



bulkley valley - lakes district
airshed management society

COMMUNITY ACTION PLAN *for* CLEAN AIR

A five-year strategy

10



ROAD DUST

For full report, see www.cleanairplan.ca

LAST UPDATE: JUNE 1, 2006

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 (CaCl₂), magnesium chloride (MgCl₂) 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 CaCl₂ or MgCl₂ 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 CaCl₂ or MgCl₂ 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/m³ 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/m³.

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, 2006.
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. BMPs 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

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.

Road dust minutes and handouts from MOE/BVL DAMP workshop held January 12, 2003 to develop this chapter are posted at 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
- *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