0.0010163
XXIV	0.4325	0.4315	0.4320	0.0010	0.4320	0.0010179
XXV	0.4380	0.4400	0.4380	0.0020	0.4387	0.0010495
XVI	0.4435	0.4470	0.4470	0.0035	0.4458	0.0010841
XXXIX	0.4940	0.4970	0.4945	0.0030	0.4952	0.0013373
XXIII	0.5020	0.4980	0.5015	0.0040	0.5005	0.001366[illegible]
XVII	0.5690	0.5695	0.5685	0.0010	0.5690	[illegible]
XIII	0.6455	0.6420	0.6460	0.0040	0.6445	[illegible]

Where:

(a) Dia #1, Dia #2, Dia #3 = three different nozzle diameters, each diameter must be measured to within (0.25mm) 0.001 inches

(b) Difference = maximum difference between any two diameters, must be less than or equal to (1.0 mm) 0.004 inches

(c) Average = average of Dia #1, Dia #2, and Dia #3

APPENDIX B

Katie Allen

From: Adams, Ralph ENV:EX <Ralph.Adams@gov.bc.ca>
Sent: Wednesday, May 20, 2015 5:27 PM
To: Jeff Lundgren
Cc: 'Terry Shannon'; Lamb-Yorski, Matthew J ENV:EX
Subject: RE: Detailed Model Plan for Atlantic Power Williams Lake
Attachments: glendale_met_station_location.jpg; Glendale_met_2012.csv

Jeff:

I have reviewed the modelling plan that you sent. The plan I reviewed was dated May 6th, 2015 and is watermarked "draft".

In my opinion the planned modelling will be suitable for assessment of the upcoming permit amendment. In particular I note that: the latest version of the CALMET/CALPUFF suite is to be used, the domain is 25km square centered on the plant, the CALMET resolution is 500m, both WRF mesoscale model and local meteorological stations are to be used as inputs for the model year 2012, and that stack test results for the existing plant will be used as the basis for emission factors.

I have some comments and suggestions concerning both the modelling plan, and the subsequent technical report that will be based in part on the modelling results.

- In table B.2 for emission sources it is stated that Particulate matter will be modelled. I assume this is TPM, as specified in the permit. While I understand that the modelling does not need to consider the size fractions of TPM, I suggest that you also prepare isopleth maps and tables for PM10 and PM2.5 concentrations. PM10 and PM2.5 are of considerable concern at the moment in the airshed.
- NO2 is not listed. While there is not a significant NO2 issue in the airshed, I recommend that NO2 be added to the list of emissions modelled. BC is in the process of bringing in new NO2 objectives based on 1 hour values, and there is more concern about this pollutant due to its inclusion in the AQHI formula.
- In table B.2 for Planned Meteorological Input, it is stated that in addition to WRF model data, the Canadian Tire and WL airport stations will be used. There is an additional station which may be useful, the MoE Glendale met site which is much closer that the other surface stations. I have appended a Google earth Image and a file of the 2012 output form the archive. I note that there is a gap in data in July which may have influenced your decision.
- I realise that this is not part of the modelling plan, but in the technical report which will eventually be produced, the background concentrations for PM and PM2.5 should be based on both the current Columneetza station measurements, and the Partisol measurements which are currently being conducted in the airshed. I can supply the data and more information on the appropriate backgrounds when they are needed.

Regards.

Ralph Adams.

Ralph Adams - Air Quality Meteorologist
Air Quality Section
Monitoring, Assessment, and Stewardship
Environmental Protection

1259 Dalhousie Drive
Kamloops, BC
V2C-5Z5
Ph. (250) 371-6279 Fax. (250) 828-4000
ralph.adams@gov.bc.ca

BC Air Quality: http://www.bcairquality.ca/

From: Jeff Lundgren [mailto:Jeff.Lundgren@RWDI.com]
Sent: Friday, May 8, 2015 9:50 PM
To: Adams, Ralph ENV:EX
Cc: Brad Bergeron; Joe Cleary (joe.cleary@comcast.net); 'Terry Shannon'
Subject: Detailed Model Plan for Atlantic Power Williams Lake

Ralph,

Attached please find a detailed model plan for Atlantic Power in Williams Lake. Please let me know if you have any concerns or would like to discuss.

Thank you.

Jeff

Jeff Lundgren, M.Sc.
Technical Director/Principal

RWDI AIR Inc.
830 - 999 West Broadway, Vancouver, B.C., Canada V5Z 1K5
T: (604) 730-5688 ext3224 **M:** (604) 603-4984 **F:** (604) 730-2915 **W:** www.rwdi.com

APPENDIX E

Intrinsik Report

SCIENCE INTEGRITY KNOWLEDGE

intrinsik

ASSESSMENT OF THE HUMAN HEALTH RISKS ASSOCIATED WITH THE PROPOSED CHANGES IN THE EMISSIONS FROM THE WILLIAMS LAKE POWER PLANT

FINAL REPORT

January 12, 2016

Prepared For: **Atlantic Power Corporation**
8835 Balboa Ave, Suite D
San Diego, CA
92123

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ASSESSMENT OF THE HUMAN HEALTH RISKS ASSOCIATED WITH THE PROPOSED CHANGES IN EMISSIONS FROM THE WILLIAMS LAKE POWER PLANT

Table of Contents

Page

List of Tables

List of Figures

List of Appendices

EXECUTIVE SUMMARY

Atlantic Power owns and operates the Williams Lake Power Plant, a 66 megawatt biomass-fuelled electricity generating facility that has been in operation since 1993. The WLPP consumes approximately 450,000 tonnes of biomass annually, with capacity to consume up to 600,000 tonnes. The WLPP primarily consumes wood residues from local sawmills, but currently operates under an environmental permit that allows the burning of up to 5% rail ties on an average annual basis. Atlantic Power is proposing to increase the volume of rail ties to 50%, but anticipates burning 15% to 25% rail ties on an average annual basis.

Atlantic Power commissioned Intrinsik to complete a screening-level HHRA based on the results of an air dispersion modelling study of the emissions from the proposed increase in the volume of rail ties to be consumed annually at the WLPP. The primary aim of the screening-level HHRA was to identify and understand the potential health risks posed to the area residents as a result of the proposed changes in the WLPP emissions. In order to do so, consideration was given to the nature of the emissions, the nature of the exposures that might occur (i.e., amount, frequency and duration), and the nature of the potential health effects that may occur following exposure to the chemicals contained in the emissions. By convention, the screening-level HHRA embraced a high degree of conservatism through the use of assumptions intentionally selected to represent worst-case or near worst-case conditions. Using this approach, any health risks identified in the screening-level HHRA were unlikely to be understated.

For the purposes of the screening-level HHRA, it was assumed that sensitive or susceptible individuals would be found on both a short-term and long-term basis at the location within the study area corresponding to the maximum point of impingement. The MPOI refers to the location at which the highest air concentration of each of the COPC would be expected to occur, and at which the exposure received by the people within the study area would be greatest. The choice of the MPOI location was meant to ensure that any potential health effects that could result from exposure to the chemical emissions associated with the WLPP, regardless of whether people might be exposed, would not be underestimated. The decision to use the MPOI to represent the location at which people would be found was made by default; that is, consideration was not given as to whether or not the MPOI location was suitable for a permanent residence.

The selection of the COPC was based on a multi-day test burn using 100% rail ties that was conducted in 2001 at the WLPP. The results of the test burn served as the basis of the emissions inventory developed by RWDI for the WLPP. Each of chemicals identified in the air dispersion modelling study was identified as a COPC in the screening-level HHRA, including Criteria Air Contaminants, metals, Polycyclic Aromatic Hydrocarbons and chlorinated compounds.

Since the chemicals will be emitted directly into the air, the primary pathway by which people could be exposed is *via* inhalation (i.e., breathing in chemicals). As a result, the inhalation pathway was the primary focus of the screening-level HHRA. Exposure through less obvious secondary pathways also could occur and needed to be explored as part of the screening-level HHRA. For example, the chemicals might fall-out or deposit from the air onto the ground and result in additional pathways of exposure (i.e., secondary pathways).

Potential health risks were determined by comparing the predicted maximum ground-level air concentrations of the COPC at the MPOI for averaging times associated with both short-term and long-term exposures with exposure limits established by regulatory and leading scientific authorities responsible for the protection of public health. These limits incorporate a high degree of protection to accommodate vulnerable members of the population in order to determine the potential health risks to the people living in the area or who might frequent the area for work, recreation or other purposes. In accordance with accepted HHRA protocol, the exposure limits were based on a COPC's most sensitive toxicological endpoint.

With very few exceptions, the health risk estimates for the non-cancer COPC at the MPOI were predicted to be below 1.0, indicating that estimated short-term and long-term inhalation exposures were less than the health-based exposure limits. Risk estimates less than or equal to 1.0 are associated with low health risk, and therefore adverse health effects would not be expected. The only exceedances of the limits at the MPOI were predicted for short-term inhalation exposure to NO_2 and SO_2 acting both singly and in combination as part of the respiratory irritants mixture. The predicted short-term NO_2 and SO_2 concentrations are unlikely to result in adverse health effects on their own or as part of a mixture due to:

- The conservatism incorporated in the predicted short-term ground-level air concentrations of NO_2 and SO_2;
- The areal extent of the predicted exceedances;
- The likelihood of an exceedance occurring; and,
- The levels of exposure that have resulted in observed adverse health effects in humans, as documented in the most recent scientific literature.

In all cases, the cancer risk estimates were predicted to be less than one in 100,000 (i.e., one extra cancer case in a population of 100,000 people), indicating that the chemical emissions from the WLPP burning 100% rail ties are associated with a negligible level of risk, as defined by BC MOE and Health Canada.

Concentrations of the COPC were predicted in soil and compared with BC's CSR numerical soil standards and background soil concentrations in the Cariboo Region. The predicted maximum concentrations of each of the COPC in soil were well below both the BC soil standards and regional background soil concentrations, suggesting that the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighbouring area.

ASSESSMENT OF THE HUMAN HEALTH RISKS ASSOCIATED WITH THE PROPOSED CHANGES IN EMISSIONS FROM THE WILLIAMS LAKE POWER PLANT

1.0 INTRODUCTION

Atlantic Power owns and operates the Williams Lake Power Plant (WLPP), a 66 megawatt biomass-fuelled electricity generating facility that has been in operation since 1993. The WLPP consumes approximately 450,000 tonnes of biomass annually, with capacity to consume up to 600,000 tonnes. The WLPP primarily consumes wood residues from local sawmills, but currently operates under an environmental permit that allows the burning of up to 5% rail ties on an average annual basis. Atlantic Power is proposing to increase the volume of rail ties up to 50%, but anticipates burning 15% to 25% rail ties on an average annual basis. The proposed increase in the volume of rail ties consumed necessitated an amendment to the current air permit. As a result, Atlantic Power retained RWDI Air Inc. (RWDI) to complete an air dispersion modelling study of the emissions from the proposed increase in the volume of rail ties to be consumed annually at the WLPP (RWDI 2015).

Atlantic Power implemented and continues to conduct public consultation to ensure that First Nations, local governments and community stakeholders are engaged throughout the amendment process, and to identify issues and concerns related to the proposed changes in fuel mixture at the WLPP. Feedback received during the consultation process included concerns over the potential risks presented by the proposed changes in fuel mixture to the health of people living in the area or who might frequent the area for work, recreation or other purposes. In response to these concerns, Atlantic Power commissioned Intrinsik Environmental Sciences Inc. (Intrinsik) to complete a screening-level human health risk assessment (HHRA) based on the results of the air dispersion modelling study completed by RWDI (2015).

The primary aim of the screening-level HHRA is to identify and understand the potential health risks posed to people living in the area or visiting the area that resulting from the changes in the WLPP emissions. The screening-level HHRA considered the nature of the emissions, the nature of the exposures that might occur (i.e., amount, frequency and duration), and the nature of the health effects that are known to occur following “over-exposure” to the chemicals contained in the emissions. By convention, the screening-level HHRA embraced a high degree of conservatism through the use of assumptions intentionally selected to represent worst-case or near worst-case conditions. Using this approach, any health risks identified in the screening-level HHRA are unlikely to be understated, but may be overstated.

This report describes the approach that was used, the findings that emerged and the conclusions that were reached as part of the screening-level HHRA for the proposed changes in the volume of rail ties consumed at the WLPP on an annual basis.

2.0 OBJECTIVES

The primary objectives of the screening-level HHRA are:

- To identify and understand the potential health risks that could result from short-term and/or long-term exposure to the chemical emissions from the proposed changes in fuel mix at the WLPP, with consideration given to the nature of the emissions, the nature of the exposures that might occur (i.e., amount, frequency and duration), and the nature of the health effects that may occur following exposure to the chemicals contained in the emissions.

- To address concerns raised by community stakeholders over the potential health risks associated with the proposed changes in fuel mix at the WLPP. Specific concerns include:

  - the potential health risks that could be presented to the most vulnerable populations, such as young children, the elderly, asthmatics and people with compromised immune systems;
  - the potential short-term (acute) and long-term (chronic) health risks that could be presented to people living in the area;
  - the potential risks to human health from exposure to the chemical emissions from the WLPP as a result of the proposed changes in fuel mix in combination with other sources of the chemicals in the study area (i.e., cumulative effects);
  - the potential risks of developing cancer (carcinogenic risks) as a result of exposure to the chemical emissions associated with increase in the burning of rail ties at the WLPP;
  - the potential health risks associated with exposure to dioxins, hydrocarbons and chlorophenols that will be emitted from the WLPP;
  - the potential health risks from exposure to the persistent and accumulative chemicals contained in the emissions from the WLPP, such as dioxins; and,
  - the potential risks of teratogenic (developmental) effects as a result of exposure to the chemical emissions associated with increase in the burning of rail ties at the WLPP.

  The intent was to integrate the concerns into the design of the screening-level HHRA.

3.0 PROJECT DESCRIPTION

The WLPP is located in an area designated for heavy industry in the northwest corner of the City of Williams Lake, British Columbia (BC). The City of Williams Lake is the largest urban centre between Kamloops and Prince George, with a population of approximately 11,150 within the city limits.

The WLPP is a 66 megawatt biomass-fuelled electricity generating facility that has been operating since 1993. The plant consumes approximately 450,000 tonnes of biomass annually, with capacity to consume up to 600,000 tonnes. The biomass consumed at the WLPP consists primarily of wood residues from local sawmills. The power supplied by the WLPP is sufficient to meet the demands of approximately 52,000 homes in BC. WLPP supplies its power to BC Hydro under a long-term electricity purchase agreement (EPA). The EPA with BC Hydro expires in 2018 with an option to renew; however, based on the recently announced reduction in the maximum timber harvest (Allowable Annual Cut) by the provincial government, together with the impacts of the Mountain Pine Beetle infestations and the increase in competition for biomass fibres, the long-term availability of sawmill and forest residues for use by the WLPP is expected to decline.

In order to supplement this reduction in traditional wood fibre, Atlantic Power is proposing to increase the volume of rail ties consumed at the WLPP. The WLPP currently operates under an environmental permit that allows for the burning of up to 5% rail ties on an average annual basis. Atlantic Power is proposing to increase the volume of rail ties up to 50%, but anticipates burning 15% to 25% rail ties on an average annual basis.

4.0 APPROACH

The overall approach taken in the screening-level HHRA will follow a conventional risk assessment paradigm (see Figure 4-1). The paradigm is recognized world-wide, and its use has been endorsed by both federal and provincial regulatory authorities, including Health Canada, Environment Canada, the Canadian Council of Ministers of the Environment (CCME), and BC Ministry of Environment (BC MOE). The paradigm consists of several steps, highlights of which are outlined below.

- Problem Formulation – This step is concerned with defining the scope and nature of the assessment, and setting practical boundaries on the work such that it is directed at the principal areas of concern. It includes the identification of the chemicals that could be emitted by the WLPP, the people potentially affected, and the pathways by which these people could be exposed. When characterizing the people who might be exposed, emphasis is placed on sensitive or susceptible individuals.
- Exposure Assessment – This step is concerned with estimating the level of exposure that people could receive to the chemicals of potential concern (COPC) *via* the various exposure pathways. The step often relies on ambient measurement as well as predictive modelling to arrive at the exposure estimates, with specific reliance on air dispersion modelling in the case of chemical emissions to air. Distinction is made between exposures of a short-term (or acute) nature extending over a few minutes to several hours and long-term (or chronic) exposures lasting for several months or years, possibly up to a lifetime.
- Toxicity Assessment – This step is concerned with identifying and understanding the potential health effects that can be caused by each of the COPC (acting either singly or in combination), and the conditions under which the effects can occur. A principal outcome of this step is the determination of the health-based guidelines (or exposure limits) for the COPC, which refer to the levels of exposure that would not be expected to cause health effects. The limits are typically based on guidelines, objectives or standards established by regulatory and leading scientific authorities responsible for the protection of public health, and incorporate a high degree of protection to accommodate vulnerable members of the population.
- Risk Characterization – This step is concerned with quantifying the potential health risks that could be presented to the local residents or general public by comparing the exposure estimates determined as part of the Exposure Assessment to the corresponding exposure limits identified in the Toxicity Assessment.

Details with respect to each of these steps are presented in the sections that follow.

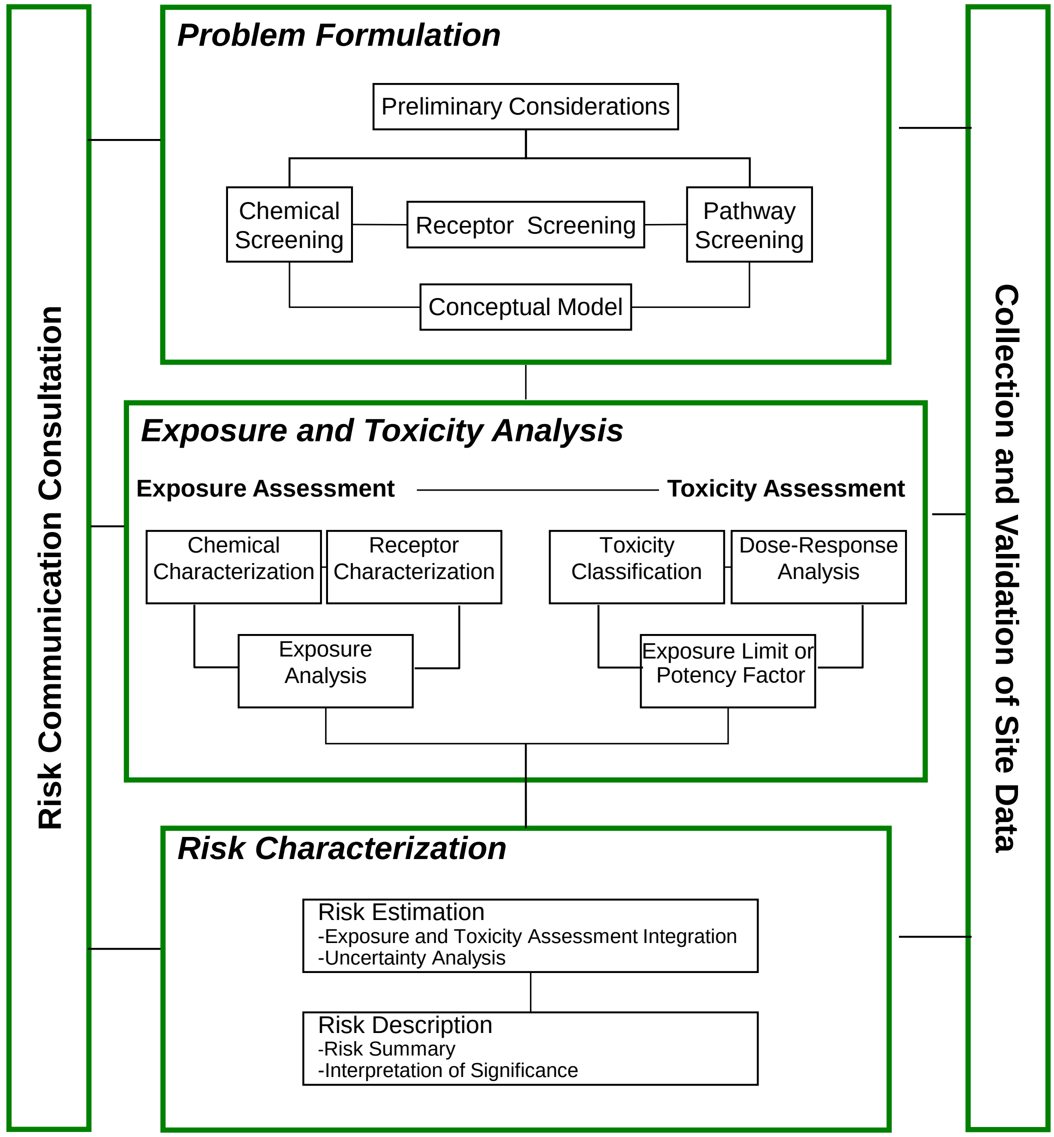

Figure 4-1 Risk Assessment Paradigm

4.1 Problem Formulation

This step is concerned with defining the scope and nature of the assessment, and setting practical boundaries on the work such that it is directed at the principal areas of concern. The Problem Formulation focuses on four major aspects:

1. Identification of the area potentially affected by the chemical emissions from the WLPP.
2. Identification of the COPC emitted from the WLPP that might contribute to potential health risks.
3. Characterization of the people who might be exposed to the COPC, with special attention directed at sensitive or susceptible individuals (e.g., infants and children, pregnant women, the elderly, individuals with compromised health).
4. Identification of the potential exposure pathways by which people might be exposed to the COPC.

Details on these four aspects are provided below.

4.1.1 Spatial Boundaries

Consistent with the spatial boundary identified and evaluated in the air quality modelling study for the WLPP, the screening-level HHRA evaluated the potential health risks within a 25 km by 25 km study area centred on the WLPP facility (RWDI 2015). Figure 1 of Appendix A shows the study area for the screening-level HHRA.

4.1.2 Identification of the Chemicals of Potential Concern

As indicated earlier, a principal outcome of the Problem Formulation step is the identification of the COPC associated with the WLPP. A multi-day test burn using 100% rail ties was conducted in 2001 at the WLPP. The results of the test burn served as the basis of the emissions inventory developed by RWDI for the WLPP (RWDI 2015). Each of chemicals identified in Table 4 of the air dispersion modelling study was identified as a COPC in the screening-level HHRA.

The COPC in the screening-level HHRA are listed in Table 4-1, arranged according to chemical category.

Table 4-1 Chemicals of Potential Concern for the Williams Lake Power Plant

Chemical Category	***Chemicals of Potential Concern***
Criteria Air Contaminants (CACs)	Nitrogen dioxide (NO_2)[1], particulate matter ($PM_{2.5}$ and PM_{10})[2], sulphur dioxide (SO_2), total particulate matter (TPM)
Metals	Antimony, arsenic, cadmium, chromium (total), chromium VI[3], cobalt, copper, lead, manganese, mercury, nickel, selenium, tellurium, titanium, vanadium, zinc
Polycyclic aromatic hydrocarbons (PAHs)	Total PAHs[4]
Chlorinated compounds	Dioxins and furans[4], chlorophenol, hydrogen chloride

Notes:
1 Based on nitrogen oxides (NO_x) measurements.
2 Based on TPM measurements.
3 Chromium VI was not identified in the emissions inventory; however, it was assumed that chromium VI would make up 100% of total chromium emissions
4 Congeners were not specified in Table 4 (RWDI 2015).

4.1.3 Characterization of the People Potentially at Risk

The people potentially at risk represent those people whose health might be adversely affected as a result of exposure to the chemical emissions originating from the WLPP. In this regard, consideration was given to:

- The people who are known or anticipated to spend time near the WLPP; and,
- The sensitivity or susceptibility of individuals in the study area (e.g., infants and young children, the elderly, pregnant women, individuals with compromised health).

In its air dispersion modelling study, RWDI superimposed a Cartesian nested grid over the study area (as per BC's Air Quality Dispersion Modelling Guidelines) and predicted ground-level air concentrations of the COPC at 1,724 locations throughout the study area centred on the WLPP. Receptor spacing for the Cartesian grid was as follows:

- 20-m spacing along the property fenceline;
- 50-m spacing within 500 m of the WLPP;
- 250-m spacing within 2 km of the WLPP;
- 500-m spacing within 5 km of the WLPP; and,
- 1,000-m spacing within 10 km of the WLPP.

Receptor locations are shown in Figure 1 of Appendix A.

For the purposes of the screening-level HHRA, it was assumed that sensitive or susceptible individuals would be found on both a short-term and long-term basis at the location within the study area corresponding to the maximum point of impingement (MPOI). The MPOI refers to the location at which the highest air concentration of each of the COPC would be expected to occur, and at which the exposure received by the people within the study area would be greatest. The choice of the MPOI location was meant to ensure that any potential health effects that could result from exposure to the chemical emissions associated with the WLPP, regardless of whether people might be exposed, would not be underestimated. The decision to use the MPOI to represent the location at which people would be found was made by default; that is, consideration was not given as to whether or not the MPOI location was suitable for a permanent residence.

4.1.4 Identification of Relevant Exposure Pathways

Exposure pathways refer to the various avenues by which the chemical emissions might "travel" from the WLPP to the people living in the area or frequenting the area for work, recreation or other purposes. Since the chemicals will be emitted directly into the air, the primary pathway by which people could be exposed is *via* inhalation (i.e., breathing in chemicals). As a result, the inhalation pathway was the primary focus of the screening-level HHRA.

Exposure through less obvious secondary pathways also could occur and needed to be explored as part of the screening-level HHRA. For example, the chemicals might fall-out or deposit from the air onto the ground and result in additional pathways of exposure (i.e., secondary pathways). Consideration of possible secondary pathways is discussed in Section 5.3 of the screening-level HHRA. This addresses the concerns raised regarding the potential health risk from exposure to the persistent chemicals associated with the WLPP emissions.

4.2 Exposure Assessment

Determination of potential ground-level air concentrations relied on both ambient measurements and the predictive exposure modelling described in the air dispersion modelling study completed by RWDI (2015). The former approach involved the monitoring of chemicals in ambient air in the study area. This approach was used in the air dispersion modelling study to characterize the representative background concentrations of the COPC in air. The second approach involved use of predictive models to estimate the air concentrations of the chemicals emitted from the WLPP. The representative background concentrations were added to the predicted ground-level air concentrations to arrive at an estimate of the cumulative exposure. Further details concerning each approach are provided below.

Measured concentrations of the COPC in the ambient air were obtained by RWDI from the Columneetza air quality monitoring station located in downtown Williams Lake (see Figure 1 of Appendix A). Ambient concentrations of NO_2, $PM_{2.5}$ and PM_{10} have been historically reported at the station. Consistent with BC MOE guidance for air dispersion modelling (BC MOE 2008), the 98th percentile of 1-hour and 24-hour air concentrations measured at the Columneetza air quality monitoring station between January 1, 2012 and December 31, 2012 were used to represent the short-term background air concentrations of NO_2, $PM_{2.5}$ and PM_{10} within the study area. Annual background air concentrations of NO_2 and $PM_{2.5}$ were based on the average of the hourly air concentrations measured at the station.

The background air concentrations assumed in the air dispersion modelling study are provided in Table 4-2.

Table 4-2 Representative Background Air Concentrations in the Study Area

Chemical of Potential Concern	***Averaging Period***	***Representative Background Air Concentration (µg/m³)***
NO_2	1-Hour	63.9
	Annual	16.5
$PM_{2.5}$	24-Hour	20.2
	Annual	5
PM_{10}	24-Hour	40.8

Predicted ground-level air concentrations were also evaluated in association with different averaging periods (i.e., 10-minute, 1-hour, 24-hour and annual) to allow for the assessment of both acute and chronic inhalation health risks. On a short-term basis, peak (1st highest) 10-minute, 1-hour and 24-hour ground-level air concentrations were used to evaluate the potential acute health risks. The exceptions being due to provincial and federal guidance for NO_2, $PM_{2.5}$ and SO_2:

- The 98th percentile of the yearly distribution of daily 1-hour maximum NO_2 concentrations was used to evaluate the potential acute health risks.
- The 98th percentile of the yearly distribution of daily $PM_{2.5}$ concentrations was used to evaluate the potential acute health risks.
- The 99th percentile of the yearly distribution of daily 1-hour maximum SO_2 concentrations was used to evaluate the potential acute health risks.

Chronic health risks were assessed using the predicted maximum annual ground-level air concentration.

Predicted ground-level air concentrations of the COPC were provided for two emission scenarios:

- 100% rail ties burned annually
- 50% rail ties burned annually

Consistent with the screening-level approach, the choice of emission scenario to be evaluated in the screening-level HHRA needed to ensure that possible exposures were not underestimated or overlooked. As a result, the screening-level HHRA focused on the potential health risks that could result from the chemical exposures associated with the burning of 100% rail ties.

4.3 Toxicity Assessment

The Toxicity Assessment is concerned with identifying the types of health effects that can be caused by each of the caused by each of the COPC (acting either singly or in combination), with understanding the conditions under which the effects are likely to occur *vis-à-vis* the amount, frequency and duration of exposure. This information can then be compared to the exposures that might be received by people in order to gauge the nature and severity of any health effects that might result.

Reliance was placed on exposure limits developed or recommended by leading scientific or regulatory authorities as criteria (e.g., objectives, guidelines or standards) for the protection of human health. The use of regulatory limits is a common practice among practitioners of risk assessment. These limits typically embrace a high degree of conservatism, in direct recognition of the mandate of most of the authorities to protect public health, including the health of infants and children, the elderly, and individuals who might be especially vulnerable to chemical exposures.

The sources of the acute and chronic exposure limits are (in no order of preference):

- British Columbia Ministry of the Environment (BC MOE)
- Agency for Toxic Substances and Disease Registry (ATSDR)
- California's Office of Environmental Health Hazard Assessment (OEHHA)
- Canadian Council of Ministers of the Environment (CCME)
- Health Canada and Environment Canada
- Netherlands National Institute of Public Health and the Environment (RIVM)
- Texas Commission on Environmental Quality (TCEQ)
- United States Environmental Protection Agency (US EPA)
- World Health Organization (WHO)

For inclusion in the HHRA, exposure limits were required to be:

- Protective of the health of the general public based on current scientific knowledge of the health effects associated with exposure to the chemical;

- Protective of sensitive individuals (i.e., infants and young children, the elderly, pregnant women, individuals with compromised health) through the incorporation of uncertainty or safety factors;
- Established or recommended by reputable scientific or regulatory authorities; and,
- Supported by adequate documentation.

When these criteria were satisfied by more than one objective, guideline or standard, the most scientifically defensible exposure limit was typically selected. Emphasis was given to regulatory limits that were health-based, and for which supporting documentation was available.

Exposure limits are often segregated into different categories in recognition of the fact that the appearance and nature of toxic responses are very much dependent on the frequency and duration of exposure. Two categories are commonly assigned:

- **Acute Exposure Limit**: refers to the amount, concentration or dose of a chemical that can be tolerated without evidence of adverse health effects on a short-term basis. These limits are routinely applied to conditions in which exposures extend over several hours or several days only.
- **Chronic Exposure Limit**: refers to the dose of a chemical that can be tolerated without evidence of adverse health effects on a long-term basis. These limits are routinely applied to conditions in which exposures extend over several months or years, possibly up to a lifetime.

Acute and chronic exposure limits were utilized in light of the need to address the potential health effects that could result from short-term and long-term exposure to the various chemical emissions associated with the WLPP.

Chronic exposure limits are further segregated into different categories in recognition of the fact that the toxic responses are very much dependent upon a chemical's mode of action or mechanism of toxicity. Two categories are commonly assigned:

- **Threshold Chemicals**: refer to chemicals that are generally non-carcinogenic chemicals. For these chemicals, a benchmark or threshold level must be exceeded for toxicity to occur. The degree of toxicity expressed then increases with increasing dose. For these chemicals, a no observed adverse effect level (NOAEL) can be identified. A NOAEL is the dose or amount of the chemical that results in no obvious response in the most sensitive test species and test endpoint. The NOAEL is often used as the starting point for the calculation of these limits. In some cases, a Benchmark Dose (BMD) is derived, which represents the dose associated with a specific magnitude of response (i.e., 5 or 10% incidence within the study population). In the derivation of exposure limits by leading scientific and regulatory authorities, uncertainty factors are then applied to lower the NOAEL or BMD by up to several thousand-fold, in part to accommodate the need to protect sensitive individuals. The limit is calculated as follows:

$$\text{Exposure Limit} = \frac{\text{NOAEL}}{\text{Uncertainty Factor(s)}}$$

It is important to note that in most instances, no empirical evidence exists to suggest that adverse health effects might occur at levels of exposure at or near the exposure limit (i.e., the limits typically embrace sufficient margins-of-safety to accommodate modest excursions without threat of adverse health effects). Moreover, because of the conservatism involved, an exceedance of the exposure limit does not necessarily mean that health effects are certain or imminent.

- **Non-Threshold Chemicals:** refer to carcinogens, which are capable of producing cancer through one or more of a number of possible mechanisms (e.g., mutagenicity, cytotoxicity, inhibition of programmed cell death, mitogenesis [uncontrolled cell proliferation] and immune suppression) that, in theory, do not require the exceedance of a threshold (US EPA 2005). In general, tumorigenicity data from animals or human epidemiological studies are examined using mathematical models to determine the chemical specific Unit Risks (URs) or Slope Factors (SFs), which are in turn used to develop applicable exposure limits. Regulatory agencies such as Health Canada and the US EPA assume that any level of long-term exposure to carcinogenic chemicals is associated with some "hypothetical cancer risk". As a result, relevant provincial and federal health authorities have specified an incremental (i.e., over and above background) lifetime cancer risk of one extra cancer case in a population of 100,000 people, which these agencies consider acceptable, tolerable or essentially negligible (BC MOE 2009, Health Canada 2012). The benchmark of an acceptable cancer risk is policy-based, and its interpretation by various regulatory health authorities may differ (CCME 2006).

The exact terminology by which exposure limits for airborne chemicals for which the primary avenue of exposure is inhalation will depend, in part, on the nature of the chemical, the nature of the exposure (i.e., amount, frequency and duration), and the regulatory jurisdiction involved. The inhalation limits for the COPC are described by one of two terms, specifically:

- **Reference Concentration (RfC):** refers to the safe level of an airborne chemical for which the primary avenue of exposure is inhalation. It is expressed as a concentration of the chemical in air (i.e., $\mu g/m^3$) and applies only to threshold chemicals.
- **Risk Specific Concentration (RsC)**: reserved for carcinogens and refers to the level of an airborne carcinogen for which the primary route of exposure is inhalation and that results in a negligible (i.e., regulatory acceptable) incremental increase in cancer (typically one in 100,000). It is expressed as a concentration of the chemical in air (i.e., $\mu g/m^3$).

A complete list of the inhalation exposure limits identified in the Toxicity Assessment for each of the COPC associated with the WLPP is presented in Table 4-3.

For those chemicals for which an exposure limit has not been developed or recommended by the various scientific or regulatory authorities, a surrogate chemical was identified. This step relied on the toxicological principle that states that the molecular structure of a chemical has a distinct bearing on its reactivity, biological activity and toxicity. The principle allows for the toxicity of a chemical for which little or no toxicological information exists to be predicted on the basis of information available on another chemical of similar molecular structure. The second chemical is termed a "surrogate". For example, an exposure limit was not identified for chlorophenol, but an exposure limit was available for trichlorophenol, which was then adopted as a surrogate chemical. Therefore, chlorophenol was assessed using the exposure limits for trichlorophenol.

Table 4-3 Inhalation Exposure Limits for the Chemicals of Potential Concern

Chemical of Potential Concern	Acute Exposure Limit				Chronic Exposure Limit			
	Averaging Period	Value (µg/m³)	Critical Effect	Reference	Type	Value (µg/m³)	Critical Effect	Reference
Criteria Air Contaminants								
NO_2	1-Hour	188	Respiratory irritation	BC MOE 2015	RfC	60	Respiratory irritation	BC MOE 2015
PM_{10}	24-Hour	50	Mortality and morbidity	BC MOE 2015	—	—	—	—
$PM_{2.5}$	24-Hour	25	Mortality and morbidity	BC MOE 2015	RfC	8	Mortality and morbidity	BC MOE 2015
SO_2	10-Minute	500	Respiratory irritation	WHO 2000	—	—	—	—
	1-Hour	200	Respiratory irritation	BC MOE 2015				
TPM	24-hour	120	—	BC MOE 2015	RfC	60	—	BC MOE 2015
Metals and Metalloids								
Antimony	—	—	—	—	—	—	—	—
Arsenic	1-Hour	0.2	Developmental effects	OEHHA 2008, 2015	RsC	0.0016	Lung tumours	Health Canada 2010
Cadmium	24-Hour	0.03	Nasal and respiratory irritation	ATSDR 2012a, 2015	RfC	0.01	Kidney effects	ATSDR 2012a, 2015
					RsC	0.002	Lung tumours	OEHHA 2011
Chromium (total)	1-Hour	12	Respiratory irritation	TCEQ 2009a, 2015	RfC	0.14	Respiratory irritation	TCEQ 2009a, 2015
Chromium VI	—	—	—	—	RfC	0.1	Respiratory irritation	US EPA 1998, 2015
					RsC	0.00013	Lung tumours	Health Canada 2010
Cobalt	—	—	—	—	RfC	0.1	Respiratory irritation	ATSDR 2004, 2015
Copper	—	—	—	—	RfC	1	Respiratory irritation and immunological effects	RIVM 2001
Lead(1)	—	—	—	—	—	—	—	—

Chemical of Potential Concern	Acute Exposure Limit				Chronic Exposure Limit			
	Averaging Period	Value (µg/m³)	Critical Effect	Reference	Type	Value (µg/m³)	Critical Effect	Reference
Manganese	—	—	—	—	RfC	0.3	Neurological effects	ATSDR 2012b, 2015
Mercury	1-Hour	0.6	Developmental effects	OEHHA 2008, 2015	RfC	0.3	Neurological effects	US EPA 1995, 2015
Nickel	1-Hour	1.1	Respiratory irritation	TCEQ 2011, 2015	RfC	0.09	Respiratory irritation	ATSDR 2005, 2014
					RsC	0.0077	Lung tumours	Health Canada 2010
Selenium	—	—	—	—	RfC	20	Neurological effects, liver effects	OEHHA 2001, 2015
Tellurium	—	—	—	—	—	—	—	—
Titanium	—	—	—	—	RfC	0.1	Nasal and respiratory irritation	ATSDR 1997, 2015,
Vanadium	1-Hour	30	Respiratory irritation	OEHHA 2008, 2015	RfC	0.1	Respiratory irritation	ATSDR 2012c, 2015
Zinc	—	—	—	—	—	—	—	—
Polycyclic Aromatic Hydrocarbons								
Total PAHs(2)	—	—	—	—	RsC	0.00012	Lung tumours	WHO 2000
Chlorinated Compounds								
Chlorophenol(3)	—	—	—	—	RsC	0.5	Leukemia and lung tumours	OEHHA 2011
Dioxins and furans(4)	—	—	—	—	RfC	0.000003	Reproductive and developmental effects	US EPA 2012, 2015
Hydrogen chloride	1-Hour	660	Respiratory irritation	TCEQ 2009b, 2015	RfC	9	Nasal and respiratory irritation	OEHHA 2000, 2015

Notes:

— not available

1 Based on the current state of the science, Health Canada and other regulatory health authorities (ACCLPP 2012, Cal EPA 2009, JECFA 2011, US EPA 2006, WHO 2009) no longer support the premise that lead is a threshold toxicant. Health Canada (2011) has concluded that lead should be considered a non-threshold substance. Accordingly, threshold-based TRVs are no longer recommended for use.

2 Assumed to be benzo(a)pyrene.

3 Assumed to be trichlorophenol

4 Assumed to be 2,3,7,8-tetrachlorodibenzo-p-dioxin.

4.3.1 Chemical Mixtures

Given that chemical exposures rarely occur in isolation, the potential health effects associated with mixtures of the COPC were assessed in the screening-level HHRA. The chemicals within a mixture may interact in different ways such that toxicity may be altered, possibly becoming enhanced (i.e., additivity, synergism or potentiation), reduced (i.e., antagonism) or remaining unchanged. The assessment of the health effects of chemical mixtures is challenging by virtue of the infinite number of chemical combinations that are possible. Recent efforts have been made by several regulatory and leading scientific authorities to better understand the types of interactions involved and to develop methods for assessing mixtures (Boobis et al. 2011; European Commission 2012; Meek et al. 2011; Price et al. 2009; Price and Han 2011). These efforts have led to the following observations:

- Under certain conditions, chemicals can act in combination as a mixture in a manner that affects the overall level of toxicity.
- Chemicals with common modes of action can act jointly to produce combined effects that may be greater than the effects of each of the constituents alone. These effects are additive in nature.
- For chemicals having different modes of action, there is no robust evidence available to indicate that mixtures of such substances are of health or environmental concern provided the individual chemicals are present in amounts at or below their threshold dose levels.
- Interactions (including antagonism, potentiation and synergism) usually occur only at moderate to high dose levels (relative to the lowest effect levels), and are either unlikely to occur or to be of any toxicological significance at low or "environmentally relevant" exposure levels.
- If information is lacking on the mode(s) of action of chemicals in a mixture, it should be assumed by default that they will act in an additive fashion, with the manner and extent to which they may interact act determined on a case-by-case basis using professional judgment.

Based on these observations and in accordance with guidance from Health Canada (2012), one approach to assessing chemical mixtures is to combine those chemicals which act through a common or similar toxicological mechanism and/or affect the same target tissues and/or organs in the body (i.e., share commonality in effect), and assume that the overall toxicity of the mixture is equivalent to the sum of the toxicities of the individual chemicals comprising the mixture. In other words, the chemicals are assumed to interact in an additive fashion (Health Canada 2012). This approach was adopted for the screening-level HHRA of the WLPP.

The chemical mixtures assumed in the screening-level HHRA are listed in Table 4-4. The critical endpoints of the exposure limits provided the basis for an individual chemical's inclusion in a chemical mixture (see Table 4-3). For example, the acute inhalation exposure limit for NO_2 is based on its ability to cause respiratory irritation; therefore, NO_2 was included in the acute inhalation respiratory irritants mixture.

Table 4-4 Assumed Chemical Mixtures

Exposure Duration	Critical Effect	Chemical Mixture Designation	Chemical Mixture Constituents
Acute	Respiratory irritation	Respiratory irritants	Cadmium, chromium (total), hydrogen chloride, nickel, NO_2, SO_2[(1)], vanadium
	Developmental effects	Developmental toxicants	Arsenic, mercury
Chronic	Nasal irritation	Nasal irritants	Hydrogen chloride, titanium
	Respiratory irritation	Respiratory irritants	Chromium (total), chromium VI, cobalt, copper, hydrogen chloride, nickel, NO_2, titanium, vanadium
	Neurological effects	Neurotoxicants	Manganese, mercury, selenium
	Lung tumours	Lung carcinogens	Arsenic, cadmium, chlorophenol, chromium VI, nickel, total PAHs

Notes:
1 The highest risk estimate of the averaging times (10-minute versus 1-hour) for SO_2 was used in the prediction of the potential health risks for the acute respiratory irritants mixture.

4.4 Risk Characterization

The Risk Characterization involves the comparison of the estimated exposures to selected health-based exposure limits to determine the potential health risks. In addition, sources of uncertainty and how these uncertainties were addressed are discussed.

The potential health risks are expressed as Risk Quotients (RQs) for the non-carcinogenic COPC and as Incremental Lifetime Cancer Risks (ILCRs) for the carcinogenic COPC.

4.4.1 Non-Cancer Risk Estimates

The RQs were calculated using the following equation:

$$\text{Risk Quotient} = \frac{\text{Exposure Estimate}(\mu g/m^3)}{\text{Exposure Limit }(\mu g/m^3)}$$

Interpretation of the RQ values proceeded as follows:

- **RQ ≤1.0**: indicates that the estimated exposure is less than or equal to the exposure limit (i.e., the assumed safe level of exposure). RQs less than or equal to 1.0 are associated with low health risks, even in sensitive individuals given the level of conservatism incorporated in the derivation of the exposure limit and the risk estimate.
- **RQ >1.0**: indicates that the exposure estimate exceeds the exposure limit. This suggests an elevated level of risk, the significance of which must be balanced against the degree of conservatism incorporated into the screening-level HHRA.

4.4.2 Cancer Risk Estimates

As previously mentioned, regulatory authorities such as BC MOE, Health Canada and the US EPA assume that any level of long-term exposure to carcinogenic chemicals is associated with some “hypothetical cancer risk”. On this basis, BC MOE (2009) and Health Canada (2012) have specified an incremental (i.e., over and above background) lifetime cancer risk of one in

100,000, which these authorities consider acceptable, tolerable or essentially negligible. Because this assumed "acceptable" cancer risk level was specifically developed to address cancer risks over and above background cancer incidence, a portion of which includes background exposure to environmental pollutants, background exposures were not included in the assessment of potential health risks for non-threshold (i.e., carcinogenic) chemicals.

For the purpose of the assessment, ILCRs were calculated for the carcinogenic COPC by comparing the predicted incremental levels of exposure associated with the WLPP to their respective exposure limits. The ILCRs were calculated as follows:

$$\text{Incremental Lifetime Cancer Risk} = \frac{\text{Incremental Exposure Estimate}(\mu g/m^3)}{\text{Carcinogenic Exposure Limit } (\mu g/m^3)}$$

Interpretation of these ILCR values was based on comparison of the ILCR against the BC MOE (2009) and Health Canada (2012) negligible risk level of one in 100,000 (i.e., one extra cancer case in a population of 100,000 people).

4.4.3 Assumptions and Uncertainties

In an attempt to ensure that health risks would not be underestimated, the screening-level HHRA incorporated assumptions intentionally selected to represent worst-case or near worst-case conditions. Table 4-5 presents a summary of the major assumptions applied in the screening-level HHRA and the associated uncertainties, arranged according to the steps of the risk assessment paradigm. Examination of the table shows that conservatism was introduced at virtually every step of the assessment, and extended to both the exposure and toxicity assessment of the HHRA.

Table 4-5 Major Assumptions Applied in the Screening-level Human Health Risk Assessment

Step of the Risk Assessment Paradigm	***Assumption***	***Uncertainty***
Problem Formulation	Chemicals listed in Table 4 of the air dispersion modelling study conducted by RWDI (2015), which served as the basis for the identification of the COPC, accurately reflect the chemical emissions inventory during the burning of rail ties.	The compounds identified by RWDI were based on a multi-day test burn using 100% rail ties at the WLPP. Considering that the emissions are based on empirical data, the uncertainty associated with this low.
Exposure Assessment	Air dispersion modelling incorporated meteorological data that represented conditions contributing to maximum predicted ground-level air concentrations of the COPC.	Meteorological data have some uncertainty, as meteorological conditions may vary around facilities like the WLPP. However, use of the meteorological data in the air quality study was in accordance with BC MOE guidance.
	Predicted ground-level air concentrations based on the test burn involving 100% rail ties are appropriate proxies for the chemical exposures that people might experience as a result of the proposed changes in fuel mix at the WLPP.	The actual percentage of rail ties expected to be burned as fuel at the WLPP will be significantly lower than the 100% assumed for the screening-level HHRA. This resulted in some of the health risks being overstated.

Step of the Risk Assessment Paradigm	Assumption	Uncertainty
	Representative background concentrations obtained from the Columneetza air quality monitoring station located in downtown Williams Lake accurate represents the background concentrations within the entire study area.	The adjustment for background may have resulted in some "double counting" of the plant emissions. As such, the incorporation of the background air data may have resulted in some of the health risks being overstated in the screening-level HHRA.
	Persons are found at the MPOI within the study area on a continuous basis, presenting the possibility that they could be exposed to the maximum predicted short-term and long-term ground-level air concentrations for the area.	This assumption most likely resulted in health risks being overstated in the screening-level HHRA.
Toxicity Assessment	Exposure limits were developed to be protective of sensitive and more susceptible individuals within the general population (e.g., infants and young children, the elderly, pregnant women, individuals with compromised health).	A considerable amount of conservatism is incorporated in the exposure limits. Limits are deliberately set to be protective of sensitive individuals. The limits were based on the most sensitive endpoints, and then adjusted to account for differences in sensitivity to chemicals among individuals. The use of uncertainty factors is already directed, in part, toward the protection of sensitive individuals.
	The findings from toxicity studies with laboratory rodents can be used to gauge the types of responses and health effects that the chemicals may cause in humans and the findings from the laboratory rodent studies can be used, in part, to determine exposure limits for the chemicals.	Laboratory rodents have traditionally served as suitable surrogate species for humans. The use of uncertainty factors accounts for the possible differences in responses to chemicals that might be observed between laboratory rodents and other species, such as humans. Recent evidence suggests that rodents might be more sensitive to certain effects than humans as a result of higher doses reaching the critical target site in rodents (e.g., nasal effects).
	In the absence of toxicity data for a number of the individual chemicals in the initial inventory, it was necessary to assume that structural similarity to the surrogate was a sufficient basis for the assumption of toxicological similarity. It is not known if this assumption is more or less conservative.	The exposure limits for surrogate chemicals adequately represent the toxicity of the chemicals being represented. A moderate level of uncertainty is associated with this assumption.
	Possible interactions of the COPC emissions from the WLPP, which might lead to enhanced toxicity, were adequately addressed in the assessment.	Consistent with Health Canada (2012) guidance, potential health risks associated with the COPC were considered to be additive if the exposure limit for the COPC had the same toxicological endpoint. In some instances, it is possible that components of a mixture may have different mechanisms of effect, contributing some uncertainty in the predicted risk estimates for mixtures.

5.0 RESULTS

As previously discussed, the potential health risks were predicted using the maximum air concentrations of the COPC at the MPOI. In recognition of the influence of exposure duration, the predicted risk estimates were segregated into acute and chronic risk estimates. The chronic risk estimates were further segregated according to non-carcinogenic and carcinogenic risk estimates.

The results discussion focuses on the risk estimates that exceed 1.0 (presented in bold in the tables), as these could signify potential health risks. Where risk estimates did not exceed 1.0 (i.e., where the predicted exposures were less than the exposure limits), the predicted risk values are presented in the tables but were not discussed further.

5.1 Predicted Acute Inhalation Health Risks

The predicted acute health risk estimates, expressed as RQs, are presented in Table 5-1. As shown in the table, the predicted RQs are less than 1.0 for each of the COPC and associated mixtures, with the exceptions of NO_2, SO_2 and the respiratory irritants mixture. The nature and severity of each exceedance is discussed in the following sections.

The interpretation of the results must necessarily consider the high degree of conservatism incorporated into the assessment both in terms of the exposure estimates that were developed and the level of protection afforded by the exposure limits. A number of conservative assumptions were incorporated into the screening-level HHRA such that the assessment reflects worst-case or near worst-case conditions with a low likelihood of occurrence. In some cases, the compounding of these conservative assumptions likely contributed to certain of the results representing nothing more than theoretical constructs of questionable practical meaning. Accordingly, the results presented below must be interpreted in the context of the high degree of conservatism that was embraced by the screening-level HHRA.

Table 5-1 Predicted Acute Inhalation Risk Quotients at the Maximum Point of Impingement

Chemical of Potential Concern[(1)]	***Averaging Period***	***Risk Quotient***[(2)(3)]
Criteria Air Contaminants		
NO_2[(4)]	1-Hour	**1.4**
PM_{10}[(4)]	24-Hour	0.82
$PM_{2.5}$[(4)]	24-Hour	0.82
SO_2	10-Minute	**1.4**
	1-Hour	**1.1**
TPM	24-hour	0.0041
Metals		
Arsenic	1-Hour	0.0089
Cadmium	24-Hour	0.0016
Chromium (total)	1-Hour	0.000059
Mercury	1-Hour	0.0015
Nickel	1-Hour	0.0028
Vanadium	1-Hour	0.0000080
Chlorinated Compounds		
Hydrogen chloride	1-Hour	0.23
Chemical Mixtures[(4)]		
Respiratory irritants	n/a	**3.0**
Developmental toxicants	n/a	0.010

Notes:
n/a not applicable
1 Only those COPC for which an acute inhalation exposure limit could be identified are presented.
2 An RQ equal to or less than 1.0 signifies that the estimated exposure is equal to or less than the exposure limit. Values in bold indicate an RQ greater than 1.0.
3 Acute RQs were estimated using the predicted maximum (1st highest) ground-level air concentration
4 Includes the representative background concentration presented in Table 4-2.
5 Constituents of the chemical mixtures are listed in Table 4-4.

5.1.1 Nitrogen Dioxide

An acute RQ for NO_2 of 1.4 was predicted at the MPOI. The RQ is based on the comparison of the predicted 1-hour NO_2 concentration of 254 µg/m^3, which represents the 98th percentile of the yearly distribution of daily 1-hour maximum NO_2 concentrations at the MPOI, against the BC MOE Ambient Air Quality Objective (AAQO) of 188 µg/m^3 for NO_2.

The analysis and interpretation of the exceedance considered the following:

- The potential change in NO_2 emissions associated with the proposed increase in the percentage of rail ties in the fuel mix at the WLPP;
- The conservatism incorporated in the predicted ground-level air concentrations of NO_2, including the representative background concentration;
- The areal extent of the predicted exceedances of the BC MOE AAQO;
- The likelihood of an exceedance of the BC MOE AAQO occurring; and,
- The levels of exposure that have resulted in observed adverse health effects in humans, as documented in the most recent scientific literature.

Predicted ground-level air concentrations of NO_2 were calculated by RWDI based on the measured emissions of nitrogen oxides (NO_x) during the 2001 test burn. Although NO_x was measured during the test burn, RWDI notes that:

> "*NO_x emissions did not change significantly for the 100% rail tie fuel, and therefore, the background NO_x levels already account for the existing plant emissions. By adding the background to the estimated emissions, the NO_x contribution from the plant is likely double counted in some instances.*"

The MPOI refers to the location at which the predicted 98th percentile of the yearly distribution of daily maximum 1-hour air concentration of NO_2 would be expected to occur within the study area, and at which the exposures received by the people within the study area would be greatest. The choice of the MPOI location was meant to ensure that any potential health effects that could result from exposure to the NO_2 emissions associated with the WLPP, regardless of where people might be exposed, would not be underestimated. The decision to use the MPOI to represent the location at which people would be found was made by default; that is, consideration was not given as to whether or not people would likely be found at the MPOI location. As shown in Figure 2 of Appendix A, the MPOI is located adjacent to the fenceline in a forested area to the northwest of the WLPP. The isopleth also delineates the area within the study area where exceedances of the BC MOE AAQO were predicted. Exceedances of the BC MOE AAQO were predicted to occur within approximately 3 km to the northwest and approximately 0.8 km to the southeast of the WLPP. The area of exceedances consists primarily of forested area, but also includes heavy industrial areas and municipal parks. No exceedances were predicted within the multifamily residential area located to the southeast of the plant.

Frequency analysis of one full year of predicted ground-level air concentrations suggests that 1-hour air concentration of NO_2 are predicted to exceed 188 µg/m^3 up to 33% of the time in the forested area to the northwest of the WLPP, but only up to 5% of the time in the area to the southeast. The results of the frequency analysis are shown in Figure 3 of Appendix A.

Determination as to whether or not the predicted ground-level air concentration of NO_2 could adversely affect human health must consider the potential dose-response relationship for the compound. The known relationships between short-term exposure to NO_2 and the health effects reported in the published scientific literature are presented in Table 5-2. The overall weight of evidence suggests that acute health effects are not realized until a threshold has been exceeded and the magnitude of the effects amplify as the concentration increases.

Table 5-2 Potential Adverse Health Effects Associated with Short-term Exposure to Nitrogen Dioxide

Concentration in Air (µg/m³)	***Description of Potential Health Effects***[(1)]
<190	No documented reproducible evidence (consistent and clinically significant) of adverse health effects among healthy individuals or susceptible individuals following short term exposure. Study results are variable and can be indiscernible from background or control groups.
190 to 560	Increased airway responsiveness, detectable by meta-analysis, among asthmatics. Large variability in both protocols and responses.
490	Allergen induced decrements in lung function and increased allergen induced airway inflammatory response among asthmatics. Most studies used non-specific airway challenges. No NO_2 induced change in lung function. No documented effects among healthy individuals.
560 to 760	Potential effects on lung function indices, including inconsistent changes FEV_1 (forced expiratory volume in 1 second) and FVC (forced vital capacity) among patients with chronic obstructive pulmonary disease (COPD) during mild exercise.
>1,100	Potentially clinically relevant effects in asthmatics.
1,900 to 3,700	Increased likelihood of inflammatory response and airway responsiveness among healthy individuals during intermittent exercise. Symptoms have not been detected by most investigators among healthy individuals. Asthmatics might experience small decrements in FEV_1.
>3,700	Changes in lung function, such as increased airway resistance, in healthy individuals

Notes:

Sources: Azadniv et al. (1998), Beil and Ulmer (1976), Blomberg et al. (1997, 1999), Cal EPA (2007), Devlin et al. (1999), Gong et al. (2005), Goodman et al. (2009), Jorres et al. (1995), Morrow et al. (1992), Nieding et al. (1979, 1980), Nieding and Wagner (1977), Vagaggini et al. (1996).

1 The descriptions are mostly for the types of health effects that might be experienced among normal, healthy individuals following acute exposure to NO_2. Some descriptions refer to the types of symptoms that might occur among individuals with pre-existing eye or breathing disorders, such as asthma, bronchitis or COPD. The exact nature and severity of responses that might occur among individuals with pre-existing conditions will depend on several factors, including: i) the severity of the person's condition; ii) the age of the individual; iii) the level of management of the disorder, including the availability and use of medications; iv) the person's level of physical activity; and, v) external environmental factors such as temperature and humidity. The symptoms that could be experienced by these individuals could be more or less severe that those described because of these factors.

Although some studies have reported mild respiratory effects in asthmatics at concentrations in the range of 190 to 560 µg/m³, due to the absence of a clear dose-response relationship and statistical uncertainty in the studies the findings do not reflect the general acute effects associated with NO_2 exposure. A meta-analysis of short-term NO_2 exposure and airway hyper-responsiveness in asthmatics suggests that there is no evidence that NO_2 causes clinically relevant effects in asthmatics at concentrations up to 1,100 µg/m³ (Goodman et al. 2009). The predicted maximum and 98th percentile 1-hour NO_2 concentrations at the MPOI of 311 µg/m^3 and 254 µg/m^3, respectively, are well below this concentration.

Based on the above rationale, the predicted short-term NO_2 air concentrations are not expected to adversely affect the health of people living in the area or frequenting the area for work, recreation or other purposes.

5.1.2 Sulphur Dioxide

Acute RQs of 1.4 and 1.1 were predicted for SO_2 at the MPOI on a 10-minute and hourly basis, respectively. The 10-minute RQ is based on the comparison of the predicted maximum 10-

minute SO_2 concentration of 699 µg/m^3 to the WHO AAQO of 500 µg/m^3, while the 1-hour RQ is based on the comparison of the 99th percentile of the yearly distribution of daily 1-hour maximum SO_2 concentrations of 226 µg/m^3 against the BC MOE AAQO of 200 µg/m^3.

The analysis and interpretation of the exceedances considered the following:

- The potential change in SO_2 emissions associated with the proposed increase in the volume of rail ties in the fuel mix at the WLPP;
- The conservatism incorporated in the predicted ground-level air concentrations of SO_2;
- The areal extent of the predicted exceedances of the BC MOE AAQO;
- The likelihood of an exceedance of the BC MOE AAQO occurring; and,
- The levels of exposure that have resulted in observed adverse health effects in humans, as documented in the most recent scientific literature.

Predicted ground-level air concentrations of SO_2 were calculated by RWDI for each of the two emission scenarios discussed previously: 100% rail ties and 50% rail ties. Consistent with the screening-level approach, the choice of the emission scenario to be evaluated in the screening-level HHRA needed to ensure that possible exposures were not underestimated or overlooked. On this basis, the screening-level HHRA focused on the potential health risks that could result from the chemicals exposures associated with the burning of 100% rail ties.

Atlantic Power, however, is only proposing to increase the volume of rail ties to 50%. The maximum 10-minute SO_2 concentration and 99th percentile of the yearly distribution of daily 1-hour maximum SO_2 concentrations for the 50% rail tie scenario were predicted to be 186 µg/m^3 and 113 µg/m^3, respectively. Based on the 50% rail tie scenario, SO_2 concentrations are not expected to exceed either the World Health Organization 10-minute air quality guideline or the BC MOE 1-hour AAQO.

Furthermore, the MPOI for the 99th percentile of the yearly distribution of daily 1-hour maximum SO_2 concentrations is located along the fenceline and into the forested area immediately to the northwest of the WLPP. Specifically, exceedances of the WHO and BC MOE air quality criteria under the 100% rail tie scenario were predicted to occur within approximately 0.2 km of the WLPP to the northwest. No exceedances were predicted to the southeast of the plant.

Frequency analysis of one full year of predicted ground-level air concentrations suggests that 1-hour air concentration of SO_2 are predicted to exceed the 200 µg/m^3 objective less than 0.05% of the time in the forested area to the northwest of the WLPP and remain below the objective more than 99.95% of the time.

Determination as to whether or not the predicted ground-level air concentration of SO_2 could adversely affect human health must consider the potential dose-response relationship for the compound. A summary of the potential adverse effects associated with short-term exposure to SO_2 as discussed in the scientific literature is presented in Table 5-3.

Table 5-3 Potential Adverse Health Effects Associated with Short-term Exposure to Sulphur Dioxide

Concentration in Air (µg/m³)	***Description of Potential Health Effects[(1)]***
<250	No documented reproducible evidence of adverse health effects among healthy individuals or susceptible individuals[(2)] following short term exposure.
250 to 530	Possible modest, transient changes in lung function indices, detectable by spirometry, among asthmatics during moderate to strenuous exercise. Changes characterized by increased airway resistance and/or reduced air conductance. All changes fully reversible and strictly sub clinical in nature, with no evidence of wheezing, shortness of breath or other clinical signs. No documented effects among healthy individuals.
530 to 1,300	Increased airway resistance and potential bronchoconstriction in asthmatic or sensitive individuals engaged in moderate exercise. Bronchoconstriction with or without attendant clinical signs depending on severity of asthmatic condition. Typically, no effects on lung function in healthy individuals.
1,300 to 2,600	Increased resistance in airways and difficulties breathing may be experienced by healthy individuals (in addition to asthmatics and sensitive individuals). Sore throat and the ability to taste and smell SO_2 may also be apparent. Effects in asthmatics and other sensitive individuals may also include wheezing, dyspnea, and bronchoconstriction.
2,600 to 13,000	Odour is detectable. Increased resistance in airways, decreased lung volume, reduced bronchial clearance, and evidence of lung irritation (increased macrophages in lung fluid) were observed at this exposure level. Headache, coughing, throat irritation, nasal congestion, increased salivation may be evident, and some symptoms may persist for several days after exposure. Mucociliary transport in the nasal passages may also be impaired, potentially leading to nasal congestion. Respiratory effects may be more severe in asthmatics and sensitive individuals.
13,000 to 26,000	Increased resistance in airways, decreased respiratory volume, difficulties breathing, and lung irritation were reported at this exposure level. Nasal, throat, and eye irritation, nosebleeds, coughing, potentially accompanied by erythema of trachea and bronchi may occur. Respiratory effects may be more severe in asthmatics and sensitive individuals.
26,000 to 130,000	Symptoms of more severe respiratory irritation may appear, such as burning of nose and throat, sneezing, severe airway obstruction, choking, and dyspnea. Exposure may result in damage to airway epithelium that may progress to epithelial hyperplasia, an increased number of secretory goblet cells, and hypertrophy of the submucosal glands. A condition known as Reactive Airway Dysfunction Syndrome (RADS) may arise in the concentration ranges (as well as above) as a result of bronchial epithelial damage. Chronic respiratory effects may develop. Eye irritation, watery eyes, and skin eruptions (rashes) may be evident. Respiratory effects may be more severe in asthmatics and sensitive individuals.
130,000 to 260,000	Increased airway resistance and potential bronchoconstriction in asthmatic or sensitive individuals engaged in moderate exercise. Bronchoconstriction with or without attendant clinical signs depending on severity of asthmatic condition. Typically no effects on lung function in healthy individuals.
>260,000	Immediately dangerous to life and health. Chemical bronchopneumonia and asphyxia were reported at high levels of exposure. Death may result from severe respiratory depression at concentrations of approximately[(2)] 600,000 µg/m³.

Notes:
Sources: NIOSH (1974), WHO (1979), ATSDR (1998), Cal EPA (1999), WHO (2000).

[1] Note that the descriptions pertain largely to the types of health effects that might be experienced among normal, healthy individuals following acute exposure to SO_2. Some descriptions refer to the types of symptoms that might occur among individuals with pre-existing eye and/or breathing disorders, such as asthma, bronchitis or COPD. The exact nature and severity of responses that might occur among these latter individuals will depend on several factors, including: i) the severity of the person's condition; ii) the age of the individual; iii) the level of management of the disorder, including the availability and use of medications; iv) the person's level of physical activity; and/or, v) external environmental factors such as temperature and humidity. The symptoms that could be experienced by these individuals could be more or less severe that those described because of these factors.

[2] Includes individuals suffering from respiratory disorders, such as asthma, bronchitis, and COPD.

As noted in Table 5-3, at SO_2 concentrations within the range of 530 to 1,300 µg/m^3 (which includes the predicted maximum 10-minute SO_2 concentration of 699 µg/m^3), reversible changes in the respiratory tracts of asthmatics have been recorded during exercise, but not in healthy individuals. Sulphur dioxide can act as a direct irritant of the respiratory system. Thus, people with breathing difficulties are often at higher risk of experiencing adverse effects following exposure. The airways of these individuals may already be irritated, making them particularly sensitive to the irritant action of SO_2. Asthmatics are known to be especially responsive to SO_2 and may show symptoms at lower concentrations than non-asthmatics. However, clear respiratory responses were not observed in a study in which non-exercising asthmatics were briefly exposed to SO_2 concentrations of 1,300 µg/m^3 (Sheppard et al. 1981; Linn et al. 1983). There is some potential variability in the nature of responses and at what concentrations they may occur. The level of sensitivity will vary among individuals depending on the nature of the asthmatic condition, the level of physical activity and the pattern of breathing (i.e., oral *vs*. nasal). While at rest, most people breathe mainly through the nose, which acts as a scrubber that removes SO_2 from the air and prevents the gas from penetrating into the deeper airways and lungs where it can cause damage. However, during exercise, breathing occurs primarily through the mouth; therefore, very little scrubbing occurs, which can allow more SO_2 to reach the lungs. Typically, a respiratory response to SO_2 is immediate, occurring within the first few minutes of exposure and usually reaching maximum levels within 5 to 10 minutes. After this time, the response may either stabilize or decline, particularly if the exposure has ceased.

At the MPOI, the 99th percentile of the yearly distribution of daily 1-hour maximum SO_2 concentrations (226 µg/m^3 for the 100% rail tie scenario) is lower than 250 µg/m^3, the concentration below which no documented, reproducible evidence of adverse health effects among healthy individuals or susceptible individuals following short-term exposure have been reported. Also at the MPOI, the maximum hourly SO_2 concentrations for the 50% rail tie scenario are all less than 250 µg/m^3.

Based on the above rationale, the predicted short-term SO_2 air concentrations are not expected to adversely affect the health of people living in the area or who might frequent the area for work, recreation or other purposes.

5.1.3 Respiratory Irritants Mixture

The predicted acute RQ for the respiratory irritants mixture is 3.0. The COPC included in the respiratory irritants mixture include:

- Cadmium
- Chromium (total)
- Hydrogen chloride
- Nickel
- NO_2
- SO_2
- Vanadium

The COPC contributing most of the risk are NO_2 (57%) and SO_2 (40%). The remaining mixture components combined for less than 3% of the mixture risk.

As discussed above, the predicted short-term NO_2 and SO_2 concentrations are unlikely to result in adverse health effects on their own due to:

- The conservatism incorporated in the predicted short-term ground-level air concentrations of NO_2 and SO_2;
- The areal extent of the predicted exceedances;
- The likelihood of an exceedance occurring; and,
- The levels of exposure that have resulted in observed adverse health effects in humans, as documented in the most recent scientific literature.

Depending on the concentrations of NO_2 and SO_2 to which an individual is exposed, the modes of action for NO_2 and SO_2 within the respiratory tract can differ, which may result in the combined RQs for the respiratory irritants mixture being further overstated. For example, NO_2 is relatively insoluble in water and can be inhaled deeply into the lungs, acting as a deep-lung irritant; whereas, SO_2 is readily soluble in water and, at low concentrations, would be readily absorbed by the moist mucous membranes lining the upper respiratory tract, effectively removing it from the airstream such that it would not penetrate deep into the lungs and alveolar spaces (Calabrese 1991). Clinical studies where both healthy and asthmatic subjects were exposed to both NO_2 and SO_2 in controlled environments have not found evidence that the combination increased respiratory symptoms relative to exposure to either gas on its own (Linn 1980, Rubinstein 1990, Sandstrom 1995). However, if SO_2 concentrations are sufficiently high for it to overwhelm the moist mucous membranes lining the upper respiratory tract, allowing it to penetrate to the lungs and alveolar spaces, then the potential effects of co-exposure to NO_2 and SO_2 on the respiratory tract may be additive. Potential bronchoconstriction has been reported in asthmatic or sensitive individuals engaged in moderate exercise at SO_2 concentrations as low as 530 µg/m³. As such, co-exposure to NO_2 and SO_2 may have additive effects at SO_2 concentrations above this level. The predicted maximum 10-minute SO_2 concentration at the MPOI was 669 µg/m³, which is within the range of concentrations at which additive effects could occur (i.e., > 530 µg/m³).

However, concentrations greater than 530 µg/m³ were only predicted to occur on a 10-minute basis in the forested area immediately to the northwest of the WLPP (i.e., within approximately 0.15 km of the fenceline), with no exceedances predicted in the residential area to the southeast of the plant. Frequency analysis of one full year of predicted ground-level air concentrations indicates that 10-minute air concentrations of SO_2 are predicted to exceed 530 µg/m^3 less than 0.05% of the time in the forested area to the northwest of the WLPP and remain below the objective more than 99.95% of the time. This suggests that these exceedances of 530 µg/m^3 are unlikely to occur and the assumption of additivity in the assessment of the respiratory irritants mixture, particularly the effects of NO_2 and SO_2, is likely conservative.

5.2 Predicted Chronic Inhalation Health Risks

The predicted chronic health risk, expressed as RQs for the non-carcinogenic COPC and ILCRs for the carcinogenic COPC, are presented in Table 5-4 and Table 5-5, respectively. As shown in Table 5-4, the predicted chronic RQs are less than 1.0 for each of the COPC and associated mixtures. Similarly, the predicted ILCRs are less than 1 in 100,000, indicating that chemical emissions from the WLPP burning 100% rail ties are associated with a negligible level of risk, as defined by BC MOE (2009) and Health Canada (2012).

Table 5-4 Predicted Chronic Risk Quotients at the Maximum Point of Impingement

Chemical of Potential Concern [(1)]	***Risk Quotient*** [(2)]
Criteria Air Contaminants	
NO_2 [(3)]	0.48
$PM_{2.5}$ [(3)]	0.63
TPM	0.0013
Metals	
Cadmium	0.00076
Chromium (total)	0.000071
Chromium VI	0.0001.0
Cobalt	0.000018
Copper	0.00011
Manganese	0.00088
Mercury	0.000042
Nickel	0.00048
Selenium	0.00000065
Titanium	0.00017
Vanadium	0.000034
Chlorinated Compounds	
Dioxins and furans	0.000041
Hydrogen chloride	0.23
Chemical Mixtures [(4)]	
Nasal irritants	0.23
Respiratory irritants	0.70
Neurotoxicants	0.00092

Notes:
1 Only those COPC for which a chronic RfC could be identified are presented.
2 An RQ equal to or less than 1.0 signifies that the estimated exposure is equal to or less than the exposure limit.
3 Includes the representative background concentration presented in Table 4-2.
4 Constituents of the chemical mixtures are listed in Table 4-4.

Table 5-5 Predicted Chronic Incremental Lifetime Cancer Risks at the Maximum Point of Impingement

Chemical of Potential Concern[(1)]	*Incremental Lifetime Cancer Risks[(2)] (per 100,000)*
Metals	
Arsenic	0.016
Cadmium	0.0038
Chromium VI	0.077
Nickel	0.0057
Polycyclic Aromatic Hydrocarbons	
Total PAHs	0.017
Chlorinated Compounds	
Chlorophenol	0.0000063
Chemical Mixtures[(3)]	
Lung carcinogens	0.12

Notes:
1 Only those COPC for which a chronic RfC could be identified are presented.
2 An ILCR equal to or less than 1.0 signifies an ILCR that is below the benchmark ILCR of 1.0 in 100,000 (i.e., within the generally accepted limit deemed to be protective of public health).
3 Constituents of the chemical mixtures are listed in Table 4-4.

5.3 Consideration of Secondary Pathways of Exposure

Apart from the assessment of the potential health risks related to the exposures to the chemical emissions that may occur *via* the primary pathway of inhalation, consideration also was given to the risks that may have occurred as a result of chemical fall-out or deposition from the air onto the ground, resulting in additional pathways of exposure (i.e., secondary pathways). In order to evaluate the potential health risks associated with possible secondary pathways, it was necessary to identify those COPC emitted by the WLPP that, although only emitted into air, could deposit nearby and possibly persist or accumulate in the environment in sufficient quantities for people to be exposed *via* alternate pathways. For this purpose, two categories of chemicals emitted from the WLPP were identified:

1. The gaseous chemicals, which are unlikely to contribute to human exposure *via* secondary pathways (e.g., NO_2, SO_2, hydrogen chloride). In addition, the health effects of these gaseous chemicals are strictly related to inhalation (i.e., act at the point of contact). Accordingly, these COPC were not considered further *via* secondary pathways.
2. The non-gaseous chemicals, which may deposit in the vicinity of the WLPP, and persist or accumulate in the environment in sufficient quantities for people to be exposed *via* secondary pathways (i.e., metals, PAHs and chlorinated compounds). The COPC were thus considered further *via* secondary pathways.

For the purpose of the screening-level HHRA, concentrations of the non-gaseous chemicals (i.e., metals, PAHs and chlorinated compounds) were predicted in soil and compared with BC's Contaminated Sites Regulation (CSR) numerical soil standards and background soil concentrations in the Cariboo Region (Gov BC 2014). Specifically, the predicted maximum annual average air concentrations of the non-gaseous COPC associated with the WLPP were assumed to deposit onto the ground at the MPOI over an 80 year period (i.e., the lifespan of a person, as per Health Canada 2012). As shown in Table 5-6, the predicted maximum concentrations of each of the non-gaseous COPC in soil are well below both the BC soil standards and regional background soil concentrations. This suggests that the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighbouring areas.

Table 5-6 Comparison of Predicted Maximum Soil Concentrations with Contaminated Site Soil Standards and Regional Background Soil Concentrations

Chemical of Potential Concern	Predicted Maximum Soil Concentration (mg/kg)	CSR Residential Soil Standard (mg/kg)		Measured Background Soil Concentration(3) (mg/kg)
		Generic(1)	Matrix(2)	
Metals				
Antimony	0.015	20	—	4.0
Arsenic	0.030	—	100/15	10
Cadmium	0.0090	—	3/1.5-1,000(3)	0.45
Chromium (total)	0.012	—	60(4)	150
Chromium VI	0.012	—	100(5)	—
Cobalt	0.0021	50	—	30
Copper	0.13	—	15,000/250-350,000(3)	65
Lead	0.26	—	400/100-4,000(3)	9.5
Manganese	0.31	—	—	750
Mercury	0.015	—	15(5)	0.025
Nickel	0.052	100	—	150
Selenium	0.015	3	—	4.0
Tellurium	0.038	—	—	—
Titanium	0.020	—	—	2,500
Vanadium	0.0040	200	—	100
Zinc	0.85		10,000/150-15,000(3)	85
Polycyclic Aromatic Hydrocarbons				
Total PAHs	0.000048	1(6)	5(5)(7)	0.0010
Chlorinated Compounds				
Dioxins and furans	0.0000000042	—	0.00035(5)	—
Chlorophenol	0.0000031	0.5	100/1-750,000(3)	0.010

Notes:
1 Generic Numerical Soil Standards for Residential Land Use, BC Contaminated Sites Regulation, Schedule 4. http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/375_96_06.
2 Matrix Numerical Soil Standards for Residential Land Use, BC Contaminated Sites Regulation, Schedule 5. http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/375_96_07. CSR matrix numerical soil standards are presented for: intake of contaminated soil/groundwater used for drinking water.
3 Depending on the pH.
4 Matrix Numerical Soil Standard was only available for groundwater used for drinking water.
5 Matrix Numerical Soil Standard was only available for intake of contaminated soil.
6 Assumed to be benz(a)anthracene. Generic standard was not available for benzo(a)pyrene.
7 Assumed to be benzo(a)pyrene.
8 Assumed to be pentachlorophenol.

6.0 SUMMARY AND CONCLUSIONS

Atlantic Power owns and operates the Williams Lake Power Plant, a 66 megawatt biomass-fuelled electricity generating facility that has been in operation since 1993. The WLPP consumes approximately 450,000 tonnes of biomass annually, with capacity to consume up to 600,000 tonnes. The WLPP primarily consumes wood residues from local sawmills, but currently operates under an environmental permit that allows the burning of up to 5% rail ties on an average annual basis. Atlantic Power is proposing to increase the volume of rail ties to 50%, but anticipates burning 15% to 25% rail ties on an average annual basis.

Atlantic Power commissioned Intrinsik to complete a screening-level HHRA based on the results of an air dispersion modelling study of the emissions from the proposed increase in the volume of rail ties to be consumed annually at the WLPP. The primary aim of the screening-level HHRA was to identify and understand the potential health risks posed to the area residents as a result of the proposed changes in the WLPP emissions. In order to do so, consideration was given to the nature of the emissions, the nature of the exposures that might occur (i.e., amount, frequency and duration), and the nature of the potential health effects that may occur following exposure to the chemicals contained in the emissions. By convention, the screening-level HHRA embraced a high degree of conservatism through the use of assumptions intentionally selected to represent worst-case or near worst-case conditions. Using this approach, any health risks identified in the screening-level HHRA were unlikely to be understated.

For the purposes of the screening-level HHRA, it was assumed that sensitive or susceptible individuals would be found on both a short-term and long-term basis at the location within the study area corresponding to the maximum point of impingement. The MPOI refers to the location at which the highest air concentration of each of the COPC would be expected to occur, and at which the exposure received by the people within the study area would be greatest. The choice of the MPOI location was meant to ensure that any potential health effects that could result from exposure to the chemical emissions associated with the WLPP, regardless of whether people might be exposed, would not be underestimated. The decision to use the MPOI to represent the location at which people would be found was made by default; that is, consideration was not given as to whether or not the MPOI location was suitable for a permanent residence.

The selection of the COPC was based on a multi-day test burn using 100% rail ties that was conducted in 2001 at the WLPP. The results of the test burn served as the basis of the emissions inventory developed by RWDI for the WLPP. Each of chemicals identified in the air dispersion modelling study was identified as a COPC in the screening-level HHRA, including Criteria Air Contaminants, metals, Polycyclic Aromatic Hydrocarbons and chlorinated compounds.

Since the chemicals will be emitted directly into the air, the primary pathway by which people could be exposed is *via* inhalation (i.e., breathing in chemicals). As a result, the inhalation pathway was the primary focus of the screening-level HHRA. Exposure through less obvious secondary pathways also could occur and needed to be explored as part of the screening-level HHRA. For example, the chemicals might fall-out or deposit from the air onto the ground and result in additional pathways of exposure (i.e., secondary pathways).

Potential health risks were determined by comparing the predicted maximum ground-level air concentrations of the COPC at the MPOI for averaging times associated with both short-term and long-term exposures with exposure limits established by regulatory and leading scientific authorities responsible for the protection of public health. These limits incorporate a high degree of protection to accommodate vulnerable members of the population in order to determine the potential health risks to the people living in the area or who might frequent the area for work, recreation or other purposes. In accordance with accepted HHRA protocol, the exposure limits were based on a COPC's most sensitive toxicological endpoint.

With very few exceptions, the health risk estimates for the non-cancer COPC at the MPOI were predicted to be below 1.0, indicating that estimated short-term and long-term inhalation exposures were less than the health-based exposure limits. Risk estimates less than or equal to 1.0 are associated with low health risk, and therefore adverse health effects would not be expected. The only exceedances of the limits at the MPOI were predicted for short-term inhalation exposure to NO_2 and SO_2 acting both singly and in combination as part of the respiratory irritants mixture. The predicted short-term NO_2 and SO_2 concentrations are unlikely to result in adverse health effects on their own or as part of a mixture due to:

- The conservatism incorporated in the predicted short-term ground-level air concentrations of NO_2 and SO_2;
- The areal extent of the predicted exceedances;
- The likelihood of an exceedance occurring; and,
- The levels of exposure that have resulted in observed adverse health effects in humans, as documented in the most recent scientific literature.

In all cases, the cancer risk estimates were predicted to be less than one in 100,000 (i.e., one extra cancer case in a population of 100,000 people), indicating that the chemical emissions from the WLPP burning 100% rail ties are associated with a negligible level of risk, as defined by BC MOE and Health Canada.

Concentrations of the COPC were predicted in soil and compared with BC's CSR numerical soil standards and background soil concentrations in the Cariboo Region. The predicted maximum concentrations of each of the COPC in soil were well below both the BC soil standards and regional background soil concentrations, suggesting that the proposed increase in the rail ties used to fuel the WLPP would not be expected to result in an increase in health risks to the neighbouring area.

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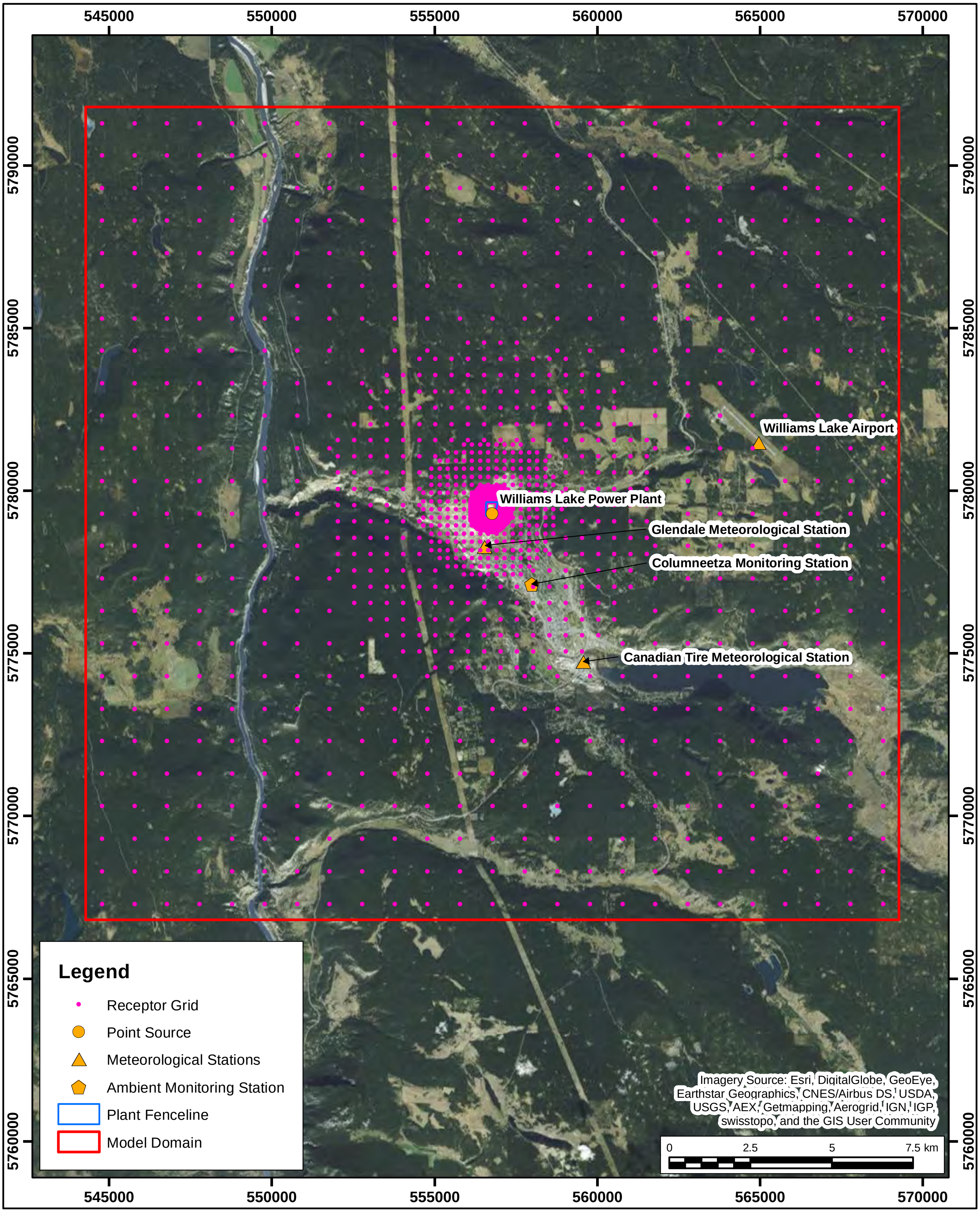
APPENDIX A

RWDI FIGURES



Model Domain with Receptor Grid

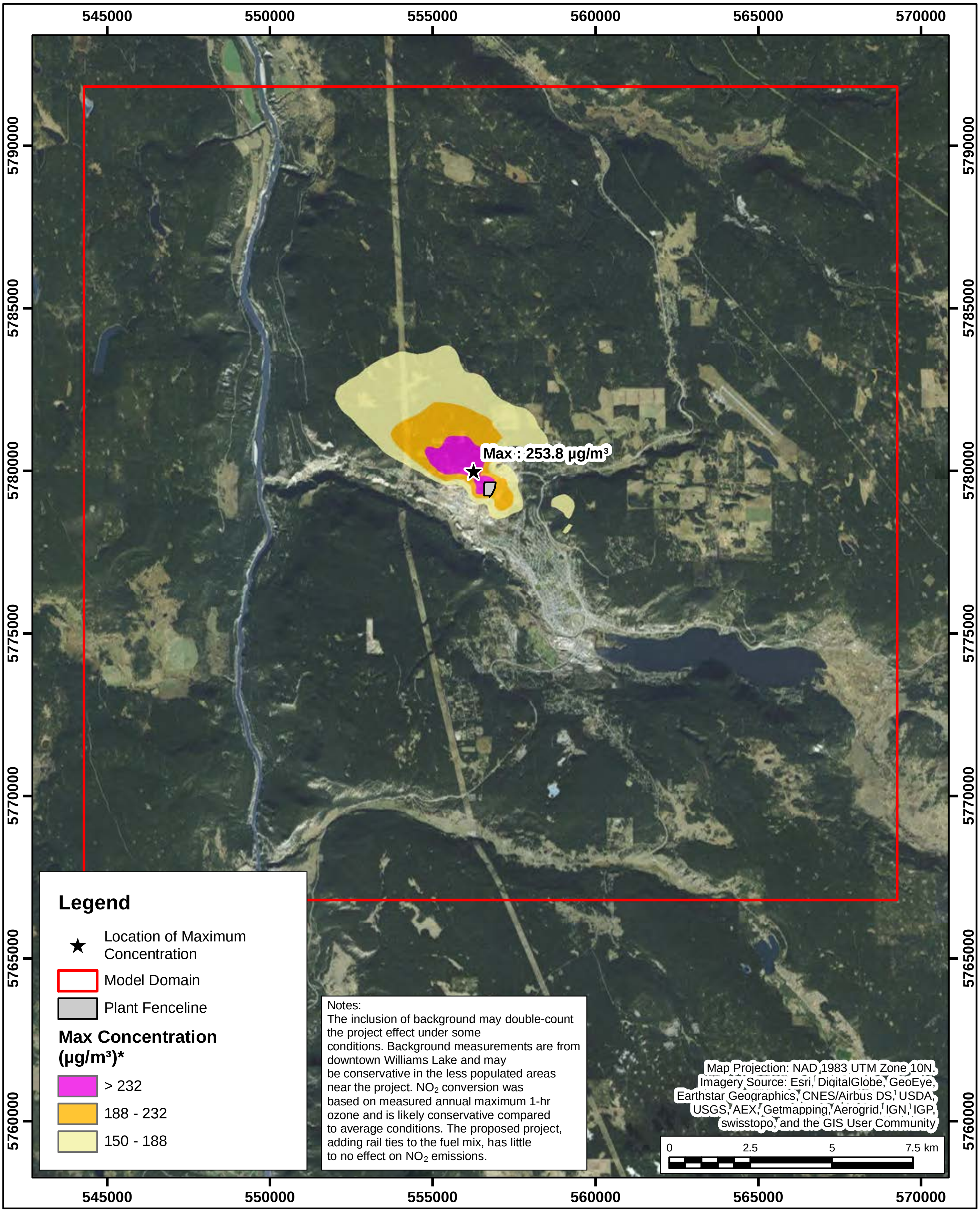
Map Projection: NAD 1983 UTM Zone 10N.

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

Drawn by: NBN	Figure: 1
Approx. Scale:	1:160,000
Date Revised:	June 29, 2015



Predicted Ninety-Eighth Percentile Peak Daily 1-Hour Maximum NO_2 Including Ambient Background Value for 100% Rail Ties or Base Fuel

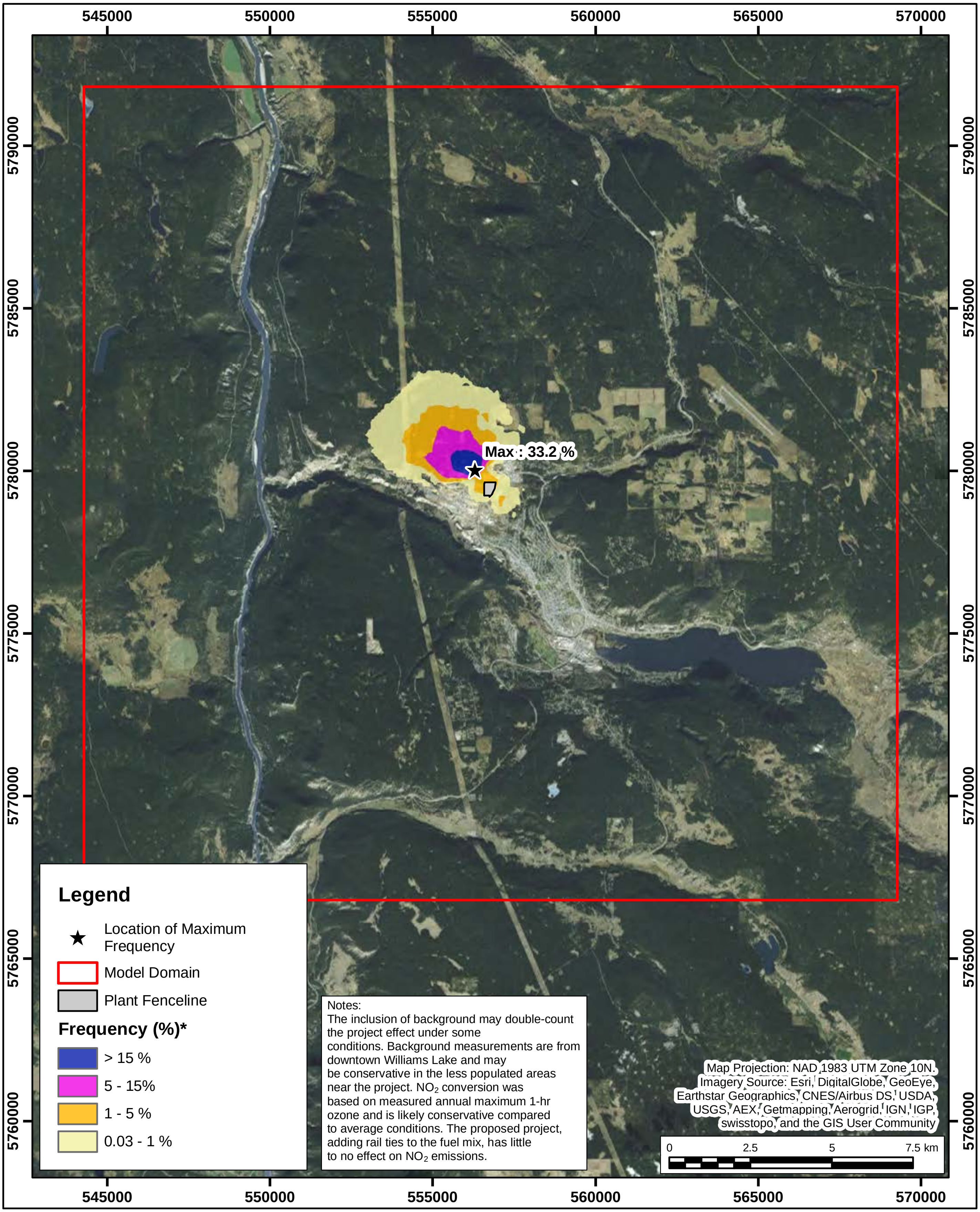
*1-hr NO_2 Interim Provincial Air Quality Objective = 188 µg/m³ (BC MOE 2014)

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

Drawn by: NBN	Figure: 2
Approx. Scale:	1:160,000
Date Revised:	Sept. 4, 2015



Predicted Frequency of Exceedance of 1-Hour NO_2 Objective Including Ambient Background Value

*1-hr NO_2 Interim Provincial Air Quality Objective = 188 µg/m³ (BC MOE 2014)

Williams Lake Power Plant - Williams Lake, BC

True North

Project #1500355

Drawn by:	NBN	Figure:	3
Approx. Scale:			1:160,000
Date Revised:			Sept. 4, 2015

RWDI

APPENDIX F

Voluntary Consultation Outline

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

STAKEHOLDER INFORMATION		ACTIVITY	CONSULTATION INFORMATION		PERFORMANCE INDEX	
Stakeholder Type	**Contacted**	**Engagement Type**	**Information Provided to Stakeholder**	**Contact Date:**	**Engagement & follow-up**	**Outstanding questions/concerns if any, and answers given/actions taken**
Local Government – Williams Lake Council	Walt Cobb, Mayor	Meeting	Provided information about history of APWL, the proposed Renewal Project, the facts around the expiration of the EPA with BC Hydro and the desire of both parties for a 10-year extension to the EPA. It included an outline of the process of making an application to the MoE for a permit amendment to allow an increase in the volume of shredded rail ties consumed at the plant.	4-May-15	Q &A session following presentation. Written Fact Sheet sent via email following meeting.	Q: What is the status of agreement and negotiations with BC Hydro?
						A: Current agreement ends in 2018. Both parties are discussing opportunity to extend agreement for another 10 years.
						Q: Will you bring in shredded ties or whole ties?
						A: The plan is to bring in whole ties and shred them on site.
						Q: How will they be delivered?
						A: Either via train and then trucked to site, or by train on a dedicated spur line.
						Recommendation: consider partnering with the city and province in providing waste heat to a neighbouring business (possibly a greenhouse) as way of supporting economic development and reducing water usage.
						Response: MOU executed regarding greenhouse development in July 2015.
Local Government – Cariboo Regional District	Al Richmond, Board Chair, and Janice Bell, CAO	Meeting	Provided information about history of APWL, the proposed Renewal Project, the facts around the expiration of the EPA with BC Hydro and the desire of both parties for a 10-year extension to the EPA. It included an outline of the process of making an application to the MoE for a permit amendment to allow an increase in the volume of shredded rail ties consumed at the plant.	5-May-15	Q&A session following presentation. Written Fact Sheet sent via email following meeting.	Q: is there a rail spur into the property?
						A: No, but will be considered if there is an opportunity.
						Q: What is the availability of rail cars to deliver ties?
						A: CN has a dedicated fleet of rail cars for rail tie transport.
						Q: What are the environmental impacts of burning rail ties?
						A: While air modelling will be done to identify any potential issues, it is APWL's contention that the combustion technology is sufficient to destroy constituent chemicals and pollution controls will keep impacts at acceptable levels.
						Q: What ratio of rail ties will you be looking to permit?
						A: Will likely ask for 50%, but utilization would be in the 25%-50% range.
						Q: What are the economic impacts?
						A: 32 full-time jobs and millions of dollars of investment in the community.
						2 Recommendations: #1 – begin public consultations before making EA application; #2 – consult with local First Nations.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

STAKEHOLDER INFORMATION		ACTIVITY	CONSULTATION INFORMATION		PERFORMANCE INDEX	
Stakeholder Type	**Contacted**	**Engagement Type**	**Information Provided to Stakeholder**	**Contact Date:**	**Engagement & follow-up**	**Outstanding questions/concerns if any, and answers given/actions taken**
						APWL accepted these recommendations and has implemented them.
First Nation -- Williams Lake Indian Band (WLIB)	Band staff	Meeting	Provided information about history of APWL, the proposed Renewal Project, the facts around the expiration of the EPA with BC Hydro and the desire of both parties for a 10-year extension to the EPA. It included an outline of the process of making an application to the MoE for a permit amendment to allow an increase in the volume of shredded rail ties consumed at the plant.	5-May-15	Q&A session. Written Fact Sheet sent via email following meeting.	Q: What percentage of fibre will be rail ties?
						A: Expect to burn up to 50%, but annual average will be 25%-50%.
						Q: Can CN guarantee a 10-year supply of rail ties?
						A: While no commitments for supply have been reached, the plant would need about 800,000 ties per year. CN currently has about 2 million legacy ties in Western Canada, and produces about 1 million per year.
						Q: Will you have to pay for the ties?
						A: Still to be determined.
						Q: What is your timeline for consultations?
						A: It is evolving, but APWL would like to ensure WLIB has ample opportunity to provide input.
						Recommendations: Develop a communication protocol agreement between APWL and WLIB; provide presentation to council; do consultations with community.
						Response: Community Benefits Agreement, which included communications protocol signed in January 2016.
						APWL held a separate open house on the WLIB land.
						Recommendation: WLIB should be lead FN, but can help with information sharing with Canoe and Canim bands, and with Tsilqhot'in National Government.
First Nation -- Soda Creek Indian Band	Julia Banks	Meeting	Provided information about history of APWL, the Renewal Project, the facts around the expiration of the EPA with BC Hydro and the desire of both parties for a 10-year extension to the EPA. It included an outline of the process of making application	5-May-15	Soda Creek Natural Resources Manager Julia Banks said she was happy with the answers to questions and thanked the group. No further meetings	Q: Do you have air monitoring data that can be compared to previous years?
						A: We have data for PMs, NOx, SOx etc.
						Q: Where would ties be coming from?
						A: No commitments for supply yet, but likely CN Rail.
						Q: Is there any concern that they wouldn't be able to fulfill supply?

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

STAKEHOLDER INFORMATION		ACTIVITY	CONSULTATION INFORMATION		PERFORMANCE INDEX	
Stakeholder Type	**Contacted**	**Engagement Type**	**Information Provided to Stakeholder**	**Contact Date:**	**Engagement & follow-up**	**Outstanding questions/concerns if any, and answers given/actions taken**
			to the MoE for a permit amendment to allow an increase in the volume of shredded rail ties consumed at the plant. Q&A session. Written Fact Sheet sent via email following meeting.		are scheduled.	A: No.
Provincial Government -- Local MLA	Donna Barnett	Meeting	Fact Sheet and Project Development discussion	3-Jun-15	Commitment to provide additional information.	MLA Barnett says she fully supports the project and appreciates the steps Atlantic Power is taking to inform the community. She says hosting an Open House on June 17 is an excellent opportunity for people to learn more about the project.
Local Government – Williams Lake Council	Mayor Walt Cobb	Email	Copy of Open House AD from June 5 WL Tribune	5-Jun-15		Offered to provide city council with a project presentation and continue to be available to provide project information and answer questions
Local Government – CRD	Janis Bell, CRD CAO	Email	Copy of Open House AD from June 5 WL Tribune	5-Jun-15		Suggested that copy of the AD be made available to CRD Board members prior to the project presentation on June 12
First Nation -- WLIB	Kirk Dressler	Email	Copy of Open House AD from June 5 WL Tribune	5-Jun-15		Asked Kirk if WILB would like an Open House in the community on June 17
First Nation -- Soda Creek Indian Band	Julia Banks	Email	Copy of Open House AD from June 5 WL Tribune	5-Jun-15		Offered to meet again and provide Soda Creek Indian Band with any additional project information required

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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First Nation -- Williams Lake Indian Band	Kirk Dressler	Email	Response from WLIB	10-Jun-15	Response from WLIB to offer to provide open house on WLIB territory (see Line 6 above)	Email from KD: "Unfortunately Council's schedule was inordinately full on Monday (with pressing issues such as the proposed restart of Mount Polley Mines) and there was no opportunity to discuss the Atlantic proposal or the concept of the Open House. Given that we have not had a proper discussion with Council, we'll have to respectfully decline the opportunity for the Open House of the 17th. Perhaps we can look at a future date for an information session at WLIB. We'll soon be providing you with a form of draft agreement that we envision could provide some structure to the process of engagement between Atlantic and WLIB."
						Followup: determine if there is another opportunity to provide an information session for the WLIB.
Cariboo Regional District	CRD Board of Directors	Presentation to CRD Board	Presentation included information about history of APWL, the proposed Renewal Project, the facts around the expiration of the EPA with BC Hydro and the desire of both parties for a 10-year extension to the EPA. It included an outline of the process of making an application to the MoE for a permit amendment to allow an increase in the volume of shredded rail ties consumed at the plant.	12-Jun-15	Presentation to CRD Board of Directors including distribution of fact sheet	Q: Where will the rail ties come from?
						A: BC and Western Canada.
						Q: Will there be enough to guarantee supply?
						A: We believe the amount the railways generate will be enough to provide 25-30% of our fibre needs.
						Q: Do you do any additional treatment other than shredding the rail ties?
						A: No, we would shred on site and burn them in a mix with traditional fibre.
						Q: What happens to the chemicals on the ties when you burn them?
						A: The plant did a test burn with 100% rail ties in 2001 and the stack test showed compliance with all provincial standards. Because the temperature we burn at is so high (2000F) the constituent chemicals in creosote are basically destroyed. Our pollution controls are also over-engineered, including a five-field electrostatic precipitator, to scrub the emissions further.
						Q: Why are you not looking at using slash piles from the bush?
						A: We have looked at logging debris, and will continue to look at all possible fibre sources, but the economics are not feasible at this time.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

STAKEHOLDER INFORMATION		ACTIVITY	CONSULTATION INFORMATION		PERFORMANCE INDEX	
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						Q: Will this be a revenue generator or revenue neutral?
						A: Our discussions with CN have not gotten into pricing, so we don't know what the financial impacts will be yet. This initiative is about continuation of plant operations.
						Q: Do you currently pay for your fibre?
						A: We pay for our fibre through a variety of arrangements with our suppliers, primarily local mills.
						Q: Has your usage of the city's aquifer changed at all over the year?
						A: Our water usage has decreased due to periodic curtailments, but continues to be between 700,000 and 1 million gallons per day when in operation.
						Q: What would it cost to build a plant like this from scratch?
						A: About $5 million per megawatt (this is a 66MW plant).
						Q: Can you burn tires?
						A: We haven't looked at tires as an option due to the complexity of the process.
						Q: Can you burn construction debris?
						A: We do take a small amount of clean construction waste from the CRD landfill, and would consider all sources of fibre that are available and economically and environmentally feasible.
						Q: Have you considered garbage (MSW)?
						A: No, for similar reasons as tires.
						Q: Are the rail companies compelled to deal with the rail ties?
						A: We don't know for sure, but the fact is that the rail companies are all showing an interest and a willingness to deal with them.
						Q: Are pulp mills impacting APWL's ability to secure fibre?
						A: Due to the shrinking fibre availability generally, there is increasing competition for sawmill residues from a number of areas.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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						Q: Will storage of the ties be considered by MoE in the permit amendment application process?
						A: Yes, MoE will expect a detailed management protocol from delivery to consumption and waste disposal.
						Comment: I am really glad you're considering using rail ties, because they are starting to cause real problems on rail sidings.
						Comment: The Ministry of Forests, Lands and Natural Resource Operations is coming out with new guidelines on logging debris recovery this fall. Recommend APWL take a second look at economics.
General Public -- Community of Williams Lake	70 members of the general public	Open House advertised by	The open house was conducted in the form of 10 storyboards, as well as an accompanying fact sheet.	17-Jun-15	Sign in sheets show 70 attended; 14 feedback forms were returned.	Scanned copies of the sign in sheets and feedback forms are attached following this consultation log.
		Ads in WL Tribune,	Seven APWL employees were on hand to provide information and answer questions.			
		GOAT Radio, & News Release				
WL Daybreak Rotary Club	16 members attended	Meeting	Project Presentation, Fact Sheet, FAQs	7-Jul-15	Rotary Club appreciated the presentation and opportunity to ask questions.	**Questions included:**
						Q: Where would the used ties come from?
						A: The used rail ties would come from Western Canada.
						Q: How would APWL handle them once they arrived in WL?
						A: APWL anticipates the used rail ties arriving in Williams Lake would be off-loaded at the CN Rail yard located at the southern end of the city and then trucked to the APWL site.
						Q: What are the chemicals that would be emitted from the stack when ties are used?
						A: The majority of harmful chemicals are destroyed in the 2000F boiler and resulting emissions fall within current provincial guidelines.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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						Q: Why aren't slash-piles being used to make up the anticipated reduction in residual fibre from local mills?
						A: We have examined logging debris as an alternate fuel and will continue to look at all possible fibre sources. Logging debris is not an economically feasible option at this time.
						Q: How would the ties be processed on site?
						A: The ties would be stored in a segregated area and only shredded as max of 3 days ahead of burning. Once shredded they will be stored in an enclosed bin.
First Nation - Canoe Creek Indian Band	2 staff attended informal meeting	Meeting	Project discussion, Fact Sheet, FAQs	7-Jul-15	FN Outreach and invitation to continue communications and outreach.	Q: Where will the used rail ties come from?
						A: The used rail ties would come from Western Canada.
						Q: How will they be handled when they arrive in WL?
						A: APWL anticipates the used rail ties arriving in Williams Lake would be off-loaded at the CN Rail yard located at the southern end of the city and then trucked to the APWL site.
						Q: What are the health and environmental impacts?
						A: There will be no net impacts on health or the environment as the majority of harmful chemicals are destroyed in the 2000F boiler and resulting emissions fall within current provincial guidelines.
First Nation - Canim Lake Indian Band	1 staff attended, informal meeting	Meeting	Project discussion, Fact Sheet, FAQs, invitation to continue communications.	7-Jul-15	Canim Lake Natural Resources Coordinator Don Dixon said meeting beneficial, thanked APWL for time to visit Canim Lake. No further meetings scheduled at this time.	Q: Is APWL looking at Roadside Logging Debris (RLD) as a future source of fibre?
						A: Yes, APWL is looking at RLD, but at current prices for processing and hauling, it is a cost prohibitive solution.
						Q: Where would the used rail ties come from?
						A: The used rail ties would come from Western Canada.
						Q: Can APWL take 'mixed animal waste and shavings' from the nearby stockyard in WL?

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

STAKEHOLDER INFORMATION		ACTIVITY	CONSULTATION INFORMATION		PERFORMANCE INDEX	
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						A: APWL's emissions permit does not allow for the disposal of animal waste, even if mixed with straw, shavings or other biomass.
WL Daytime Rotary Club	25 members attended	Meeting	Project Presentation, Fact Sheet, FAQs	8-Jul-15	Rotary Club appreciated the presentation and opportunity to ask questions.	**Questions included:**
						Q: How would APWL handle the used rail ties once they arrived in WL?
						A: · APWL anticipates the used rail ties arriving in Williams Lake would be off-loaded at the CN Rail yard at the southern end of the city and trucked to the APWL site.
						Q: What would be the noise and dust levels with shredding at the plant?
						A: The shredder will be designed to minimize noise and dust emissions.
						Q: What are the health and environmental impacts of the proposed projects?
						A: The air dispersion modelling study and a health impact assessment (both are available) conclude no negative impacts to human health or the environment.
						Q: Why isn't APWL lobbying BC Hydro for a higher power rate which would allow for transport of RSL debris as a fibre source and ultimately help sustain the local forest industry by better utilizing harvested fibre?
						A: Logging debris is not an economically viable fuel source at this time.
						Q: What chemicals are emitted when creosote ties are burned and what the health impacts on citizens?
						A: The air dispersion modelling study combined with a health impact assessment (both are available) conclude no negative impacts to human health or the environment.
						Q: What are the 'next steps' for APWL with the proposed project?
						A: The next step is to obtain an amended Air Permit.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

STAKEHOLDER INFORMATION		ACTIVITY	CONSULTATION INFORMATION		PERFORMANCE INDEX	
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First Nation - Tsilhqot'in National Government	1 staff attended, informal meeting	Meeting	Project discussion, Fact Sheet, FAQs	8-Jul-15	Invitation to continue communications. The TNG Stewardship Coordinator Luke Doxtator said he was satisfied with the responses to questions, thanked APWL and offered to followup if they had any further questions or requests for additional meetings. No further meetings scheduled at this time.	Q: Why is APWL pursuing the rail ties option when the local mills are still running full tilt?
						Q: Why does APWL require rail ties when local mills have never fully utilized the AAC in the WL TSA?
						Ax2: The anticipated constraints on fuel supply going forward were explained and the subsequent determination that rail ties were the most cost effective and secure solution.
						Q: What are the health and environmental impacts on WL?
						A: There will be no net impacts on health or the environment as the majority of harmful chemicals are destroyed in the 2000F boiler and resulting emissions fall within current provincial guidelines
						Q: How many First Nations people currently work at APWL?
						A: Not sure exactly, but only a small handful.
						Q: What qualifications would be required for the 3-4 jobs required to operate the shredder?
						A: They would be entry-level jobs, with training provided by APWL.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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Provincial Government - BC Ministries of Environment and Jobs, Tourism, Skills Training and Labour	Minister Shirley Bond (JTST), Minister Mary Polak (Env), MLA Donna Barnett, MLA Greg Kylo, Deputy Minister Athana Mentzelopoulos (JTST Intergovernmental Relations Secretariat), Associate Deputy Minister Tim McEwan (JTST Major Investments Office)	Meeting	Project discussion, Fact Sheet, FAQs	21-Jul-16	Provided background information on the project, commitment to continue to keep government informed.	MLA Barnett noted community support the project has. Ministers Bond and Barnett commended AP on its efforts at community and First Nations engagement to date and encouraged AP to continue with engagement efforts. Minister Bond indicated interest in finding out whether there is a way to make roadside logging debris / forest residues work economically as a fibre source.
General Public	Cathy Koot, Williams Lake Field Naturalists' Club	Email	Email following up from an earlier request for information, offering to provide further information and/or meet in person	18-Aug-15		See Appendix A
First Nations Engagement	Neskonlith FN	Email	1st email request for meeting to discuss project	20-Aug-15		No response
First Nations Engagement	Toosey Indian Band	Email	1st email request for meeting to discuss project	31-Aug-15		No response
Local government - Williams Lake Council	Williams Lake City Council	Meeting	Project Presentation, Fact Sheet, FAQs	15-Sep-15	WL Council unanimously endorsed the project, and a motion for a letter in support of the project.	Council provided numerous comments supportive of the project. There were no questions specific to the project.
Williams Lake Chamber of Commerce	Williams Lake Chamber of Commerce	Meeting	Project Presentation	24-Sep-15	WL Chamber of Commerce members present unanimously supported the project.	No question were asked. The Williams Lake Chamber Board of Directors has provided a letter in support of the project.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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First Nations Engagement	Williams Lake Indian Band	Meeting	Project update and time line. APWL will begin 30-day public comment period on Oct 05. APWL seeks feedback on proposed Community Benefits Agreement,.	30-Sep-15	Project update meeting and discussion of Community Benefits Agreement	WLIB will provide feedback on proposed CBA the week of Oct 5-9 and APWL will provide WLIB with proposed funding levels for envelopes outlined in the CBA during the same time period.
First Nations Engagement	Neskonlith FN	Email	2nd Email request for meeting to discuss the project	30-Sep-15		No response to 1st email requesting meeting. 2nd email sent to solicit interest in meeting with APWL.
First Nations Engagement	Toosey Indian Band	Email	2nd Email request for meeting to discuss the project	30-Sep-15		No response to 1st email requesting meeting. 2nd email sent to solicit interest in meeting with APWL.
First Nations Engagement	Alkali Lake Band	Meeting	Project Fact Sheet and FAQs	1-Oct-15	Brian & Terry updated community reps on WL Renewal Project	Commitment to consider fibre supply from Toosey forest license when costs become less prohibitive.
First Nations Engagement	Canoe Creek Band	Phone call	Call from Brent Adolph	1-Oct-15	Terry updated Brent on the project status and time line	Brent expressed appreciation for the update and stated that he would contact us if they had further questions.
First Nations Engagement	Neskonlith FN	Email	3rd Email request for meeting to discuss the project	14-Oct-16		No response

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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First Nations Engagement	Neskonlith FN	Email	4th email (this one was to Chris Ortner, Interim Natural Resources Coordinator) plus followup phone call to Chris three days later offering to meet to discuss the project	Oct 16 / Oct 19		No subsequent response.
First Nations Engagement	Toosey Band	Phone call	Call from Violet Tipple	22-Oct-15	Violet: meeting with Chief and Council was postponed and she would call again to rescheduled.	No further communication to reschedule, nor any response to follow-up email.
WLIB	Band staff	Meeting	Proposed Community Benefits Agreement & answers to project questions	22-Oct-15	Verbal agreement on proposed CBA.	Expectation of list of WLIB questions Oct 26/27 (See Appendix A) Presentation of proposed CBA to Chief and Council on Oct 26, follow-up to result.
Provincial Government – Local MLA	Donna Barnett	Meeting	WL Power Plant Cost/Pricing Explanation	23-Oct-15	Donna thanked for the meeting, suggested APWL invite MOE&M, Hon. Bill Bennett.	None.
WL Air Quality Roundtable	Bert Groenenberg-Chair, Roundtable members: CRD, Interior Health, MoE, City, Industrial Reps.	Meeting	Presentation by Terry Shannon, Atlantic Power on the AP Renewal Project.	19-Nov-15		Q : Was information concerning emissions from beehive burners based on average or worst case emissions?
						A: The nature of the beehive burners was such that emissions testing was not possible. Emissions were estimated based emission factors from USEPA AP-42. This document categorized burners according to their level of controls and then predicted particulate emissions based on the rate of wood residue incinerated. The emission factors would have been calculated for average emissions and not worst case.
Interior Health	Greg Baytalan	Meeting/tour WLPP	Shared project information	19-Nov-15		Awaiting final Consultation Report (CR) and Technical Assessment Report (TAR).
Ministry of Environment	Peter Lawrie, Dan Bings, Brady Nelless, Jack Green	Meeting/tour WLPP	Shared project information, discussed Permit amendment process.	2-Dec-15		Awaiting final CR and TAR.
WL Tribune	Monica Lamb-Yorski	Meeting/tour WLPP	Shared project information	8-Dec-15		Tour resulted in a newspaper feature. See Appendix B.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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Interested Citizens	Steve O'Hara and & 3 others from Gibraltar Mine: **Dale Lawson**, Senior Coordinator Health & Safety, **John Jackson**, Senior Env. Coordinator **Ben Pierce**, Superintendent Env	Meeting/tour WLPP	Shared project information	22-Dec-15		
WLIB	Chief and Council	Meeting	Signing ceremony	7-Jan-16	WLIB and APWL officially signed Community Benefits Agreement	Working relationship going forward formalized. WLIB have provided a letter of support for project.
BC Cabinet Ministers	**Hon. Bill Bennett,** Minister Energy & Mines, **Hon. Steve Thomson**, Minister Forest, Lands and Natural Resources Operations	Meeting/tour WLPP	Project discussion, Fact Sheet, FAQs, invitation to continue communications.	18-Jan-16	Minister Bennett indicated his support for the Project and complimented WLPP staff on the exceptionally high standard of housekeeping.	
WLIB	Contact - Rhonda Leech	Open house at WLIB Community Hall	Invitations distributed to all households in the community on two occasions. Information was on display and AP staff were there to share information about the project.	4-Feb-16	Approx. 20 attended.	Questions and answers can be found in detail in Appendix A and C.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

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Public	See table following.	Tours WLPP 2 per day, days per week, 3 weeks in March	Shared project information	Last 3 weeks of Mar 2016		We are grateful that so many citizens of Williams Lake and area accepted our invitation to tour the Williams Lake Power Plant. Thank you for your time and interest in our project.

Atlantic Power Williams Lake Air Permit Amendment - Voluntary Public Consultation Outline

WLPP Site Tours - March 2016					
10-Mar	**15-Mar**	**16-Mar**	**23-Mar**	**29-Mar**	**30-Mar**
Jim Hilton	Dave Walgren	Rene Walder	Susan Fournier,	Clifford Phillips	Dennis Lambert
Sandi Hilton	Craig Brightmon	Lisa Walder	Karen Eden	Chris Hicks	Ian Thompson
Jim Willems	Graham Ashton	Jim Thompson	John Dell	Dorothy Hicks	Tony Dickens
Caterina Birchwater	Alena Wang	Ben Gossen	Paul French	Anne Blake	Rose Dickesn
Sage Birchwater	Robert Hatt	Mrs. Gossen	Vic Sharman	Philip Blake	Ken Aisaachton
	Brad Hehr	Sage Birchwater	Lyda Sharman	Lucy Martel	Astri Aisaachton
	Jim Klassen	Shiney Birchwater	Dave Walgren	John Reimer	Manpreet Randhawa
	Randy Jarvis	Owen Birchwater	Lindae Hilton	Karla Leclerc	Bahadar Randhawa
	Bryan Toop	Wesley Birchwater	Robert Chapman	Rene Leclerc	Ingrid Schwarzmaier
	Brad Wolgsen	Capri Birchwater	Lucy Jones		Chris Schwarzmaier
	Mark Runge		Jeremy Manning		Joerg Brandner
	Gerda Knuff		Dave Bowering		Peter Brandner
	Paul Dyson		Lisa Bowering		
	Patricia Barron				
	Darrell Barron				
	Barry Laird				
	Ed Kozuki				*Cancelled/info sent*
	Al Garlinge				Rick Todd
	Judy Garlinge				Julie Eversfield

Form WL Tribune, June 5, 2016

Williams Lake Renewal Project
OPEN HOUSE
Wednesday, June 17, 5:00 - 8:00 p.m.
Gibraltar Room
Cariboo Memorial Recreation Complex, 525 Proctor Street

Sign-in sheets show 70 in attendance

14 Feedback forms received

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

SIGN-IN SHEET

Thank you for attending our open house. We value the input of all of our stakeholders as an important part of making the Williams Lake Renewal Project a success for the whole community.

The information we collect here will be used solely for the purpose of providing a record of public consultation to the Ministry of Environment.

However, by providing your email address, you agree to allow Atlantic Power to send you periodic information about the Williams Lake Renewal Project.

Name	Address	Phone Number	Email
[illegible]	1240 N. 12th Av	392-3887	
[illegible]	WL	2503052405	
Catarina [illegible]	WL	250-305-2405	
Jackie LaFlamme	W.L.	250-398-6450	
Darlene LaFlamme	W.L	250-392-5948	
Lorne [illegible]	W.L.	250392[illegible]	
Dave [illegible]	WL	604 562 2846	
Danae Moore	WL	250-398-0997	ckanerz77@gmail.com
Jason Hughes	150 Mile House	250-296-4882	

AtlanticPower Corporation

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Name	Address	Phone Number	Email
MRS. SATWANT SAHAL	709 pigeon Ave. Williams Lake BC V2G 2B4	250-392-7491	
PETER & GAIL EPP	306 HAZEL ST WILLIAMS LAKE	250 392-7967	
Marilyn Haines	1632 Dutch	250-305 9534	
Mike Oswald	Point road Williams Lak		
Jenny Noble			neptune.noble @gmail.com
Brad Mones		250 267 7084	
LARRY OLSON	109-540 Borland St Williams Lake	250 267 8746	larry.olson@gov.bc.ca
Leah Hartley	2nd Ave	250 392 1766	lhartley@williamslake.ca
John & Donna Kaul	1267 South Lakeside Dr	(250) 392-7493	

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

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Name	Address	Phone Number	Email
Elaine Sager	37-350 Pearkes Dr. Williams Lake	250 398 7553	easager@shaw.ca
KELLY MCKELVIE	951A FIFTH AVE WL	250-267-6721	KMCKELVIE@GIBRALTARMINE.COM
ROD ECKERT	1820 HAMEL Rd WL	250 392 0258	eckertr@hotmail.com.
IVAN BONNELL	CITY of WILLIAMS LAKE 450 MART ST WMS LK	250-392-2311	ibonnell@williamslake.ca
MATTHEW REID	7156 CAHILTY RD. HEFFLEY CRK. BC. V0E 1Z1	250-267-5945	mreid@atlanticpower.ca.
Mike Dextrase	1917 Hamel Rd	250-267-6710	mike.dextrase@tolko.com
RANDY CHADNEY		250-267-2062	Randy.Chadney@tolko.com.
Chas Stal.	2604 ASPEN PLACE	250 392-5460	tit4tat@telus.net.
BILL MONTGOMERY	102-375 MANDARIN	250-392-4000	bemontys@telus.net

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

SIGN-IN SHEET

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Name	Address	Phone Number	Email
Ross McCaubrey	Box#106 150 Mile	250 296 4285	rgmccaubrey@yahoo.com
Rebecca Dyok	Williams Lake	250 392 6551 ext 224	rdyok@vistaradio.ca
Diane French	WL	250 392 7058	[illegible]@shaw.ca
Wade Watson	WL	250-398-59[illegible]	wadewatson@shaw.ca
Mike Garrad	1611 [illegible] Rd WL	250 30[illegible]	[illegible]@gmail.com
Jason Ryll	703 WILLOUGHBY PLACE	250-267-7955	jryll@williamslake.ca
[illegible]	W.L	250-392-[illegible]	[illegible]@williamslake.ca
Kim Herdman	332 3rd ave	250-392 6597	
Lorraine Baker			

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

SIGN-IN SHEET

Thank you for attending our open house. We value the input of all of our stakeholders as an important part of making the Williams Lake Renewal Project a success for the whole community.

The information we collect here will be used solely for the purpose of providing a record of public consultation to the Ministry of Environment.

However, by providing your email address, you agree to allow Atlantic Power to send you periodic information about the Williams Lake Renewal Project.

Name	Address	Phone Number	Email
Scott Nelson	1713 Signal Point Rd Williams lake BC.	250-305-4967	scott@williamslake.net
Harold Redekop	150 Mile House.	296-4661	
DEREK BURBRIDGE	748 PIGEON AVE WL	392-1914	
Paul French	569 9th ave WL	398-0529	
Jeannie Rodyk	1611 Wood Road WL	392 0671	jeannierodyk@gmail.com
Levi Nelson	3081 Rodeo drive 150 M.H. House BC	250-267-3509	
Rob Van Buskirk	1250 Brownmiller Road Quesnel	250-255-1590	robert.vanbuskirk2@westfraser.com
Michael Rawluk	372-3rd Ave N.		
Dusty Rhodes	1810 Ransome Place	250-855-8020	duster.1@hotmail.com

AtlanticPower Corporation

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Name	Address	Phone Number	Email
Art Prevost	1385 11th Ave N	3926091	aprevost@usw.ca
BRIAN ECKERT	680 WESTERN AVE	392-6939	
Keith + Fawn Kawlarz	463 Murre Rd.	392-7728	
Twila Nelson	1713 Sigurd Pl	250 392-4089	wlrental@shaw.ca.
Steve Forseth	204-665 Borland St	250-267-6125	sforseth@cariboord.ca
Bill Nek	Box 559 150 Mile	250 296-3432	
Bio Stahl		250 530 4110	
Wade Buhrke	117 Snyder Rd	250-392-7200	
CHRIS TURNER	1355 KALLYN ROAD	250 305 8130	

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Name	Address	Phone Number	Email
Jim Hilton	2087 Buckley DR. W. Lake	3923476	jimhilton@xplornet.com
Julien Steyl	1904 Hamel Rd, WL V2G 5G8	250 ~~246~~ 398 5162	jpsteyl@gmail.com.
Derek Chandler	7593 Stormy Cres	7783493957	dchandler@gwequipment.com
Ian Lanki	Box1099, 150Mile House	296-3601	ilanki@telus.net
Donna + Rick Ford	1717 Signal Point Rd	250 392 5223	thefords@hotmail.com
Shane McMath	710 Widgeon RD	392 9433	ShaneMcMath26@shaw.ca
Alexa Nelson	Box 559, 150 Mile house	250 2672376	

AtlanticPower Corporation

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Name	Address	Phone Number	Email
John Reimer		250 305 1025	john@ownmail.net
Sandi Hilton	2087 Buckley Dr. W.L.	250-392-3476	
Monica Lamb-Yorski	2029 South Lakeside	250-392-1861	news@witribune.com
Natasha Jawoski	120 Likely Road 150 Mile House	250-296-0085	

AtlanticPower Corporation

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Name	Address	Phone Number	Email
Peter Atamanenko			peter.a@inbox.com

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Name	Address	Phone Number	Email
SHAwn Masters	1085 12th Ave williams Lake	250 392-3211	

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

Thank you for attending our open house. We value the input of all of our stakeholders as an important part of making the Williams Lake Renewal Project a success for the whole community. We would appreciate it if you would take two minutes to provide us with your opinions and any feedback you have on the project.

WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

[illegible]

The Green House - provide local food [illegible]

community garden space [illegible] local food [illegible]

for greens through winter

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

use other fuel than creosote ties

ANY ADDITIONAL COMMENTS?

If you would like to receive regular information updates on the project, please provide your name and email address:

Name ______________________ *Email* ______________________

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ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

Getting rid of railway ties otherwise ending up in landfills.

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

ANY ADDITIONAL COMMENTS?

Yeah to burning railway ties!

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Julien Steyl ***Email***

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ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

The possibility of a greenhouse project to cut down on the use of potable water.

Even though their is no room for you to do this on your property, well thought out smoke screen.

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

- start a treatment facility of waste water
- drill your own wells
- "No" to rail tie burning (alternative fuel source)
- Move the plant out of the valley.

ANY ADDITIONAL COMMENTS?

The governments standard of air quality is substandard. If you lived here with bad emissions and the location of the plant that creates a low ceiling in the winter, you and your family would be an unhealthy depressed bunch as our community. Work with the people not for the almighty profit.

If you would like to receive regular information updates on the project, please provide your name and email address:

Name ______________________ ***Email*** ______________________

Times 5 concerned citizens.

AtlanticPower
Corporation

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

a website explaining
the project and
how people can find informatn

ANY ADDITIONAL COMMENTS?

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Sage Birchwater ***Email*** sagebirchwater@shaw.ca

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ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

Tax Base

Jobs

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

- Just Garbage

ANY ADDITIONAL COMMENTS?

Good Information

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Bill [illegible] ***Email*** ____________

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FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

EMPLOYMENT OPPORTUNITIES

TAX FOR WLAKE

CONTINUED USE OF WASTE

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

UTILIZE WASTE

ANY ADDITIONAL COMMENTS?

Thank-you for this informative presentation

If you would like to receive regular information updates on the project, please provide your name and email address:

Name DICK + DONNA FORD ***Email*** dickfordnz@hotmail.com

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ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT
FEEDBACK FORM

Thank you for attending our open house. We value the input of all of our stakeholders as an important part of making the Williams Lake Renewal Project a success for the whole community. We would appreciate it if you would take two minutes to provide us with your opinions and any feedback you have on the project.

WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

jobs
community involvement
taxes

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

ANY ADDITIONAL COMMENTS?

Very ~~MM~~ informative meeting Well Done!

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Twila Nelson ***Email*** wlrental@shaw.ca

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FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

Continued employment at the Cogen facility & the greenhouse project

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

ANY ADDITIONAL COMMENTS?

Presentation could use more economic facts ie multipliers

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Larry Olson **Email** ljolson@shaw.ca

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ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

The use of current unused + wasted materials to generate/fill the shortfall in biomass for the plant.

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

I have nothing to add.

ANY ADDITIONAL COMMENTS?

If you would like to receive regular information updates on the project, please provide your name and email address:

Name M Garrod.

Email

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

I like that the railway ties will be remaved from our environment, cleaning up the enironment from having the leaking Kreosote intotheground. I also like additional projects like the green house that Atlantic power would be supporting.

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

ANY ADDITIONAL COMMENTS?

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Jeannie Rudyk ***Email*** jeannierudyk@gmail.com

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

It does get rid of the ties

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

make sure every drop of chemical leached does not make it into the environment. ~~Be~~ the same for the burning emission

ANY ADDITIONAL COMMENTS?

If you would like to receive regular information updates on the project, please provide your name and email address:

Name M [illegible]

Email

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

I like the green house why wasn't it done before in the last 20 years?

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

find another source of fuel. there are many technologies →
I do not endorse the Storage or burning of Rail Road tie's
Start looking at water conservation → grey water

ANY ADDITIONAL COMMENTS?

this project is comming down to Sacrificing the environment and Health of Citizens to keep the Bottom line of atlantic Power corp profits up.

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Kim Herdman **Email** KyHerdman@gmail.com

over →

If this is the only way to Keep Atalntic Power in town then maybe we Should use our tax dollars and Subsidize home owners for solar panels + wind power

go back to the drawing board.

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

* the proposed Greenhouse project

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

- increased use of logging cull piles and a VERY SMALL use (less than 5% of the whole) of creosoted or polychlorinated railway ties..
- use less of W.L's treated water (ie. either take it directly out of the river or the lake (before it is treated for town use))

ANY ADDITIONAL COMMENTS?

- consider alternate fiber sources (especially roadside cull piles, municipal/agricultural waste) + use only the otherwise useless railway ties (ie. ties not usable for landscaping, fencing or whatever) - ~~[illegible]~~
- don't use W.L. as a dumping ground for used railway ties

If you would like to receive regular information updates on the project, please provide your name and email address:

Name ______________________ ***Email*** ______________________

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

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WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

ANY ADDITIONAL COMMENTS?

PLEASE SHARE DATA FROM TRIAL RUNS,
AND HEALTH IMPACT STUDIES,
WITH PUBLIC, ASAP :)

If you would like to receive regular information updates on the project, please provide your name and email address:

Name PETER ATAMANENKO **Email** peter.a@inbox.com

AtlanticPower Corporation

ATLANTIC POWER WILLIAMS LAKE RENEWAL PROJECT

FEEDBACK FORM

Thank you for attending our open house. We value the input of all of our stakeholders as an important part of making the Williams Lake Renewal Project a success for the whole community. We would appreciate it if you would take two minutes to provide us with your opinions and any feedback you have on the project.

WHAT DO YOU CONSIDER THE MOST POSITIVE ASPECTS OF THE PROJECT?

- Good for the community "divers. fy of the economy"
- fantastic for city tax contribution
- consumes wood waste rather than landfill or burn
- creates local jobs.
- consumes 600,000 tonnes of wood waste

WHAT ASPECTS OF THE PROJECT COULD BE IMPROVED?

ANY ADDITIONAL COMMENTS?

- look to create a 25 year plan for operation
-

If you would like to receive regular information updates on the project, please provide your name and email address:

Name Scott Nelson **Email** Scott@williamslake.net

250-305-4967

APPENDIX G

Current Permit PA 8808

November 20, 2012

Tracking Number: 268330
Authorization Number: 8808

REGISTERED MAIL

Atlantic Power Preferred Equity Ltd.
4455 Mackenzie Avenue North
Williams Lake BC V2G 4R7

Dear Permittee:

Enclosed is Amended Permit 8808 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual fee will be determined according to the Permit Fees Regulation.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the *Environmental Management Act* to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from the Southern Interior Region - Cariboo. Plans, data and reports pertinent to the permit are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Southern Interior Region - Cariboo, Suite 400 - 640 Borland St., Williams Lake, BC V2G 4T1.

Yours truly,

Douglas J. Hill, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region - Cariboo

Enclosure

cc: Environment Canada

MINISTRY OF
ENVIRONMENT

PERMIT

8808

Under the Provisions of the Environmental Management Act

Atlantic Power Preferred Equity Ltd.

4455 Mackenzie Avenue North
Williams Lake BC V2G 4R7

is authorized to discharge emissions to the air from an electrical power generating plant located at 4455 Mackenzie Avenue North in Williams Lake, British Columbia, subject to the terms and conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may lead to prosecution.

This Permit supersedes and amends all previous versions of Permit 8808 issued under Part 2, Section 14 of the *Environmental Management Act*.

1. AUTHORIZED DISCHARGES

1.1 This section applies to the discharge of air contaminants from a **BIOMASS FUELLED BOILER**. The site reference number for this discharge is E218415.

1.1.1 The maximum rate of discharge is 110 m^3/second, on a dry basis.

1.1.2 The authorized discharge period is continuous.

1.1.3 The characteristics of the discharge shall be equivalent to or better than:

Total Particulate Matter *corrected to 8% O_2	Maximum: 50 mg/m^3*
Nitrogen Oxides *1 hour average, as NO2, corrected to 8% O_2	Maximum: 320 mg/m^3*

Date issued: February 20, 1991
Date amended: November 20, 2012
(most recent)

Douglas J. Hill, P.Eng.
for Director, *Environmental Management Act*
Southern Interior Region - Cariboo

Opacity	Maximum:	10 %*

*Opacity determined by continuous in-stack opacity measurement. Opacity shall not be exceeded for more than 10% of the operating time for each day of operation.

1.1.4 The authorized works are a biomass fired boiler, multi-clones, a five field electrostatic precipitator and related appurtenances approximately located as shown on the attached Site Plan.

1.1.5 The location of the facilities from which the discharge originates and the point of discharge is Lot B of District Lot 72 Cariboo District Plan PGP35292 (Parcel Identifier: 017-247-276).

1.2 This section applies to the discharge of air contaminants from **WATER COOLING TOWERS**. The site reference number for this discharge is E218417.

1.2.1 The rate of discharge is estimated to be 5,800 m^3/second.

1.2.2 The authorized discharge period is continuous.

1.2.3 The characteristics of the discharge shall consist of water droplets including dissolved minerals naturally present and water conditioning additives for pH control and prevention of algal growth, water vapour and air.

1.2.4 The authorized works are three cooling towers, piping and related appurtenances approximately located as shown on the attached Site Plan.

1.2.5 The location of the facilities from which the discharge originates and the point of discharge is the same as Section 1.1.5 above.

1.3 This section applies to the discharge of air contaminants from an **ASH SILO VENT**. The site reference number for this discharge is E218419.

1.3.1 The maximum rate of discharge is variable and intermittent.

1.3.2 The authorized discharge period is continuous.

1.3.3 The characteristics of the discharge are of the nature of an ash silo vent at a biomass fuelled electrical generating facility.

1.3.4 The authorized works are mechanical conveyors, piping, an ash silo, vent and related appurtenances approximately located as shown on the attached Site Plan.

1.3.5 The location of the facilities from which the discharge originates and the point of discharge is the same as Section 1.1.5 above.

1.4 This section applies to the discharge of air contaminants from **MISCELLANEOUS VENTS**. The site reference number for this discharge is E218418.

1.4.1 The maximum rate of discharge is variable and intermittent.

1.4.2 The authorized discharge period is continuous.

1.4.3 The characteristics of the discharge are of the nature of steam and water safety relief vents at a biomass fuelled electrical generating facility.

1.4.4 The authorized works are fans, piping, vents and related appurtenances approximately located as shown on the attached Site Plan.

1.4.5 The location of the facilities from which the discharge originates and the point of discharge is the same as Section 1.1.5 above.

2. GENERAL REQUIREMENTS

2.1 Standard Conditions

For the administration of this permit all gaseous volumes shall be converted to standard conditions of 293.15 K and 101.325 kPa with zero percent moisture.

2.2 Maintenance of Works and Emergency Procedures

The authorized works shall be inspected regularly and maintained in good working order. In the event of an emergency or condition beyond the control of the Permittee which prevents effective operation of the authorized works or leads to an unauthorized discharge, the Permittee shall take appropriate remedial action and notify the Director immediately. The Director may reduce or suspend operations to protect the environment until the authorized works has been restored, and/or corrective steps taken to prevent unauthorized discharges.

2.3 **Bypasses**

Any bypass of the authorized works is prohibited unless the approval of the Director is obtained and confirmed in writing.

2.4 **Process Modifications**

The Director shall be notified prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge. Despite notification under this section, permitted levels must not be exceeded.

2.5 **Disposal of Ash**

The residue of combustion shall be removed from the boiler regularly and shall be disposed of on a site and in a manner approved by the Director.

2.6 **Water Vapour**

The Permittee shall provide additional works or take the necessary steps to reduce the effects of water vapour discharged to the air if, in the opinion of the Director, conditions develop which may interfere with visibility or the normal conduct of transport or business.

2.7 **Authorized Fuel**

The authorized fuel is untreated wood residue unless authorized below or the approval of the Director is obtained and confirmed in writing.

2.7.1 The incineration of wood residue treated with creosote and/or a creosote-pentachlorophenol blended preservative (treated wood) is authorized subject to the following conditions:

- The treated wood component shall not exceed 5% of the total biomass fuel supply calculated on an annual basis;
- The treated wood waste shall be well mixed with untreated wood waste prior to incineration;
- The incineration of wood residue treated with metal derived preservatives is prohibited;
- The Permittee shall measure and record the weight of treated wood residue received. The source of treated wood shall be recorded.

- The Permittee may request authorization to increase the proportion of treated wood residue incinerated by submitting a request in writing to the Director.

2.7.2 The incineration of hydrocarbon contaminated wood residues originating from accidental spills is authorised provided that written approval in accordance with section 52 of the Hazardous Waste Regulation has been received by the responsible party for disposal of the waste by incineration. The Permittee shall maintain a record of the quantity, date received, and identity of the responsible party of hydrocarbon contaminated wood residues originating from accidental spills.

2.7.3 Vegetative residues (i.e. green foliage, invasive weeds, diseased plants, etc.), seedling boxes, and paper records are authorized as fuel provided such materials constitute less than 1% of the daily feed into the boiler. Non-biomass contaminants (e.g. plastic, glass metal) shall not exceed 1% of the daily feed into the boiler.

2.8 Fuel Stockpile Fire Prevention and Control

The Permittee shall maintain a Fire Prevention and Control Plan which documents plans and procedures to prevent and control spontaneous combustion of stockpiled hog fuel. Amendments to the Plan shall be submitted to the Director within 30 days of adoption.

2.9 Fugitive Dust Control

Fugitive dust created within the operational area shall be suppressed. If fugitive dust becomes a concern, the Director will, in consultation with the Permittee, evaluate the sensitivity of the receiving environment, the contribution of the sources, plus any other pertinent information. The

Director may require development and submission of a Fugitive Dust Management Plan or additional control measures on fugitive dust sources.

2.10 Storm Water Management

The Permittee shall maintain a Storm Water Management Plan which documents plans and procedures to control site runoff and protect water quality of receiving waters. The Plan shall include, but not be limited to, a description of surface water flow patterns, water quality characteristics, measures to control and manage site runoff, and ongoing monitoring and reporting. Amendments to the Plan shall be submitted to the Director within 30 days of adoption. The Director may require the Permittee to implement additional measures to control, monitor or assess water discharges from the operational area.

3. MONITORING AND REPORTING REQUIREMENTS

3.1 Discharge Monitoring

The Permittee shall monitor the boiler emissions authorized in section 1.1 in accordance with the following monitoring program:

Parameter	Frequency	Method
Particulate	Annually	manual in-stack sampling
Opacity	Continuous	continuous emission monitor
Nitrogen oxides	Continuous	continuous emission monitor

The Director may modify the monitoring program by providing written direction to the Permittee.

3.2 Operating Conditions

The Permittee shall sample the emissions from the boiler in section 1.1 under normal operating conditions. The Permittee shall record the operating conditions of the boiler in terms of steam load (lb/hr) for the sampling period and for the ninety day period prior to the sampling event.

3.3 Sampling Procedures

Sampling is to be carried out in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 2003 Edition (Permittee)", or most recent edition, or by suitable alternative procedures as authorized by the Director.

A copy of the above manual may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409) or via the internet at www.crownpub.bc.ca. A copy of the manual is also available for review at all Environmental Protection offices.

The continuous emission monitors shall be maintained and audited in accordance with Environment Canada’s EPS 1/PG/7 Protocols and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Power Generation.

3.4 **Reporting**

The required records of treated wood residue received under section 2.7.1 and of hydrocarbon contaminated wood residues originating from accidental spills under section 2.7.2 shall be maintained and submitted to the Director, annually. The report shall be submitted by January 30th annually for the preceding calendar year.

The continuous emission monitoring (CEM) data collected as required by section 3.1 shall be submitted in a format using suitable summary statistics as approved by the Director, on a monthly schedule. The CEM monthly data shall be submitted within 30 days of the end of the reported month. All CEM data shall be maintained by the permittee for inspection.

The annual particulate monitoring data required by section 3.1 and the operating condition records required under section 3.2 shall be maintained and submitted, suitably tabulated, to the Director, within 60 days of completion of the manual stack sampling event.

SITE PLAN

Date issued: February 20, 1991
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(most recent)

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