



bulkley valley - lakes district  
airshed management society

**COMMUNITY ACTION PLAN** *for*  
**CLEAN AIR**

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*A five-year strategy*

PREPARED BY

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IN CONSULTATION WITH

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Smithers, B.C.

&

**The BVLD Airshed Management Society Board of Directors**

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The writing of the original Plan (June 2004) was a group effort, over a period of almost two years. All told, there were about 20 writers composed of technical, medical and operational experts as well as community level representatives. Most of the writers are local residents, and include members of the Regional Working Group and Subcommittees, Community Working Groups, the Ministry of Environment, the Facilitation team, and outside experts as required.

Thank you to the many volunteers and representatives who sit on or participated in the following working groups and emission-source specific forums:

Bulkley Community Working Group, with representatives from the Hazeltons and Kitwanga

Lakes Community Working Group

Morice Community Working Group

Regional Working Group (RWG)

Road Dust Forum Participants

Resource Management Burning Subcommittee of the RWG

Advisory Committee to the RWG

Science Team from MOE - Skeena Region

Facilitators (Footprint Environmental Strategies)

The individuals on these working groups and committees represent concerned citizens, parents, health professionals, industry, local government, business, farmers and ranchers, and the provincial government. The Plan would not have been written without their expertise, enthusiasm and commitment to clean air.

Also, many thanks to the individuals who read the regular BVL DAMP Updates, visited the website, and took the time to discuss issues and solutions with the core group. Your comments and suggestions provided a direct link to the greater community in the BVL D, making it easier for the writers to make recommendations that truly reflect common regional goals and strategies.

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# Executive Summary

## *Community Action Plan for Clean Air*

The BVL D Airshed Management Plan is a 5 year strategy (2004 to 2009) to improve air quality in the corridor that stretches from Kitwanga to Endako. This area has a population of approximately 30,000 people<sup>1</sup> and covers 35,000 square kilometres.

Since smoke and road dust have the largest impacts on local air quality, this plan targets a pollutant known as fine particulates. The Plan presents a set of goals, indicators and strategies that together provide a roadmap to achieving better air quality (with respect to fine particulates) both by reducing the frequency, severity and duration of air quality episodes, as well as by improving air quality at all times.

The Plan has been a joint venture between industry, government, health officials, and concerned citizens. This partnership has been easy to forge due to the common recognition that fine particulates are a public health concern and affect economic opportunities in the airshed. In searching for a balance between social and economic concerns, it became apparent that with improved education, planning and coordination among stakeholders, the goal of improved air quality is possible without undue economic burden on any one sector.

A total of seven emission source categories were targeted in this plan. These categories include:

- Beehive burners
- Other Regulated Industrial Sources
- Forest harvest debrisburning
- Agriculture, land development and small sawmill debris burning
- Wood Burning Appliances (Residential and commercial space heating)
- Backyard burning
- Road dust (from paved roads)

Goals, strategies and indicators for each are summarized in Table A: Summary of all recommendations by emission source. The implementation status for each strategy as of June 2006 is also provided in this summary table.

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<sup>1</sup> Canadian Census Data 2001: [www.bcstats.gov.bc.ca](http://www.bcstats.gov.bc.ca)

**Table A: Summary of All Recommendations by Emission Source.**

<i>Summary of Strategies</i>	<i>Key Players</i>	<i>Status</i>
FOR ALL EMISSION SOURCES	SEE CHAPTER 3	
<p>Inform the public and stakeholders about fine particulate effects on human health and the environment; emission sources; how air quality episodes develop and how they can be reduced in severity and duration.</p> <p>Improve understanding of fine particulate emission sources, weather and the landscape as they influence air quality, using best available science.</p> <p>Create emission reduction and timing action plans for each of 7 identified fine particulate source categories, including beehive burners, other regulated industrial sources, forest harvest debris burning, agriculture, land development and small sawmill debris burning; residential and commercial space heating, road dust, and backyard burning.</p> <p>Board of Directors for BVL DAMS and qualified membership to act as a resource for local government when siting new industry within the airshed.</p>	<p>Ministry of Environment</p> <p>Northern Health</p> <p>Local governments</p> <p>Band offices</p> <p>BVL D Airshed Management Society</p> <p>Partnerships with other organizations with complementary mandates including:</p> <p>BC Lung Association</p> <p>One Sky, Canadian Institute for Sustainable Living</p> <p>Energy Centre of the North</p>	<p>Communications Plan completed August 2005</p> <p>Fall Fair booth in August 2005 very successful; booth booked for 2006.</p> <p>Beginning Year 3 of 5 year implementation period June 2006</p> <p>Annual plan effectiveness assessments using indicators.</p> <p>Assessments are made public through AGMs and website postings (cleanairplan.ca)</p> <p>Public is invited annually to review plan and submit proposals for amendments; this process is also ongoing as facilitator is always available to receive comments. Submissions are recorded and included by year as Appendix D in the Clean Air Plan.</p> <p>Presentations to local governments made in March and April of 2004.</p> <p>First Clean Air Day event held June 7, 2006 – plans underway for 2007.</p>
FOR BEEHIVE BURNERS	SEE CHAPTER 4	
<p>Support Houston <b>cogeneration</b> proposal.</p> <p>Support development of “Plan B” (if cogeneration does not go ahead) in co-operation with industry and government. Focus on “value added” approach.</p> <p>Installation of onsite energy system, with remaining waste being chipped and sent to Eurocan</p>	<p>MOE</p> <p>Canfor</p> <p>HFP</p> <p>West Fraser Mills/ PIR</p> <p>Partners of mills for plan implementation (i.e CANFOR, Moricetown Band, Pinnacle Pellet Inc)</p> <p>EuroCan</p> <p>NEWPRO</p>	<p>Last phase-out date for Tier 1 beehive burners has been extended until Dec.31/2007 from June 30, 2005.</p> <p>5 operating burners (2 are Tier 1)</p> <p>PIR shut down burner July 2005</p> <p>CANFOR scheduled to shut down burner by Dec 31/07</p>

<i>Summary of Strategies</i>	<i>Key Players</i>	<i>Status</i>
FOR OTHER REGULATED INDUSTRIAL SOURCES	SEE CHAPTER 5	
<p>Voluntary shutdowns for NEWPRO during Air Quality Advisories</p> <p>Updated emissions characterization for NEWPRO</p> <p>Community education program for NEWPRO</p> <p>Other regulated and unregulated sources will be considered during the annual review.</p>	<p>MOE</p> <p>NEWPRO</p> <p>LB Paving</p>	<p>AMS is producing a community education brochure and webpage of FAQs, to be completed by September 2006</p> <p>MOE and NEWPRO working on an emissions characterization program, with the first phase to be completed by February 2007</p>
FOR FOREST HARVEST DEBRIS BURNING, AGRICULTURE, LAND DEVELOPMENT AND SMALL SAWMILL DEBRIS BURNING	SEE CHAPTERS 6 & 7	
<p>Improve co-ordination of burning operations to take advantage of available venting.</p> <p>Promote and refine the new Custom 3 day venting index forecast service provided by MOE.</p> <p>Find and exploit alternatives to open burning</p> <p>Reduced volume of wood residue burnt</p> <p>Regional sub-committee to make specific recommendations for inclusion in MOF District Burn Plans, for example:</p> <p>Air quality episode based Burn Bans</p> <p>Max # of Burns / smoke management zone</p> <p>Sunrise/Sunset window for burning</p> <p>Involve Flight Services, air charter operators in burning plans to improve flight safety.</p>	<p>Large industry: Canfor, HFP, BFP, PIR, DLFP, Timber Sales BC</p> <p>MOF MOE</p> <p>Cattlemen's, Dairywomen's Associations</p> <p>Woodlot owners</p> <p>Air charter &amp; tourism companies</p>	<p>Resource Management Burning subcommittee of the Regional Working Group continues to make progress.</p> <p>Custom Venting Index Forecasting Service has been running for 2 seasons with good results.</p> <p>Revisions have been made to MOF District Burn Plans</p> <p>Effectiveness assessments are occurring annually.</p> <p>2006 Burn Operators Forum will focus on burning alternatives.</p>
FOR WOOD BURNING APPLIANCES	SEE CHAPTER 8	
<p>Woodstove Exchange Program</p> <p>Community Education Program</p>	<p>MOE</p> <p>Retailers</p>	<p>Woodstove Exchange project completed September 2004 resulting in 35 changeouts and</p>



<i>Summary of Strategies</i>	<i>Key Players</i>	<i>Status</i>
<p>Woodstove Bylaws toolkit for consideration by local governments</p> <p>Promote alternate heating sources and energy efficient construction and renovations.</p>	<p>Manufacturers</p> <p>Local Government</p> <p>WETBC</p> <p>CFDC Nadina</p>	<p>greater awareness.</p> <p>Public educational efforts ongoing.</p> <p>Local Government Actins to reduce Wood Stove Emissions workshops held May 2006 – very well attended.</p> <p>Smithers is drafting bylaw, will go before Council July 2006.</p> <p>Houston and Burns Lake are considering introducing bylaws.</p> <p>MOE has completed Phase 1 of Wood Stove Exchange Pilot Project and funding is in place for Phase 2 – the design and implementation of a 2<sup>nd</sup> Exchange Program.</p>
FOR BACKYARD BURNING	SEE CHAPTER 9	
<p>Public Education</p> <p>Municipal Bylaws toolkit</p>	<p>MOE</p> <p>Municipal Governments &amp; Fire Depts.</p> <p>CWGs</p>	<p>Ongoing education through websites and displays.</p> <p>Residential Backyard Burning brochure developed for Hazelton and distributed in utility bills May 2006.</p> <p>Houston had draft bylaw for open burning and wood burning appliances – draft form June 2006.</p>
FOR ROAD DUST (from paved roads)	SEE CHAPTER 10	
<p>Focus on traction materials management, including fall/late winter / early spring cleanup in populated highway corridors, and use of “lower fine particulate content” materials.</p> <p>Promote co-operation among local governments &amp;. MOTH maintenance contractor.</p> <p>Promote acquisition and use of equipment that may reduce the volume of fine particulates applied as traction material on roads in populated areas.</p> <p>Best Management Practices for inclusion in highway maintenance contracts are being developed by MOTH to address air quality concerns</p>	<p>Local government public works staff, MOTH &amp; MOE</p>	<p>Provided forum for local gov’t works staff and contractors in January 2003 and have promoted and attended events organized by other agencies annually since then.</p> <p>Best Management Practices have been developed for highway contractors and for road dust suppression.</p>

## Introduction

**T**he recommended goals, indicators and strategies in this plan represent a consensus of the membership of the BVL D Airshed Management Society. The plan is reviewed annually and updated to reflect emerging concerns and research, as well as successful completion of initiatives in the preceding year.

The original Plan published in 2004 as based on consensus by over 50 members of the **BVL D** Airshed Management Planning process. For a period of 12 months beginning in March 2003, members of the Morice, Bulkley (with Kispiox) and Lakes Community Working Groups (**CWG**) have been learning about what influences local air quality and emissions can be better managed to reduce their potential for impacts. From listening to presentations on local weather patterns and the operation of beehive burners, to reading health reports, to attending workshops on how to correctly operate a woodstove, the learning methods and subject matter has been wide ranging. The result of this hard work is that each **CWG** is a self-taught collective of knowledge and experience related to air quality and its management.

### *What are the scope and overall goals of this Plan?*

The BVL D Airshed Management Plan (**AMP**) is a 5 year strategy (2004 to 2009) to improve air quality in the corridor that stretches from Kitwanga to Endako (see Figure 1-1 and Appendix C) and covers 35,000 square kilometers. This area has a population of approximately 30,000 people.<sup>2</sup>

The overall goal of this plan is to continuously improve air quality in the BVL D airshed and the quality of life for area residents. In developing the goals and strategies listed in this plan, consideration was given to factors such as economics, feasibility, and practicality among others. The Plan was developed by the people who will use it, to help ensure all such factors were considered throughout.

Since smoke and road dust have the largest impacts on local air quality, this plan targets a pollutant known as **fine particulates**. Fine particulates are tiny solid or liquid particles that come in many shapes and sizes and from many sources, both natural and human-caused. Fine particulates are classified in terms of particle size. Those that are 10 micrometers or less in diameter are called **PM10**, (where PM stands for **particulate matter**, a subset of which is fine particulate). Fine particulates that are 2.5 micrometers or less in diameter are called **PM2.5**. Note that PM2.5 is a subset of PM10, which means that PM10 includes PM2.5. PM2.5 is largely associated with combustion sources (smoke), while the larger particles in PM10 (those greater than 2.5 micrometers) are associated more with crustal sources such as dust. Furthermore, smaller particles are more closely related to adverse health effects. To put these sizes into perspective, one micrometer is a millionth of a metre, so PM10 is roughly the same size as

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<sup>2</sup> Canadian Census Data 2001: [www.bcstats.gov.bc.ca](http://www.bcstats.gov.bc.ca)

bacteria - and like bacteria, PM10 is invisible to the naked eye and small enough to be breathed into our lungs. In this plan, we are addressing human-caused sources of fine particulates that contribute to episodes of poor air quality.

### *Who is this Plan written for?*

This plan is written by and for citizens who live in the BVLD, from Kitwanga to Endako. Bad air quality affects our health, as well as our overall quality of life and the economic well being of our communities. The emission source specific chapters will be a valuable resource for those people directly involved with controlling emissions of fine particulates including:

- Local governments
- First Nations
- Energy and heating system specialists
- Forest harvesting and processing personnel
- Industry managers
- Forestry contractors
- Wood burning appliance owners and operators
- Farmers and Ranchers
- Rural residents who burn garbage
- Concerned citizens

In addition, those whose address quality of life as part of their work will also want to act on this plan, including those involved in:

- Economic development
- Health Environmental education
- Environmental regulators and researchers
- Land developers and realtors

### *How to use this Plan*

The Plan is divided into stand-alone chapters on each of the emission source categories: Beehive Burners; Other Regulated Industrial Sources; Forest Harvest Debris Burning; Agriculture, Land

Development and Small Sawmill Debris Burning; Residential and Commercial Space Heating, Backyard Burning, and Road Dust.

This format will make it easy for anyone to find the information they need to make a positive contribution to clean air. Each chapter contains a set of goals, indicators, and strategies for reducing **emissions** from that source. In addition, where community-specific recommendations or variances from the regional strategies were identified, these were included at the end of each chapter,

Additional chapters provide an overview of the science used to develop goals and strategies, the relationship with air quality to other community planning and environmental issues, and the impacts of fine particulates on human health.

### *Who oversees the Plan?*

The BVLD Airshed Management Society is comprised of 8 directors and a hired facilitator. A budget and workplan is developed annually to implement the Plan. Through annual presentations to local governments, displays in the community and at regional events, and a website, the Society ensures that residents of the BVLD are aware of the Clean Air Plan and the opportunity to be part of the team that refines the Plan each year at our AGM and Community Forum.

In addition, project teams are often formed to carry out strategies for specific emission sources and meet as needed. See Chapter 11 on Working the Plan for details on funding, monitoring, and how to get involved.

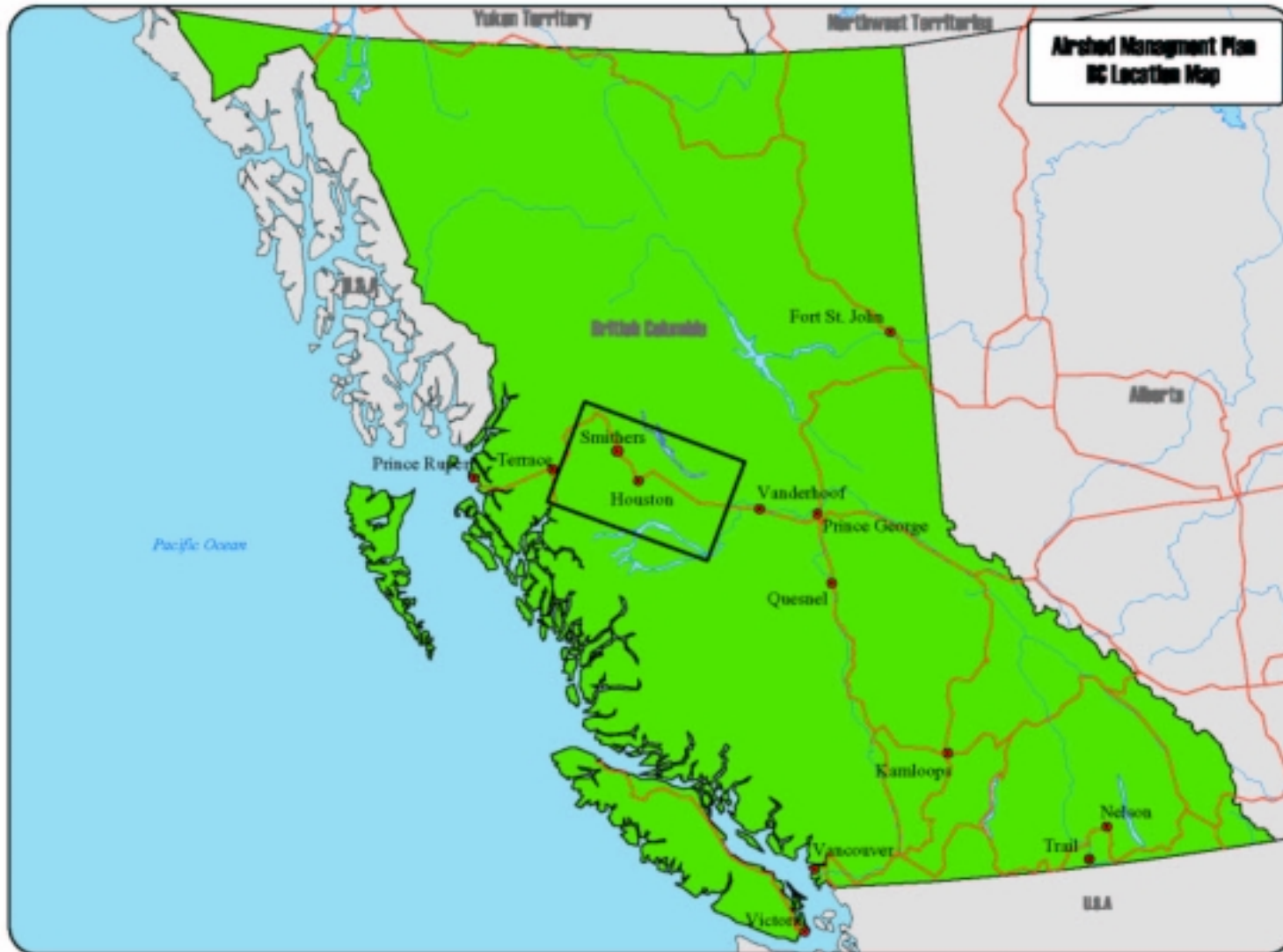


Figure 1-1 BVLD location in the province of BC.

## Fine Particulate Pollution

### **2.1 Fine Particulates and Human Health**

**T**he driving force behind the control of air pollution has always been the protection of the public's health. In the **BVL D** area, local physicians have for over a decade, expressed concern over high rates of **fine particulate** related illnesses. These illnesses include both **circulatory** and **respiratory diseases**. While some of the burden of illness in these categories can be attributed to such things as poor eating habits, **diabetes (type II)**, and smoking, the public health science research strongly supports the statement that community air pollution from emissions of fine particulates increases the risk of dying from lung and cardiovascular disease (Appendix B).

An expert panel brought together by the BC Lung Association reported in 2003 on a number of air pollutants (Bates et al, 2003)<sup>3</sup>. In this report, studies of fine particulate health effects from all over the world were synthesized in a manner that is generally applicable to British Columbia. Both **PM10** and **PM2.5** were found to be associated with many adverse outcomes, some of which are follows:

Cardio-respiratory effects include:

- Risk of heart attacks
- Risk of pneumonia
- Aggravation of chronic lung disease
- Increased risk of lung cancer
- Reduced survival

Effects on **asthmatics** include:

- Increased visits to family physicians
- Increased visits to hospital emergency
- Increased hospital admissions
- Increased airway inflammation

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<sup>3</sup> Dr. D. Bates, Dr. J. Koenig, Dr. M. Brauer, RWDI West Inc. May 2003. Health and Air Quality 2002-Phase 1: Methods for Estimating and Applying Relationships between Air Pollution and Health Effects. Prepared for BC Lung Association.

- Decreased lung function
- Increased incidence of **asthma** can happen

Other effects on vulnerable segments of the population, such as the aged, and those with existing health conditions were also summarized in the Bates study.

For more information on Health Effects of fine particulates, see Appendix B and the following resources:

- Environment Canada's briefing on fine particulates at [http://www.ec.gc.ca/air/p-matter\\_e.html](http://www.ec.gc.ca/air/p-matter_e.html)
- BC Lung Association's Clean Air Now campaign at <http://www.lung.ca/cando/whatis.html>
- The province of BC's report on Health Effects of Inhalable Particles: Implications for British Columbians - Overview and Conclusions at <http://MOEwww.gov.bc.ca/air/particulates/heoipifb.html>

## **2.2 Economic Opportunities**

### **2.2.1 Building in Efficiencies and Incentives**

A balance of public health and economic values in this Clean Air Plan was put forward as an absolute need at the beginning of the Community Working Group (CWG) formation process. It is with this in mind that the Plan has focused on the resolution of issues through cooperative means.

***We do not have to choose between creating jobs and reducing air pollution. By focusing on value-added industry, both goals can be met.***

Each "emission source reduction" goal and strategy can be accomplished without major disruption to the associated industry, individual homes, business owners, or governments. The approach to forest harvest debris burning and residential and commercial space heating outlined below provide two examples of how this is possible.

We know that forest harvest debris burning must take place on a seasonal basis to abate wildfire and insect hazards. By co-operative means among burn operators to make better use of existing atmospheric **venting** conditions, reduced emissions are possible at little or no additional cost. Also, by making better use of existing venting through custom **venting index forecasts**, it is

possible to provide more certainty on when and under what conditions burning may take place without causing air quality episodes. Hopefully, this will lead to more efficient and therefore less costly open burning operations while reducing the number, duration and severity of air quality episodes.

As for the wood stove question, a financial incentive and targeted education approach has been adopted, and will be applied for a period of five years. It is recognized that many families and businesses rely on older wood heating appliances for most or all of their heating requirements and can ill afford to upgrade to a newer technology (higher efficiency) appliance. Financial assistance through rebates and low interest loans will be used to rid the BVL D area of polluting "old technology" wood stoves. Additional approaches such as municipal bylaws restricting or prohibiting inefficient stoves have been explored in terms of what bylaws have been used in other jurisdictions, should incentive and public education approaches fall short of the goal.

### **2.2.2 Taking a Value Added Approach**

While deliberating on how to assist the **tier 1** beehive burner operators in moving to lower emission alternatives for wood waste management, the CWGs settled on an approach that would support efforts to move forward with "**value added**" methods, such as electrical co-generation or bio-fuel production. The BVL D Airshed Management Society is prepared to provide continued support for value added alternatives research and development for this and other emissions reduction issues, until they are resolved satisfactorily

### **2.2.3 Looking for Economic Opportunities**

The most valuable approach to making economic gains through airshed planning is to improve the quality of life for all residents. Looking for and exploiting ways to reduce emissions of fine particulates that may cause health effects in BVL D communities will have a direct benefit by making the area more liveable, thus attracting new economic growth and diversification opportunities. Reducing emissions may also allow the airshed to accommodate additional sources, making room for new industries.

Being proactive in identifying locations for new development that would minimize pollution of populated areas would assist in promoting economic growth. This can be accomplished by analyzing weather patterns and geography so that new sources of fine particulate emissions can be accommodated in areas where there is little or no opportunity for impact of emissions on people. This type of analysis uses dispersion modeling scenarios to identify suitable areas for development. Once identified, this information can be relayed to local governments and suitable areas for development can be designated through the use of official community plans. This will help to reduce approvals needed to develop in those designated areas, promoting new industry.

The BVL D Airshed Management Society can also work with local government in an advisory or referral role for the review of official community plans and the siting of developments with airborne emissions. Developments may include industries such as manufactured wood products including fiberboard or wood stove pellet manufacturing.



For information on Official Community Plans (OCPs), see:  
[http://www.pytela.bc.ca/scf/guide/c\\_ocp.htm](http://www.pytela.bc.ca/scf/guide/c_ocp.htm).

## 2.3 Think Globally, Act Locally

Integration of social, economic and environmental objectives at a range of scales is desirable in community planning. Airshed management planning objectives and strategies are very compatible with energy management planning, climate change and greenhouse gas emission reduction strategies, land use planning, waste management planning, and growth management strategies. Coordination between planning processes can lead to impressive results in a shorter period of time, and at a lower cost.

Reducing fine particulates, greenhouse gases, waste production and energy consumption can be achieved in numerous ways in all sectors and by every individual. Climate change and energy planning are two emerging issues, and examples of how air quality improvement crosses over into these areas are provided below.

### 2.3.1 Climate Change

The largest influences on climate result from choices made to meet transportation and energy needs. Reducing vehicle emissions is possible by reducing total kilometers driven and by reducing the amount of emissions per kilometer. For example, walking or biking shorter distances instead of driving, and carpooling or taking public transit for longer distances are among these choices. Such actions will reduce emissions of greenhouse gases from the tailpipe of your vehicle, as well as lower emissions of fine particulates due to tailpipe emissions, tire wear and road dust.

Ensuring that homes and businesses are well-insulated will mean less energy is needed for heat. Depending on these buildings are heated, this can mean reduced greenhouse gas and fine particulate emissions, as well as reduced drain on pocketbooks

There are many other ways to reduce emissions of fine particulates that also result in lower greenhouse gas emissions and lowered energy use and less waste production. For more information refer to the BC Climate Exchange website at <http://www.bcclimateexchange.ca/index.php?p=home> .

### 2.3.2 Energy Planning and Efficiency

Understanding the energy needs of a community and the many ways of meeting these needs will ensure a healthy, sustainable future. **Cogeneration** is one example of a value added process. The wood currently being burned in beehive burners could be used to provide a renewable source of energy in the form of electricity and could reduce the need for other non-renewable sources of electricity.

Alternative sources of energy can also be used to power industries, businesses, and homes in remote locations. Examples include wind and solar energy, both of which have no emissions of greenhouse gases or fine particulates, and both of which are available in as great a supply as Mother Nature can produce. Other possibilities include **biomass** and biogas fuels, micro-hydro and geothermal energy.

No matter how a home or business is heated, be it with wood, gas, pellets or other fuel, operating the heating appliance efficiently will reduce the amount of fuel needed, thus reducing emissions of fine particulates and potentially greenhouse gases. If heating with wood, using a newer emissions certified appliance whenever possible will further reduce emissions of fine particulates.

AMS is committed to working with local groups to promote energy efficiency and improved air quality. For more information on alternative energy and applications for the BVL D, see:

- Nadina Community Futures Development Corporation at [www.cfdcnadina.ca/environment/energycentre/](http://www.cfdcnadina.ca/environment/energycentre/) .
- BC Community Energy Association at [www.energyaware.bc.ca](http://www.energyaware.bc.ca)
- Natural Resources Canada - RETScreen International [www.retscreen.net](http://www.retscreen.net)
- BC Sustainable Energy Association [www.bcsea.org](http://www.bcsea.org)
- Advanced Buildings Technologies and Practices [www.advancedbuildings.org](http://www.advancedbuildings.org)

AMS will continue to look for opportunities to integrate with other airshed planning and compatible planning processes through the ongoing development of this plan. We have already participated in a province-wide study on the Integration of Air Quality-Related Planning Initiatives. The intent of this study is to evaluate the performance of various planning processes available to local governments that address air quality-related objectives, namely greenhouse gas and community energy plans. BVL DAMS is profiled in this report, which is available for download at <http://MOEwww.gov.bc.ca/air/whatsnew.html>.

As well, other airshed planning processes are happening around the province and MOE staff and BVL DAMS members continue to exchange ideas with these groups, Links to websites and reports resulting from plans being developed in Prince George, Williams Lake and Quesnel are located at [www.cleanairplan.ca](http://www.cleanairplan.ca).

## Supporting Science and Technical Information

**T**he purpose of this chapter is to provide the reader with a background of the science used in **airshed** management planning, specifically for the **BVLDAMS**. An accounting for the emission sources targeted in the Plan is also provided, along with a summary of the overall goals, indicators and strategies for the Plan.

### 3.1 Air Quality Science

Air quality in the BVLD airshed is typically driven by fine particulates emitted by combustion and dust sources. In conjunction with the emissions themselves (when and where they occur, how much is emitted, and whether they're smoke or dust related), weather and topography also play a defining role in determining **ambient** air quality in populated areas. In order to better understand the relationship between emissions, weather and topography, we rely on local knowledge, monitoring and modelling. By using these tools, effective strategies are developed to meet the goal of reducing the effects of fine particulate emissions, and indicators are chosen that demonstrate the results of implementing those strategies.

*To help us better understand and even estimate when, where and under what conditions impacts to human health and the environment could occur, we rely on local knowledge, monitoring and mathematical modelling.*

**Ambient** air pollutant concentrations are measured directly with monitoring equipment or estimated using mathematical models. Both techniques are being used to investigate everything from a single source to all sources of fine particulates in the BVLD. In order to accurately understand what impacts each source has on ambient air quality however, detailed **meteorology** and emission information is needed. Furthermore, due to the large variation in emissions and meteorology from day to day and year to year, understanding ambient air quality requires many years of data. Within the BVLD airshed planning area, there are numerous long term meteorological monitoring stations, as well as continuous fine particulate monitoring stations in Burns Lake (PM10), Houston (PM10 and PM2.5), Telkwa (PM10) and Smithers (PM10 and PM2.5). Non-continuous fine particulate monitoring stations are operating in Hazelton (PM10

and PM2.5) and Kitwanga (PM10). See Appendix E for a summary of co-located air quality and meteorology stations in the BVLD.

Table 3-1 illustrates the monthly seasonality associated with ambient levels of PM10 in Houston. Graphs for Burns Lake, Telkwa and Smithers show a similar trend with peaks in spring and fall (Levelton Consultants Ltd., 2002). There are a total of six periods where there were 10 or more days under an Air Quality Advisory or Burn Ban. These occurred in March of 1998, April of 1997, November of 1997, November of 2002, March of 2004 and February of 2005.

An Advisory is issued as a result of elevated levels of particulate matter detected by one or more of the air quality monitoring stations, and is based on the Air Quality Index. (AQI). The Air Quality Index is set as 0-25 GOOD 26-50 FAIR, 51-100 POOR, and 100+ VERY POOR. A sample air quality advisory is included in Appendix F.

**TABLE 3-1 Summary of Air Quality Advisories and/or Burn Bans issued in the BVLD 1995-2005**

Month	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											

Note: number of days includes the first day of an advisory or ban being issued and the last day on which the advisory or ban was in effect.



Ambient concentrations of fine particulates are compared to **benchmark** concentrations as a way of estimating the potential for health and environmental effects. These benchmark concentrations can be expressed as reference levels, guidelines, objectives or standards. A **PM10** trigger level of  $26 \mu\text{g}/\text{m}^3$  on a 24-hour average basis (fair category of the air quality index) is used as the level above which episode management actions may need to be considered in the BVL D airshed. When decisions are made regarding both mandatory and voluntary emission reduction actions, all factors contributing to air quality are considered including:

- Current and forecasted weather conditions
- 1-hour and 24-hour PM10 concentrations
- 1-hr and 24 hour PM2.5 concentrations (where available)
- Knowledge of contributing sources

These actions are used in an attempt to prevent air quality from deteriorating into the poor category ( $51^+$  in the air quality index), and to help hasten an improvement in air quality. The index is a national system that is used to inform the public of ambient air quality conditions, and can be driven by any one of a number of pollutants. Although the air quality index does not yet include PM2.5, levels of this pollutant are taken into consideration for episode management in the BVL D when levels become elevated.

Meteorology and topography add layers of complexity to air quality management. Air flows like water in mountainous valleys like those in the BVL D. There can be multiple layers of air, flowing at different (wind) speeds, in different directions. In addition to the controlling influence of regional weather systems, there are daily and seasonal shifts in air flow patterns on a more local scale. For example, there are daily reversals of air flow in valleys as a result of heating and cooling cycles which can be more pronounced on a seasonal basis. These properties of air flow can be quantified through meteorological measurements and modelling. There are numerous observational weather stations collecting this kind of data throughout the BVL D airshed. Additional weather data is obtained from regional weather stations where upper air measurements occur, the nearest of which is in Prince George.

While meteorological and air quality monitoring is limited to locations where stations are located, modelling is not so restricted. Modelling uses measured meteorological data along with emission, land use and topographical information to estimate the weather and air quality at a number of predefined locations. This makes it especially useful in the BVL D where there are a limited number of monitoring stations in such a large area. **CALMET** is the meteorological model being used for the BVL D airshed, and **CALPUFF** is the air quality model.

Meteorological data (from surface and upper air observation stations) is used along with land use and topographical information to model the weather in three dimensions over a chosen period of time-for the BVL D this is being done for 2001 and 2002. The more observational data available, the more accurate the model will be at estimating weather between each station.

Emissions can be measured using instrumentation at existing sources, or they can be estimated using basic physical and chemical principles. Emission rates can also be generalized to some extent for use in similar situations throughout the airshed. The fine particulate emission inventory being developed for the BVL D uses both options to provide the best estimates of emissions from a variety of sources. For instance, a town may contain 250 woodstoves, which may be broken down into two types based on their burning efficiencies and smoke emission rates. The emission rates estimated for the two stove types are measured with the results published by researchers. Those published emission rates that best suit local conditions in terms of wood available for fuel use are then chosen to be representative for that source. The emission rate data can then be adjusted to the known stove types and locations.

Once developed, the modelled weather and locally-specific detailed emission data for all sources of fine particulates are used to model concentrations of that pollutant throughout the airshed. These modelled ambient concentrations of fine particulates are then compared with data from monitoring locations to ensure the model is predicting air quality in a reasonable manner. Once confidence in the model output is achieved, the model can be manipulated to change emissions and locations, remove or add sources to better understand what each source contributes to ambient air quality. This information, combined with local knowledge and monitoring data will then be used with common sense to make decisions on how to improve air quality in the BVL D.

### ***3.2 How emission sources for this Plan were selected***

A total of seven source categories were selected by members of the Community Working Groups as part of a “common sense” BVL D **emission inventory**. The seven categories are:

- 1) **Beehive Burners**
- 2) Other Regulated Sources (i.e. **stack emissions** and asphalt paving plants)
- 3) Forest Harvest Debris Burning
- 4) Agriculture, Land Development and Small Sawmill Debris Burning
- 5) Residential and Commercial Space Heating
- 6) Backyard Burning
- 7) Road Dust (from paved roads).

Selection of these sources was not random or arbitrary. Extensive deliberation within the CWGs took place to reduce the total number of sources from many to a list of the most important. The final categories are representative of both scientific evidence as well as people's view points derived from observation. Put simply, an emission inventory involves qualifying and quantifying the emissions in an area which contribute to ambient air quality. Qualifying entails determining what sources exist that emit the pollutant of interest, and quantifying involves determining how much each source emits and when. Emission data from the inventory is used to provide information regarding what % of total emissions in a airshed come from each source.

Additionally, the emission data is used in dispersion modelling to estimate the contribution of those emissions to ambient air quality. The relationship between how much a source emits, and

how much it contributes to ambient air quality is not a simple one, and was discussed in more detail earlier in this chapter.

It should be noted that the categories were chosen based on their fine particulate emissions. While these sources emit more than just fine particulates, the BVL DAMP is focused on this pollutant because it typically drives air quality in the airshed.

### ***3.3 Other Contributing Emission Sources***

While other sources of fine particulate do exist, their relative contribution to the overall scope of emissions is considered lower than the primary sources. Depending on resources available, these sources may be addressed individually in the Plan at a later date. Emission sources identified by CWGs that are not specifically dealt with in the Airshed Management Plan include vehicle tailpipes and aircraft, space heating with fuel other than wood, lawnmowers and other small engines, refuse disposal and municipal landfill waste, forest fires, unpaved roads, industrial food and agriculture (fish and meat smoking, coffee roasting, methane, etc), restaurants, home-barbeque and tobacco use.

Table 3-2 illustrates key components of the six major emission sources. Categories for each source include general geographic location, contributing season and a short summary of contribution to ambient air quality. It should be noted that as the emission inventory is not yet complete (with final report and modelling), it would be premature to quantify contributions as described in the beginning of this section. This table describes general properties of each emission source. It is meant to be short and illustrative so that should one have an interest in a particular source, one can refer to the chapter in which it is located for further descriptive information. In this table, sources are classified as Non-seasonal or Seasonal based on the time of year they are typically active (emitting fine particulate). Each source has the potential to contribute to air quality episodes when in operation, depending on total emissions from all sources, meteorology and location.

**TABLE 3-2 Summary of Data on Contribution to Baseline and Ambient Air Quality**

<i>Profile</i>	Beehive Burners	Other Regulated Sources (stacks)	Forest Harvest Debris Burning	Agriculture, Land Development and Small Sawmill Debris Burning	Residential and Commercial Space Heating	Backyard Burning	Road Dust (from paved roads)
<i>Geographic</i>	7 beehive burners (2 currently not in operation). 3 <b>tier 1</b> and 4 <b>tier 2</b> burners.		Usually more than 5 km from urban areas. Mountains and valleys within airshed.	Rural settings. Closer to urban areas than forest harvest debris burning.	Used in both urban and rural areas. More common in rural areas but urban areas are more concentrated.	Local bylaw dependent	All paved roads and parking lots where aggregate is used to increase winter traction.
<i>Non-Seasonal</i>	Yes	Yes (industry dependent)		Yes (small sawmills)		Yes	
<i>Seasonal</i>		Yes (industry dependent)	Fall, spring and some winter beetle wood burning	Fall and spring (agriculture, land development and small sawmill debris burning)	Fall, winter and spring		Fall, winter and spring



### 3.4 General Goals, Indicators, and Strategies

At the beginning of this planning process, it was made clear from community advisors that for the Plan to succeed, clear goals, indicators, and strategies for each emission source should be identified. In order for this emission-specific work to be accomplished, it was realized that general goals, indicators and strategies for the entire airshed needed to be set. Table 3-3 presents work in this area, and notes that the two overall goals for this Plan are to:

1. Gain a better understanding of air quality in the Plan area; and,
2. To continuously improve air quality in the BVLD Airshed

These two goals will form the basis of discussion at the BVLD Airshed Management Society’s Annual General Meetings.

**Table 3-3 General Goals, Indicators and Strategies**

<i>Goal</i>	<i>Indicators</i>	<i>Strategies</i>
1. Gain a better understanding of air quality in the plan area.	Degree of agreement between modelled air quality results and actual measured air quality for “ <b>episode scenarios.</b> ”  Comparison of <b>PM2.5</b> and <b>PM10</b> concentrations at a number of locations in the airshed plan area.	Improve air quality and meteorological monitoring network and gain experience through air quality modelling scenarios. (CALPUFF)  Obtain and expand air quality monitoring network- specifically PM2.5 instrumentation, and co-locate with existing PM10 equipment and meteorological monitors. Obtain a mobile monitoring station for air quality and meteorology.
2. Continuous improvement in air quality in the BVLD Airshed.	Mean annual PM10 and PM2.5 concentrations ( $\mu\text{g}/\text{m}^3$ ).  Reduce % of days where average daily PM10 concentration > 50 $\mu\text{g}/\text{m}^3$ . Interim goal = 1%  Reduce % of days where average daily PM2.5 concentration > 30 $\mu\text{g}/\text{m}^3$ . Interim goal = 1%  Percentage of “ <b>potential episode days</b> ” <sup>4</sup> where PM10 24 hour average is greater than 25 $\mu\text{g}/\text{m}^3$ , by year and/or season. and PM2.5 > 15 $\mu\text{g}/\text{m}^3$ by year and/or season  Improve air quality due to PM10 and PM2.5 on all days (non-episode and episode days) <ul style="list-style-type: none"> <li>- PED average PM10 and PM2.5</li> <li>- Non – PED average PM10 and PM2.5</li> </ul> Monitor statistics on associated human health risks.	Reduce or eliminate air quality episodes through source specific emission strategies.  Education and operational changes to improve air quality.  Bring forward emerging research and changing regulations and policies.

<sup>4</sup> Potential episode day is one that is characterized by still air with above 15  $\mu\text{g}/\text{m}^3$

## Beehive Burners

The five operating **beehive burners** (burners) in the BVLD airshed are outlined below (a sixth non-operating **Tier 2** burner is located in Carnaby, west of Hazelton). **Tier 1** burners are those in close proximity to a community, (5 km or less from a populated area of 500 or more people) while Tier 2 burners are located farther from area communities.

**Table 4-1 Beehive Burners Operating in the BVLD**

Location	Mill	Classification	Status
Smithers	Pacific Inland Resources (West Fraser)	Tier 1	<b>Closed July 2005</b>
Houston	CanFor	Tier 1	<b>Scheduled to close by Dec 31, 2007</b>
	Houston Forest Products	Tier 1	
Decker Lake	Decker Lake Forest Products	Tier 2	
Burns Lake	Babine Forest Products	Tier 2	
North Shore of Ootsa Lake	Cheslatta Forest Products	Tier 2	

### 4.1 Background

Communities in the BVLD airshed were in part built around, and continue to depend in large part on the forest industry. Over time, the sawmill industry changed from mainly a bush sawmill concept to a more centralized processing concept, leading also to a more centralized generation of wood residue by-products. The beehive burner was developed to provide a contained method to dispose of the large quantities of wood residue generated in the fewer locations used under the centralized processing model in use today.

Large sawmills such as those listed above provide employment, helping to stimulate regional economic activity and thereby supporting community infrastructure. They also provide a significant portion of the provincial government's overall revenue, and as such contribute to the provincial and regional standard of living and social net. At the same time, due to their close proximity to area communities, the potential for health impacts from **fine particulates** emitted by these operations is increased.

At its inception, the beehive burner was a simple, cost-effective solution for managing wood waste. Few alternative uses for bark, sawdust or shavings existed and mill technology of the day did not allow for efficient recovery of wood chips. As outlined below under 'Emission Reduction Efforts to Date' advancements in technology and changes to regulations have improved the performance of Tier 1 beehive burners in terms of smoke emissions, while

technological improvements in the sawmilling process have reduced the quantity of non-recoverable fibre, thus reducing the amount of wood residue needing disposal.

## **4.2 Significance of Source to Ambient Air Quality**

**Emissions** of fine particulates from beehive burners are significant and **modelling** being done as part of this plan will attempt to quantify their contribution (and the contribution of all other sources) to **ambient** air quality. Considerable effort is being expended in this regard, as it is difficult to determine the relationship between emissions from sources and their effects on ambient levels of fine particulates. This difficulty holds true for all sources including beehive burners. Some of the issues which must be overcome include:

- Emissions must be estimated, since direct emissions measurements are not feasible.
- Other sources including road dust, residential and commercial space heating, slash burning (forestry, agriculture, land development, small sawmills), other regulated industrial sources and backyard burning also have the potential to significantly affect ambient air quality
- **Meteorology** and **topography** further complicate the issue.

Two case studies exist regarding the effect of phasing out beehive burners on ambient air quality in the communities of Prince George and Williams Lake. These cases highlight the difficulties associated with trying to determine the relationship between emissions from specific sources and local air quality, particularly when ambient data is from a combination of continuous and non-continuous monitors, and when both **PM10** and **PM2.5** data is not available for the entire period.

The Prince George case shows that although a number of burners in the airshed were shut down over 1993-2000, ambient data could not conclusively show a related improvement in air quality from 1991 to 2003. It should be noted however that waste from burners shut down early in the phase out period was typically diverted to other still operating burners, and towards the end of the phase out period, wood diverted from burners was and is still used to produce hog fuel for power boilers at the pulp mills in Prince George. The power boiler emissions are considerably closer to residential areas and some monitors than were the burners (Dennis Fudge, Air quality Meteorologist, MOE, Prince George, personal communication).

Historically Williams Lake had as many as 9 beehive and silo burners operating within its airshed, with the number reduced to 5 by 1990. The remaining 5 burners were gradually phased out from late 1992 to late 1995. Wood waste is now used at an electrical generation facility, with much lower emissions of fine particulates. The ambient data for this community clearly shows a trend of improving air quality in the airshed from 1991 through 1999. A local bylaw prohibiting backyard burning introduced in 1998 may have also contributed to this trend in later years.<sup>5</sup>

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<sup>5</sup> The Effect of Wood Waste Burner Phase Out on Air Quality in Williams lake BC, Earle Plain, Ministry of Environment, Cariboo Region, February 2000.

Forest companies have worked together with MOE and local communities to set-up and maintain ambient air quality monitoring stations as well as to develop source emission inventories to help better define the relationship between individual sources and ambient air quality.

### **4.3 Emission Reduction Efforts to Date**

Tier 1 beehive burner operations have undergone numerous developments in recent years either through voluntary efforts made by the mills or as a result of an Environmental Appeal Board Decision<sup>6</sup> in April 2002. Changes have focussed on minimizing days where the burners are operated as well as on maintaining optimum combustion conditions (such as temperature, air and fuel supply). Both of these goals reduce emissions of fine particulates to the airshed from these sources.

In addition, as part of the permitting process, the MOE Regional Waste Manager can require Tier 1 burners to shut down and stockpile waste from their mill operations during periods of degraded air quality.

Canfor, Weldwood and West Fraser have been working with independent power producers to develop a **cogeneration** project that will bring about an alternative to the beehive burner concept and create local employment while generating 'green' electricity and heat. For more information on this topic please refer to the semi-annual reports on this process available at both the Smithers and Houston libraries.

### **Summary of industry efforts to reduce emissions from burners**

- For Tier 1 burners, systems have been installed for bypassing and stockpiling wood residue to allow for shutdown of the burner during air quality episodes, while continuing to allow the mill to operate (waste from mill is stockpiled). Tier 1 burners are now also started up (cold start) and shut down once per week (instead of daily as was the previous practice for Tier 1 burners, and continues to be the practice for some Tier 2 burners in the plan area) thereby minimizing smoke emissions that typically occur during start-up and cool down.
- Continuous temperature monitoring-fuel supply can be augmented to maintain efficient combustion
- **Programmable Logic Controller (PLC)** technology is used to control air flow and dampers, further contributing to maintenance of optimum temperature.
- Dry wood is used to assist with cold starts, which helps to ensure a rapid start up meaning efficient combustion is reached as soon as possible.
- Thorough maintenance is performed to ensure operating efficiency.

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<sup>6</sup> For the complete ruling, see Resources under [www.bvldamp.ca](http://www.bvldamp.ca).

- Warning devices (i.e. lights) are in place to advise when the temperature begins to drop, ensuring rapid response to eliminate increased smoke.
- Burner performance is reviewed on a daily basis by plant management.
- Current and forecast weather conditions are monitored with additional surveillance of burner performance during conditions that have the potential to lead to increased emissions and/or impacts of existing emissions.
- Fibre recovery on a "per log" basis has been improved.
- PIR installed a Hog System allowing them to ship some brown wood previously destined for their burner, to Eurocan Pulp and Paper in Kitimat. As of June 2004, they have now issued a purchase order for an \$8.5m Hot Oil Energy System, which will displace the beehive burner. This system will heat the seven lumber drying kilns, which presently utilize natural gas to dry lumber. The system will consume 60% of PIR's brown wood residue, with the balance being shipped to Eurocan. Start-up of this new system is scheduled for March 2005. The beehive burner will remain in place for emergency use only.
- Canfor and HFP continue to explore cogeneration, and are actively investigating alternatives in the case that the large scale cogeneration proposal does not go through.

#### ***4.4 Relevant Regulations and Community Plans***

The operation of each beehive burner is governed by a permit issued by the MOE Regional Waste Manager under the Environmental Management Act (formerly Waste Management Act). The current legislated last phase-out deadline for Tier 1 burners is December 31, 2007.

#### ***4.5 Community Consultation***

The operation of beehive burners has attracted much attention from local residents concerned about air quality and local employment opportunities. The goals, indicators and strategies outlined below have been developed and endorsed by MOE and local forest companies - Canfor, Weldwood, West Fraser and Cheslatta Forest Products.

Efforts to reduce dependence on burners necessarily involve partnerships and consensus building with local residents, community groups and businesses. BVL DAMP has stressed the importance of having a "Plan B" for phasing out the burners, should the Houston co-generation proposal not proceed by the legislated deadline.

#### ***4.6 Goals, Indicators, and Strategies***

The overall goals for managing this source of fine particulates:

- To reduce emissions from all beehive burners.

- To eliminate Tier 1 beehive burners and reduce or eliminate Tier 2 beehive burners in the BVL D airshed plan area.

A summary of indicators and strategies for these goals is provided in Table 4.2. The implementation plan is presented in Table 4.3.

**Table 4-2 Goals, Indicators, Strategies**

<i>Goals</i>	<i>Indicators</i>	<i>Strategies</i>
To eliminate Tier 1 beehive burners and reduce or eliminate Tier 2 beehive burners in the BVL D airshed plan area.	Number of operating Tier 1 and Tier 2 beehive burners in the airshed plan area.	Support Green Energy and Value-added Proposals  Help develop “Plan B” in cooperation with industry and government, should the cogeneration proposal not go forward by the legislated deadline. Focus on “value added” approach.  Help develop plans to divert wood debris from existing beehive burners to “value added” alternatives.
To reduce emissions from all beehive burners.	Number of beehive burner operating days in the airshed plan area.	Same as above, plus continuance of existing efforts, including shut down of Tier 1 burners during air quality episodes, as required by the MOE Regional Waste Manager

**Table 4-3 Implementation Plan**

Strategy	Description	Feasibility	Partners	Timeline	Monitoring and Evaluation
Energy system and pellet manufacturing plant.	See press release issued by CANFOR.	Economic review of this project has demonstrated the viability of this initiative.  This solution will generate increased local economic activity without significant financial damage to the forest companies.	CANFOR Pinnacle Pellet Inc. Morictown Band	Broke ground April 2006; burner will be shut down by Dec 31, 2007.	Semi-annual reports to MOE and the community
Plan B: Alternatives to Cogeneration	Alternative uses of the waste material will be explored if cogeneration plan does not materialize by the legislated deadline.  Suggested alternatives include incineration and biofuels production and use.	Current cogeneration proposal relies on finding adequate fiber supply in the vicinity of Houston. If competing projects are developed now, competition for fiber supply may impede finalizing the proposal.			

Strategy	Description	Feasibility	Partners	Timeline	Monitoring and Evaluation
Exploring increased capacity for the Eurocan steam plant	Investigations of alternatives for disposal of wood residue is underway in the event that co-generation does not proceed by the legislated deadline	Economic review has demonstrated the feasibility of this initiative when certain conditions are met	PIR/West Fraser		
Installation of an energy system at PIR	Onsite disposal of a substantive or complete volume of wood residue	A purchase order has been issued to cover this installation	PIR/West Fraser	July 2005	completed

#### 4.7 Tools and Resources

- PIR closed circuit television for onsite use
- Cogen Europe – Website  
<http://www.cogen.org/publications.htm>
- Skeena Region Beehive Burner Phaseout Backgrounder  
<http://MOEwww.gov.bc.ca/ske/skeair/reports/SRBHBPObckgrnd.pdf>
- MOE Skeena Region Air Quality Website-Case Study: Beehive Burner Phase Out in the Bulkley Valley [http://MOEwww.gov.bc.ca/ske/skeair/pm\\_case.html](http://MOEwww.gov.bc.ca/ske/skeair/pm_case.html)
- Environmental Appeal Board Decision 1999  
[http://www.eab.gov.bc.ca/waste/99was06\\_08\\_10-13.htm](http://www.eab.gov.bc.ca/waste/99was06_08_10-13.htm)

## Other Regulated Industrial Sources

### 5.1 Background

Two “stack emission” sources were identified within the Clean Air Plan geographic scope - NEWPRO and LB Paving, both located in Smithers. Emphasis is being placed on assisting NEWPRO in 2005 and 2006, both because the Smithers plant manager has been an active participant in the planning process and because of the profile NEWPRO has in the community as a major employer and source of emissions. Further efforts to determine the level of assistance that LB Paving will be evaluated as part of our work plan development.

As major mills in the area close down their beehive burners, emissions from replacement operations will also be evaluated and if necessary, action plans developed for reducing emissions. Pacific Inland Resources became the first BVL D mill to close down their beehive burner in July 2005.

**Northern Engineered Wood Products Inc (NEWPRO)** converts over 50 million kg of wood waste from local sawmills, otherwise destined to be burned (mainly in beehive burners), into a value added composite panel product. Two Heil dryers are used to reduce the moisture content of the sawdust and planer shavings as part of the manufacturing process. A permit (PA-6099) issued by the Ministry of Environment, under provisions of the Environmental Management Act regulates emissions from both dryer stacks. Annual compliance testing is performed on the two dryer stacks in accordance with the Ministry stack sampling protocol. Visual monitoring with the aid of a webcam is used to regulate the effects weather conditions in the Bulkley Valley have on the visible dryer stack emissions. Extensive upgrades relating to reducing emissions (listed in section 5.4) have been completed since 1995.

NEWPRO currently operates on a continuous production schedule at full capacity. Lack of a guaranteed fiber supply has limited the company’s ability to expand or increase production. NEWPRO, in partnership with the Town of Smithers, the Office of the Wetsuweten and West Fraser, has recently secured a Community Forest License in the Bulkley Valley.

**LB Paving** operates two hot mix asphalt plants throughout the paving season which runs from May to November, weather permitting. McCall Environmental performs Annual Compliance Testing on the following LB Paving manufacturing plants. The Koering 3000lb Batch Plant is a stationary plant located in the LB Paving pit in the Town of Smithers. The plant is fueled with natural gas and produces 70 tonnes of paving asphalt per hour. It operates intermittently during the paving season and is comprised of:

- Tower section complete with screen deck
- Bucket elevator
- Drum dryer



### ➤ Cyclone System

The Boeing Mobile Plant has been located in the same pit between Smithers and Telkwa for 3 years. It can move to other sites as work dictates. It operates intermittently throughout the paving season and is comprised of:

- 1987 BMG wet scrubber
- Drum Dryer
- 1986 Bomega storage tank
- 1988 Bomega silo
- 2001 Cat Generator

This plant is fueled with propane and produces 100 tonnes of paving asphalt per hour. Emission controls are provided by a Venturi wet wash system and contained settling pond.

## **5.2 Significance of Source to Ambient Air Quality and Public Health**

In the 2002 Emissions Inventory for the BVL D Airshed, permitted sources other than beehive burners were calculated to contribute 16% of Total Particulate Matter, 23% of PM<sub>10</sub>, and 16% of PM<sub>2.5</sub>.

Annual reports of stack samples are available for NEWPRO's inside and outside dryer stacks. An updated emissions characterization is needed and when this is available, a statement on the composition of emissions (condensable organics – one description of VOCs – and PM<sub>10</sub>) can be included in the Plan.

## **5.3 Relevant Regulations and Community Plans**

Provincial and federal regulations covering air quality in general include all sources of particulate matter.

The Ministry of Environment is responsible for designing and enforcing emission permits and works with NEWPRO to ensure compliance.

Annual compliance testing is performed on the two dryer stacks (one indoor, one outdoor) in accordance with permit PA 6099, issued under the provisions of the Environmental Management Act. The analysis includes the following parameters:

- a) Gas volumetric flow rates, gas moisture and gas temperature.
- b) Total particulate matter and condensable concentration.
- c) Total gaseous non-methane organics concentration.
- d) Formaldehyde concentration

All finished products are tested to ASTM D5582 for emissions as part of the Composite Panel Association Grademark Certification program.

Plant air quality is tested annually as part of Workers Compensation regulations.

At present, there are no municipal by-laws or clauses in the Official Community Plan that are directly relevant to emissions from this source.

#### **5.4 Emission Reduction Efforts to Date**

NEWPRO (Northern Engineered Wood Products Inc.)

- Installed real time Web Cam monitor in Control booth ( 2005)
- Updated Greens Dryer Combustion Control (2003)
- Installed High Efficiency Cyclone on Greens Dryer (2002)
- Installed a Web Cam on a ridge located on Viewmont Road (approx. 2001)
- Installed Rock Trap Closed Loop Cyclone (2000)
- Installed New High Capacity Baghouse on Sander Pneumatic System (1999)
- Installed Closed Loop Cyclone on Main Fuel Bin (1999)
- Redirected 1st Pass Saw line waste to #3 Baghouse via Flaker vent cyclone (1997)
- Exhausted Flaker Vent Cyclone through # 3 Baghouse (1997)
- Redesigned Inside Energex Combustion Chamber/Combustion Control (1997)
- Installed Dual High Efficiency Cyclones on Inside Dryer (1995)

LB Paving efforts have included:

- A new Standard-Havens Baghouse filter system as a replacement for air pollution abatement components (2000)

#### **5.5 Goals, Indicators and Strategies**

*The following section applies to NEWPRO exclusively.*

Goals for improving local Air Quality through reduced emissions:

- To reduce the number of days industry emissions affect local air quality.
- To prevent dryer emission test failures (as per EMA permit requirements)

Indicators to mark progress towards goals:

- Emission characterization program progress
- Annual test results
- Number of voluntary Outside Dryer shutdown days.

**TABLE 5-1 Implementation Plan**

Strategy	Additional Comments	Project Team	Budget	Timeline
Annual stack testing reports reporting and meeting.	Annual emission inventory report to be reviewed and ensure that testing parameters, metrics, and results can be cross-referenced with permits and Clean Air Plan for compliance.  Add in graphs to show emission levels.	MoE permit compliance staff  Manager for NEWPRO  BVL DAMS facilitator or Board member.		MoE to provide reference document by November 1, 2005.
1 <sup>st</sup> phase of emissions characterization program	This will involve researching industry standards within North America on operational equipment, emission rates/characteristics, and treatment systems. Study results will be compared to Newpro's operations and may lead to recommendations for an emissions characterization program (phase 2).	MoE  NEWPRO		February 2007
Improve processor to sharpen image on the web from the webcam		NEWPRO		
Voluntary outside dryer shut down plan as a method of pollution prevention  Reducing moisture content by changing wetting procedures to reduce dryer time.	Dryer is an independent operation and doesn't affect staffing levels. Shutdown can be for a maximum of 4 days at a time and may also be based on visibility in town. Assess storage capacity. Shutdown plan is based on air quality and venting conditions	MoE  NEWPRO		In effect
Community education on emissions	Neighbourhood Air Quality Series – Newpro: just the FAQs. This brochure will attempt to address issues and concerns raised with respect to Newpro  Other community education will follow if desired	BVL DAMS Communications Team  NEWPRO  MoE		Add into Strategic Communications Plan; implement by September 2006

## **5.6 Tools and Resources**

Recommendations for information on implementation of strategies include:

Alberta Clean Air Strategic Alliance [www.casahome.org](http://www.casahome.org)

Monitoring and characterization data is most pressing need.

# Forest Harvest Debris Burning

## 6.1 Background

**T**he forest industry is the largest employer in the **BVL D**, and provides numerous direct and indirect jobs and services. Through logging, residual debris (tree limbs and tops, rotten wood, etc) is created and this debris forms a fire and insect spread hazard. As a result the debris must be disposed of in a safe and practical manner. Due to the remote nature of many logged blocks, open burning of debris on-site is a frequently used technique for alleviating these hazards. Open burning of debris as it relates to forest harvest takes three general forms:

- Piling of debris into distinct piles and then subsequently burning those piles;
- Broadcast burning of debris where debris is burned "as is" on the ground as opposed to being piled into distinct piles, and
- "Fall and Burn" of individual/small groups of bark beetle infested trees.

## 6.2 Significance of Source to Ambient Air Quality

Although many logging blocks are located in remote areas, wind and **topography** can combine to move smoke (fine particulates) towards populated centers. For example, airflow patterns in mountainous areas may lead to cold air drainage into valley bottoms each night carrying some of the smoke and fine particulates from open burning with it. Typically, populated areas such as the communities along the Highway 16 corridor tend to be located in these valley bottoms, resulting in an increased potential for smoke from open burning to cause health impacts on area residents, aircraft navigation hazards and aesthetically undesirable views.

**Pile Burning / Broadcast Burning:** The majority of forest debris burning occurs during the fall and, to a lesser extent, spring seasons; and some winter burning occurs where concurrent bark beetle suppression is required. As a result, this burning is expected to have a greater contribution to both overall levels of **fine particulates** during fall and spring (and winter to a lesser extent) as well as having an increased potential to contribute to poor air quality episodes during those seasons. Although **venting** conditions typically improve in the spring and are best during mid-summer, the decision to burn debris must be balanced with the increased fire hazard associated with warmer months. Forest harvest debris disposal by open burning requires coordination of several factors including:

- moisture content of debris (ease of ignition/smoke output )
- forest moisture content (fire hazard)
- completion and timing of harvest (bark beetle emergence)
- weather factors (such as snow level)
- suitable venting conditions (for good **smoke dispersion**)

Typically, there is a three-month period in the Fall (one month each for Bulkey/Morice/Lakes localities) when these factors are optimally balanced, resulting in tens of thousands of piles of debris being burned in that short time period each year in the BVL D. The potential then exists that even on days when venting conditions are good for smoke dispersion, the **airshed** can be overloaded with too many piles being burnt on a given day, resulting in air quality impacts.

Fall and Burn of Bark Beetle Infested Trees: A widely used method of bark beetle control on scattered small infestations, or where logging is constrained (such as a steep hillside or in a park), involves hand falling individual infested trees, hand **piling** them and then burning them. Burning is a legal requirement as it kills the beetles residing in the bark and reduces the fire risk in the stand. Due to the small size and poor access constraints, MOE generally issues permits that allow these operators to burn on days of less than good venting conditions in moderate and low smoke sensitivity zones. Burning in high smoke sensitivity zones is typically not allowed on days when a **'burn ban'** has been issued.

### **6.3 Emission Reduction/Control Efforts to Date**

Emission reduction/control efforts to date have occurred to manage the impact of smoke on local population centers by:

- reducing the amount of material burned
- reducing emissions of fine particulate when burning occurs
- optimizing when burning can occur

Reducing the amount of material burned: Historically, **broadcast burning** was considered the most effective method for creating plantable terrain and opening ground to planters for reforestation, as well as for controlling vegetation and creating warm soil for optimum growth of planted trees. Changes in regulatory environment, among other factors, has lead to a switch away from broadcast burning to other **site preparation treatments** that do not involve the complete burning of an area, and therefore much less **biomass** is burned.

Retention of debris through a site specific approval process (such as the **silviculture prescription**) to meet biodiversity or wildlife objectives has allowed some licensees to retain a portion of their debris piles, or to not pile certain areas. Additionally, new management objectives for retaining **coarse woody debris** (CWD) on-site has resulted in less debris needing to be burnt.

Reducing emissions of fine particulate (cleaner burning): Harvest methods have changed from **landing to roadside based** operations, with many smaller piles becoming concentrated along roadsides, as opposed to fewer large piles at the **landing**. Smaller piles 'breathe' better and result in less smoke production and shorter burn duration. With other factors being equal, such as utilization standards, the actual amount of debris burnt would be similar with either system.

There is a strong trend to reduce **emissions** from open burning, while still maintaining the practice. Industry operators and regulators alike continue to consider fire to be a valuable management tool.

## **6.4 Relevant Regulations and Community Plans**

Regulations relating to this practice exist under both the Ministry of Forests (MOF) for fire and **insect hazard abatement** as well as under the Ministry of Water, Land and Air Protection (MOE) for **smoke hazard abatement** and include the:

- Forest and Range Practices Act (formerly the Forest Practices Code of British Columbia Act)
- Forest Fire Prevention and Suppression Regulation
- Environmental Management Act (formerly the Waste Management Act)
- Open Burning Smoke Control Regulation (OBSCR)
- Bulkley **Timber Supply Area** Burn Plan for Smoke Management
- Nadina Forest District Burn Management Plan

## **6.5 Community Consultation/Key Players**

This chapter was largely written by selected members of the Resource Management Burning Subcommittee of the Regional Working Group (for the BVL D Airshed Management Plan). Membership on this subcommittee is comprised of ecologists, biologists, air quality scientists, foresters, and woodland operators. Representatives from the regional provincial government offices of MOE and MOF together with representatives from large industry, including CanFor , Houston Forest Products, Babine Forest Products, Pacific Inland Resources, and Decker Lake Forest Products, woodlots and charter flight operators participated in meetings to develop the material included in this chapter.

The purpose of these strategies is to reduce emissions from forest harvest debris burning while protecting the economic interests and safety of stakeholders. Further discussion with stakeholders will be ongoing through the planning process.

## **6.6 Goals, Indicators and Strategies**

The overall goals for managing this source of fine particulate are:

- To reduce or eliminate air quality episodes attributable to forest harvest debris burning.
- To provide a proactive response when air quality is deteriorating in the valley.
- To reduce smoke impact on light aircraft navigation

A summary of indicators and strategies for these goals is provided in Table 6.1. The strategies listed are intended to result in reduced emissions of fine particulate from forest harvesting and agricultural burning as well as to reduce impacts contributions to ambient air quality from this source.

**Table 6-1 Goals, Indicators, Strategies**

Goals	Indicators	Strategies	Status
To reduce or eliminate air quality episodes attributable to forest harvest debris burning, and reduce impacts from forest harvest debris burning at any time.	Percentage of <b>Potential Episode Days (PED)</b> where <b>PM10</b> 24 hour averages are greater than 25 µg/m <sup>3</sup> during the forest harvest debris burning season.	Maintain MOE's educational, coordination and enforcement role with emitters. (see Table 6-2)  Continued operation of the Resource Management Burning Regional Working Group subcommittee. (see Table 6-2)  Continually explore alternatives that directly target reductions in debris production or smoke emissions. (see Table 6-2)	On-going  Meet annually at beginning of September before each burning season to review this chapter of the Clean Air Plan and effectiveness of strategies. Invites are sent out 4 weeks in advance. Last meeting: September 26/05
To provide a proactive response when air quality is deteriorating in the valley.	Percentage of Potential Episode Days (PED) where PM10 24 hour averages are greater than 25 µg/m <sup>3</sup> during the forest harvesting and agricultural burning season.	No new pile burning or broadcast burns allowed within any smoke management zone, regardless of current venting indices, as indicated by MOE-issued <b>burn bans</b> . Applicable to all Timber Supply Areas within the airshed.	On-going
To reduce smoke impact on light aircraft navigation	Complaints from charter companies.	As per applicable burn management plans, ensure the maximum number of piles per day being burnt is not exceeded.  Continue and improve two-way communication on burn schedules and flight ways (routes). Specifically, flight routes must be pre-identified on a map and given to permit holders, and both local charter companies are to be notified the day before of burning to be conducted along these routes.	On-going  No complaints from charter companies received in 2005.



**Table 6-2 Implementation Plan**

Detailed Strategy Description	Feasibility	Monitoring & Evaluation	Status
<p><b>Education</b></p> <p>Develop a centralized information source that burn operators can use to ensure burning is conducted properly and meets legal requirements related to smoke management. Information would include:</p> <ul style="list-style-type: none"> <li>• Venting information</li> <li>• How to conduct a proper burn</li> <li>• Legal requirements and their applicability to operations</li> <li>• Benefits of burning well piled, seasoned debris.</li> </ul> <p>Work with burn operators to improve burn techniques through timing and duration of burning based on local weather patterns and weather/venting index forecasts.</p>	<p>Elements are in place today.</p> <p>The availability of time and resources of the central agency (MOE) will be a factor.</p>	<p>Add to agenda for Subcommittee during annual meetings.</p>	<p>Dedicated page on cleanairplan.ca built in October 2005. Link is on homepage.</p> <p>Information added to site as it becomes available.</p> <p>Annual Burn Operators forum held each September and communication is ongoing between AMS, MOE and operators as needed.</p>
<p><b>Coordination of burning operations to take advantage of available venting and to avoid overloading the airshed (burning too many piles in a given day).</b></p> <p>Promote and refine the new Custom 3 day venting index forecasting service provided by MOE. Emitters to submit a list of areas where burning is to occur, including an estimate of how much is going to be burned, prior to ignition.</p> <p>Use expert advice to minimize impacts from burning operations (i.e. A qualified meteorologist, approved by the Regional Waste Manager, Skeena Region of MOE).</p> <p>Maintain awareness of overlap with other plans as well as for smoke sensitivity zone and burn ban boundaries.</p> <p>Through a combined effort of the Subcommittee and MOE and using District Level Burn Plans, develop a regional burn schedule setting the maximum allowable amount of burning to occur per geographical area prior to burning and circulate in &amp; outside Skeena Region</p>	<p>The availability of time and resources of the central agency (MOE) will be a factor. Strengthening the Subcommittee and proving the value of and funding a paid coordinator will be critical.</p>	<p>MOE to produce report on achievements of forecasting service.</p> <p>Add to agenda for Subcommittee.</p>	<p>CVI Forecast Service continues to be offered. At 2005 Burn Operators' Forum, each operator indicated location of their burn piles on a map.</p> <p>MOE is coordinating schedule of burns and provides annual update on effectiveness of strategies at the Burn Operators Forum.</p>

Detailed Strategy Description	Feasibility	Monitoring & Evaluation	Status
<p><b>Enforcement of applicable regulations and burn plans</b></p> <p>Continue and improve on MOE air quality and venting condition monitoring in the plan area.</p> <p>MOE to continue issuances of Advisories and Burn Bans.</p> <p>Continue with MOE Compliance Promotion Program, with site visits to emitters to provide education and enforcement.</p> <p>Continue to produce annual compliance and enforcement reports.</p> <p>Emitters to maintain compliance with burn management plans and OBSCR.</p>	<p>Air Quality monitoring is current mandate of MOE.</p> <p>Compliance and Enforcement is current mandate of MOE.</p>	<p>Publicize compliance promotion and findings &amp; provide route for public comment.</p>	<p>Distribution list of AQ Advisories is expanded upon request. Service is provided 7 days/week.</p> <p>Update on compliance reports provided at Burn Operator's Forum – refer to minutes and presentations for details at cleanairplan.ca.</p>
<p><b>Continued operation of the Resource Management Burning Regional Working Group Subcommittee</b></p> <p>Forum for discussion of new techniques, reporting on debris reduction achievements and co-ordination of burning activities among emitters.</p> <p>Forum for continual improvements (adaptive management) to AMP and process related to resource management burning</p> <p>Make group recommendations to Skeena-Stikine and Nadina Forest Districts regarding their respective Burn Management Plans / burning policies prior to plan expiry annually. Recommendations might include:</p> <ul style="list-style-type: none"> <li>• Review boundaries used for smoke sensitivity zones and burn bans</li> <li>• Max # of Burns per smoke management zone</li> <li>• Expand use of sunrise/sunset window for burning</li> <li>• Expand involvement of flight services, air charter operators in burning plans to improve flight safety.</li> <li>• Consistency where possible between plans</li> </ul>	<p>MOE or Subcommittee to provide venue and agenda for meetings, and other avenues for ongoing communication (i.e. website and written educational materials)</p>	<p>Pre and post burning season meetings and level of participation by all stakeholders will determine success of this strategy.</p>	<p>Post-burning season meeting did not happen in 2006 – at 2005 meeting a pre-season only schedule was approved. Extra effort for second meeting is directed into ongoing and direct communications on implementation of strategies.</p> <p>AMS had input from Fire Protection Service on development of residential outdoor burning brochure for Hazelton April 2006.</p> <p>All burn plans have now been updated (2005) and are consistent with Clean Air Plan objectives. New versions are posted at cleanairplan.ca</p>

Detailed Strategy Description	Feasibility	Monitoring & Evaluation	Status
<p><b>Continually explore alternatives that directly target reductions in the amount of debris to be burned and/or emissions from debris being burned.</b></p> <p>Reduce the amount of debris targeted for burning. Consensus based approach to set targets and agree on strategies. Targets could be related to existing government allowances. Strategies could include processing at the stump, scattering and covering debris during road construction, returning larger material to the block vs. piling, exploring chipping or mulching options and non-burning options.</p> <p>Annual reporting on alternatives and success stories to provide a record of improvements that can be compared with air quality.</p> <p><b>More detail is outlined in Appendix F-2: Recommendations to District Level Burn Plans, and several ground level strategies.</b></p>	<p>Subcommittee best forum for this purpose. Tracking of burning already done, tracking of not burning is new. MOE could provide a reporting template: Total waste volume, Actual Burned Volume, Unburned Volume (% of total)</p>	<p>Emitters to provide reports on debris burned vs not burned (cubic metres) in specified zones of district workplan areas.</p> <p>Wildfire risk and loss of productive ground will need assessment.</p>	<p>More work on this strategy is needed. This will be the focus of the 2006 Burn Operator's Forum.</p>

## 6.7 Additional Working Group Recommendations

- No variations on above regional strategies requested by community working groups
- Forest Plans (Forest Stewardship Plans ): set cutblock CWD levels, preferably higher than in past utilisation standards

## 6.8 Tools and Resources

- Tools include custom three-day **venting index forecasts**; co-operation / co-ordination of burning activities; evaluation of wildfire / insect hazard abatement requirements vs. possibilities for debris burning variances; education—including spreading the word about good practice and rules; inclusion and improvement of existing smoke management plans.
- Smoke management plans should include all necessary contacts, such as fire danger class rating links and phone numbers to obtain MOF **burn reference numbers**, MOE burn ban information, and venting index forecasts.
- Skeena Region Air Quality Information Line 1-888-281-2992 (Environment Canada Public **Venting Index forecasts** for Smithers and Burns Lake and to find out information on mandatory (ie. burn ban) and voluntary emission reduction strategies are in place, MOE regulatory requirements for open burning and daily air quality conditions.
- Ministry of Forests Burn Reference Numbers 1-888-797-1717
- Ministry of Environment-Skeena Region (Smithers) (250) 847-7260
- Environment Canada 2-day Spot Venting Index Forecast  
Call 1-250-491-1544 to set up an account and 1-900-565-2255 to obtain spot venting index forecast (fee of \$25 per forecast, will need to provide latitude, longitude, elevation and aspect)
- Venting Index Forecast  
<http://MOEwww.gov.bc.ca/epd/epdpa/venting/venting.html>
- BVL D 3-day Custom **Venting Index Forecast** (see Appendix F)  
Contact Arnel Castellan at 250.847.7547 or e-mail [Arnel.Castellan@gov.bc.ca](mailto:Arnel.Castellan@gov.bc.ca) (no fee, provide lot location, elevation, number and size of piles)
- The following documents are available at [cleanairplan.ca](http://cleanairplan.ca)
  - Skeena Region Guide to the OBSCR:
  - MOE Guide to the OBSCR:
  - OBSCR Checklist
  - Nadina Forest District Burn Management Plan
  - Bulkley Timber Supply Area Burn Plan for Smoke Management

# Agriculture, Land Development and Small Sawmill Debris Burning

## 7.1 Background

**A**griculture is common throughout the BVL D and has helped to build the foundation on which the communities and economy has been based. Land development occurs as more people move into the **airshed** and can be expected to continue on some scale.

Small sawmills are part of the forest industry that also forms a basis for area communities and local economies, and these typically small operations provide employment in areas where other opportunities may not exist.

Techniques for open burning can vary from sector to sector, and operator to operator. However, all operators and sectors began burning wood waste as opposed to any other management technique because it was practical and effective. Larger operations may have different equipment such as excavators that can more readily build clean (no dirt) piles. Smaller operations are often equipped with bulldozers and tractors which tend to incorporate more soil into debris piles. This increases the chances for smoke generation.

The experience level of the pile builder/burn operator also plays a significant role. Compared with forest harvest debris burning where dedicated contractors are responsible for building and burning piles, burning done for agricultural and land development purposes is often (but not always) done by operators whose positions are not solely focussed on burning.

There are however many burns for these purposes that are done well, with little or no impact from the smoke produced. By making the knowledge behind successful burns available to all operators, best practices can be promoted airshed-wide.

Small sawmill operators may dispose of wood waste (slabs and sawdust) by trucking it to permitted burning operations (beehive burners) or seek authorization to dispose of it through open burning. MOE staff may require the use of forced air or enhanced burning in containers (i.e. air curtain burners) where warranted. Conditions to limit smoke **emissions** are included in the authorization.

## 7.2 Significance of Source to Ambient Air Quality

Open burning for agriculture and land development occurs throughout the year however typically is more common in spring and fall, limited by snow cover in winter and fire hazard in summer, similar to forest harvest debris burning. The source of emission oftentimes occurs in valley bottoms, close to populated areas, and as a result can contribute significantly to ambient air quality where people live. Many small sawmill operations are more remote, lessening their potential to impact on people.

### **7.3 Emission Reduction Efforts to Date**

There has been a growing trend toward better **piling** and burning practices by operators in agriculture, land development. The experience level of operators and their awareness of both improved techniques and the benefits of lower smoke emissions are rapidly increasing. There is still however a need for further improvement to reduce or eliminate impacts that continue to occur from these sources.

Small sawmill operators are encouraged to seek options of using sawdust for animal bedding and soil amendments on farms. They are also assisted by MOE staff in finding burning opportunities that will result in less smoke. In this latter case, it is often costly to obtain commitments from air curtain burning contractors for their services. This could be rectified if the sawmill operators could coordinate their efforts to obtain those services.

### **7.4 Relevant Regulations and Community Plans**

- Forest Fire Prevention and Suppression Regulation (under Forest Practices Code of British Columbia Act)
- Open Burning Smoke Control Regulation (under Environmental Management Act)
- Environmental Management Act
- Bulkley Timber Supply Area Burn Plan for Smoke Management
- Nadina Forest District Burn Management Plan

### **7.5 Community Consultation/Key Players**

- Cattleman's Association
- Dairyman's Association
- Provincial Government-MOE, MOF
- **Licensees**
- Permit and approval holders
- Local operators not included in the above list
- Regional District of Bulkley-Nechako

### **7.6 Goals, Indicators and Strategies**

The goals, indicators and strategies for this emission source are similar to those for forest harvest debris burning and there was much cross-consultation between the writers for these two chapters. Table 7-6 summarizes the implementation plan for reducing emissions from agriculture debris, land clearing and small sawmill operations.

**Table 7-6 Goals, Indicators and Strategies**

Goals	Indicators	Strategies	Status
To reduce or eliminate air quality <b>episodes</b> attributable to agriculture, land development and small sawmill debris burning.	Number of PED where <b>PM10</b> 24 hour averages are greater than 25 µg/m <sup>3</sup> and the episode is attributed to this cause, based on confirmed complaints, inspection or audit reports.	Work with operators to improve timing, duration and extent of burning, based on local weather patterns.	Need to verify that outreach is working. Information is conveyed through representatives re: Burn Operators Forum and CVI forecasting service.
		Communicate with operators and facilitate sharing of knowledge between emitters about the benefits of burning well piled, seasoned debris.  Publish educational articles in farming periodicals such as <i>Beef in BC</i>	As above.  Not done – can add to 2006/2007 workplan.
		Work with operators to find alternatives to open burning (value added, or advanced burning technology).	To be done through Burn Operators Forum – this will be the theme for 2006.
	Category 3-6 Burns: Require to indicate number of piles to burn	Require operators to submit to MOE the size and number of piles to burn, location and when burnt, and include the maximum number of total piles to burn per day outlined in airshed plan and burn plans for smoke management  Burns fall under Forest Harvest debris burn plans (Bulkley Timber Supply Area Burn Plan for Smoke Management and Nadina Forest District Burn Management Plan) with regards to smoke management -need to facilitate awareness among operators of this and ensure they follow the plans	To be verified with MOE – can report out at 2006 Burn Operators Forum
Reduce or eliminate the number of burning days in the small sawmill sector	Number of open burning days for each small sawmill.  Number of “air curtain burner” days for each small sawmill	Assist small sawmill operators in coordinating contracted air curtain burning services.	Project planning has begun by identifying partners and specific sawmills that may require assistance. More effort needed in the year ahead.
Reduce emissions from burning of mixed wood waste collected at transfer stations operated by Regional District of Bulkley-Nechako.	Number of complaints.	Consultation with RDBN.  Promotion of solutions.  Public Education.	Wrote letter and gave presentation to RDBN in September 2005.  Provided input into draft and comments on final report on wood waste management options.

## 7.7 Additional Working Group Recommendations

- Education surrounding best practices for dealing with various types/species of debris to ensure conditions for burns are optimal and **emissions** minimized (Bulkley CWG)
- Promote agricultural land clearing “just after the sap has risen in the trees” followed by fall burning. This is dependent on favorable ground conditions to operate machinery in spring. Even if early spring debris piling is not feasible, burning in fall of same year. (RWG)
- Pursue discussions with CANFOR re: using cogen plant for handling land clearing debris’ will need to develop delivery protocols and fuel specs (Morice CWG)
- Cattlemen’s Association to discuss possibilities of equipment cost sharing through co-op purchases, rentals, or contracted services (Morice CWG)

## 7.8 Tools and Resources

- Skeena Region Air Quality Information Line 1-888-281-2992 (Environment Canada Public **Venting Index forecasts** for Smithers and Burns Lake and to find out information on mandatory (ie. burn ban) and voluntary emission reduction strategies are in place, MOE regulatory requirements for open burning and daily air quality conditions.
- Ministry of Forests Burn Reference Numbers 1-888-797-1717
- Ministry of Water, Land and Air Protection-Skeena Region (Smithers) (250) 847-7260
- Environment Canada 2-day Spot Venting Index Forecast  
Call 1-250-491-1544 to set up an account and 1-900-565-2255 to obtain spot venting index forecast (fee of \$25 per forecast, will need to provide latitude, longitude, elevation and aspect)
- Venting Index Forecast  
<http://MOEwww.gov.bc.ca/epd/epdpa/venting/venting.html>
- BVL D 3-day Custom **Venting Index Forecast** (see Appendix F)  
(250) 847-7224 Ben.Weinstein@gems1.gov.bc.ca (no fee, provide lot location, elevation, number and size of piles)
- Skeena Region Guide to the OBSCR:  
<http://MOEwww.gov.bc.ca/ske/skeair/reports/OBSCRguide2002.pdf>
- MOE Guide to the OBSCR: <http://MOEwww.gov.bc.ca/air/particulates/agttoobsc.html>
- OBSCR Checklist  
[http://www.bvldamp.ca/html/documents/MicrosoftWord-Checklist\\_000.pdf](http://www.bvldamp.ca/html/documents/MicrosoftWord-Checklist_000.pdf)
- Nadina Forest District Burn Management Plan



<http://MOEwww.gov.bc.ca/ske/skeair/reports/nadinaplan.pdf>

- Bulkley Timber Supply Area Burn Plan for Smoke Management  
<http://MOEwww.gov.bc.ca/ske/skeair/reports/BTSABurnPlan2002.pdf>
- The Environmental Farm Planning project (in development), is a voluntary, confidential process to perform an environmental risk assessment of the farming operation and to develop a plan to reduce or avoid these risks. Best Management Practices will also be promoted through a Reference Guide and Planning Workbook. Worksheets for Dust and Particulates as well as Open Burning will be available by the end of 2004. For the Press Release (Feb.26/04) describing this project, see the Agriculture and Agri-Food Canada website: [http://www.agr.gc.ca/cb/index\\_e.php?s1=n&s2=2004&page=n40226a](http://www.agr.gc.ca/cb/index_e.php?s1=n&s2=2004&page=n40226a)
- For a description of the Environmental Farm Program see:  
[http://bcac.bc.ca/efp\\_programs.htm](http://bcac.bc.ca/efp_programs.htm)
- Burning Unwanted Crop Residue Fact Sheet <http://www.lung.ca/cando/content/FS-stubble.pdf>

## Wood Burning Appliances

### 8.1 Background

**W**hen used properly, wood can be an economical and comfortable heating strategy for a home or business. Unfortunately, many people fail to maximize their wood burning appliance's potential efficiency due to poor burning practices and having an older inefficient model (i.e. non-EPA emission certified appliance).<sup>7</sup> This often results in unnecessarily degraded air quality outside and inside the home. Smoldering, smoky fires that produce a plume of blue-grey smoke from the chimney are the main cause of wood heat-related air pollution. However, there are ways to control the amount of smoke generated from wood heating and these are promoted through Burn It Smart workshops, educational videos and brochures - all of which are available through the [cleanairplan.ca](http://cleanairplan.ca) website.

Although the number of homes heated with wood declined dramatically in the middle of the 1900s, many homeowners returned to wood heating in the 1970s when there were concerns about the price and availability of alternate fuel options such as natural gas. Now more than 400,000, or six percent, of all single family dwellings in Canada use wood as the primary fuel for heating. In addition, over 950,000, or 14 percent, use it as a supplementary heating fuel.

Of 11,500 homes in the plan area, approximately 7,200 are heating with wood. It is estimated that of these 7,200, there are 4,200 conventional technology (i.e. non-EPA emission certified appliance) wood burning appliances (58%) and 3,000 (42%) high efficiency (EPA emission certified appliance) appliances.

### 8.2 Significance of Source to Ambient Air Quality

Any poorly operated appliance burning uncured wood can produce a dense smoke plume (even an EPA emission certified one). In calm clear weather, such as during temperature inversions typical in the BVL D in winter, the atmosphere's capacity to disperse emissions is at a minimum. As a result, smoke plumes from wood stoves and fireplaces build up in the area causing local air pollution. To make matters worse, people often try to make their final load of fuel for the day last all night by **damping** the air supply as much as possible. The result is a smouldering fire and a great deal of smoke with all its pollutants. This harmful smoke tends to linger near its source, rather than dispersing outwards or upwards. It has the greatest impact near or even inside the homes that produce it.

Smoke particles can be small enough to seep into neighbouring houses - even around closed doors and windows. As anyone who lives near a chronically smoky wood stove knows, the emissions from even one household can pollute the surrounding neighbourhood for hours and even days, whenever the stove is used.

<sup>7</sup> High-efficiency wood stoves, fireplaces or inserts that are certified as CSA B-415 or US Environmental Protection Agency (EPA) certified, when properly installed and operated, can cut emissions by up to 90 percent and burn up to a third less wood while delivering the same amount of heat.

### **8.3 Emission Reduction Efforts to Date**

Burn it Smart Workshops were put on in the Fall of 2003 in Burns Lake, Houston, Smithers and Hazelton. The attendance for each workshop respectively was 14, 19, 25 and 6 for a total of 64.

These workshops provide practical suggestions and demonstrate how to use wood burning appliances in a safe and efficient manner, to reduce pollution and help operators economize on the amount of wood that is burned.

### **8.4 Relevant Regulations and Community Plans**

The BC Building Code specifies that a building permit can only be issued for **Canadian Standards Association (CSA)**<sup>8</sup> approved stoves. CSA approval is stated on the label of the wood stove or in the operator's manual. This safety standard is not an emission certification.

Under the Environmental Management Act (formerly the Waste Management Act), the Solid Fuel Burning Domestic Appliance Regulation specifies fine particulate emission limits (EPA emission certified appliances), labelling and testing requirements for new wood stoves, fireplace inserts and factory built fireplaces manufactured in BC, or sold or imported for use in BC.

Local Government Building Bylaws regulate the installation of wood burning appliances. Bylaws specifically related to air quality typically cover smoke opacity limits, fuel prohibitions, noxious odours, "no burn" periods, and removal of uncertified appliances upon the purchase and sale of a building. There are no specific bylaws in any of the BVL D communities at this time regulating the use of wood burning appliances. Other BC communities have passed bylaws; for example, the City of Prince George has a Clean Air Bylaw that prohibits the use of wood burning appliances, except as a sole source of heat, during Air Quality Advisories.

### **8.5 Goals, Indicators and Strategies**

#### **Goals**

- To reduce or eliminate air quality episodes attributed to residential and commercial wood heating.

#### **Indicators**

- Percentage of **potential episode days** for the winter wood heating season where **PM10** 24 hourly averages are greater than  $25 \mu\text{g}/\text{m}^3$  AND exclusive of days when winter "beetle wood" debris burning is occurring ( i.e. March).
- Number of non-**EPA emission certified appliances** in each town in the BVL D **airshed** plan area, or number "turned in" during the wood stove exchange program.

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<sup>8</sup> Canadian Standard (CSA) means the Performance Testing of Solid-Fuel-Burning Stoves, Inserts, and Low Burn-Rate Factory Built Fireplaces CAN/CSA standard published by the Canadian Standards Association. At this time it is CSA 415.1

## Strategies

Four major strategies have been identified for reducing emissions from residential and commercial wood heating sources. These strategies and some preliminary thoughts on how to implement them are described in Table 8-1. Wood burning appliances that are targeted now include wood furnaces and outdoor boilers as per the 2005 Clean Air Plan Review.

### **8.6 Tools and Resources**

- Burn it Smart  
<http://www.burnitsmart.org/english/index.html>
- City of Prince George Clean Air Bylaw  
<http://www.city.pg.bc.ca/cityhall/bylaws/bylaw7232.pdf>
- Wood Stove Exchange Website  
<http://www.woodheat.org/changeout/index.htm>
- Residential Wood Burning Emissions in British Columbia (Revised May 17, 2005)  
[http://www.env.gov.bc.ca/air/airquality/pdfs/wood\\_emissions.pdf](http://www.env.gov.bc.ca/air/airquality/pdfs/wood_emissions.pdf)
- A Guide to Residential Wood Heating, Natural Resources Canada (2002)  
[http://www.canren.gc.ca/prod\\_serv/index.asp?CaId=103&PgId=576](http://www.canren.gc.ca/prod_serv/index.asp?CaId=103&PgId=576)

**TABLE 8-1: Implementation Plan For Reducing Emissions From Heating Sources**

Strategy	Description	Status
Wood stove change out program Goal: to change out all old-technology woodstoves	To provide incentives to homeowners to trade in conventional wood stoves for cleaner and safer alternatives.	Skeena-BVL D Woodstove Exchange Program delivered in 2004 resulting in 35 changeouts. A report summarizing this project will be available through the website. The Exchange program was put on hold to allow the Province of BC to conduct a pilot project in the BVL D composed of 1. Social Marketing Research to identify barriers 2. Design and delivery of a next generation exchange program. A presentation on this pilot project was given at the Smithers workshop on Local Government Actions to Reduce Emissions from Woodburning Appliances in May 2006. A presentation will also be given at the AMS AGM and Community Forum on June 15, 2006.
Community Education Program	Promotion and distribution of Burn It Smart materials Delivery of workshops Door to door education. Displays Website	A comprehensive education program based on social marketing is being developed that draws on the work completed in the overall Communications Strategy. This program will support bylaws currently being developed and will be completed by August 31, 2006.  As part of Clean Air Day June 7, 2006 a display is being developed focusing on wood burning appliances.  AMS had a booth at the Fall Fair 2005 and plans to have one again in 2006.  The website now includes a section on neighbourhood air quality.  AMS is part of a local network to promote energy efficiency and has attended meetings to ensure that the next woodstove exchange program is coordinated with home energy audit programs and available grants.
Local Government Toolkit	Model bylaws, examples of communication and policy tools.	Has been replaced by the Smithers workshop on Local Government Actions to Reduce Emissions from Woodburning Appliances in May 2006. All participants received copies of the Model Bylaw, and will receive a copy of the communications strategy being developed in support of the Smithers bylaw. The Town of Smithers hired Footprint Environmental Strategies to design and deliver the workshop, draft the bylaw, and produce the education program.
Lobby for local regulations and stronger provincial regulations.	Presentations detailing the problem and specific regulatory strategies.	See above.  A presentation on outdoor woodburning boilers has been developed by MoE and will be available on the website.

# Backyard Burning

## **9.1 Background**

**B**ackyard burning was for many years an acceptable practice. The level of acceptance has diminished since the late 1960's, first with increased town populations and a higher likelihood of having to inhale the smoke, and more recently with the realization that the smoke is in fact a serious environmental and health concern.

## **9.2 Significance of Source to Ambient Air Quality**

Backyard burning has an undetermined and variable influence to overall air quality in the BVL D. It is a problem during poor dispersion conditions at, or close to, ground level in populated areas - resulting in high concentrations of **fine particulates** in residential areas. It also is a problem when garbage and other non clean-wood products are burned.

In addition to the production of fine particulates, the burning of garbage or other materials such as demolition waste, painted wood, and manufactured wood products can produce significant amounts of **dioxins**. Potential health effects of dioxins include effects on reproduction and fetal development, **immune system** suppression, hormone system disruption, and cancer.

## **9.3 Emission Reduction Efforts to Date**

### **Smithers and Telkwa**

- Town of Smithers Open Burning Bylaw No. 1155, 1996. This bylaw prohibits the "open burning of domestic waste materials, garden refuse, garbage or noxious material". The bylaw also prohibits the "open burning of land clearing waste" unless they hold a permit issued pursuant to Section 3 of the Bylaw.
- Town of Smithers grass clippings composting site at 2888 - 19th Avenue
- Smithers Recycling Centre at 2889 Tatlow Rd in Smithers for processing of paper products, cardboard, and number 2 plastics including milk jugs.
- The Smithers/Telkwa Transfer Station on Donaldson Road accepts much of the material that may be destined for the backyard burn barrel. Materials must be sorted into categories including wood, metal, appliances, tires, and mixed garbage for transfer to the landfill site.

## **Houston**

- District of Houston municipal composting site in the Industrial Site

## **Burns Lake**

- The Village of Burns Lake requires residents to have a burning permit for backyard burning between April 15th and October 15th. Bylaw 570, Permit for Burning, includes an extract from the Fire Code that states "The Fire Chief may have a special permit for open air burning of brush, grass, weeds and other materials"... "No person to whom a special permit has been issued under Section 27 shall, on or in any fire burn any rubber tires, oil, tar, asphalt shingles, battery boxes, plastic materials, or any similar materials which may produce heavy black smoke".
- The Village of Burns Lake encourages residents to take grass clippings to the composting site at 5th and Carroll Street.

### **9.4 Relevant Regulations and Community Plans**

- Environmental Management Act prohibition against pollution
- The Environmental Management Act Open Burning Smoke Control Regulation
- The Forest and Range Practices Act of British Columbia
- The Town of Smithers Open Burning Bylaw No. 1155, 1996
- The Village of Burns Lake Bylaw 570 Permit for Burning

### **9.5 Community Consultation/Key Players**

- The Ministry of Water, Land and Air Protection
- The District of Houston
- The Houston Fire Department, Chief Ken Thompson
- The Town of Smithers
- The Smithers Fire Department, Chief Les Schumacher
- The Village of Burns Lake
- The Burns Lake Fire Department, Chief Jim McBride
- The Village of Hazelton
- The Village of Hazelton Temporary Fire Chief, Nick Marshall
- The District of New Hazelton
- The District of New Hazelton Fire Chief, Clifford Coukell

## 9.6 Goals, Indicators and Strategies

Table 9-1 summarizes our approach to reducing emissions from backyard burning. Education and regulation, as well as promotion and development of alternatives to burning such as recycling and composting will be the cornerstone of our success.

**TABLE 9-1: Goals, Indicators and Strategies**

Goals	Indicators	Strategies	Status
To reduce or eliminate air quality degradation attributable to backyard burning.	Public complaints	Implement a public communications/ education strategy to find alternatives.  Radio and newspaper public service announcements	In April 2006, AMS developed a brochure for the District of Hazelton on backyard burning. This was mailed out to each household with utility bills. The brochure was reviewed by the Ministry of Forests and Ministry of Environment.  This brochure can easily be adapted for other communities.
		Implement back yard burning bylaws. Needs review to determine appropriateness for each community including rural properties	District of Houston has a draft bylaw to address both backyard burning and wood burning appliances (May 2006).

## 9.7 Additional Working Group recommendations

- Meet with Municipal Council and Fire Department representatives to discuss alternatives and rationale (Morice CWG)

## 9.8 Tools and Resources

- Model Municipal Bylaw for Regulating Residential Backyard Burning  
<http://MOEwww.gov.bc.ca/air/particulates/pdfs/bylaw.pdf>
- Recycling Council of BC: [www.rcbc.bc.ca](http://www.rcbc.bc.ca)
- Composting Council of Canada: [www.compost.org](http://www.compost.org)
- Zero Waste North - Find out where to recycle, repair and reuse goods in the BVL D area:  
[www.footprintbc.com/zerowastenorth/](http://www.footprintbc.com/zerowastenorth/)



## Road Dust

### **10.1 Background**

To ensure that paved roads are safe in the winter, maintenance crews apply traction materials. During the spring melt this material is exposed to traffic and the **fine particulates** associated with it can become airborne. These fine particulates from traction material applied to paved roads are referred to in this plan as simply “road dust”. This affects air quality in populated areas adjacent to these paved roads. Road maintenance operators would like to remove as much traction material as soon as possible but, due to safety concerns, must wait until winter conditions have ended before commencing roadside sweeping.

Particles from road dust and smoke sources fall into both **PM10** and **PM2.5** categories. However, road dust is comprised mostly of larger particles. Since these larger particles tend to quickly settle out of the air, road dust **emissions** are a public health concern largely within town limits. The tendency for road dust effects to be an issue in late winter / early spring is suggested quantitatively by monitoring data (high levels of PM10 and very low levels of PM2.5 during springtime are often recorded in Houston where both types of monitors are co-located). Qualitative evidence of the localized effects of road dust on air quality can be witnessed quite frequently during freeze / thaw cycles in the spring, where there is very noticeable dust along roads as vehicles pass by, while just a short distance away these effects are not noticeable.

Road dust emission levels are influenced by the quantity and size of winter traction materials applied, the duration of the winter/spring seasonal transition, the ability of works crews to remove as much material as soon as possible, and the levels of traffic driving on unswept roads. Highway corridors running through communities have been identified as key areas of concern. The Ministry of Transportation is currently developing **best management** practices for highways maintenance that will include air quality as a consideration.

### **10.2 Significance of Source to Ambient Air Quality**

While road dust emissions tend to be localized and seasonal in nature, they do contribute to spring air quality episodes in BVL D communities. Of the seven emission source categories targeted in this plan, road dust is the least significant in terms of health and environmental effects (due to the larger size of the fine particulates and local scale), but can be a significant contributor to seasonal air quality episodes. For a discussion of impacts from air quality episodes on quality of life (health and economic opportunities) refer back to Chapter 2.

### **10.3 Emission Reduction Efforts to Date**

Throughout the BVL D airshed, numerous techniques are used by road maintenance operators to ensure that roads are safe for travel, and that the potential for health and environmental impacts

from road dust are minimized. All jurisdictions support improving road maintenance efficiencies and standards while looking for the most cost-effective methods to achieve them. Air quality and associated health and environmental improvements often result from improvements in efficiency. Here are a number of strategies and techniques employed by local road maintenance operators:

- Use of traction material made from breaking up larger rocks. This creates more angular particles that provide better traction than the more rounded material typically available from gravel pits, and tend to stay longer on the road surface where they are needed most
- Screen for particle size and/or use washed traction material to prevent very large and very fine particles from being applied to roads
- On unpaved roads, dust control application of calcium chloride (CaCl<sub>2</sub>), magnesium chloride (MgCl<sub>2</sub>) or lignosulphonates (all three in liquid form). These materials bind to **fine particulate** on roads thereby decreasing the amount of dust.
- Anit-icing application of CaCl<sub>2</sub> or MgCl<sub>2</sub> prior to roads becoming icy. . These salts help to lower the temperature at which water freezes (ie. below 0°C instead of at 0°C) and reduce the amount of traction material needing to be applied
- De-icing application of CaCl<sub>2</sub> or MgCl<sub>2</sub> on already icy/snowy roads. Sweeping and/or vacuuming. This reduces the amount of dust on the roads.
- Prior to sweeping or vacuuming roads, apply water (or coordinate with rain fall event)

#### ***10.4 Relevant Regulations and Community Plans***

Municipal public works and highways road maintenance operators are responsible for road safety and maintenance. Each jurisdiction is managing as best as they can within their limited budgetary constraints. While there are no regulations specifically concerning road dust, regulations covering air quality in general do include this source of fine particulate. Furthermore, MOT is developing best management practices that will guide services provided under maintenance contracts.

#### ***10.5 Community Consultation/Key Players***

- The Ministry of Environmentl
- The Ministry of Transportation
- Highways maintenance contractors
- Parking lot contractors
- Public works and roads maintenance officials from BVL D communities

## 10.6 Goals, Indicators and Strategies

### Goals

- To reduce or eliminate air quality episodes attributable to road dust.
- Reduce or eliminate air quality episodes attributable to road dust during the fall/late winter / early spring period. During this time, highway segments within town boundaries are subject to temperature swings causing successive freeze / thaw cycles. This creates a safety issue in terms of when to clean up the traction materials left over from the winter, as well as new materials applied during the "freeze" part of the cycle.

### Indicators

- Number of 'potential episode days' where PM10 24 hour averages are greater than 25 µg/m<sup>3</sup> for the spring road dust season, based on meteorological conditions and inspection.
- Pick the most likely period in which episodes may occur each spring, based on temperature and visual observations of road conditions within town boundaries. Determine the relative number of days within the period when PM10 24 hour averages are greater than 25µg/m<sup>3</sup>.

**TABLE 10-1: Strategies**

Strategy	Additional Comments	Project Team	Status
Collaborate efforts with municipality and highway crews to develop a proactive approach to road maintenance (in terms of road dust).	Facilitate dialogue among northern BC communities and road maintenance operators  To share best practices and successes and learn from each other	MOE to host annual forum	Road maintenance meetings are now held semi-annually by Lakes District Maintenance and attended by the AMS MOE representative. Last meeting was held May 23/06.
Best Management Practices (BMPs) for use in highways maintenance contracts that include air quality as a consideration in the application, use and cleanup of traction materials within town boundaries.	Feedback into Ministry of Transportation BMPs  Road maintenance staff to provide feedback and input into BMPs which will guide highways maintenance contracts and operations.	MOT MOE BVL DAMS	Completed – see Tools and Resources.
Continuous improvement of operations:  a) Use of traction materials that contain reduced amounts of fine materials,  b) Choose methods of application that require less material c) Acquire application and cleanup equipment that has the potential to reduce dust emissions	Focus efforts on spring sweeping and reducing materials put on roads  Concentrate on high traffic areas  Adopt methods to reduce amount of traction materials used on roads	Already being done by local government public works departments	Need to follow up with municipalities for updates and to ensure they have copies of this newest version of the road dust chapter.

## 10.7 Tools and Resources

Road maintenance, safety and clean up is the responsibility of municipal public works and highways maintenance contractors. These operators are valuable resources and are already working to maximize efficiencies that will also result in air quality and health improvements. Efforts to assist these operators by providing regular opportunities for them to meet and discuss strategies and successes will facilitate adoption of best management practices.

Other jurisdictions can also provide some lessons. For example, the City of Prince George is also experimenting with methods and applications (pre-screening, dust suppressants) in a strategy to reduce road dust emissions.

### For more background materials see:

Best Management Practices for Highway Maintenance Activities - July, 2004

[http://www.th.gov.bc.ca/publications/eng\\_publications/environment/MoT\\_Hwy\\_Maint\\_BMP.pdf](http://www.th.gov.bc.ca/publications/eng_publications/environment/MoT_Hwy_Maint_BMP.pdf)

**[Best Management Practices to Mitigate Road Dust from Winter Traction Materials](#)** (March 2005)

Winter traction materials are applied to snow-covered and icy roadways to make them safe for travelling. But while protecting road safety, these materials can contribute to air pollution by stirring up road dust — including fine particulate matter, which is a significant health threat. The ministry has developed this "best management practices" document to help local governments, planners and road-maintenance crews.

[http://www.env.gov.bc.ca/air/airquality/pdfs/roaddustbmp\\_june05.pdf](http://www.env.gov.bc.ca/air/airquality/pdfs/roaddustbmp_june05.pdf).

Road dust minutes and handouts from MOE/BVL DAMP workshop held January 12, 2003 to develop this chapter are posted at [www.cleanairplan.ca](http://www.cleanairplan.ca). Handouts included:

- Ten of the Best Street Sweeping Practices, reprinted from *Better Roads Magazine* April 2003
- Corraling Road Dust on Gravel Roads, Erosion Control, Joseph Tilton  
[http://www.forester.net/ecm\\_0207\\_dust.html](http://www.forester.net/ecm_0207_dust.html)
- *Road Management and Engineering Journal*  
<http://www.usroads.com/journals/rmej.htm>
- Fugitive Dust Control Techniques and Businesses:  
[http://www.nmenv.state.nm.us/aqb/dust\\_control.html#Salts](http://www.nmenv.state.nm.us/aqb/dust_control.html#Salts)

## Working the Plan

### **11.1 Background**

**M**ay 1, 2004 marked the beginning of a five-year implementation phase for the overall and emission specific strategies outlined in the Plan. Some of the strategies in this Plan were already in place, with appropriate technical teams and financial support to ensure early success. Among these strategies were the Wood Stove Exchange Program, Road Dust control, and Reductions to Volume and Emissions from Forest Harvest Debris Burning.

### **11.2 Structure**

As of August 2005, the implementation of the Plan is now carried out under the structure of a non-profit society registered in BC. An application for charitable status is current being reviewed by the Canada Revenue Agency. At the June 13, 2005 Business Meeting and Annual Plan Review, eight directors were elected to the Board fulfilling the terms of the constitution and bylaws of the BVL D Airshed Management Society.

March 31, 2006 marked the end of a 3 year contract term for a part-time facilitator under the administration of the Ministry of Environment. The role and need for a facilitator was reviewed at the April 2006 meeting of the Board of Directors and at this time, a decision was made to offer the current facilitator a contract for continued services, renewable annually for a period of 3 years.

The facilitator's role is to steer the implementation of the Clean Air Plan, including the development of an annual workplan and budget and communications strategy. This role also includes fundraising as needed. In 2006, financing for implementation of the Plan and the facilitator's compensation is provided by the Ministry of Environment with supplemental funding through fundraising for specific projects. Grants in varying amounts have been provided by the BC Lung Association (production of a quarterly newsletter), the Bulkley Valley Credit Union (development and implementation of a neighbourhood air quality education program), the Fraser Basin Council (participation in the BC Clean Air Forum), and BC Transit (Clean Air Day). Additional sources of funding and commitment to multi-year funding are needed and determine activities to be carried out in the workplan.

Contributions of time and energy by volunteers also drive the AMS capacity to deliver specific projects and coordination of these efforts is done by the facilitator. Lastly, and perhaps most importantly, partnerships with key organizations such as the Northern Health Authority, local governments, the BC Lung Association, and other airshed management groups around the province add to the overall effectiveness and capacity of the BVL D Airshed Management Society.

The workplan follows an annual cycle and include core activities as outlined in Table 11-1.

**TABLE 11-1: Summary of core activities**

Task	Task Leader	Timeline
Annual Clean Air Plan Review and AGM	Facilitator and MOE, with input from AMS Board	June
Clean Air Day Celebrations	Facilitator and MOE, with input from AMS Board	June
Annual Burn Operators Forum	Facilitator and MOE, with input from AMS Board	Late August, early September
Annual presentations to local governments	Facilitator and MOE, with input from AMS Board	February
Booth at Fall Fair	Facilitator and MOE, with input from AMS Board	Late August
Maintenance of website (cleanairplan.ca)	Facilitator	Ongoing
Quarterly Board Meetings	Facilitator	April, June (AGM), July (for Plan amendments) and December

### **11.3 MOE Role**

The Ministry of Environment will continue to play a pivotal role in airshed management. Specific tasks include:

- Provision of Custom Venting Index Forecasting service
- Enforcement of regulations and issuance of permits
- Preparation of annual Ambient Air Quality Assessment Report
- Maintenance and improvement of meteorology and air quality monitoring network
- Air quality dispersion **modelling**
- Support of the BVL D Airshed Management Society operations through financial and in-kind contributions
- Sitting on the Board of Directors and providing strong leadership in establishing priorities and improving capacity
- Representing BVL D airshed priorities at provincial workplan and budget development meetings
- Community outreach activities

Air quality protection is a key mandate for the BC Ministry of Environment and relates to GOAL 4 of the Province’s strategic plan: Lead the world in sustainable environmental management, with the best air and water quality, and the best fisheries management, bar none.



bulkley valley - lakes district  
airshed management society

**COMMUNITY ACTION PLAN** *for*  
**CLEAN AIR**

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*A five-year strategy*

APPENDICES

LAST UPDATE: JUNE 11, 2006

APPENDICES

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# Appendices

## **Appendix A**

### *Abbreviations and Glossary*

AMP	Airshed Management Plan
BFP	Babine Forest Products
BMP	<b>Best Management Practice</b>
BVL D	Bulkley Valley-Lakes District
CanFor	Canadian Forest Products
CFDC	Community Futures Development Corporation
CSA	Canadian Standards Association
CWD	<b>Coarse Woody Debris</b>
CWG	<b>Community Working Group</b>
DM	District Manager (Ministry of Forests)
DLFP	Decker Lake Forest Products
EPA	Environmental Protection Agency
HFP	Houston Forest Products
MOF	British Columbia Ministry of Forests
MOTH	British Columbia Ministry of Transportation and Highways
PED	<b>Potential Episode Day</b>
PIR	Pacific Inland Resources
PLC	<b>Programmable Logic Controller</b>
RWG	<b>Regional Working Group</b>
TSA	<b>Timber Supply Area</b>
WETBC	Wood Energy Technicians of British Columbia
MOE	British Columbia Ministry of Water, Land and Air Protection
AIR QUALITY ADVISORY	An advisory issued by the Ministry of Water, Land and Air Protection alerting the public that air quality is degraded.
AIR QUALITY	A period of degraded air quality (due to higher than normal levels of pollution),



EPIISODE	due to a combination of emissions, topography and meteorology.
AIR QUALITY INCIDENT	See Air Quality Episode.
AIRSHED	A geographic area that, because of emissions, topography and meteorology typically experiences similar air quality.
AMBIENT	Environmental or surrounding conditions.
ASTHMA	A condition often of allergic origin that is marked by continuous or spastic laboured breathing accompanied by wheezing, by a sense of constriction in the chest, and often by attacks of coughing or gasping.
ASTHMATIC	A person who is sensitized to allergens and with hyper-responsive airways. There is genetic predisposition, but non-genetically related asthma occurs also in adults.
ATMOSPHERIC MIXING	Movement of air that results in mixing. Typically caused by atmospheric instability.
ATMOSPHERIC PROFILE	A chart or graph which shows meteorological variables (temperature, wind, etc.) from the surface up into the atmosphere at one location.
BEEHIVE BURNER	A beehive burner is a large conical steel structure used to burn wood residue. The beehive burner contains a series of dampers, air ducts, fans and various controls. Wood residue is fed into the structure near 2/3 from the base.
BENCHMARK	A standard by which something can be measured or judged.
BEST MANAGEMENT PRACTICES	A practice or combination of practices that are determined to be the most effective, practical means of reducing the amount of pollution generated by a source to a level compatible with environmental quality goals.
BIOMASS	Biomass refers strictly speaking to the total weight of all the living things in an ecosystem. However, it has come to refer to the amount of plant and crop material that could be produced in an ecosystem for making biofuels and other raw materials used in industry, for example.
BROADCAST BURNING	Debris is burned as is on the ground as opposed to being piled into distinct piles.
BRONCHITIS	Acute or chronic inflammation of the bronchial tubes.
BURN BAN	A suspension of the exemption under the Waste Management Act of the requirement to have a permit or approval to discharge waste (therefore, no burning under the Open Burning Smoke Control Regulation is allowed). This means that only operators with a valid permit or approval for open burning can do so during a burn ban.
BURN REFERENCE NUMBER	Ministry of Forests require residents planning a fire larger than a typical backyard burning pile to obtain a burn reference number by calling 1-888-797-1717. This number ensures that MOF can track every person planning to burn debris.
CALPUFF	A computer model that uses modeled meteorology from CALMET along with inputted emission information from sources to produce an estimate of air quality at numerous locations throughout a defined area and period of time.
CALMET	A computer model that uses meteorological monitoring data, land use data and terrain data to develop a 3-dimensional estimate of meteorological conditions at

	numerous locations over a defined area and period of time.
CANADIAN STANDARDS ASSOCIATION	A not-for-profit, membership-based association serving business, industry, government and consumers in Canada and the global marketplace. It works in Canada and around the world to develop standards that address needs, such as enhancing public safety and health.
CATEGORY 1 & 2 BURNS	Ministry of Forests defines small open fires/backyard burning (reference number not required) as category 1 & 2 burns. Note, a burn reference number is not required.
CATEGORY 3 - 6 BURNS	Ministry of Forests defines industrial and agricultural burning as category 3-6 burns. Note, a burn reference number is required.
CATEGORY 7 & 8 BURNS	Ministry of Forests defines open fires for resource management purposes as category 7 & 8 burns. Note, a burn reference number is required.
CIRCULATORY DISEASE	Disease caused by the normal flow of blood through the body being restricted or blocked as a result of arterial plaque. This may cause damage to the heart, brain, kidneys or other organs and tissues.
CLOUD CEILING	The lowest broken or overcast layer of a cloud. Usually the term will only be used if clouds occupy more than %50 of the visible sky at a particular height. If a cloud ceiling is low, chances are the sky is drab and visibility for small aircraft may be reduced.

COARSE WOODY DEBRIS	Coarse woody debris is dead woody material, in various stages of decomposition, located above the soil, larger than 7.5 cm in diameter (or equivalent cross-section) at the crossing point, which is not self-supporting. Trees and stumps (intact in ground) are considered self-supporting.
COMBUSTIBLE MATERIAL	Material which have the potential to burn.
COGENERATION	Simultaneous production of heat energy and electrical or mechanical power from the same fuel in the same facility. The use of waste heat (as in steam) from an industrial process to produce electricity, or the use of steam from electric power generation as a heating source are examples of cogeneration.
COMMUNITY WORKING GROUP	Three groups (Lakes, Morice and Bulkley (with Kispiox)) of stakeholders developed for the BVL DAMP with a focus on local air quality issues.
DAMPING	The act of starving a fire of air, thereby lengthening the time it takes for wood to burn. This decreases the efficiency of the burn, causing incomplete combustion (burning) which results in smoke (smoke is wasted, unburned fuel).
DIABETES (TYPE II)	Mild form of diabetes mellitus that develops gradually in adults; can be precipitated (made to occur sooner or faster) by obesity, severe stress, menopause or other factors; can usually be controlled by diet and hypoglycemic agents without injections of insulin.
DIOXINS	Any in a family of over 200 chlorinated organic chemicals (all heterocyclic hydrocarbons). Dioxins are produced when chlorinated materials such as plastics are burned. Dioxins are known to cause skin diseases (chloracne), birth defects, miscarriages, and cancer.
EPA EMISSION CERTIFIED APPLIANCE	A wood-burning appliance which has met the low-emission standards set by the United States Environmental Protection Agency.
EMISSION INVENTORY	Involves qualifying and quantifying the emissions in an area which contribute to ambient air quality. Qualifying entails determining what sources exist that emit the pollutant of interest, and quantifying involves determining how much each source emits and when.
EMISSION	A substance discharged into the environment.
EPISODE	See Air Quality Episode.
EPISODE SCENARIO	Modelled air quality episode.

FALL AND BURN	Hand felling, hand piling, and burning individual trees or patches of trees for the purpose of bark beetle control.
FINE PARTICULATE(S)	Tiny solid or liquid particles that come in many shapes and sizes and from many sources, both natural and human-caused. Fine particulates 10 micrometer or less in diameter are called PM10, and those 2.5 micrometers or less in diameter are called PM2.5 (PM stands for particulate matter),
FORECAST LOOPS	An animated prediction model which plays repeatedly.
FORECAST VENTING	See Venting Index Forecast.
HAND BUCKING	Trimming tops and branches from harvested trees, and cutting that tree to ideal lengths. This can be done using a chainsaw or handsaw.
HOG SYSTEM	Industrial and commercial facilities incinerate 'Hog' to power their facilities. Hog is the unusable waste generated by saw-milling logs and consists of bark and sawdust. A hog system grinds and chops this material from larger material and collects/prepares it for transport from the sawmill to the end user.
HORMONAL SYSTEM	The system of glands that secrete (produce) hormones.
IMMUNE SYSTEM	A collection of cells and proteins that work to protect the body from potentially harmful, infectious microorganisms (microscopic life-forms), such as bacteria, viruses and fungi.
INSECT HAZARD ABATEMENT	Efforts that reduce the risk of insect damage spreading. Fall and Burn is one example of this.
LANDING	An area of concentrated skidding activity, where logs are dropped to be 'Hand Bucked' or 'Machine Processed'. Skidding is where machines drag logs to a centralized point (landing) or roadside.
LICENSEE	Refers to a holder of a Major License under the Forest Act.
METEOGRAMS	A numerical weather forecast in which the output displays temperature (surface and at 850 hPa), mean-sea level pressure, wind and precipitation.
METEOROLOGY	The study of the weather, as well as the atmosphere and atmospheric phenomena including the atmosphere's interaction with the earth's surface, oceans, and life in general.
MODEL	A computer program used to estimate or simulate a real world situation.
PARTICULATE MATTER	A criteria air pollutant. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including the burning of wood, diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and woodstoves among others. Fine particulate are a subset of particulate matter
PHENOMENA	The plural of phenomenon, an occurrence, circumstance, or fact that is perceptible by the senses.
PILING	Placing logging debris into specific vertical piles for the purpose of burning the debris more efficiently or to reduce the area of ground affected by the debris.
PM2.5	Particulate matter with a diameter of less than 2.5 micrometers (µm). One micrometer is one millionth of a metre. PM2.5 is included in fine particulate,

	and is a subset of PM10 (when measuring PM10, it includes PM2.5). PM2.5 is typically associated with combustion sources (smoke) and is more closely related to adverse health effects than larger particles.
PM10	Particulate matter with a diameter of less than 10 micrometers (µm). One micrometer is one millionth of a metre. PM10 is included in fine particulate and includes PM2.5 (when measuring PM10, it includes PM2.5). The larger particles in PM10 are typically associated with crustal (ie. dust) sources.
POTENTIAL EPISODE DAY	A day where, based on meteorological variables (still air, poor venting) the potential for an air quality episode exists, dependent on emissions.
PROGRAMMABLE LOGIC CONTROLLER (PLC)	A solid-state control system that has a user-programmable memory for storage of instructions to implement specific functions such as I/O control, logic, timing, counting, report generation, communication, arithmetic, and data file manipulation. A controller consists of a central processor, input/output interface, and memory. A controller is designed as an industrial control system.
REFORESTATION	Replanting of trees on land that has recently been harvested for trees (logged).
REGIONAL WORKING GROUP	Made up of representatives from Community Working Groups and others, developed for the BVL DAMP with a focus on airshed-wide air quality issues.
RESIDUAL DEBRIS	Tree limbs and tops, rotten wood, etc.
RESPIRATORY DISEASE	Describes a number of problems that affect the organs of the respiratory system. The respiratory system is made up of the organs that are involved in breathing. These include the nose, throat, larynx, trachea, and lungs, which are made up of the bronchi, and arterioles.
ROADSIDE BASED	Refers to forest harvest debris piles based located near or on a roadside. Roadside based debris piles are smaller but greater in number than piles concentrated at a landing.
SILVICULTURE PRESCRIPTION	A pre-harvest paper document that outlines factors to consider during and after logging that will achieve a new plantation when complete.
SITE PREPARATION TREATMENTS	Sometimes post-harvest ground is not plantable. Either the ground has too much debris, is too wet, or the soils are too compact. A Site Preparation treatment will target the problem to create a more favorable planting and growing environment for the seedling.
SMOKE DISPERSION	The ability of the atmosphere to dilute smoke through mixing and transport.
SMOKE HAZARD ABATEMENT	Reduction of hazard due to smoke.
STACK EMISSIONS	Substances coming out of a stack.
TIMBER SUPPLY AREA	An integrated resource management unit established in accordance with the Forest Act.
TIER 1 (BEEHIVE) BURNER	A Tier 1 burner is one that is 5 km or less from a populated area of 500 or more people.
TIER 2 (BEEHIVE) BURNER	A Tier 2 burner is defined as other than a Tier 1 burner.
TOPOGRAPHY	The terrain of an area including position and elevation information for surface

	features.
VALUE ADDED ALTERNATIVE	A solution or alternative to any situation which has direct or indirect 'value' of any kind. Value could be in the form of alternate cash generation (ie. use of waste as or to create a useable product), waste reduction or pollution prevention.
VENTING	An atmospheric phenomenon (resulting from a combination of wind and the atmosphere's ability to lift air), which allows for smoke dispersion.
VENTING INDEX FORECAST	A numerical weather forecast in which the result is a scale from 0-99, consisting of three categories (good, fair and poor), which describes venting conditions. Poor venting exists when the venting index forecast is from 0-33, fair venting exist when the venting index forecast is from 34-54 and good venting conditions exist when the venting index forecast is from 55-99.
VISUAL BLIGHT	Something which Impairs or destroys vision.
WELL BEHAVED	In this plan, refers to a realistic outcome produced by a numerical weather forecast or weather variables in general.
WINDGRAMS	A numerical weather forecast in which the output is a forecast of wind conditions (speed and direction) up into the atmosphere and foreword into time at one given location.
WOOD STOVE CHANGE OUT PROGRAM	A program in which education and incentives are available to people wanting to trade in a non-EPA emission certified appliance in exchange for a new lower emission (fine particulate) appliance.

## Appendix B

### *Health Effects*

Health effects of **fine particulates** were described briefly in Chapter 2. There is a large body of literature on this subject, and the 2 documents cited in Chapter 2 would be a reasonable introduction to these health issues. Both contain references to a variety of research results.

The Pope et al (2002)<sup>9</sup> long term study (12 years) of lung cancer commissioned by the American Cancer Society looked at health vital status variables and cause of death. This ongoing mortality study enrolled 1.2 million adults. It included linking risk factor data for approximately 500 000 adults with air pollution data for metropolitan areas throughout the United States. The combined air quality, health vital status and cause of death data up to the end of 1998, confirmed that each 10 µg/m<sup>3</sup> increase in fine particulate air pollution is associated with a 4% increase in all cause mortality, a 6% increase in cardiopulmonary death and an 8% increase in lung cancer deaths (over the course of the study). The conclusion was that long-term exposure to combustion-related fine particulate air pollution is an important environmental risk factor for cardiopulmonary and lung cancer mortality.

The Bates et al (2002)<sup>10</sup> summary report on air pollution in BC provided commentary on a number of studies aimed at determining the degree to which fine particulates affect human health. The authors cited one study done in Christchurch New Zealand (Particulate Air Pollution and Hospital Admissions in Christchurch New Zealand, McGownan J.A., P.N. Hider, E. Chako, and G.I. Town 2002, in Australia New Zealand Journal of Public Health 26: 23-29) which is of interest in terms of its similarity of emission sources to interior BC communities (mostly wood smoke derived fine particulates). Conclusions in the Christchurch study supported previous researchers' conclusions that there are increases in many measures of illness associated with daily air quality. The Christchurch example showed that for each daily increment of 15 µg/m<sup>3</sup> **PM10**, there were statistically significant percentage increases in daily hospital admissions for pneumonia and flu (5.32%), acute respiratory infections (4.53%), all respiratory admissions (3.37%) and cardiac conditions (1.36%).

To put this in perspective, **ambient** air quality data for the period of 1997 to 2001<sup>11</sup> demonstrate that average annual PM10 concentrations in Bulkley Valley and Lakes Districts range from 13 to 22 µg/m<sup>3</sup>, while maximum 24 hour averages have ranged from 55 to 187 µg/m<sup>3</sup>. The data shows that there are often at least 4 smoke related **air quality episodes** per year in the Bulkley Valley and Lakes Districts.

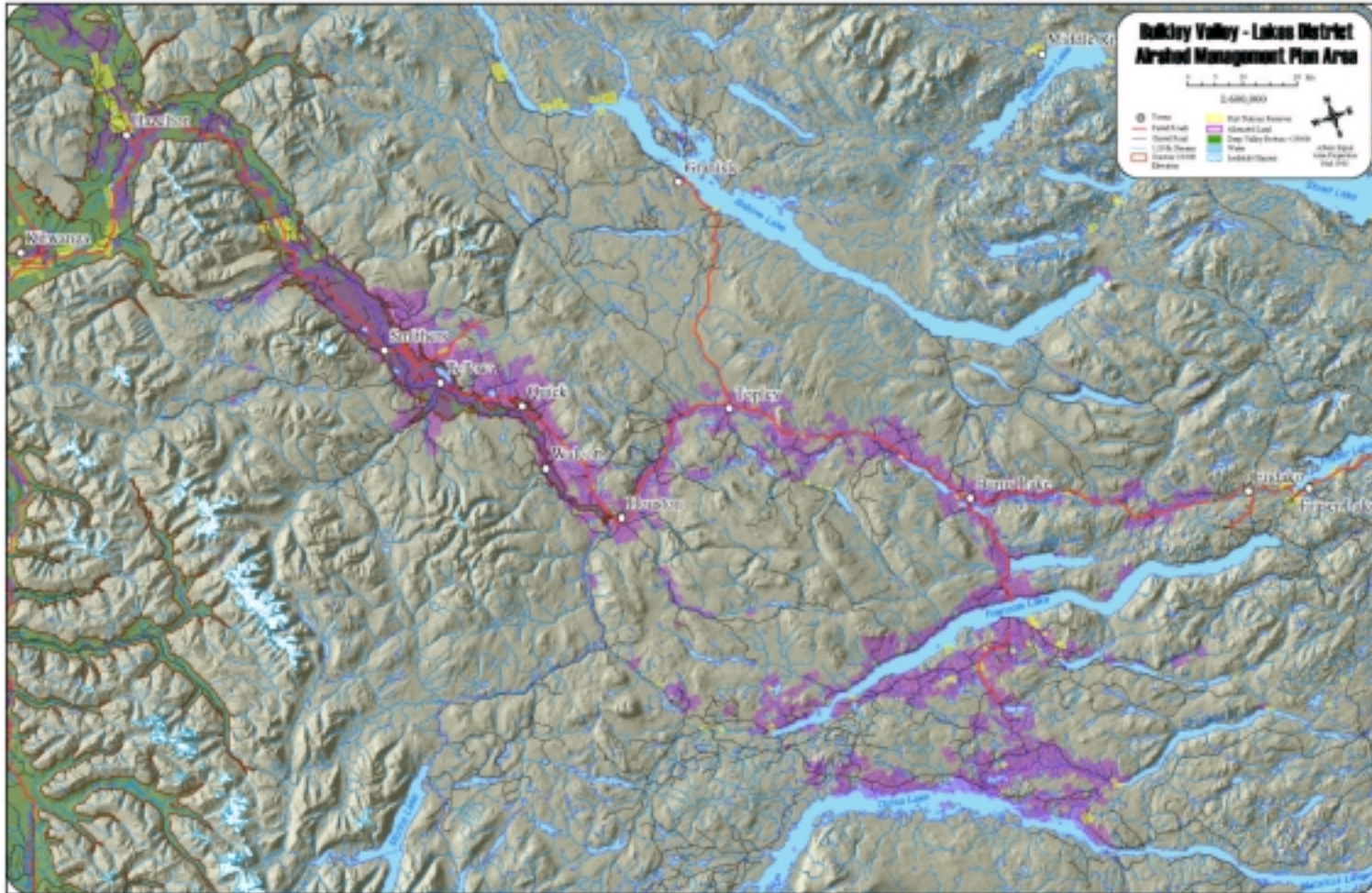
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<sup>9</sup> C. Arden Pope III, Richard T. Burnett, Michael J. Thun, Eugenia E. Calle, Daniel Krewski, Kazuhiko Ito, George D. Thurston. 2002. Journal of the American Medical Association Vol. 287 No. 9 1132-1141.

<sup>10</sup> Dr. D. Bates, Dr. J. Koenig, Dr. M. Brauer, RWDI West Inc. May 2003. Health and Air Quality 2002-Phase 1: Methods for Estimating and Applying Relationships between Air Pollution and Health Effects. Prepared for BC Lung Association.

<sup>11</sup> Summarized in Levelton Consultants Ltd., 2002 Air Quality Summary and Assessment for the Bulkley Valley and Lakes District. Prepared for MMOE, Skeena Region.

**Appendix C**  
*Map of the Airshed Planning Area*





## Appendix D

### *Summary of Submissions under Annual Clean Air Plan review and Responses*

#### **2006 (received as of June 1, 2006)**

Description (2006 submissions)	Response
Amend scope to include emissions from potential new sources and develop strategies. i.e. Telkwa Coalbed Gas, Molybdenum Mine, Northwest Premium Meat Co-op (slaughterhouse)	
Amend scope to include emissions from CN rail : diesel emission and coal dust	
Amend scope to include transportation emissions especially Telkwa – Smithers travel corridor.	Can address this as capacity allows – for now are partnering with other organizations as part of Clean Air Day celebrations to promote green commuting.
Amend scope to include agricultural balewrap plastic - many farmers are burning - could be ch.8 or ch.6	Can work with MSW department of MOE and Min. of Agric. to find solutions as well as implement other recommendations of Ch.7.
Revisiting slash burning – focus on reducing quantity of slash to be burned by finding alternatives.	Can make this the focus of the 2006 Burn Operators Forum.
Amend constitution to specifically include action on climate change and energy efficiency in context of community adaptive measures.	
Workplan should focus 70% on improving neighbourhood air quality via space heating emission reductions and 30% all other sources.	
Communications strategy should be updated and refined to include a specific communications plan for general education and neighbourhood air quality specifically.	

#### **2005**

Description (2005 submissions)	Response
Refine indicators listed in Table 3-3 – amend definition of Potential Episode Day to include PM2.5>15, add new indicator: 5 days where PM2.5>30, refine indicator fro improving air quality as follows “ PED average PM10 and PM2.5, Non-PED average PM10 and PM2.5”	Accepted – see new table 3-3 in 2006 version of Plan
Include new chart showing annual average of PM10 and 2.5 by community	Information presented as part of Ambient Air Quality Assessment reports and community presentations; available on website.
Ch. 4 – Resubmission: disagreement with wording of study findings from Prince George on effect of closing down beehive burners on air quality – new	Received –It was determined that wording is acceptable as

Description (2005 submissions)	Response
wording suggested.	originally written and changes will not be made. A new case study can replace the PG one with a local example when it becomes available.
Ch. 4 – update to reflect PIR closure of beehive burner; move PIR source to Ch.5	Accepted.
Complete Ch.5 to outline strategies for reducing emissions from NEWPRO	Accepted – see new Ch.5 in 2006 version of Plan
Ch.7 – add local government waste management operations to scope	Accepted with modifications
Ch.8 – add wood furnaces and outdoor boilers to scope	Accepted
Ch.10 – add unpaved “Tier 1” roads to Road dust scope and add BMP document to resources listing.	Not accepted – further consultation with communities needed on long term strategy. In the interim, specific concern on Buck Flats Road can be pursued more effectively through other channels. New listing added.
Ch.11 – Update to reflect new governance structure, workplan and financing	Accepted action – facilitator to draft new chapter for 2006 version.
Appendix E – update summary of co-located air quality and meteorology monitoring stations	Accepted
Addendum – Communications Strategy	Modified – refer to document in Ch.11 and make available upon request to membership.
Addendum – Constitution and Bylaws	Modified – refer to document in Ch.11 and make available upon request to membership.
Appendix F – update to reflect implementation of Forest Harvest Debris chapter re: cross-referencing with Smoke Management Plans.	Accepted with modification – remove Appendix F and accepted recommendation of Burn Operator Forum to include status update in each chapter.
Appendix H – Remove and provide link to provincial woodstove emissions inventory in Ch.8	Accepted.

## 2004

Description (2004 submissions)	Response
Make sure we follow through on shutdown of beehive burners and suggested we coordinate a market boycott.	Received – boycott strategy is not consistent with our preferred style of building cooperative solutions but it is acknowledged that direct community action to speed up process of shutting down burners can be taken in consultation with mills.
Description of NEWPRO operations for inclusion in Plan.	Accepted.
Update on implementation of strategies from Resource Management Burning Subcommittee.	Accepted.
Disagreement with wording of study findings from Prince George on effect of closing down beehive burners on air quality – new wording suggested.	Received – MOE staff will investigate and if changes to

Description (2004 submissions)	Response
	wording are warranted because statements are misleading then this will be done.
Expand scope of Clean Air Plan to include reduction of greenhouse gases and promotion of energy efficiency.	Accepted with modifications – workplan can include partnering with organizations on projects that have these goals but this is not a primary focus of the Plan at this point. These two goals are co-benefits of many of our air quality improvement strategies but for now we do not want to dilute our efforts.
Letter re: burning of MSMA treated wood in beehive burners	Accepted – not appropriate for AMS to get involved with this issue – refer to regulatory agencies.
Comments on Structure: Pursue society structure and form Committees to focus on areas of Education, Energy, and Industrial Sources.	Received. Will pursue structure options and draft a constitution.

**Appendix E**

*Summary of Co-located Air Quality and Meteorology Monitoring Stations in the BVL D (as of June 2006)*

Continuous Monitoring	Endako	Burns Lake Fire Centre	Houston Firehall	Telkwa <sup>12</sup>	Smithers St. Josephs
Location	Endako	#8-4 <sup>th</sup> Avenue	3382-11 <sup>th</sup> Street	1304 Birch Street	4020 Broadway Avenue
Meteorology	July 97-current	March 97-current	Nov 94-current	Jan 98-current	Nov 94-current
PM10		March 97-current	Feb 97-current	Feb 98-current	Feb 97-current
PM2.5		Install by Sept 06	Mar 01-current		July 04-current
Carbon Monoxide					June 97-current
Nitrogen Dioxide					June 97-current
Nitrogen Oxide					June 97-current
Ozone					June 97-current

Non-Continuous Monitoring	Hazelton	Kitwanga
Location	Northwest Community College	Kitwanga School
Meteorology		
PM10	05/04-current	05/04-current
PM2.5	05/04-current	

<sup>12</sup> The Telkwa station is currently not in operation due to vandalism in 2005. A new location is being sought along with funding to replace the damaged equipment.

**Appendix F**

*Sample Air Quality Advisory*

Note: This is a new appendix as of June 2006 and replaces the summary of initiatives completed by the Resource Management Burning Subcommittee.



**AIR QUALITY ADVISORY**

**Issued: Saturday April 8, 2006**

The following air quality conditions are current as of the time this advisory was issued, and are driven by **particulate matter** in the atmosphere.

Air Quality Index (AQI): 0-25 Good; 26-50 Fair; 51-100 Poor; 100+ Very Poor

Community	AQI	Health Advisory
Burns Lake	75	<b>yes</b>
Houston	44	<b>no</b>
Telkwa	n/a	<b>no</b>
Smithers	31	<b>no</b>
Terrace	10	<b>no</b>

As a result of the measured, elevated levels of **particulate matter**, the Ministry of Environment and the Northern Health Authority Smithers have issued the following **Health Advisory** for those communities noted above:

**People with reactive lung disease such as asthma should be aware that strenuous activity could trigger breathing problems.**

For further information on health effects, please contact your local medical health office at <http://www.northernhealth.ca> .

**Causes:** **Causes:** This air quality episode is driven mainly by road dust during the day and wood smoke from residential / commercial heating at night. Other contributors include emissions from industry, back yard burning, automobiles, trucks and open burning. A maximum hourly PM<sub>10</sub> value of over 209 micrograms per cubic metre was recorded at the Burns Lake Fire Centre station at 9:00 PM last night.

A low centre of low pressure will make its way across the BVLD over the next 48 hours. This will bring periods of precipitation throughout the weekend, starting Saturday and continuing through Sunday. As rain is a good dust suppressant, it is expected that the overall air quality in the BVLD will improve during the weekend.

**Mandatory Emission Reduction Actions**

Area ( <i>full definitions on page 2</i> )	Open Burning Restrictions
Lakes District including the Burns Lake area	<b>yes</b>
Bulkley Valley and Upper Skeena including the Houston, Telkwa, Smithers and Hazelton areas	<b>no</b>
Inland Coast including the Terrace and Kitimat areas	<b>no</b>
Inland North Coast including the Stewart area	<b>no</b>

- Open Burning Restrictions for those areas noted above, are in effect until further notice by order of the Director (as defined in the *Environmental Management Act*) and authorized under the Open Burning Smoke Control Regulation [B.C. Reg. 145/93, s. 4].

No new open burns may be initiated, and no additional material may be added to existing open burns for the duration of the restrictions.

A person who contravenes these prohibitions commits an offence [B.C. Reg. 145/93, s. 5.] and is liable on conviction to a fine of not more than \$200,000.

These Open Burning Restrictions apply to the

<b>Lakes District</b>
Lakes District which includes the Burns Lake area
Lakes District including the Burns Lake area defined as the Nechako Drainage basin, including all tributaries such as the Ootsa, Eutsuk, Tetachuck, Cheslatta, Francois and Endako Drainage basins.

**Voluntary Emission Reduction Actions**

Community	Voluntary Emission Reductions
Burns Lake	<b>yes</b>
Houston	<b>no</b>

Telkwa	<b>no</b>
Smithers	<b>no</b>
Terrace	<b>no</b>

- Residents are asked to avoid using wood-burning appliances that do not meet US EPA or CSA emission standards unless such stoves are the only source of heat.
- Residents who must heat with wood are asked to ensure that a clean burn is occurring at all times, using well cured wood and having an adequate supply of air to the fire.
- Residents are asked to follow local backyard burning bylaws, and avoid backyard burning where a bylaw prohibiting this practice does not already exist.
- All other open burning activities that can be delayed until air quality and weather improves are also asked to be avoided.
- Residents are asked to seek alternatives where possible, to the use of single occupancy motor vehicles, and to walk, bicycle or carpool to destinations.

**The Ministry of Environment will continue to monitor and reassess the situation.  
This Air Quality Advisory is in effect until further notice.**

Contacts:	<b>Skeena Region Air Quality Information Line 1-888-281-2992</b>	
Ben Weinstein (Phone: (250) 847-7224) Air Quality Meteorologist BC Ministry of Environment		Helen Joseph (Phone: (250) 638-6535) Air Resources Officer BC Ministry of Environment

## **Appendix G**

### *Custom Venting Index Forecasting*

#### **Appendix G-1: Letter to BC Timber Sales / Woodlot Licensee to introduce Custom Venting Index Forecasting Service**

Monday, November 17th, 2003

#### **Re: Availability of Custom Venting Index Forecasting Service**

My name is Ben Weinstein and I work with Ian Sharpe and Christine Rigby at the



Ministry of Water, Land and Air Protection (MOE) in Smithers. I am writing to inform you of a new service that MOE is offering with regards to venting requirements for burning under the Open Burning Smoke Control Regulation, for the remainder of this fall burning season, the option of custom **venting index forecasts**. As many of you are aware, Environment Canada issues a two-day venting index forecast each morning at 07:00. It has been brought to our attention that in some cases a two-day venting index forecast is not adequate and that a three-day venting index forecast is needed. We have therefore decided to offer the option of a three-day custom venting index forecast provided by myself, should it be desirable.

Perhaps I should take the time to introduce myself further.

I have an undergraduate atmospheric science degree from UBC. Upon graduating, I moved to Toronto to work as a weather forecaster for a small private weather firm. In August I accepted a position with MOE which involves air quality research, more specifically the task of compiling micro-emission inventories for the Bulkley Valley and Lakes District (BVL D). I feel confident that I can provide a product to meet your needs to open burn, as well as to meet the need of reducing impacts on air quality from that open burning.

Of course, there is a procedure to follow to get things under way. To properly meet your needs I will need to know certain data about you and your property namely:

- lot location
- elevation
- number and size of piles

If you send this information to me I will be happy to notify you when the venting is sufficient to ignite piles. I will contact you rather than you phoning each day to inquire about the venting conditions. Forecasts will be issued by 5:00 PM for the next three days.



Should you not have email access at your residence I can also fax it to you. Remember though that if you want a forecast for the next day I will need your pile data by 11:00 AM.

This service is available for forecasts Monday through Saturday (i.e. no forecasts will be available for Sundays), and is in addition to options already in place including:

- Environment Canada Public Venting Index Forecasts for Smithers and Burns Lake: 1-888-281-2992 or <http://MOEwww.gov.bc.ca/epd/epdpa/venting/venting.html>
- Environment Canada Spot Venting Index Forecast: Call (250) 491-1544 to set up an account and call 1-900-565-2255 to obtain spot venting index forecast (fee of \$25 per forecast, will need to provide latitude, longitude, elevation and aspect)
- Test Burn (as per outlined in the Open Burning Smoke Control Regulation only)

Please note that you must call 1-888-281-2992 before igniting piles or adding debris, to determine whether the Regional Waste Manager has issued any burn restrictions under the Open Burning Smoke Control Regulation (alternatively you can be added to an email notification list to be informed of any burn restrictions).

Using the custom venting index forecast service does not in any way limit your ability to use these other options, but in order to properly assess the usefulness of the custom forecast service, maximum use of this trial offer is needed. If at any time the custom forecast service is not available, please use whichever other option is most appropriate.

The custom forecast service is on trial for the current burn season. Its success will be evaluated at the end of the season and if it is successful, work will begin towards providing for a custom venting index forecast system to be in place for future burn seasons. This service is free for the remainder of this season. Once again, the aim is to provide a viable three day alternative to Environment Canada's two day forecasts, and to reduce impacts on air quality from open burning in the BVL D while allowing burns which need to happen.

Sincerely,

Benjamin Weinstein, BSc.  
Air Resources Technician  
Ministry of Water, Land and Air Protection

Box 5000, 3726 Alfred Avenue  
Smithers, B.C. V0J 2N0  
phone: 250.847.7224  
fax: 250.847.7591  
Ben.Weinstein@gems1.gov.bc.ca

## Appendix G-2: Description of custom venting index forecasting

### About venting

Good venting results when the atmosphere's ability to mix is strong. Mixing is a product of two components, namely atmospheric instability (the atmosphere's willingness to move air upwards from the surface) and wind. Instability can be created by various phenomena including daytime heating of the earth's surface, topography, and convection (upward movement) associated with low pressure systems, while wind is mainly a consequence of strong horizontal pressure gradients. (Other types of wind do exist on a smaller scale.)

The key aspect of mixing is that its components, instability and wind deal with movement in different directions. Instability (mainly) deals with movement in the vertical while wind (mostly) applies to movement in the horizontal. Good venting requires contribution from both components, though it can be satisfactory with strong representation from only one.

### Purpose

Checking the venting index forecast is a mandatory requirement for **licensees** wishing to perform prescribed forest harvesting/resource debris burning. Only under certain venting conditions (good today /good tomorrow, good today/fair tomorrow or in some areas fair today/fair tomorrow) is the burning of piled debris allowed. It was of concern to many licensees that the venting conditions issued by Environment Canada (EC) may not pertain to the area in which they wish to burn. Also, it was of concern that a two-day venting index forecast was not sufficient in order to properly manage all available resources; an area specific custom venting index forecast extending a third day was required. This was the service provided to any licensee who requested it.

### Method

Unlike Environment Canada, no direct formula was used to calculate venting conditions. Instead, conditions were determined using a number of numerical models which included EC's 4-panel prognostic charts, soundings, **meteograms**, **windgrams**, and stability charts as well as high resolution satellite imagery and animated forecast-loops. This information is readily available on the internet and is provided by Environment Canada, University of British Columbia, the National Oceanic and Atmospheric Administration as well as various other universities and weather companies. Final decisions were made using a combination of the modeled data results as well as risk management.

## Sample forecasts

### Good Venting

Here is my weather forecast. Good news and not so good news.

Tomorrow the venting conditions will be satisfactory at all locations. Good northeasterly winds and good mixing potential will act together to make burning conditions more than satisfactory.

I will skip Thursday for now and go to Friday, which will have very poor overall venting because the mixing potential is very small. As well, the winds will be weak up to 1250m.

Even burning at elevation above the mixing layer will not suffice, as the **atmospheric profile** will be extremely stable, and smoke will likely descend from altitude into the valley floors.

So that leaves Thursday, the day of transition. This shift in atmospheric structure will likely occur in the late afternoon. Thus Thursday's venting will be fair, for all locations.

Ben

### Poor Venting

Hi, I thought I'd give you a head's up on some unfortunate turn of events in terms of the venting.

Yesterday's optimism of the weekend's venting has vanished.

I mentioned yesterday that Saturday's venting would be good in some spots and fair in other spots above 800m, helped out by strong winds. Unfortunately, even these winds won't be able to work with the atmospheric profile that will be in place tomorrow. Low-level inversion followed by a pocket of warm air will ensure that no mixing occurs, even at elevations above 800m. Therefore, tomorrow's venting will be poor, even though Environment Canada has issued a 'good' forecast for tomorrow.

Sunday the winds will die down and the inversion will grow stronger, therefore venting will also be poor.

The reason for this about face has to do with the tracking and intensity of two low pressure systems, one that is centred in the eastern Yukon, and another offshore that will be passing through the region on Sunday. The intensity of the Yukon low has unexpectedly decreased, and as a result is not pulling air north with as much strength as is required to develop winds and move air masses.

Salvation may come on Monday when the offshore low I mentioned moves inland and leaves us behind. Right now our air source is the Pacific Ocean-warm and moist, and on Monday it looks to shift somewhat to being from the west and north.

This 'poor tomorrow poor Sunday' forecast applies to the entire region, at all elevations.

Ben

**Also**

Just a quick update, as I won't be in the office this afternoon.

The following is the venting index forecast for Burns Lake.

Fair tomorrow above 950m, poor below. Fair Friday above 950m, poor below and Poor Saturday. The incoming low pressure system has been delayed a day and so the warm front that I thought would pass through on Friday looks to be coming on Saturday instead. Conditions may improve after the front passes, though lately the weather has not been very cooperative.

## How to Contact Us

This Plan is reviewed annually to measure progress towards goals and the effectiveness of the indicators and strategies for reaching those goals. The Plan contents may be revised through a consensus-based process at the Annual General Meeting and Clean Air Plan Review, or through the Board of Directors with input from the community.

All proposed changes and their rationale should be submitted to the process facilitator or MOE for review at the annual Plan review meeting. Submissions will be available for review at any time, and will be circulated in advance and added to the agenda of each yearly plan review meeting.

Individuals or organization wishing to join BVLDAMS, assist in implementation of specific initiatives listed in the Plan, or submit amendments, should also direct their inquiries to the Plan Implementation facilitator at:

Footprint Environmental Strategies

Box 3746 Smithers, BC V0J2N0

E-mail: [info@cleanairplan.ca](mailto:info@cleanairplan.ca) Website: [www.cleanairplan.ca](http://www.cleanairplan.ca)

Phone: 1(250)847-1672