Ministry of Environment and Climate Change Strategy

Foreword – Road Dust Emissions Inventory Uncertainties and Contributions to $PM_{2.5}$ in the Comox Valley

Road dust is not an important source of fine particulate matter ($PM_{2.5}$) in the Comox Valley. Ambient measurements of $PM_{2.5}$ show that concentrations are low during the warm/dry periods of spring and summer (when road dust impacts would be expected) and elevated during the cool/wet fall and winter periods primarily due to sources of wood smoke[1] such as open burning and residential wood heating.

To clarify, the road dust emissions estimates presented in the emissions inventory report entitled "Particulate Matter Emissions Inventory for the Comox Valley 2015 Base year" (RWDI 2017) are based on methods that include a large degree of uncertainty. For this inventory, a provincial road dust value taken from a national emissions inventory, was scaled down to the Comox Valley airshed level using predicted fuel-sales as a proxy – this was the best scaling information available for the region. This method resulted in an estimated road dust contribution to $PM_{2.5}$ of 46%. More accurate methods to estimate road dust emissions are based on a number of site-specific variables which are not known with any degree of certainty without extensive field measurements. Because of the large uncertainty in these estimates, road dust emissions are omitted from discussion in the report, as they are not a significant source of $PM_{2.5}$ in this area.

A better estimate of road dust contributions to fine particulate matter ($PM_{2.5}$) comes from a method called "ambient particle speciation," which measure the actual composition of air samples in some detail. Canada-wide studies[2] have determined that road dust can contribute between 3% and 9% of the $PM_{2.5}$ mass, and that this is restricted to periods after spring thaw when ground up traction material on paved surfaces is available for re-entrainment. For example, a particle speciation study in the interior town of Golden BC[3] found that road dust contributed up to 9% of the $PM_{2.5}$ mass (maximum contributions after spring thaw), while open burning and residential heating contributed > 70%. The estimate of 46% in the Comox Valley Emissions Inventory is, therefore, extremely inconsistent with results obtained elsewhere through more precise methods.

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[1] Plain, E. (2016). Patterns of Air Quality and Meteorology in Courtenay BC 2011-2016. BC Ministry of Environment and Climate Change Strategy.

[2] Ewa Dabek-Zlotorzynska, et al. (2010). Canadian National Air Pollution Surveillance (NAPS) PM2.5 speciation program: Methodology and PM2.5 chemical composition for the years 2003-2008. Atmospheric Environment, Vol. 45, Issue 3, January 2011.

[3] Evans G, and C. Jeong (2007). Data analysis and source apportionment of PM2.5 in Golden, British Columbia using Positive matrix Factorization (PMF).