Inventory of Common Air Contaminants Emitted in the Quesnel Airshed (2000).

Prepared for:

Quesnel Air Quality Roundtable

By

Earle Plain
Air Quality Meteorologist
Ministry of Water, Land, and Air Protection
Cariboo Region

BRITISH COLUMBIA

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The scaling of the 1995 provincial emissions inventory down to the Quesnel Airshed level was completed by Earle Plain of the Ministry of Water, Land, and Air Protection in conjunction with a contract to Levelton Engineering Ltd.

Glossary of Terms

AP-42	U.S. EPA Compilation of Air Pollutant Emission Factors.
EPA	Environmental Protection Agency.
CO	Carbon monoxide.
NOx	Nitrogen oxides, including nitric oxide and nitrogen dioxide. Reported as nitrogen dioxide equivalent.
SOx	Sulphur oxides, including sulphur dioxide and sulphur trioxide. Reported as sulphur dioxide equivalent.
TRS	Total reduced sulphur, including dimethyl disulphide, dimethyl sulphide, methyl mercaptan, and hydrogen sulphide.
VOC	Volatile organic compounds, including carbon, but excluding: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, methane, ethane, methlylene chloride, methyl chloroform, many chlorofluorocarbons, and certain classes of perfluorocarbons.
TPT	Total particulate matter, including PM_{10} and $PM_{2.5}$.
PM_{10}	Particulate matter with aerodynamic diameters less than or equal to 10 micrometres. This group can be considered inhalable particulate.
$PM_{2.5}$	Particulate matter with aerodynamic diameters less than or equal to 2.5 micrometres. This group can be referred to as the fine fraction of $PM_{10,}$ or respirable particulate matter.
LDGV	Light duty gasoline powered vehicle (passenger vehicles).
LDGT1	Light trucks (gasoline powered), under 2722 kg (6000 lb.) GVW.
LDGT2	Light trucks (gasoline powered), 2722 kg (6000 lb.) GVW to 3856 kg (8500 lb.) GVW.
HDGV	Trucks and Buses (gasoline powered), over 3856 kg GVW.
LDDV	Light duty diesel powered vehicle (passenger vehicles).
LDDT	Light trucks (diesel powered), under 3856 kg GVW.
HDDV	Heavy duty diesel powered vehicle (trucks and buses) over 3856 kg GVW.
MC	Motor cycles.

1.0 Introduction

This report has been prepared as part of the background information required to prepare an Airshed Management Plan for the City of Quesnel. In order to develop Airshed Management strategies for common air pollutants emitted in the Quesnel Airshed (Figure 1), the completion of a detailed emission inventory is a necessary first step. It is anticipated that the emissions inventory values will be used in an Airshed dispersion modelling exercise to determine ambient air impacts and to apportion contributions to poor air quality from major sources (Plain and Zirnhelt, 2000).

1.1 Scope of Work

The inventory contained in this report covers the emissions generated within the Quesnel Airshed, some 33,670 hectares of land (Figure 1). Emission sources were grouped into the following major categories (sources investigated within each category are also summarized):

PERMITTED SOURCES
All point sources in the Quesnel Airshed that are *Permitted* under the Ministry of Water, Land, and Air Protection Waste Management Act to discharge air contaminants.
Permitted sources are grouped into the following major categories: Pulp Industry, Sawmill & Planing Mill Products Industry, Softwood Veneer and Plywood Industry, Medium Density Fibreboard Industry, Value Added Millwork Industries, Asphalt Industry, Ready-Mix Concrete Industry, Electrical Industrial Equipment Industries, and Petroleum Products – Wholesale.
COMMERCIAL SOURCES
Includes emissions from the following source categories: Oil and Gas Industry, Land Clearing Burning, Restaurants, Light Industry, Welding Shops, Space Heating, Agriculture, Landfills, Building Construction/Demolition, Gravel Pits, Bakeries, Asphalt Application, Dry Cleaning, Metal Degreasing, Printing Inks, Glues Adhesives and Sealants, and Paint Applications.
MOBILE SOURCES
Includes emissions from the following source categories: Aircraft, Marine (boats), Rail (trains), Light Duty Vehicles, Heavy Duty Vehicles, Off-Road Vehicles, Road Dust from Unpaved Surfaces, and Road Dust from Paved Surfaces.
RESIDENTIAL SOURCES
Includes emissions from the following source categories: Wood Stoves, Backyard Burning, Tobacco, Barbecues, Natural Gas Heating, Structural Fires, Fuel Oil Heating, LPG Heating, Lawn Equipment, and Consumer Products.
NATURAL SOURCES
Includes VOC and NOx emissions from Wildfires and Vegetation. Does not include particulate estimates.

The air contaminants selected for this inventory are consistent with those reported in past provincial inventories but are also contaminants of concern in the Quesnel Airshed. They include Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulphur Oxides (SOx), Total Reduced Sulphur (TRS), Volatile Organic Compounds (VOC), Total Particulate Matter (TPT), Fine

Particulate Matter less than 10 microns in diameter (PM_{10}) and, Fine Particulate Matter less than 2.5 microns in diameter ($PM_{2.5}$).

It should be noted that emissions inventory estimates for TPT, PM_{10} and $PM_{2.5}$ are for primary particulates only. Secondary particulate matter, gaseous matter that may eventually convert to particulate matter through atmospheric chemical reactions (i.e. SO_2 to SO_4), is not included.

1.2 Methodology

This Airshed specific emissions inventory was calculated using the information from the last BC provincial emissions inventory (1995) as a baseline. In many cases efforts were then made to update the information in the database to reflect loadings to the Quesnel Airshed based on the year 2000. The title of the baseline document is "1995 British Columbia Emissions Inventory of Common Air Contaminants and Greenhouse Gases (Report and Appendices)" (MELP, 1999). The 1995 emission values were adjusted by either applying a Quesnel Airshed factor (i.e. population or land use ratio) to regional emission estimates for each source category or by using Quesnel specific values where a population or land base ratio was not deemed appropriate. Levelton Engineering Ltd. completed this initial work under contract.

The following sections describe what methods were used to scale down the 1995 provincial inventory to Quesnel Airshed values.

1.2.1 Permitted Sources

The 1995 point source inventory for British Columbia (O'Neil, 1996) was used as a base case for the Permitted Sources section of this inventory. Any changes made to this original report are reflected in the electronic version on the Air Resources Branch web-site (MELP, 1999). The base data for this point source inventory came from the WASTE system – a large computer database residing on a VAX mainframe system. Emission totals for each air contaminant were calculated based on discharge permit limits. If the Waste Management permit does not specify a limit for a specific contaminant, emissions are determined using emission factors for the sources located at each site (WASTE Permit Fees factors and/or USEPA AP-42 factors).

The use of WASTE system permit fees data for inventory purposes is generally considered to be conservative (higher). Release estimates are permit limits that are not to be exceeded, and generally do not reflect the average operating emissions of industrial sources which are lower due to down time and other operating factors. However, an under estimation could also occur for some sources that may operate above prescribed emission limits (i.e. older sawmill cyclones). Where provided, directly measured emissions data has been incorporated into this inventory. This is the case for Cariboo Pulp and Paper, where stack monitoring data was used to estimate emissions for the larger sources at this facility. It is anticipated that this inventory will continue to be refined as industry undertakes more direct measurements of their point source discharges. In addition, emission estimates from the remaining beehive burner at Quesnel Waste Disposal

reflect current operating conditions. Emissions from this source are based on the most recent reported volume of waste disposed (year ending April 2001).

Other updates to the 1995 emissions inventory include the removal of sources that are no longer operating (as of the year 2000) and the addition of new sources since the original inventory was completed. These changes include the shut down of two beehive burners in the airshed (one at Weldwood Westply and the other at Quesnel Waste Disposal), the shutdown of two value added plants (Nazko and Golden tree), the shutdown of boiler number 3 at Weldwood Westply, and the shutdown of the sawmill division at Weldwood Westply. New industrial sources that have been added to the inventory include emissions from a value-added plant (Shane Pont DBA Custom Wood Products Ltd.) and emissions from a new sawmill facility near Cariboo Pulp (Quesnel Lumber Division of Weldwood). Also, original emission estimates for the wood-waste burner at Cariboo Consultants were cut in half due to reduced operating times at this facility. Table 1 summarizes the permitted sources used in this inventory, along with their respective emissions to the Quesnel Airshed. Note that in the base case emissions inventory, emissions from some sources were calculated according to more than one source classification code (SCC). This is done to obtain better emission estimates for that source. If more than one SCC code is used for a source, the emission estimates are multiplied by a factor to form a composite value (i.e. if three SCCs are used, each estimate is multiplied by 0.3333 to form a composite sample for that source).

Also note that not all emission sources from the Permitted sites are included in this summary. For instance, there was no attempt to calculate fugitive dust emissions from pulp mill chip piles as there are no emission factors available for this source type.

1.2.2 Commercial Sources

Information from three different inventory reports (Gibson 1998; Jennejohn et al. 1996; Fam, 1996) were used as the baseline for commercial source compilation. These reports also contain the assumptions and emission factors used to calculate emissions from commercial sources. For most commercial source emissions, a population ratio between Quesnel and the Cariboo Region as a whole was used to scale down regional emissions to the Quesnel Airshed level. The population for the City of Quesnel and for the area encompassed by the Quesnel Airshed was determined from 1996 census data as provided by Statistics Canada (1996). Dwelling counts were obtained in the same manner. It was assumed that 70% of the population and dwelling counts accounted for in the Quesnel Census Agglomeration data were within the Quesnel Airshed. The population for the Quesnel Airshed was calculated to be 20,238 (8,468 in city limits and 11,770 outside city boundaries) while the number of dwellings was 7,375. Table 2 summarizes the prorations used to scale down each commercial source category and also lists respective source emissions to the Quesnel Airshed.

The total area (in hectares) for each land-use category was calculated by staff in the Ministry of Water Land and Air Protection Cariboo Region GIS section. These land-use categories were used to calculate ratios (i.e. Quesnel Airshed vs. Cariboo Region) for forested lands, agricultural lands, etc. Information provided by the Ministry of Agriculture (Fofonoff, pers. comm.)

indicates that there is only a single agricultural area (268 ha by the Fraser River NW of the downtown area) that is intensively farmed in the Quesnel Airshed. The remainder of the agricultural land is in the form of perennial forage crops (alfalfa, clover, and grasses). All areas are irrigated and the rotation is in the neighbourhood of 6-10 years where a portion of an area is broken open and re-seeded. There is no grain production in the area and there are limited weed control programs using herbicides - generally only backpack applications. For the agricultural emission categories that apply only to operations that are intensively worked (i.e. fertilizer application, pesticides, fugitive dust, etc.) only this intensively farmed area was used to calculate ratios. Livestock statistics for the Quesnel area were obtained from Statistics Canada.

In the original inventory, there are no estimates for open-burning, only for prescribed burning (major forestry/wildlife burns). None of these types of burns occurred within the Quesnel Airshed boundaries in 2000. However, open-burning of land-clearing debris does occur within the Airshed boundaries and can contribute significantly to particulate matter loading. Emissions from the burning of land clearing debris were calculated by assuming that at least 80 m^3 of material (8 10 m^3 piles) was burned for each reference number issued by the Ministry of Forests (MOF) in the Quesnel Airshed. The total number of burn reference numbers issued by the MOF within the Quesnel Airshed was 36 in 1999 and 64 in 2000. Using the higher number yields a total of 5,120 m^3 of fuel burned. A conversion from volume of material to weight of material was completed using the most conservative conversion factor available (Dobie and Wright, 1992). It was assumed that all the debris was Douglas Fir (highest weight per species) and that there was at least 50% moisture content in the green material. This yielded 4,613.12 tonnes of green material burned in 2000 within the Airshed. The emission factors provided by Gibson (1998) were then applied to the final weight of the material burned during prescribed burning.

Emission factors for spot/landing (piles) burns - (g/kg)

CO	NOx	SOx	VOC	CH4	TPT	PM_{10}*	$PM_{2.5}$*
101	1.5	5	4.27	5.7	6	5.94	5.4

*Tests conducted by USEPA indicate that 99% of TPT is PM_{10} and 90% of TPT is $PM_{2.5}$.

1.2.3 Residential Sources

Methods used to calculate emissions from residential sources are summarized in Gibson (1998). The Regional emissions from residential sources were scaled down to Quesnel Airshed values by using either a ratio based on population or on the number of dwellings.

Table 3 summarizes the proration parameters used to scale down each residential source category and also lists respective source emissions to the Quesnel Airshed.

1.2.4 Natural Sources

Assumptions and methods used to calculate provincial emissions from natural sources are summarized in Gibson (1998). These emissions were scaled down to airshed values by using the total area (hectares) of various land-use types (i.e. total forested land, rangeland, etc.) to calculate scaling ratios.

Table 4 summarizes the prorations used to scale down each natural source category and also lists respective source emissions to the Quesnel Airshed.

1.2.5 Mobile Sources

Assumptions and methods used to calculate provincial emissions from mobile sources are summarized in Fam (1996). Table 5 summarizes the prorations used to scale down each mobile source category and also lists respective source emissions to the Quesnel Airshed. Most mobile emissions were scaled according to a population ratio. The exceptions are described below.

For emissions from aircraft, Levelton Engineering Ltd. used actual numbers of landings/take-offs (LTOs) for each aircraft type as the base quantity. An LTO cycle includes: approach, taxi/idle in, taxi/idle out, take-off and climb out. It was assumed that emissions released above 30,000 feet do not contribute to local air quality. The LTO values for each aircraft type were extracted directly from the 1995 mobile source emissions inventory and emission factors for aircraft (Fam, 1996) were applied to those values.

Road dust calculation assumptions were made according to the numbers of each vehicle type in BC (Fam, 1996) and the average kilometres travelled by each vehicle type. Vehicle kilometres travelled (VkmT) by each vehicle type for the airshed were calculated by subtracting the VkmT for the lower mainland from the BC total. These net values were scaled down to the Quesnel Airshed by using a population ratio of Quesnel to the rest of BC (less the lower mainland). It was then assumed that all vehicle types spent 95% of the time on arterial roads (paved) and 5% of the time on unpaved surfaces. The total kilometres travelled by each vehicle type was then multiplied by a snow corrected emission factor (see Fam 1996) to calculate TPT, PM_{10} and $PM_{2.5}$. This factor assumes that for 143 days of the year (average period of snowfall cover), dust is not released from paved and unpaved roads. Road dust due to traction material application (re-entrained dust following spring thaw) was calculated by assuming that all paved roads in the airshed behaved as unpaved surfaces for 7 days out of the year (2% of the time). Table 7 (a-c) summarizes the results of these road dust calculations by vehicle type.

There are only two recreational lakes within the Quesnel Airshed, Dragon Lake and Bouchie Lake. Therefore the only Marine emissions that were included in this scaling exercise were from recreational vessels, in/outboards, gasoline and diesel (see Table 5).

2.0 Emission Summary

An emission summary for all source categories is presented in Table 6. Emission summaries by parameter are also included graphically in the Appendix of this report. For instance, the major source contributions to Carbon Monoxide are presented in Appendix A. In addition, each major source category is further broken down to reveal the sources within that category that generate the highest atmospheric loading (tonnes/year) of each pollutant.

Note that graphs were not produced for total reduced sulphur (TRS) as these emissions are primarily from the pulp industry. TRS is not included in the SOx category for permitted sources.

When interpreting the pie charts, one should also examine the accompanying tables at the top of the page that shows the total loading of the pollutant from those sources.

2.1 Carbon Monoxide (CO)

Permitted and Mobile sources emit the most CO into the Quesnel Airshed (Appendix A) at 42.41% and 39.91% of the total CO loading respectively. Residential sources come in a distant third at 13.24% while Commercial sources contribute roughly 4.44% of the total CO loading to the airshed.

Of the Permitted sources, the pulp industry emits the greatest share of the carbon monoxide emissions (58.50%) followed by the sawmill and planing mill industry (33.19%) and softwood veneer and plywood sectors (4.59%). The power boiler at Cariboo Pulp is the largest source of CO from the pulp industry while the remaining beehive burners and hog fuelled energy systems emit the largest volume of CO from the sawmill and planing industry.

The largest Mobile source of carbon monoxide is light duty vehicles (92.97% of the Mobile sources total). The main Residential source of CO is wood-stove emissions (93.55% of the total). Backyard burning contributes significantly less carbon monoxide emissions to the airshed because it is limited to outlying areas (prohibited within city limits) while wood-stove use is prevalent throughout the entire airshed. The largest Commercial source of CO is from land clearing burning (99.23% of the total loading from this category), followed by emissions from space heating and agricultural burning.

2.2 Nitrogen Oxides (NOx)

Of all major source categories, Permitted sources emit the most NOx into the Quesnel Airshed at 1,882 Tonnes per year (72.34% of the total). The pulp industry and the sawmill and planing mill industry make up over 76% of the total NOx emissions from Permitted sources (Appendix B).

Mobile sources emit roughly 25% of the total NOx emissions in the airshed. Light duty vehicles, heavy duty vehicles and rail account for nearly 97% of the Mobile NOx emissions. Residential sources account for 1.22% of the Nitrogen Oxides emissions in the airshed. Space heating

accounts for most of the residential NOx emissions. Commercial space heating and land clearing burning emissions make up the bulk of the NOx emissions from the Commercial sector.

It should be noted that NOx emissions are important precursors to ground-level ozone formation (smog). NOx can also be converted to secondary particulates such as particulate nitrate. Nitrate particles are very good at scattering visible light and can result in visibility degradation. In addition, NOx gases and secondary particles can enter clouds where they continue to react and eventually rain out as acid deposition.

2.3 Sulphur Oxides (SOx)

Permitted sources dominate as the main source of SOx in the Quesnel Airshed at 94% (518 Tonnes/Year) of the total emissions (Appendix C). Of those emissions, the pulp industry is the dominant source at 85% of the permitted loading to the Airshed. Note that TRS is not included in SOx emissions from the pulp industry.

Mobile sources contribute only 4.4% (24 T/Y) of the total sulphur oxides emissions to the Airshed. Light duty vehicles, rail and heavy duty vehicles are responsible for nearly 98% of these Mobile SOx emissions. Again, space heating dominates as the main SOx source from the Commercial and Residential sectors.

It should be noted that SOx emissions readily convert to secondary sulphate particles that can either deposit to the ground through dry deposition or be rained out of clouds as acid rain (wet deposition). Sulphate particles that remain in the atmosphere are also very good light scatterers and can be responsible for significant visibility impairment (Malm, 2000).

2.4 Volatile Organic Compounds (VOCs)

A large component of the VOC emissions come from the Permitted sources sector (37.49%) followed by Residential sources at 19.20%, Natural (biogenic emissions) at 17.86%, Mobile at 16.45% and Commercial sources at 9.00% of the total loading (Appendix D). The largest Permitted sources include the sawmill and planing industry (wood residue burners, energy systems, and dry kilns) at 40.32% of the total, the pulp industry (power boiler) at 32.42% and the medium density fibreboard industry at 19.41%.

The main source of VOCs from the Residential sector is wood-stove emissions while light duty vehicle emissions dominate the Mobile source category at 87.52% of the total. Commercial sources of VOCs come mainly from the oil and gas industry (refuelling and spills at gas stations), landfills and from paint applications.

2.5 Total Particulate (TPT)

Note that secondary particulates are not included in these loading estimates. Total particulate generally includes particles of all diameters (fine particles and coarse particles). From the Mobile source category (Appendix E), road dust contributes the majority of TPT. Therefore road dust has been broken out separately into paved and unpaved road dust to better understand and illustrate its contribution to overall TPT loading to the airshed.

Paved road dust contributes 40.61% of the TPT loading to the Quesnel Airshed followed by Permitted sources at 35.50% and unpaved road dust at 19.57%. Of the Permitted sources, the pulp industry and the sawmill and planing mill products industry combine to make up 70% of the total emissions from this sector while 19% come from the Softwood Veneer and Plywood manufacturing.

Commercial sources contribute 2.04% (192.78 T/Y) of the total TPT loading to the airshed. Emissions from gravel pits make up the highest TPT loading from this category (75.82% of the total).

Paved road dust is generated by the grinding action of vehicles of all types travelling over material that has been deposited on the roads by either wind action or directly from vehicles (i.e. wood chips, mud, traction material, etc.). It should be noted that fugitive dust from activities around industrial areas (i.e. log yards) is not accounted for in these calculations. These emissions are likely significant in the Two-Mile Flat industrial area.

2.6 PM_{10}

The emission factors used in calculating road dust contributions to PM_{10} reflect the fact that mechanical grinding (vehicles travelling over material on the road) primarily results in coarse fraction particles. Permitted sources emit the most PM_{10} (50.07% of the total loading) into the airshed with paved and unpaved road dust contributions at 22.93% and 20.60% respectively (Appendix F). It is evident that more of the Permitted source material remains in the fine fraction. The pulp industry and the softwood veneer and plywood industry combined emissions account for over 54% of the PM_{10} emissions to the airshed. The sawmill and planing industry contributes 38.5% to the total loading of PM_{10}.

Residential sources are beginning to come more into the picture at 4.63% of the total airshed PM_{10} loading. The dominant Residential source of PM_{10} emissions is space heating with wood stoves. It should be noted that although the total Residential emissions of PM_{10} are low relative to other sources in the airshed, they occur where people live. In addition, fine particulate emissions from most residential sources are released close to ground level where dispersion is less effective. In addition, emissions from sources such as wood-stoves are released primarily at night, when dispersion is at it's worst. As a result these emissions may have short-term localized impacts.

Again, secondary particulates resulting from chemical conversion of SOx and NOx emissions are not included in PM_{10} loading estimates.

2.7 $PM_{2.5}$

Permitted sources emit the most $PM_{2.5}$ into the Quesnel Airshed (Appendix G) at 66.59% of the total loading while paved and unpaved road dust contributions drop to 11.28% and 10.76% of the total respectively. As the particle size fraction decreases, the pulp industry sector begins to dominate the picture (41.61%) of the Permitted sources contributing to total loading for $PM_{2.5}$. This makes sense as there are more combustion sources in this sector than in the sawmill and planing products industry (35.59%). Combustion sources such as energy systems and wood residue burners dominate in the Permitted sector.

Residential wood stoves contribute the most from the Residential sector which now make up 8.69% of the total $PM_{2.5}$ loading, while land clearing burning accounts for most of the $PM_{2.5}$ emissions from the commercial sector.

3.0 Conclusions

Permitted sources emit the most CO, SOx, NOx, VOC, TRS and fine particulate matter (PM_{10} and $PM_{2.5}$) to the Quesnel Airshed. Road dust contributes the most to TPT loading to the Airshed. There is a relatively even split in VOC emissions between all the major source categories.

While there are uncertainties associated with road dust calculations, it is evident that effective control of this source will have a positive impact on ambient particulate matter values. The combined contribution of paved and unpaved road dust to TPT, PM_{10} and $PM_{2.5}$ loading to the Quesnel Airshed is 60.18%, 43.53% and 22.04% respectively.

As evidenced from the total loading of fine particulates to the airshed from Permitted sources, management should also be focussed on this area. Secondary particulate formation from SOx and NOx also needs to be investigated through dispersion modelling and ambient monitoring.

4.0 Recommendations

When the next air quality summary report for Quesnel is prepared, the emissions inventory for the Quesnel Airshed should be refined further and summarized in an emissions section. It is recommended that the following work be carried out to assist with these refinements:

a) Point sources: Obtain updated emissions data from companies in the airshed that conduct source testing on a regular basis and examine trends in the annual statistics since 1995.
b) Residential sources: Conduct a survey on wood stove use within the Quesnel Airshed.

c) Natural sources: Examine current literature on natural source contributions to particulate matter and carbon monoxide. Search for factors that may be used to account for fugitive dust contributions from exposed river banks along the Fraser River.
d) Mobile sources: Contact ICBC to obtain a list of the actual number of vehicles registered in Quesnel by vehicle type. Contact the Quesnel Airport to confirm Landing/Take-off values for each type of aircraft. Obtain fuel supply and usage statistics from major fuel companies in the Airshed (Fudge, personal communication).
e) Commercial sources: determine actual numbers of each commercial source type in the Airshed (e.g. restaurants, bakeries, autobody shops, etc.). Obtain gravel pit production numbers and the crushing methods used (Fudge, personal communication).

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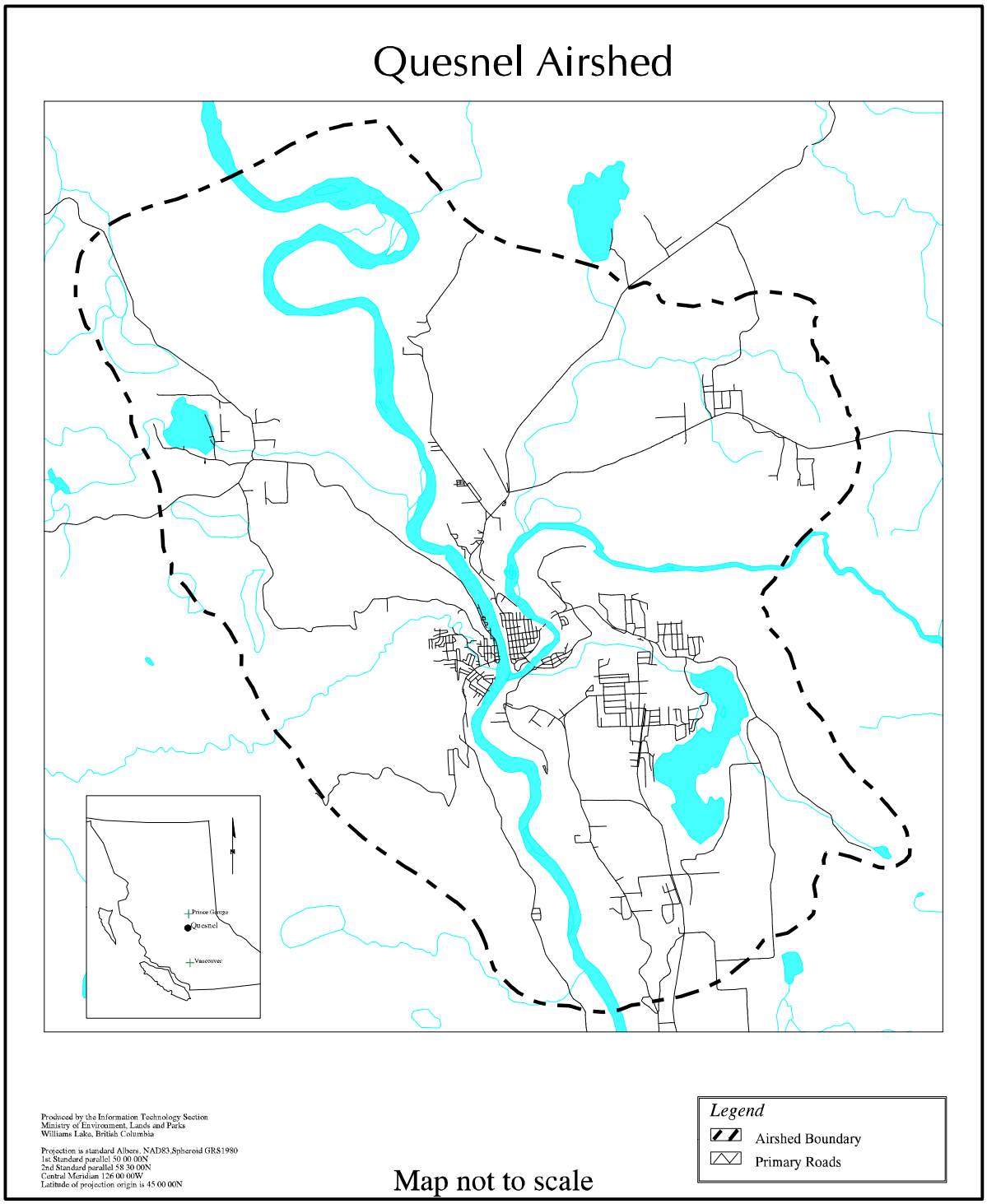
FIGURES

Figure 1. **Quesnel Airshed Boundaries.**



TABLES

Table 1. Permitted Source Summary and Respective Emissions to the Quesnel Airshed (Tonnes/Year).

Perm no.	Client Name	Sic description	Site name	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
1578	Cariboo Pulp And Paper Company Limited	Pulp Industry	Cariboo pulp, recovery stack	459.00	157.73	171.00	4.00		413.00	342.79	284.97
1578	Cariboo Pulp And Paper Company Limited	Pulp Industry	Cariboo, power boiler stack	974.46	132.81	237.00	0.79	330.42	264.00	253.44	224.41
1578	Cariboo Pulp And Paper Company Limited	Pulp Industry	Cariboo pulp, package boiler	21.77	108.93	0.66		5.75	3.29	3.29	3.29
1578	Cariboo Pulp And Paper Company Limited	Pulp Industry	Cariboo pulp, dissolving tank stack			0.75	7.37		20.00	19.60	18.60
1578	Cariboo Pulp And Paper Company Limited	Pulp Industry	Cariboo pulp, lime kiln stack	15.77	157.73	33.00	1.54		38.00	30.02	30.02
1578	Cariboo Pulp And Paper Company Limited	Pulp Industry	Cariboo pulp, bleach stacks, Slaker, MCO2, brown stock			11.81	8.52				
1578 Total				**1471.0**	**432.4**	**421.2**	**22.2**	**336.2**	**738.3**	**649.1**	**561.3**
2576	Quesnel Waste Disposal Ltd.	Sawmill & Planing Mill Products Industry	Quesnel waste burner #1	1750.97	13.47	1.35		148.16	269.36	148.15	107.74
2576 Total				**1750.9**	**13.5**	**1.4**		**148.2**	**269.4**	**148.2**	**107.7**
3248	Imperial Oil & Mccoll-Frontena	Petroleum Products, Wholesale	Petroleum storage tanks					0.10			
3248	Imperial Oil & Mccoll-Frontena	Petroleum Products, Wholesale	Tank truck loading rack					0.10			
3248 Total								**0.2**			
3257	Petro-Canada	Petroleum Products, Wholesale	Petroleum storage tanks (10)					0.10			
3257	Petro-Canada	Petroleum Products, Wholesale	Tank truck loading rack					0.10			
3257 Total								**0.2**			
3725	Weldwood Of Canada Limited	Softwood Veneer and Plywood	Natural gas fired boiler stack	13.62	187.24	0.20		0.60	0.34	0.34	0.34
3725	Weldwood Of Canada Limited	Softwood Veneer and Plywood	#2 hog fuel boiler	192.37	25.02	5.53		62.26	203.64	183.28	154.77
3725	Weldwood Of Canada Limited	Softwood Veneer and Plywood	Gas fired boiler	13.62	187.24	0.20		0.60	0.34	0.34	0.34
3725	Weldwood Of Canada Limited	Softwood Veneer and Plywood	3 Veneer Dryer lines (5 stacks each)					10.09	206.72	119.89	39.27
3725	Weldwood Of Canada Limited	Softwood Veneer and Plywood	Sander Baghouse						18.53	7.41	4.69
3725	Weldwood Of Canada Limited	Softwood Veneer and Plywood	Lilly Pad Chip Cyclone						16.28	6.51	3.26

Perm no.	Client Name	Sic description	Site name	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
3725	Weldwood Of Canada Limited	Softwood Veneer and Plywood	Two chip cyclones						34.88	13.95	6.98
3725 Total				**206.0**	**212.3**	**5.7**		**72.9**	**643.6**	**396.7**	**241.9**
5350	C And C Wood Products Limited	Value added Millwork Industries	Nat. Gas lumber dry kiln					1.11	3.34	1.94	0.64
5350	C And C Wood Products Limited	Value added Millwork Industries	Nat. Gas lumber dry kiln	0.84	4.19	0.03		0.22	0.13	0.07	0.02
5350	C And C Wood Products Limited	Value added Millwork Industries	Small nat gas Lumber dry kiln					0.18	0.54	0.31	0.10
5350	C And C Wood Products Limited	Value added Millwork Industries	Small nat gas Lumber dry kiln	0.08	0.40			0.02	0.01	0.01	
5350	C And C Wood Products Limited	Value added Millwork Industries	Large nat gas Lumber Dry Kiln					1.66	4.97	2.88	0.94
5350	C And C Wood Products Limited	Value added Millwork Industries	Large nat gas Lumber Dry Kiln	9.45	47.26	0.29		2.50	1.43	0.83	0.27
5350	C And C Wood Products Limited	Value added Millwork Industries	Five cyclones						10.60	4.24	2.12
5350 Total				**10.4**	**51.9**	**0.31**		**5.7**	**21.0**	**10.3**	**4.1**
5737	Cariboo Consultants Ltd.	Sawmill & Planing Mill Products Industry	Woodwaste burner	374.50	2.88	0.29	0.00	31.69	57.62	31.69	23.05
5737 Total				**374.50**	**2.88**	**0.29**	**0.00**	**31.69**	**57.62**	**31.69**	**23.05**
5804	Quesnel River Pulp Company	Pulp Industry	Eleven cyclones						273.23	51.42	5.10
5804	Quesnel River Pulp Company	Pulp Industry	Package boiler	5.58	76.80	0.08		0.24	0.14	0.14	0.14
5804	Quesnel River Pulp Company	Pulp Industry	Bio gas flare			6.49	0.07				
5804	Quesnel River Pulp Company	Pulp Industry	Off gas scrubber			12.20	0.14				
5804	Quesnel River Pulp Company	Pulp Industry	Pulp flash dryer	12.95	178.05	0.20		0.57	0.32	0.32	0.32
5804 Total				**18.5**	**254.9**	**18.9**	**0.02**	**0.8**	**272.7**	**51.9**	**5.6**
7081	Ever-Redi Concrete Products Ltd.	Ready-Mix Concrete Industry	Concrete batch plant						0.01	0.01	
7081 Total									**0.01**	**0.01**	
7512	West Fraser Mills Ltd.	Sawmill & Planing Mill Products Industry	Two woodwaste hot oil energy recovery systems	362.66	46.78	10.34		116.42	250.24	225.21	190.18
7512	West Fraser Mills Ltd.	Sawmill & Planing Mill Products Industry	Four cyclones						74.01	29.61	14.80
7512	West Fraser Mills Ltd.	Sawmill & Planing Mill Products Industry	Two cyclones (planermill)						55.54	22.22	11.11
7512	West Fraser Mills Ltd.	Sawmill & Planing Mill Products Industry	Three pneumatic conveying systems						11.88	4.75	2.38
7512	West Fraser Mills Ltd.	Sawmill & Planing Mill Products Industry	Five hot oil dry kilns					0.02	0.05	0.03	0.01
7512 Total				**362.7**	**46.8**	**10.3**		**116.4**	**414.2**	**289.7**	**221.4**
7841	Quest/Tolko Wood Products	Sawmill & Planing Mill Products Industry	Lumber dry kilns	126.36	632.27	3.81		59.66	97.91	56.79	18.6

Perm no.	Client Name	Sic description	Site name	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
7841	Quest/Tolko Wood Products	Sawmill & Planing Mill Products Industry	Seven cyclones						158.79	63.52	31.76
7841 Total				**126.4**	**632.3**	**3.8**		**59.7**	**256.7**	**120.3**	**50.4**
7844	Slocan Forest Products Ltd.	Sawmill & Planing Mill Products Industry	Five nat. Gas lumber dry kilns					39.16	117.47	68.13	22.32
7844	Slocan Forest Products Ltd.	Sawmill & Planing Mill Products Industry	Five nat. Gas lumber dry kilns	2.92	14.60	0.09		0.77	0.44	0.26	0.08
7844	Slocan Forest Products Ltd.	Sawmill & Planing Mill Products Industry	6 cyclones						169.35	67.74	33.87
7844 Total				**2.9**	**14.6**	**0.1**		**39.9**	**287.3**	**136.1**	**56.3**
8347	West Fraser Mills Ltd. (Quesnel Laminators)	Value added Millwork Industries	Three Planer cyclones						54.56	21.82	10.91
8347 Total									**54.6**	**21.8**	**10.9**
9026	Terrace Paving(385191 B.C. Ltd.)	Asphalt Industry	Asphalt plant wet scrubber stack	3.46	3.28	5.28		2.55	72.33	10.20	0.58
9026 Total				**3.5**	**3.3**	**5.3**		**2.6**	**72.3**	**10.2**	**0.6**
12592	Pinnacle Wood Products Ltd.	Value added Millwork Industries	Air cyclone, pa12592, Pinnacle Wood Prod.						45.37	18.15	9.07
12592 Total									**45.4**	**18.2**	**9.1**
13326	P. Scheck Industrial Electric Ltd.	Electrical Industrial Equipment Industries	Bayco burnout oven (PA13326)						0.12		
13326 Total									**0.12**		
13444	West Fraser Mills Ltd.	Medium Density Fibreboard	Dryer cyclone stacks (4) combined discharge					197.09	94.71	54.93	18.00
13444	West Fraser Mills Ltd.	Medium Density Fibreboard	Wood fired energy system esp stack	153.30	183.96	50.46		4.64	18.29	16.46	13.90
13444	West Fraser Mills Ltd.	Medium Density Fibreboard	12 fabric filter baghouses combined discharge						23.17	9.27	4.63
13444	West Fraser Mills Ltd.	Medium Density Fibreboard	Mat reject cyclone stack						1.06	0.42	0.21
13444 Total				**153.3**	**183.9**	**50.5**		**201.7**	**137.2**	**81.1**	**36.7**
14952	Weldwood Of Canada Ltd.	Sawmill & Planing Mill Products Industry	High pressure shavings baghouse						0.89	0.80	0.68
14952	Weldwood Of Canada Ltd.	Sawmill & Planing Mill Products Industry	2 dry kilns					21.90	65.70	38.11	12.48
14952	Weldwood Of Canada Ltd.	Sawmill & Planing Mill Products Industry	Salton gas fired energy system	8.34	33.36	0.15		1.37	1.47	1.47	1.47
14952	Weldwood Of Canada Ltd.	Sawmill & Planing Mill Products Industry	Planer shavings baghouse						1.17	1.06	0.89
14952	Weldwood Of Canada Ltd.	Sawmill & Planing Mill Products Industry	Residual baghouse						1.19	1.07	0.91
14952	Weldwood Of Canada Ltd.	Sawmill & Planing Mill Products Industry	Sawmill dust baghouse						12.74	11.47	9.68

Perm no.	Client Name	Sic description	Site name	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
14952 Total				**8.3**	**33.4**	**0.2**		**23.3**	**83.2**	**54.0**	**26.1**
15864	Pont, Shane DBA Custom Wood Fibre Products Ltd.	Value added Millwork Industries	Cyclone (custom)						9.47	8.53	7.2
15864 Total									**9.5**	**8.5**	

Note: True zero values have been removed for clarity.
Values shown as 0.0 are between 0.0 and 0.01 T/Y.
Estimates for total emissions are subject to rounding errors, which may result in slight differences between totals.

Table 2. Commercial Source Summary and Emissions to Quesnel Airshed (Tonnes/Year).

CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
Agriculture	Wind Erosion	BCROPLND	39209	3352	use 'AGR' area (268.65 Ha)						0.59	0.30	0.14
Agriculture	Fugitive Emission Agricultural	BAGRIFUGI	3822533	311224	use 'AGR' area (268.65 Ha)						0.33	0.07	0.03
Agriculture	Fertilizer Applied	BFERTILIZE	63073	4892	use 'AGR' area (268.65 Ha)						0.01	0.00	0.00
Agriculture	Fertilizer Nitrogen	BFERTILIZE	63073	4892	use 'AGR' area (268.65 Ha)		0.02						
Agriculture	Pesticides Applied	BPESTICIDE	133168	1181	use 'AGR' area (268.65 Ha)						0.00	0.00	0.00
Agriculture	Cattle	BLIVESTOCK STATS	602404	116593	407.52					5.36	0.48	0.04	0.01
Agriculture	Cattle - Manure	BLIVESTOCK STATS	602404	116593	407.52								
Agriculture	Pigs	BLIVESTOCK STATS	602404	116593	6.39					0.00	0.00	0.00	
Agriculture	Pigs - Manure	BLIVESTOCK STATS	602404	116593	6.39								
Agriculture	Sheep	BLIVESTOCK STATS	602404	116593	21.255					0.00	0.00	0.00	
Agriculture	Sheep - Manure	BLIVESTOCK STATS	602404	116593	21.255								
Agriculture	Poultry	BLIVESTOCK STATS	602404	116593	437.805						0.00	0.00	
Agriculture	Poultry - Manure	BLIVESTOCK STATS	602404	116593	437.805								
Agriculture	Horses	BLIVESTOCK STATS	602404	116593	20.325					0.01	0.00	0.00	
Agriculture	Horses - Manure	BLIVESTOCK STATS	602404	116593	20.325								

CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
Agriculture	Pesticides	BCROPLND	39209	3352	use 'AGR' area (268.65 Ha)					0.00			
Misc Burning	Agricultural Burning	BAGRIBURN	4705	400	Use 'AGR' area (1200 Ha)	0.49	0.00			0.06	0.08	0.08	0.075
Misc Burning	Bio-Med/Cremat/Animal Incineration	BPOPULATION	1721610	73222	none in airshed								
Oil And Gas	Loading And Tankage Emissions At Bulk Terminals	BPOPULATIO	1.000001	0.04084	use population					16.88			
Oil And Gas	Loading And Tankage Emissions At Bulk Plants	BPOPULATIO	1.000001	0.04084	use population					19.64			
Oil And Gas	Loading Of Tanker Trucks At Refineries	BBCTRKREFE	222	0	0								
Oil And Gas	Tanks, Refueling & Spills At Auto Serv Stations	BPOPULATIO	1.000001	0.04084	use population					58.88			
Oil And Gas	Natural Gas Ind - Combustion - Distribution	BDISTRIB	98915	739	use population	0.26	0.53			0.01	0.06	0.06	0.06
Oil And Gas	Natural Gas Ind - Combustion - Transmission	BTRANSMISS	12273	951	0								
Oil And Gas	Natural Gas Ind - Combustion - Battery	BBATTERY	1363518	0	0								
Oil And Gas	Natural Gas Ind - Combustion - Drilling	BDRILLING	118272	0	0								
Oil And Gas	Natural Gas Ind - Combustion - Service	BSERVICE	2973	0	0								
Oil And Gas	Natural Gas Ind - Combustion - Pumping	BPUMPING	2877	0	0								
Oil And Gas	Natural Gas Ind - Combustion - Gas Processing	BGASPROC	25726	0	0								
Oil And Gas	Natural Gas Ind - Leaks - Transmission	BTRANSMISS	12273	951	0								
Oil And Gas	Natural Gas Ind - Leaks - Battery	BBATTERY	1363518	0	0								
Oil And Gas	Natural Gas Ind - Leaks - Gas Production	BGASPRODN	17972	0	0								
Oil And Gas	Natural Gas Ind - Leaks - Lvp Loading	BLVPLOAD	382	0	0								
Oil And Gas	Natural Gas Ind - Leaks - Distribution	BDISTRIB	98915	739	use population					1.45			
Oil And Gas	Natural Gas Ind - Vents - Drilling	BDRILLING	118272	0	0								
Oil And Gas	Natural Gas Ind - Leaks - Gas Processing	BGASPROC	25726	0	0								

CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
Oil And Gas	Natural Gas Ind - Vents – Distribution	BDISTRIB	98915	739	use population					1.54			
Oil And Gas	Natural Gas Ind - Vents - Transmission	BTRANSMISS	12273	951	0								
Oil And Gas	Natural Gas Ind - Vents - Battery	BBATTERY	1363518	0	0								
Oil And Gas	Natural Gas Ind - Vents - Gas Production	BGASPRODN	17972	0	0								
Oil And Gas	Natural Gas Ind - Vents - Lvp/Hvp Loading	BLVPLOAD	382	0	0								
Oil And Gas	Natural Gas Ind - Vents - Field Dehydration	BDEHYDRAT	22148	0	0								
Oil And Gas	Natural Gas Ind - Vents - Gas Processing	BGASPROC	25726	0	0								
Oil And Gas	Natural Gas Ind - Tanks - Battery	BBATTERY	1363518	0	0								
Oil And Gas	Natural Gas Ind - Tanks - Lvp Loading	BLVPLOAD	382	0	0								
Oil And Gas	Natural Gas Ind - Tanks - Gas Processing	BGASPROC	25726	0	0								
Oil And Gas	Natural Gas Ind - Spills	BSPILL	407	0	0								
Other	Breweries	BBEER	1	386647	0								
Other	Restaurants	BPOPULATION	1721610	73222	20238						2.00	2.00	1.86
Other	Gravel Pits	BPOPULATION	1721610	73222	20238						146.16	8.33	
Other	Welding Shops	BPOPULATION	1721610	73222	20238						1.49	1.49	1.49
Other	Landfills Combined	BLANDFILLC	1.00001	0.05135	None								
Other	Landfills Municipal	BPOPULATION	1721610	73222	20238					12.63	3.14	0.25	0.06
Other	Landfills - Woodwaste	BLANDFILLC	1.00001	0.05135	0.05135					48.19	4.20	0.33	0.08
Other	Fugitive Emission Conc/Dem	BCONDEM95	1997443	86965	23751						1.20	0.10	0.02
Other	Bakeries	BPOPULATION	1721610	73222	20238					0.53			
Other	Commercial-Light Industrial General Particulate	BPOPULATION	1721610	73222	20238						3.84	2.20	1.56
Other	Cut Back Asphalt Application	BPOPRURAL95	551267	42138	11770					14.89			
Solvent Evaporation	Dry Cleaning	BPOPULATION	1721610	73222	20238					2.80			
Solvent Evaporation	Metal Degreasing	BPOPULATION	1721610	73222	20238					9.98			
Solvent Evaporation	Printing Inks	BPOPULATION	1721610	73222	20238					12.21			
Solvent Evaporation	Glues Addhesives Sealents	BPOPULATION	1721610	73222	20238					3.01			

CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
Solvent Evaporation	Application Of Coatings - Auto Refinishing	BPOPULATION	1721610	73222	20238					7.46			
Solvent Evaporation	Application Of Coatings - General Industrial	BPOPULATION	1721610	73222	20238					13.59			
Space Heating	Natural Gas Comm/Ind	BPOPULATION	1721610	73222	20238	2.25	10.91	0.27		0.58	1.31	1.26	1.18
Space Heating	Lpg Commercial	BPOPULATION	1721610	73222	20238	0.25	2.14			0.08	0.06	0.06	0.06
Space Heating	Fuel Oil Comm/Ind	BPOPULATION	1721610	73222	20238	0.35	1.38	2.08		0.02	0.14	0.08	0.06
Prescribed Burning	Land Clearing Burning	#permits *80 m^3 *0.901			64 permits (2000)	465.93	6.92	0.02		19.70	27.68	27.40	24.91

Note: True zero values have been removed for clarity.
Values shown as 0.0 are between 0.0 and 0.01 T/Y.
Estimates for total emissions are subject to rounding errors, which may result in slight differences between totals.

Table 3. Residential Source Summary and Respective Emissions to the Quesnel Airshed (Tonnes/Year).

CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
Misc Burning	Back Yard Burning	BPOPRURAL95	551267	42138	11770 (outside city)	49.99	3.57	0.60		17.85	9.52	9.43	8.57
Other	Barbecues	BDWELLING95	661460	25528	7375						1.78	1.78	1.78
Misc Burning	Structural Fires	BPOPULATION	1721610	73222	use # of fires*avg tonnes (31.92 total)	2.68	0.06			0.22	0.17	0.17	0.17
Other	Tobacco	BPOPULATION	1721610	73222	20238	1.39	0.04				1.81	1.81	1.81
Solvent Evaporation	Consumer Products	BPOPULATION	1721610	73222	20238					58.69			
Solvent Evaporation	Application Of Architectural Coatings	BPOPULATION	1721610	73222	20238					23.23			
Space Heating	Natural Gas Residential	BDWELLING95	661460	25528	7375	4.70	11.00	0.29		0.87	1.34	1.29	1.21
Space Heating	Lpg Residential	BDWELLING95	661460	25528	7375	0.13	1.12	0.01		0.04	0.04	0.03	0.03
Space Heating	Oil Residential	BDWELLING95	661460	25528	7375	0.48	1.76	2.88		0.07	0.24	0.13	0.10
Space Heating	Fuel Wood Residential	BFUELWOOD95	439911	21439	7375	1311.01	16.46	2.38		450.48	172.76	172.76	164.13
Off Road	Lawn Equipment	BDWELLING95	661460	25528	7375	31.05	0.32	0.03		4.17	0.096	0.09	0.08

Note: True zero values have been removed for clarity.
Values shown as 0.0 are between 0.0 and 0.01 T/Y.
Estimates for total emissions are subject to rounding errors, which may result in slight differences between totals.

Table 4. Natural Source Summary and Respective Emissions to the Quesnel Airshed (Tonnes/Year).

CATEGORY	PROCNAME	PROPARM	VALUE BC	VALUE REGION 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
Natural	Agri/Wild Life	BWILDLIFE	489243	68404	use 'forest' area					0.32			
Natural	Cropland Region 1	BCROPLND1	21000	6915	NA								
Natural	Cropland Region 2	BCROPLND2	18016	10782	NA								
Natural	Cropland Region 3	BCROPLND3	194	194	NA								
Natural	Grassland	BGRASSLNDVOC	1	0.12448133	use 'RANG' area								
Natural	Grassland	BGRASSLNDNOX	1	0.11126761	use 'RANG' area								
Natural	Mixed_Wood_Forest	BTREES_VOC	1	0.03125537	use 'forest' area					18.56			
Natural	Mixed_Wood_Forest	BTREES_NOX	1	0.03421353	use 'forest' area		0.06						
Natural	Deciduous_Forest	BDECDFOR_VOC	1	984373	use 'forest' area					0.96			
Natural	Deciduous_Forest	BDECDFOR_NOX	1	0.01031992	use 'forest' area								
Natural	Transitional_Forest	BTRANFOR_VOC	1	0	0								
Natural	Transitional_Forest	BTRANFOR_NOX	1	0	0								
Natural	Coniferous_Forest	BCONFFOR_VOC	1	0.1648996	use 'forest' area					475.41			
Natural	Coniferous_Forest	BCONFFOR_NOX	1	0.1691678	use 'forest' area		1.25						
Natural	Scrub	BSCRUB_VOC	1	0	0								
Natural	Scrub	BSCRUB_NOX	1	0	0								
Natural	Urban Vegetation	BNATURBANVOC	1	0	0								
Natural	Urban Vegetation	BNATURBANNOX	1	0	0								
Natural	Marine Aerosol Coast	BCOASTWATER	1	0.066	0								
Natural	Marine Areosol Open	BOPENWATER	1	0.058	0								
Natural	Wildfires				none occurred in the airshed								

Note: True zero values have been removed for clarity.
Values shown as 0.0 are between 0.0 and 0.01 T/Y.
Estimates for total emissions are subject to rounding errors, which may result in slight differences between totals.

Table 5. Mobile Source Summary and Respective Emissions to the Quesnel Airshed (Tonnes/Year).

AREA CODE	CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	PART	PM10	PM25
23110	Aircraft	Commercial Jets	BBCCOMJETS	44104	386	7	0.04	0.02	0.00		0.01	0.00	0.00	0.00
23111	Aircraft	Private Jets	BBCPRIVJETS	16378	906	49	0.05	0.00			0.00	0.01	0.00	0.00
23112	Aircraft	Government-Civil Jets	BBCGOVMTJETS	2516	48	2	0.00				0.00	0.00	0.00	0.00
23113	Aircraft	Military Jets	BBCMILIJETS	3446	54	0								

AREA CODE	CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	PART	PM10	PM25
23120	Aircraft	Turboprop	BBCTURBO	336548	6202	184	0.15	0.02	0.00		0.11	0.02	0.01	0.01
23130	Aircraft	General Aviation Piston	BBCGPISTON	216421	7440	58	0.07	0.00			0.00	0.00	0.00	0.00
23140	Aircraft	Helicopters	BBCHELI	168263	5036	41	0.00	0.01	0.00		0.01	0.01	0.00	0.00
23180	Aircraft	Commercial Piston	BCCPISTION	276871	7398	22	0.23	0.00			0.00	0.00	0.00	0.00
21451	Heavy Duty Vehicles	Hdgv, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					4.03			
21452	Heavy Duty Vehicles	Hdgv, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	49.68	3.04	0.15			0.10	0.09	0.06
21453	Heavy Duty Vehicles	Hdgv, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21454	Heavy Duty Vehicles	Hdgv, City, Brake Linings	BPOPULATION	1721610	73222	20238								
21461	Heavy Duty Vehicles	Hdgv, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					3.62			
21462	Heavy Duty Vehicles	Hdgv, Highway, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	47.02	6.41	0.26			0.17	0.16	0.10
21463	Heavy Duty Vehicles	Hdgv, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								
21464	Heavy Duty Vehicles	Hdgv, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
21751	Heavy Duty Vehicles	Hddv, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					14.54			
21752	Heavy Duty Vehicles	Hddv, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	68.60	83.14	1.30			6.11	6.10	5.42
21753	Heavy Duty Vehicles	Hddv, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21754	Heavy Duty Vehicles	Hddv, City, Brake Linings	BPOPULATION	1721610	73222	20238								
21761	Heavy Duty Vehicles	Hddv, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					14.46			
21762	Heavy Duty Vehicles	Hddv, Highway, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	62.56	135.49	2.32			10.85	10.84	9.64
21763	Heavy Duty Vehicles	Hddv, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								
21764	Heavy Duty Vehicles	Hddv, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
21151	Light Duty Vehicles	Ldgv, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					203.74			
21152	Light Duty Vehicles	Ldgv, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	2014.43	118.01	4.26			2.35	2.24	1.28

AREA CODE	CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	PART	PM10	PM25
21153	Light Duty Vehicles	Ldgv, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21154	Light Duty Vehicles	Ldgv, City, Brake Linings	BPOPULATION	1721610	73222	20238								
21161	Light Duty Vehicles	Ldgv, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					94.03			
21162	Light Duty Vehicles	Ldgv, Highway, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	858.13	95.51	3.21			1.81	1.72	1.04
21163	Light Duty Vehicles	Ldgv, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								
21164	Light Duty Vehicles	Ldgv, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
21251	Light Duty Vehicles	Ldgt1, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					60.42			
21252	Light Duty Vehicles	Ldgt1, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	673.49	41.92	2.04			0.80	0.78	0.47
21253	Light Duty Vehicles	Ldgt1, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21254	Light Duty Vehicles	Ldgt1, City, Brake Linings	BPOPULATION	1721610	73222	20238								
21261	Light Duty Vehicles	Ldgt1, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					28.27			
21262	Light Duty Vehicles	Ldgt1, Highway, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	282.43	33.60	1.54			0.63	0.62	0.38
21263	Light Duty Vehicles	Ldgt1, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								
21264	Light Duty Vehicles	Ldgt1, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
21351	Light Duty Vehicles	Ldgt2, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					4.86			
21352	Light Duty Vehicles	Ldgt2, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	46.13	2.54	0.11			0.06	0.05	0.04
21353	Light Duty Vehicles	Ldgt2, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21354	Light Duty Vehicles	Ldgt2, City, Brake Linings	BPOPULATION	1721610	73222	20238								
21361	Light Duty Vehicles	Ldgt2, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					3.67			
21362	Light Duty Vehicles	Ldgt2, Highway, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	33.54	3.43	0.13			0.07	0.07	0.04
21363	Light Duty Vehicles	Ldgt2, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								

AREA CODE	CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	PART	PM10	PM25
21364	Light Duty Vehicles	Ldgt2, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
21551	Light Duty Vehicles	Lddv, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					0.47			
21552	Light Duty Vehicles	Lddv, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	1.06	1.03	0.05			0.19	0.19	0.16
21553	Light Duty Vehicles	Lddv, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21554	Light Duty Vehicles	Lddv, City, Brake Linings	BPOPULATION	1721610	73222	20238								
21561	Light Duty Vehicles	Lddv, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					0.20			
21562	Light Duty Vehicles	Lddv, Highway, Other Vehicle Emssions	BPOPULATION	1721610	73222	20238	0.41	0.71	0.04			0.14	0.14	0.12
21563	Light Duty Vehicles	Lddv, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								
21564	Light Duty Vehicles	Lddv, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
21651	Light Duty Vehicles	Lddt, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					0.65			
21652	Light Duty Vehicles	Lddt, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	1.19	1.13	0.07			0.22	0.22	0.19
21653	Light Duty Vehicles	Lddt, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21654	Light Duty Vehicles	Lddt, City, Brake Linings	BPOPULATION	1721610	73222	20238								
21661	Light Duty Vehicles	Lddt, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					0.32			
21662	Light Duty Vehicles	Lddt, Highway, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	0.54	0.92	0.06			0.20	0.20	0.17
21663	Light Duty Vehicles	Lddt, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								
21664	Light Duty Vehicles	Lddt, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
21851	Light Duty Vehicles	Mc, City, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					1.65			
21852	Light Duty Vehicles	Mc, City, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	11.81	0.47	0.02			0.02	0.02	0.01
21853	Light Duty Vehicles	Mc, City, Tire Wear	BPOPULATION	1721610	73222	20238								
21854	Light Duty Vehicles	Mc, City, Brake Linings	BPOPULATION	1721610	73222	20238								

AREA CODE	CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	PART	PM10	PM25
21861	Light Duty Vehicles	Mc, Highway, Vehicle Hydrocarbons	BPOPULATION	1721610	73222	20238					0.80			
21862	Light Duty Vehicles	Mc, Highway, Other Vehicle Emissions	BPOPULATION	1721610	73222	20238	3.62	0.41	0.02			0.01	0.01	0.01
21863	Light Duty Vehicles	Mc, Highway, Tire Wear	BPOPULATION	1721610	73222	20238								
21864	Light Duty Vehicles	Mc, Highway, Brake Linings	BPOPULATION	1721610	73222	20238								
25110	Marine	Deep Ocean Vessels Underway	BBCROUTEGRT	49110378	691466	0								
25120	Marine	Deep Ocean Vessels Dockside	BBCPORTGRT	49110378	691466	0								
25211	Marine	Harbour Vessels, Charter 0-15 M (350 Hp)	BBCPORTGRT	49110378	691466	Assume none								
25212	Marine	Harbour Vessels, Charter 15-30 M (756 Hp)	BBCPORTGRT	49110378	691466	Assume none								
25213	Marine	Harbour Vessels, Charter 30+ M (1400 Hp)	BBCPORTGRT	49110378	691466	Assume none								
25221	Marine	Harbour Vessels Tugboats 0-449 Hp	BBCPORTGRT	49110378	691466	Assume none								
25222	Marine	Harbour Vessels Tugboats 500-999 Hp	BBCPORTGRT	49110378	691466	Assume none								
25223	Marine	Harbour Vessels Tugboats 1000-1499 Hp	BBCPORTGRT	49110378	691466	Assume none								
25224	Marine	Harbour Vessels Tugboats 1500-1999 Hp	BBCPORTGRT	49110378	691466	Assume none								
25225	Marine	Harbour Vessels Tugboats 2000+ Hp	BBCPORTGRT	49110378	691466	Assume none								
25226	Marine	Harbour Vessels Workboats 0-499 Hp	BBCPORTGRT	49110378	691466	Assume none								
25227	Marine	Harbour Vessels Workboats 500-999 Hp	BBCPORTGRT	49110378	691466	Assume none								
25228	Marine	Harbour Vessels Workboats 1000+ Hp	BBCPORTGRT	49110378	691466	Assume none								
25301	Marine	BCFerries Underway	BBCFERRY	77851457	5735135	0								
25302	Marine	Cp Ferries Underway	BBCFERRY	77851457	5735135	0								
25410	Marine	Recreational Vessels, Outboards	BPOPULATION	1721610	73222	20238	36.78	0.07	0.05		12.29			
25420	Marine	Recreational Vessels, Inboards, Gasoline	BPOPULATION	1721610	73222	20238	0.31	0.03	0.00		0.02			
25430	Marine	Recreational Vessels,	BPOPULATION	1721610	73222	20238	0.02	0.06	0.00		0.03	0.00	0.00	0.00

AREA CODE	CATEGORY	NAME	PRORATION USED	VALUE BC	VALUE Region 5	VALUE QUESNEL 95	CO	NOx	SOx	TRS	VOC	PART	PM10	PM25
		Inboards, Diesel												
25440	Marine	Recreational Vessels, In/Outboards, Gasoline	BPOPULATION	1721610	73222	20238	1.54	0.17	0.01		0.10			
25450	Marine	Recreational Vessels, In/Outboards, Diesel	BPOPULATION	1721610	73222	20238	0.12	0.30	0.02		0.16	0.01	0.01	0.01
25460	Marine	Fishing Vessels	BBCPORTGRT	49110378	691466	Assume none								
22100	Off Road	Off-Road Gasoline - Agriculture	BCROPLND	39209	3352	use 'AGR' area								
22101	Off Road	Off-Road Gasoline - Agriculture Greenhouse	BCROPLND	39209	3352	use 'AGR' area	0.78	0.03	0.00		0.03	0.00	0.00	0.00
22200	Off Road	Off-Road Diesel - Agriculture	BCROPLND	39209	3352	use 'AGR' area	0.13	0.33	0.01		0.05	0.04	0.04	0.03
22201	Off Road	Off-Road Diesel - Construction	BPOPULATION	1721610	73222	20238	7.02	18.28	0.44		1.55	1.60	1.60	1.47
22202	Off Road	Off-Road Diesel - Agriculture Greenhouse	BCROPLND	39209	3352	use 'AGR' area								
24110	Rail	Diesel Line Travel	BBCDSLRAIL	5640	340	29.99	18.89	98.24	7.11		4.91	2.34	2.34	2.15
24120	Rail	Diesel Yard Travel	BBCDSLRAIL	5640	340	11.66	2.84	16.65	1.08		0.99	0.40	0.40	0.37
24131	Rail	Railway Coal Dust Outside Lfv	BBCDSLRAIL	5640	340	none in Quesnel								
21111	Rdust Paved	Road Dust, Paved	RDUSTPAVED	0	0	See Table 7 A-C for method						3847.00	929.00	231.00
21113	Rdust Unpaved	Road Dust, Unpaved1	RDUSTUNPAVED	0	0	See Table 7 A-C for method						1854	834	220

Note: True zero values have been removed for clarity. Values shown as 0.0 are between 0.0 and 0.01 T/Y.
Estimates for total emissions are subject to rounding errors, which may result in slight differences between totals.

Table 6. Summary of Emissions from all Sources in the Quesnel Airshed (Tonnes/Year).

Permitted Source Summary for Quesnel by Category (T/Y)

	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
Asphalt Industry	3.46	3.28	5.28		2.55	72.33	10.20	0.58
Medium Density Fibreboard Industry	153.30	183.96	50.46		201.73	137.23	81.08	36.74
Electrical Industrial Equipment Industries						0.12		
Petroleum Products, Wholesale					0.40			
Pulp Industry	1489.54	687.29	440.20	22.42	336.98	1010.98	701.02	566.86
Ready-Mix Concrete Industry						0.01	0.01	0.00
Sawmill & Planing Mill Products Industry	2625.75	743.36	16.02		419.14	1368.28	780.01	484.02

Softwood Veneer and Plywood	205.98	212.26	5.73		72.95	643.6	396.7	241.9
Value added Millwork Industries	10.36	51.85	0.31		5.69	166.96	73.39	38.59

Commercial Source Summary for Quesnel by Category (T/Y)

	CO	NOx	SOx	TRS	VOC	TPT	PM10	PM25
OIL and GAS Total	0.26	0.53			98.41	0.06	0.06	0.06
Restaurants Total						2.00	2.00	1.86
Gravel Pits Total						146.16	8.33	
Welding Shops Total						1.49	1.49	1.49
Landfills Total					60.81	7.33	0.58	0.15
Construction/Demolition Total						1.20	0.10	0.02
Bakeries Total					0.53			
Light Industrial General Particulate						3.84	2.20	1.56
Asphalt Application Total					14.89			
Dry Cleaning Total					2.80			
Metal Degreasing Total					9.98			
Printing Inks Total					12.21			
Glues Adhesives Sealants Total					3.01			
Paint Applications Total					21.05			
Space Heating Total	2.85	14.43	2.35		0.68	1.51	1.39	1.29
Land Clearing Burning Total	465.93	6.92	0.02		19.70	27.68	27.40	24.91
Agriculture Total	0.49	0.02			5.44	1.51	0.49	0.26

Mobile Source Summary for Quesnel by Category (T/Y)

Aircraft Total	0.55	0.04	0.01		0.13	0.04	0.02	0.02
Heavy Duty Vehicles Total	227.86	228.07	4.03		36.65	17.23	17.19	15.22
Light Duty Vehicles Total	3926.78	299.67	11.55		399.08	6.50	6.26	3.93
Marine Total	38.77	0.63	0.09		12.61	0.02	0.02	0.02
Off Road Total	7.93	18.63	0.45		1.63	1.64	1.64	1.51
Rail Total	21.74	114.89	8.19		5.90	2.74	2.74	2.52
Road Dust Paved Total						3847.05	928.59	230.80
Road Dust Unpaved Total						1853.86	834.17	220.06

Residential Source Summary for Quesnel by Category

Back Yard Burning	49.99	3.57	0.60		17.85	9.52	9.43	8.57
Structural Fires	2.68	0.06			0.22	0.17	0.17	0.17
Barbecues						1.78	1.78	1.78

Tobacco	1.39	0.04			1.81	1.81	1.81
Natural Gas Residential	4.70	11.01	0.29	0.87	1.34	1.29	1.21
Lpg Residential	0.13	1.12	0.00	0.04	0.03	0.03	0.03
Fuel Oil Residential	0.48	1.76	2.88	0.07	0.24	0.13	0.10
Wood Stoves Residential	1311.01	16.46	2.38	450.48	172.76	172.76	164.13
Lawn Equipment	31.05	0.32	0.03	4.17	0.10	0.09	0.09
Paint Applications	0.00	0.00	0.00	23.23	0.00	0.00	0.00
Consumer Products				58.69			
Natural Sources (T/Y)		1.31		495.25			

Note: True zero values have been removed for clarity.
Values shown as 0.0 are between 0.0 and 0.01 T/Y.
Estimates for total emissions are subject to rounding errors, which may result in slight differences between totals.

Table 7a. Quesnel Airshed Mobile Source Kilometers Traveled by Vehicle Type Calculations.

Vehicle type	No. of Vehicles BC	km/vehicle	VkmT X10^6	LFV Totals VkmT X10^6	Net Province VkmT X 10^6	VkmT (X 10^6) Cariboo Region	VkmT Quesnel Airshed
LDGV	1,390,111	16,948	23,560	10105	13455	578.565	159910934.8
LDGT1	461,505	17,422	8,040	3078	4962	213.366	58972728.25
LDGT2	66,902	17,422	1,166	871	295	12.685	3506036.847
HDGV	16,174	15,506	251	53	198	8.514	2353204.392
MC	60,458	3,223	195	83	112	4.816	1331105.515
LDDV	15,518	16,948	263	112	151	6.493	1794615.471
LDDT	12,159	23,588	287	124	163	7.009	1937233.919
HDDV	32,272	87,465	2,823	629	2194	94.342	26075406.24
Total	2,055,099	198,522	36,584	15,055	21,530	926	255,881,265

Table 7b. Quesnel Airshed Road Dust Calculations (Emissions in T/Y).

	Paved Surfaces			Unpaved Surfaces			Winter sanding (paved surfaces assumed unpaved for 7 days)		
	TSP	**PM10**	**PM2.5**	**TSP**	**PM10**	**PM2.5**	**TSP**	**PM10**	**Pm2.5**
LDGV	1941	372	89	1159	521	138	463	209	55
LDGT1	716	137	33	427	192	51	171	77	20
LDGT2	43	8	2	25	11	3	10	5	1
HDGV	29	5	1	17	8	2	7	3	1
MC	16	3	1	10	4	1	4	2	0
LDDV	22	4	1	13	6	2	5	2	1
LDDT	24	5	1	14	6	2	6	3	1
HDDV	316	61	15	189	85	22	76	34	9
Total Quesnel Airshed	**3106**	**595**	**143**	**1854**	**834**	**220**	**742**	**334**	**88**

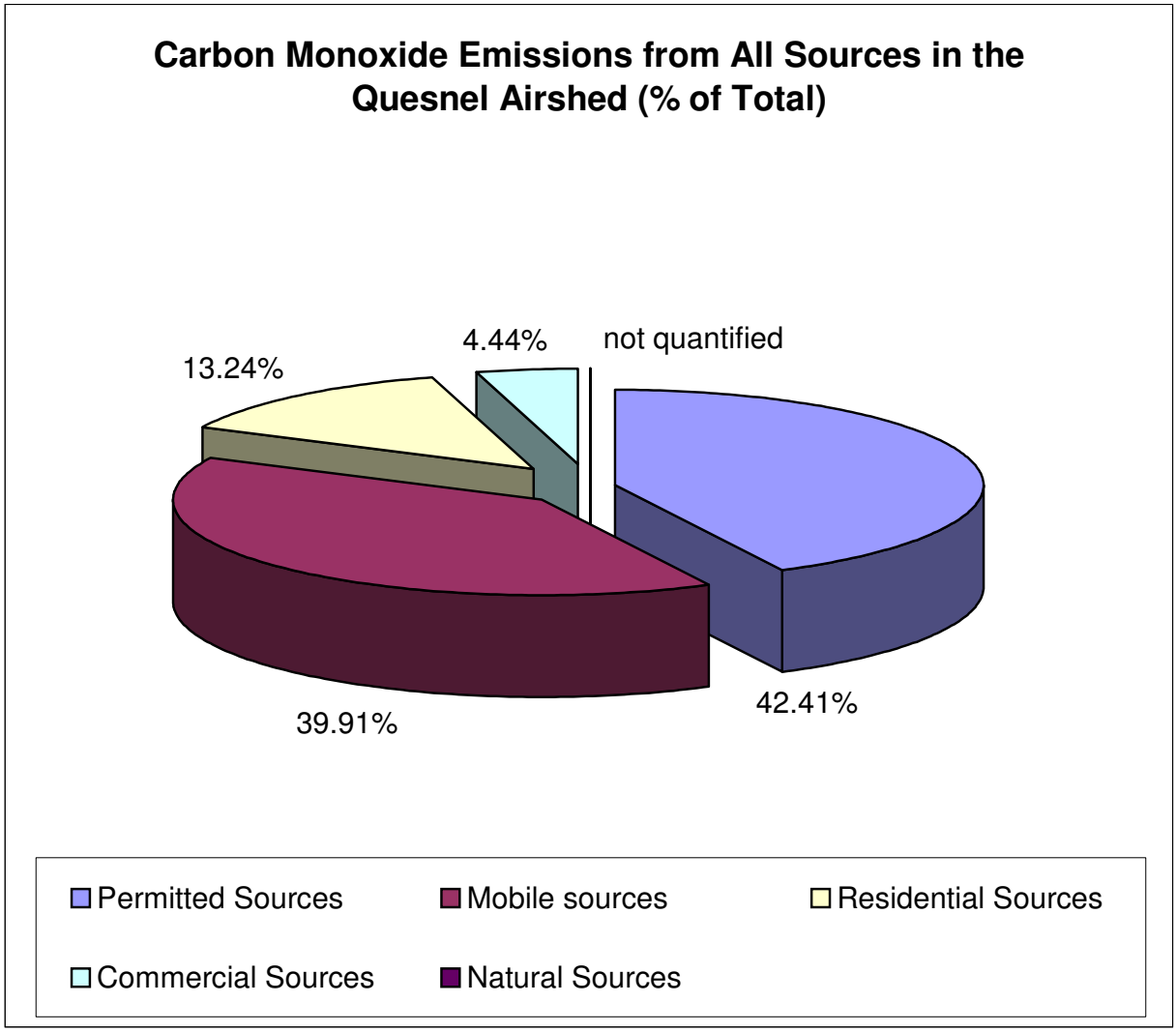
Table 7c. Summary of Road Dust Emission Estimates for the Quesnel Airshed (T/Y).

	Paved Surfaces			Unpaved Surfaces		
Totals with winter traction material included for Paved surfaces.	**TSP**	**PM10**	**PM2.5**	**TSP**	**PM10**	**PM2.5**
	3847	929	231	1854	834	220

APPENDIX A – Carbon Monoxide (CO)

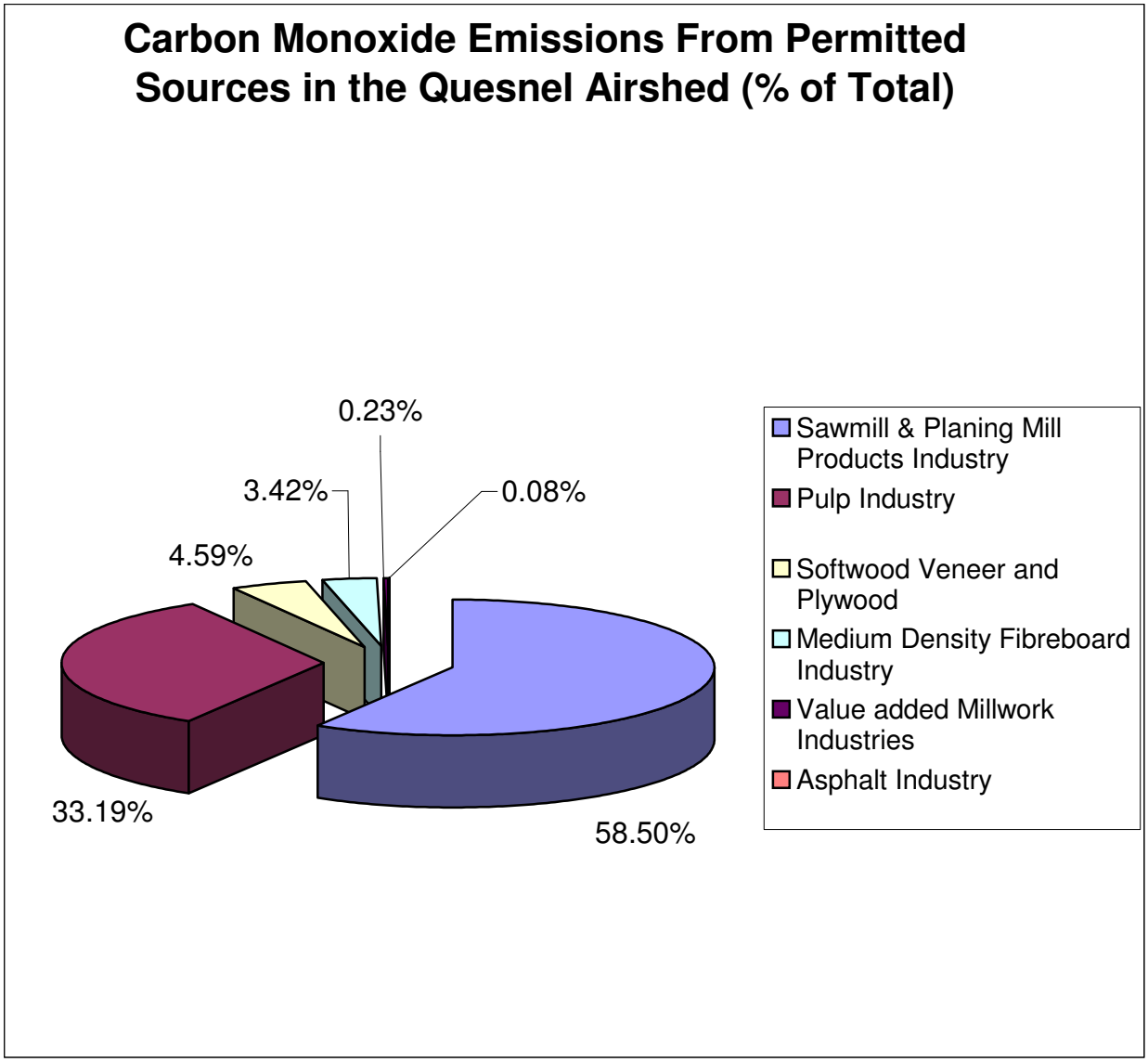
Carbon Monoxide (CO) Emissions from All Sources in the Quesnel Airshed
1995 Baseline (adjusted to 2000)

	CO (T/Y)	% of Total	
Permitted Sources	4488.39	42.41%	
Mobile sources	4223.62	39.91%	
Residential Sources	1401.42	13.24%	
Commercial Sources	469.52	4.44%	
Natural Sources	0.00	0.00%	no factors available
Total CO Loading to the Airshed	10582.95	100.00%	



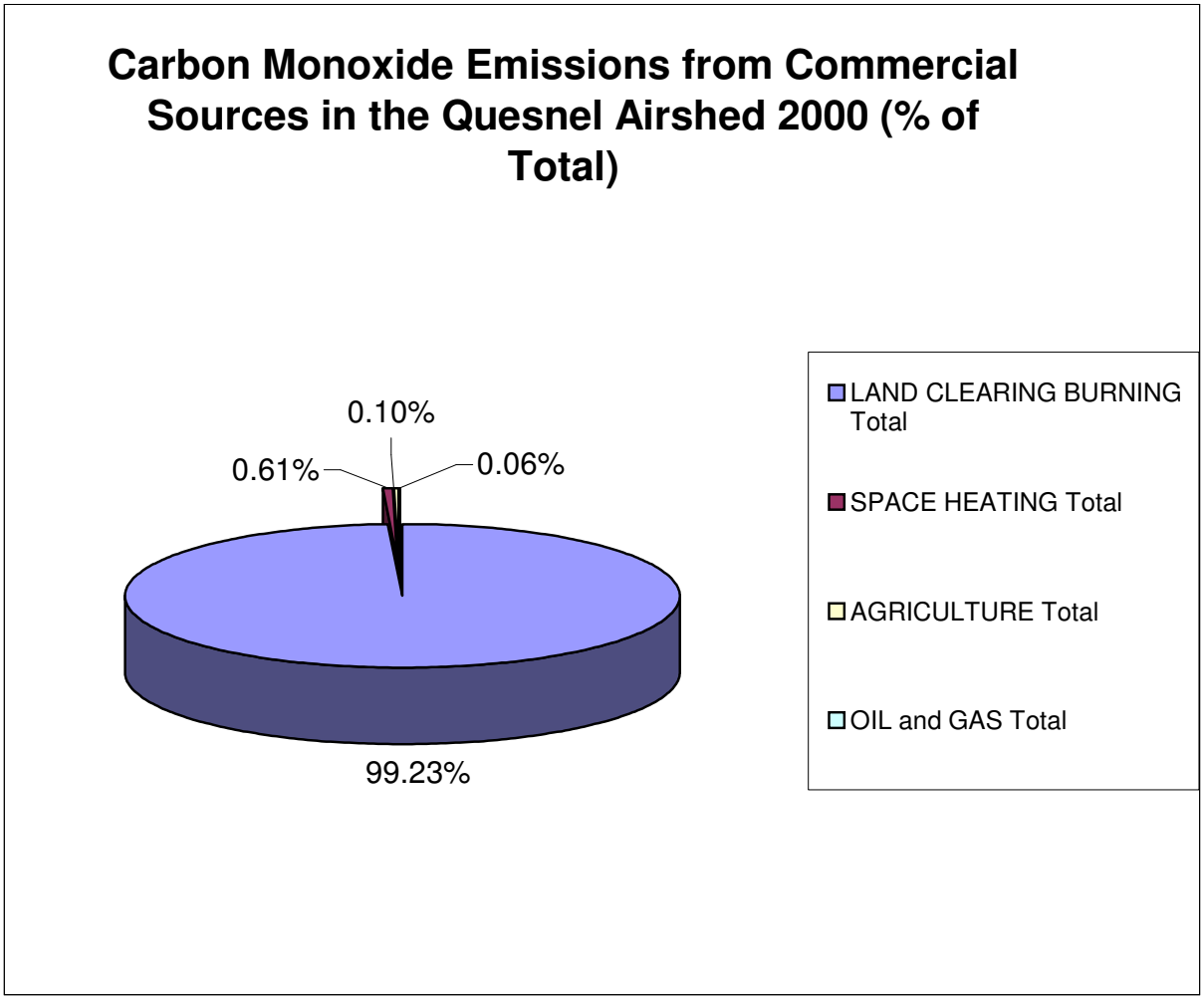
Carbon Monoxide (CO) Emissions from Permitted Sources in Quesnel - 2000

	CO (T/Y)	% of Total
Sawmill & Planing Mill Products Industry	2625.8	58.50%
Pulp Industry	1489.5	33.19%
Softwood Veneer and Plywood	206.0	4.59%
Medium Density Fibreboard Industry	153.3	3.42%
Value added Millwork Industries	10.4	0.23%
Asphalt Industry	3.5	0.08%
Electrical Industrial Equipment Industries	0.0	0.00%
Petroleum Products, Wholesale	0.0	0.00%
Ready-Mix Concrete Industry	0.0	0.00%
Total CO loading to Airshed:	4488.4	100%



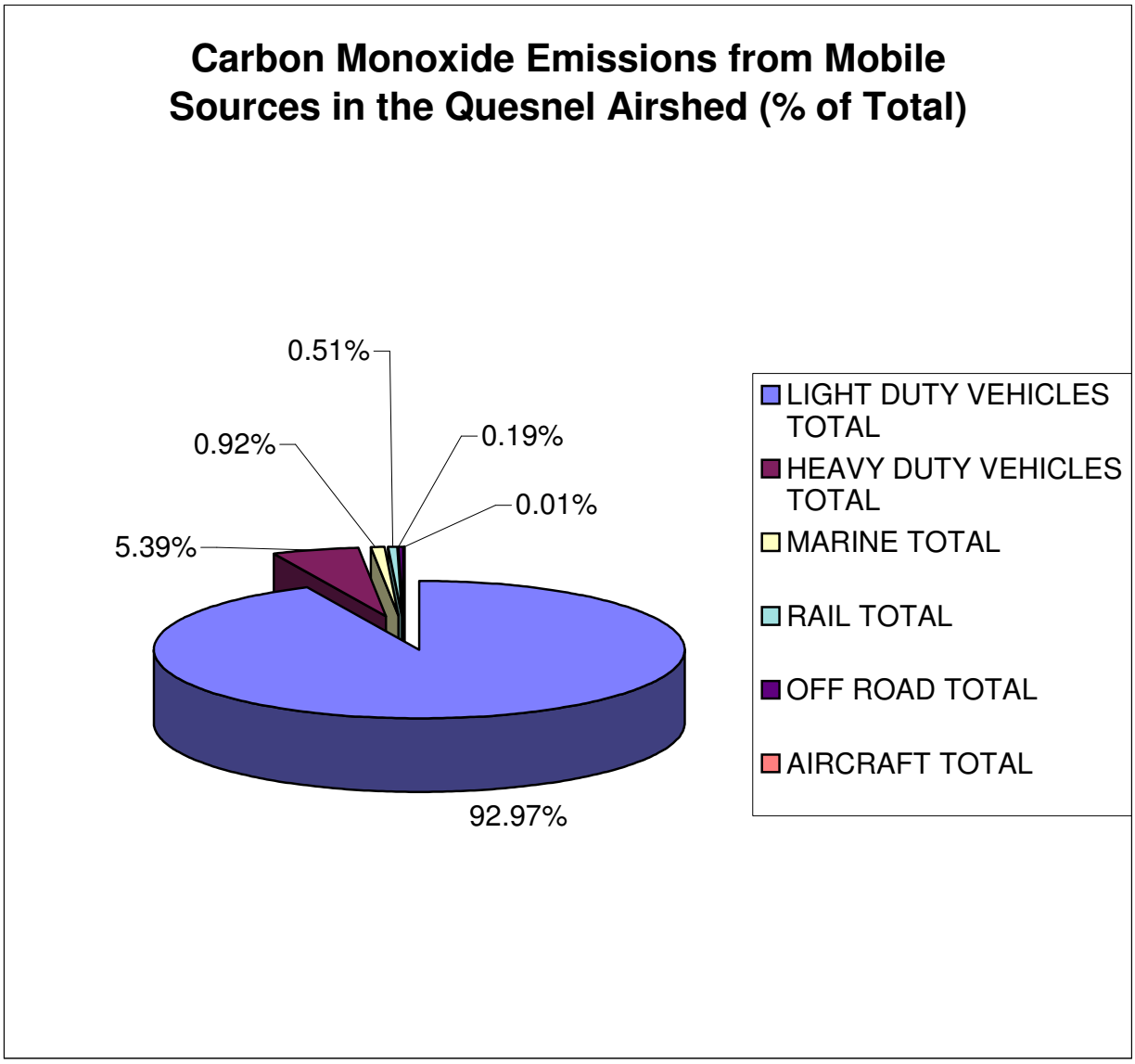
Carbon Monoxide (CO) Emissions from Commercial Sources in the Quesnel Airshed - 2000

	CO (T/Y)	% of Total
LAND CLEARING BURNING Total	465.93	99.23%
SPACE HEATING Total	2.85	0.61%
AGRICULTURE Total	0.49	0.10%
OIL and GAS Total	0.26	0.06%
RESTAURANTS Total	0.00	0.00%
GRAVEL PITS Total	0.00	0.00%
WELDING SHOPS Total	0.00	0.00%
LANDFILLS Total	0.00	0.00%
CONSTRUCTION/DEMOLITION Total	0.00	0.00%
BAKERIES Total	0.00	0.00%
LIGHT INDUSTRIAL GENERAL PARTICULATE	0.00	0.00%
Asphalt Application Total	0.00	0.00%
DRY CLEANING Total	0.00	0.00%
METAL DEGREASING Total	0.00	0.00%
PRINTING INKS Total	0.00	0.00%
GLUES ADHESIVES SEALANTS Total	0.00	0.00%
PAINT APPLICATIONS Total	0.00	0.00%
Total CO Loading from Commercial Sources	469.52	100%



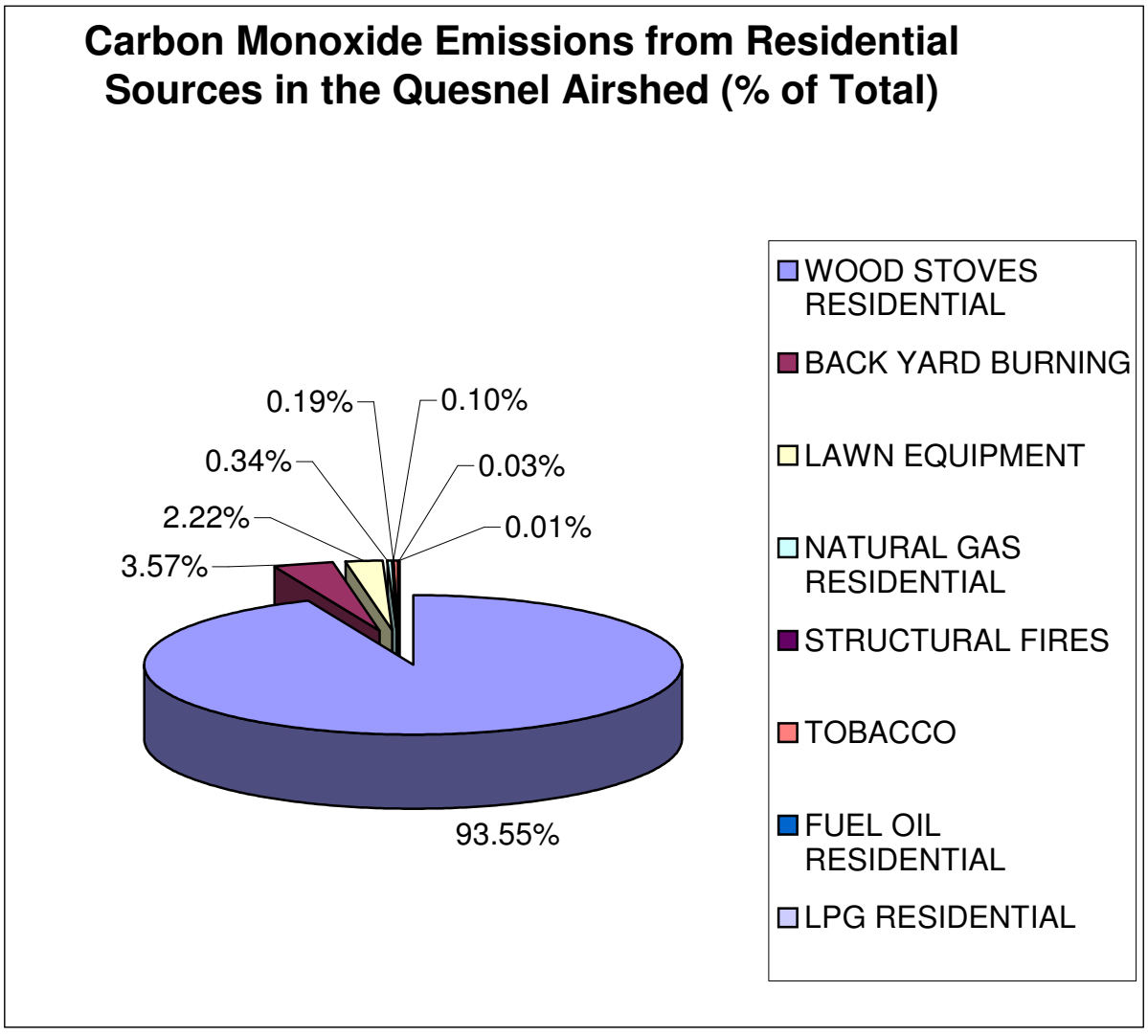
Carbon Monoxide Emissions from Mobile Sources in the Quesnel Airshed (1995 Baseline - adjusted to 2000)

	CO (T/Y)	% of Total
LIGHT DUTY VEHICLES TOTAL	3926.78	92.97%
HEAVY DUTY VEHICLES TOTAL	227.85	5.39%
MARINE TOTAL	38.77	0.92%
RAIL TOTAL	21.74	0.51%
OFF ROAD TOTAL	7.93	0.19%
AIRCRAFT TOTAL	0.54	0.01%
Total CO Loading to the Airshed from Mobile Sources	4223.61	100.00%



Carbon Monoxide (CO) Emissions from Residential Sources in the Quesnel Airshed - 2000

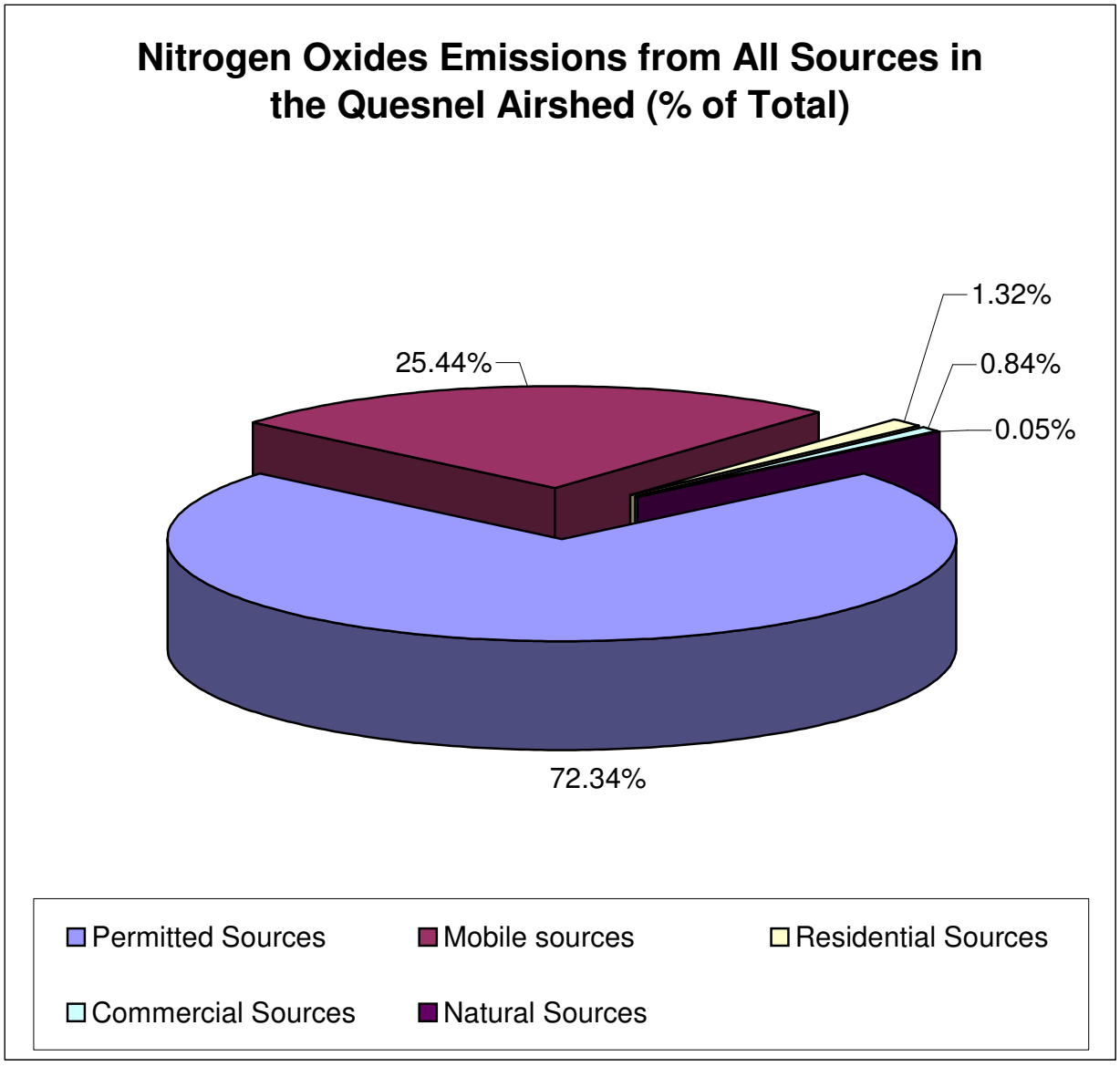
	CO (T/Y)	% of Total
WOOD STOVES RESIDENTIAL	1311.01	93.55%
BACK YARD BURNING	49.99	3.57%
LAWN EQUIPMENT	31.04	2.22%
NATURAL GAS RESIDENTIAL	4.70	0.34%
STRUCTURAL FIRES	2.68	0.19%
TOBACCO	1.39	0.10%
FUEL OIL RESIDENTIAL	0.48	0.03%
LPG RESIDENTIAL	0.13	0.01%
BARBECUES	0.00	0.00%
PAINT APPLICATION	0.00	0.00%
CONSUMER PRODUCTS	0.00	0.00%
Total CO Loading to the Airshed from Residential Sources	1401.42	100.00%



APPENDIX B – Nitrogen Oxides (NOx)

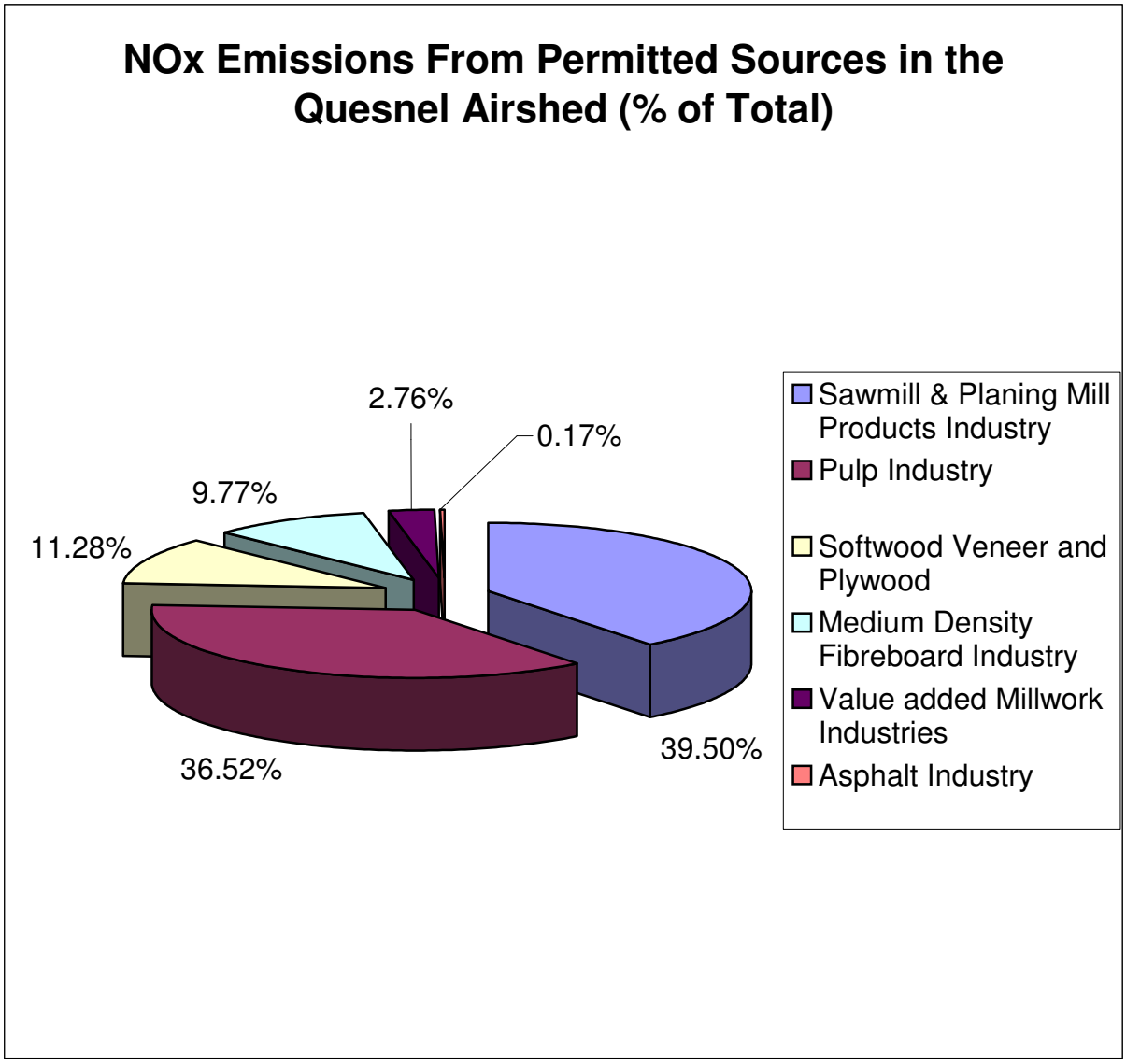
Nitrogen Oxides (NOx) Emissions from All Sources in the Quesnel Airshed 1995 Baseline (adjusted to 2000)

	NOX (T/Y)	% of Total
Permitted Sources	1882.00	72.34%
Mobile sources	661.94	25.44%
Residential Sources	34.34	1.32%
Commercial Sources	21.90	0.84%
Natural Sources	1.31	0.05%
Total NOx Loading to the Airshed	2601.50	100.00%



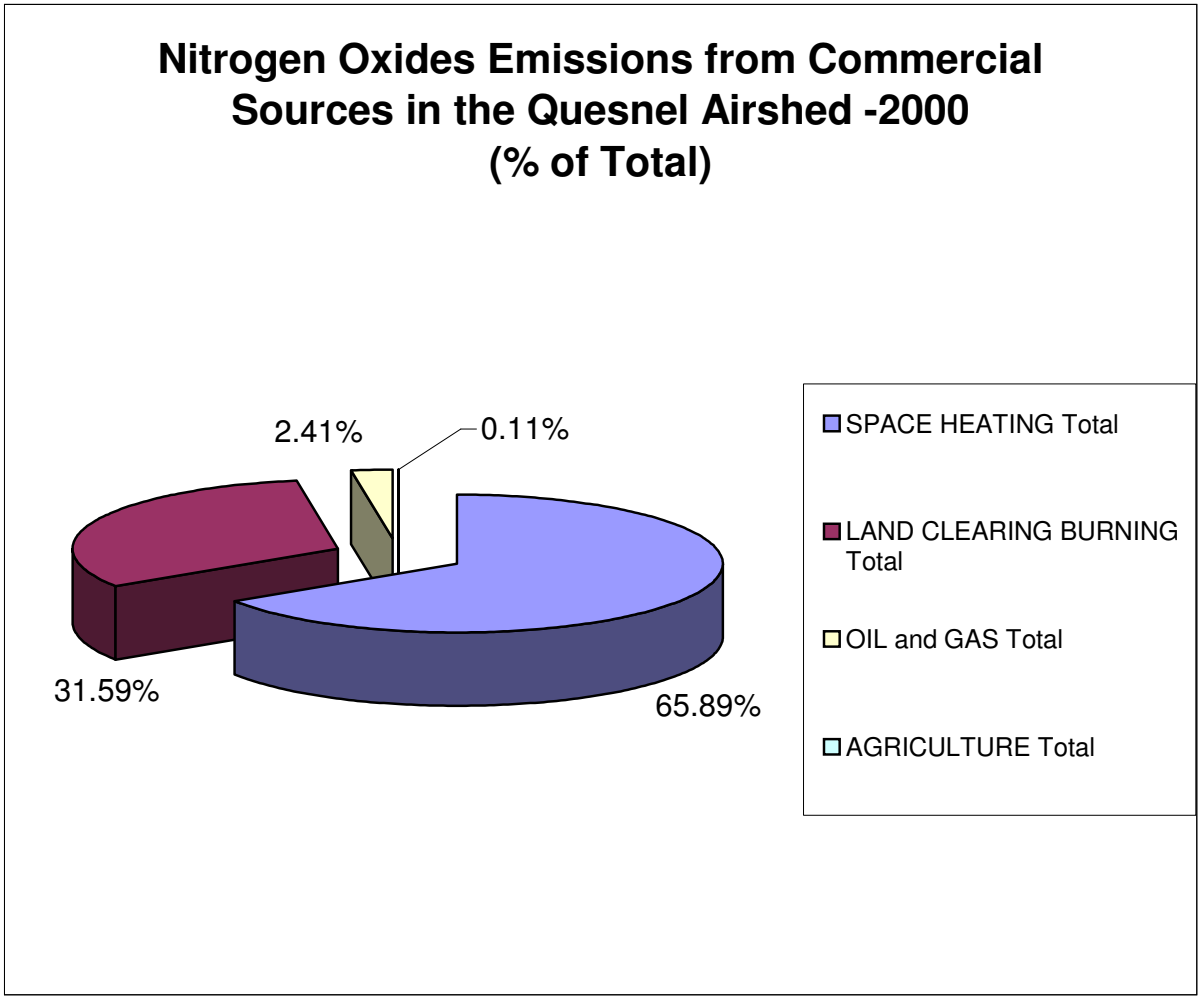
Nitrogen Oxide (NOx) Emissions from Permitted Sources in Quesnel - 2000

	NOX (T/Y)	% of Total
Sawmill & Planing Mill Products Industry	743.4	39.50%
Pulp Industry	687.3	36.52%
Softwood Veneer and Plywood	212.3	11.28%
Medium Density Fibreboard Industry	184.0	9.77%
Value added Millwork Industries	51.8	2.76%
Asphalt Industry	3.3	0.17%
Electrical Industrial Equipment Industries	0.0	0.00%
Petroleum Products, Wholesale	0.0	0.00%
Ready-Mix Concrete Industry	0.0	0.00%
Total NOx loading to Airshed:	1882.0	100%



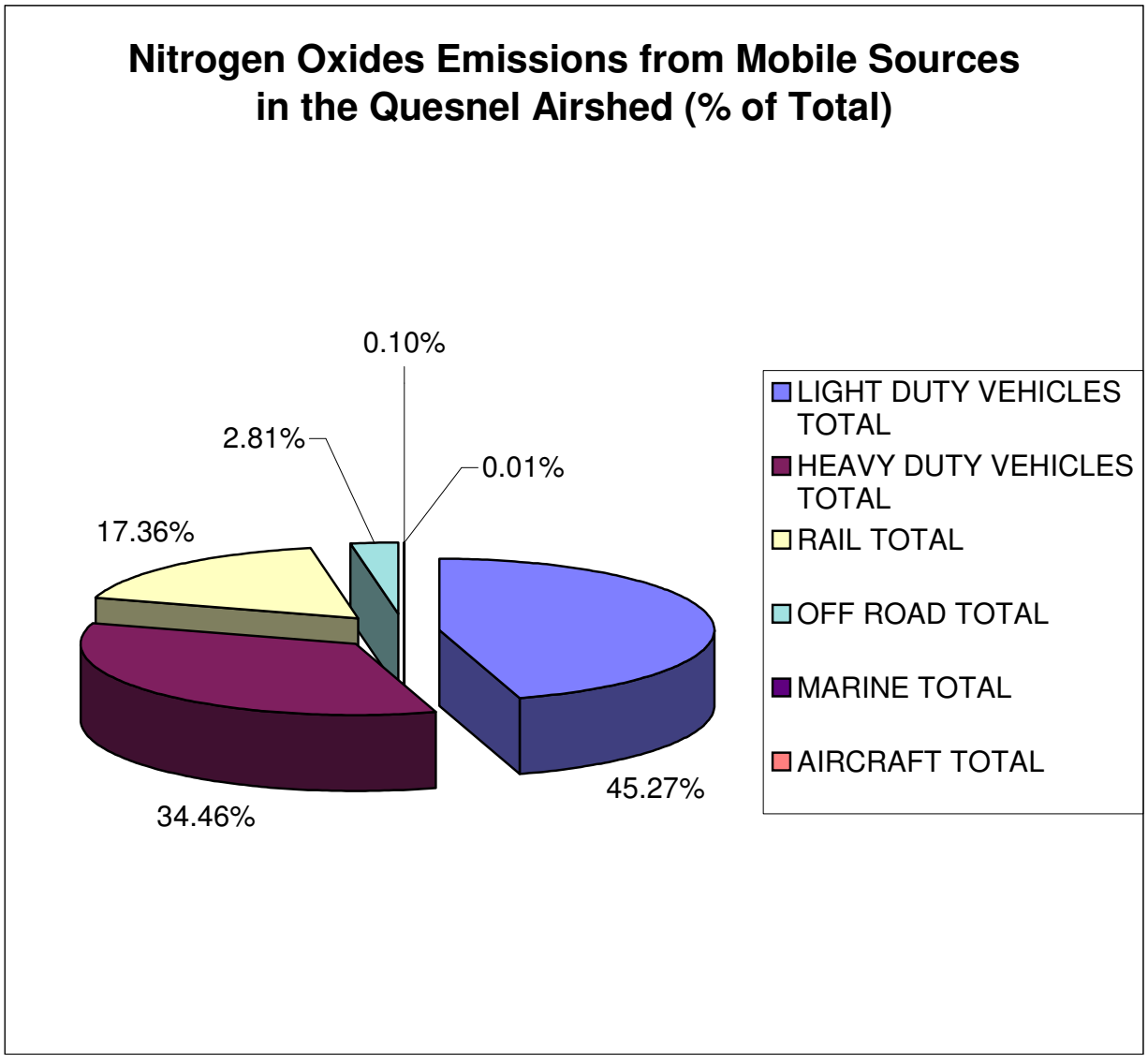
Nitrogen Oxides (NOx) Emissions from Commercial Sources in the Quesnel Airshed - 2000

	NOX (T/Y)	% of Total
SPACE HEATING Total	14.43	65.89%
LAND CLEARING BURNING Total	6.92	31.59%
OIL and GAS Total	0.53	2.41%
AGRICULTURE Total	0.02	0.11%
RESTAURANTS Total	0.00	0.00%
GRAVEL PITS Total	0.00	0.00%
WELDING SHOPS Total	0.00	0.00%
LANDFILLS Total	0.00	0.00%
CONSTRUCTION/DEMOLITION Total	0.00	0.00%
BAKERIES Total	0.00	0.00%
LIGHT INDUSTRIAL GENERAL PARTICULATE	0.00	0.00%
Asphalt Application Total	0.00	0.00%
DRY CLEANING Total	0.00	0.00%
METAL DEGREASING Total	0.00	0.00%
PRINTING INKS Total	0.00	0.00%
GLUES ADHESIVES SEALANTS Total	0.00	0.00%
PAINT APPLICATIONS Total	0.00	0.00%
Total NOx Loading from Commercial Sources	21.90	100%



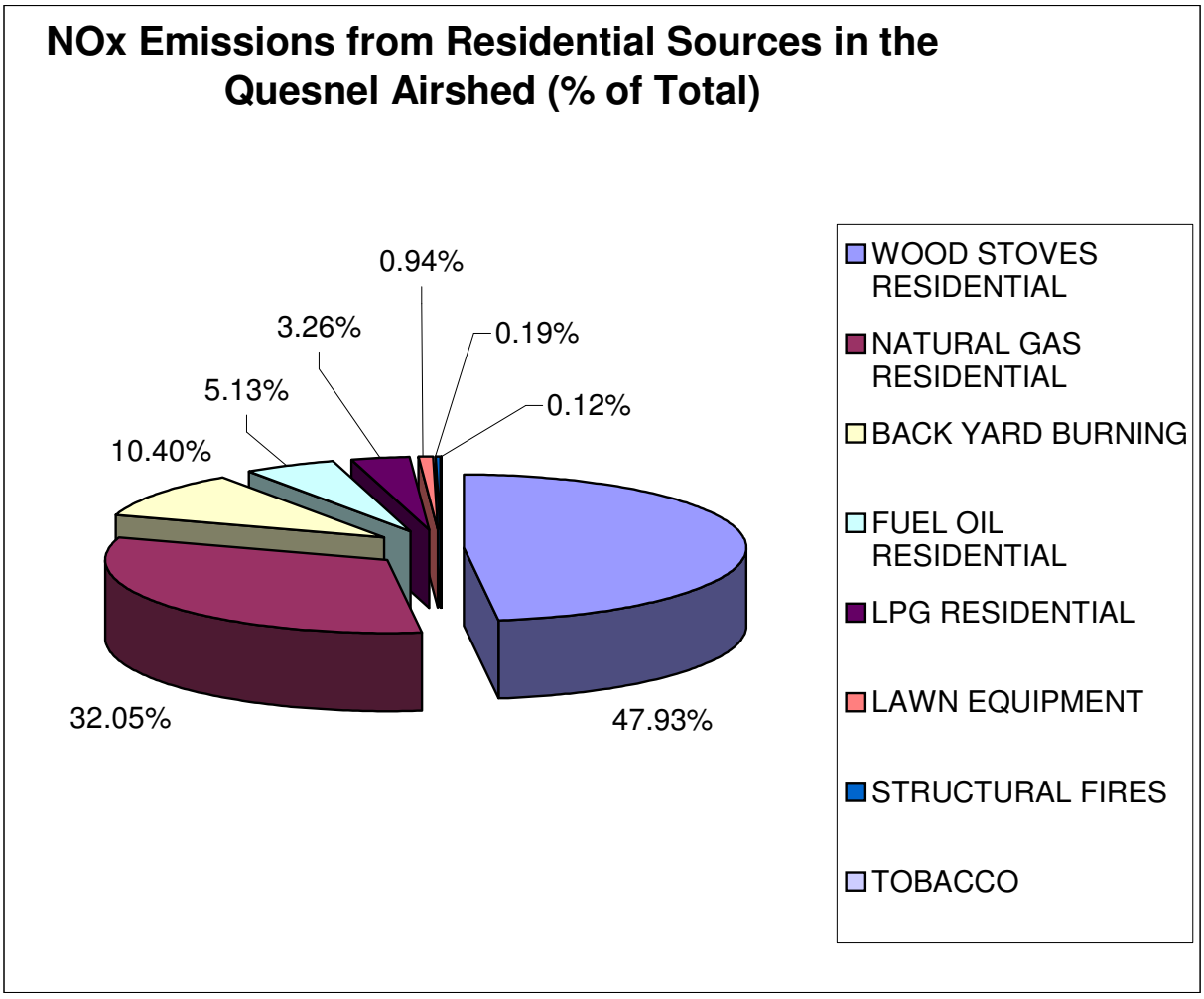
Nitrogen Oxides (NOx) Emissions from Mobile Sources in the Quesnel Airshed (1995 Baseline - adjusted to 2000)

	NOX (T/Y)	% of Total
LIGHT DUTY VEHICLES TOTAL	299.67	45.27%
HEAVY DUTY VEHICLES TOTAL	228.07	34.46%
RAIL TOTAL	114.89	17.36%
OFF ROAD TOTAL	18.63	2.81%
MARINE TOTAL	0.63	0.10%
AIRCRAFT TOTAL	0.04	0.01%
Total NOx Loading to the Airshed from Mobile Sources	661.94	100.00%



Nitrogen Oxides (NOx) Emissions from Residential Sources in the Quesnel Airshed - 2000

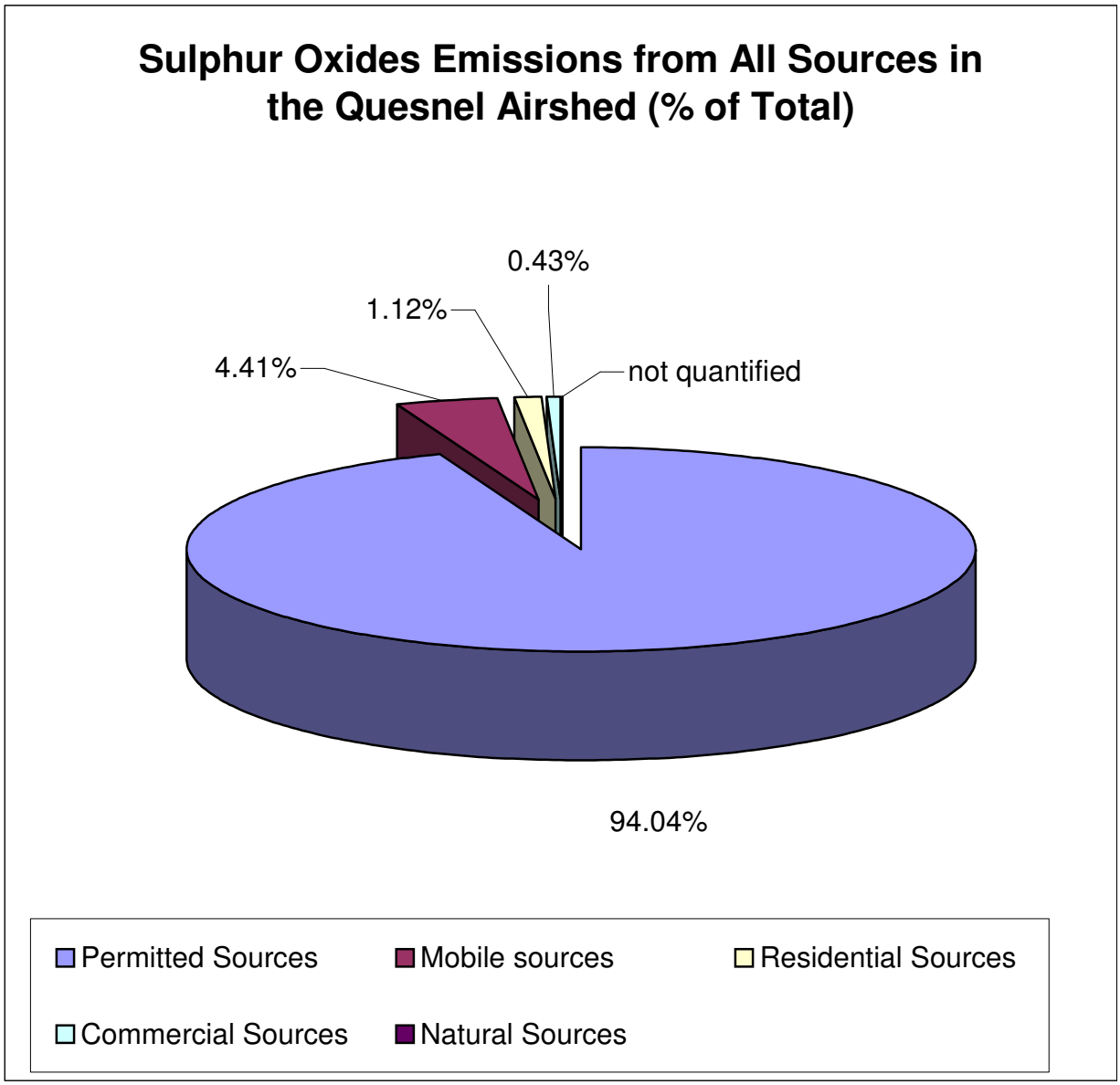
	NOX (T/Y)	% of Total
WOOD STOVES RESIDENTIAL	16.46	47.93%
NATURAL GAS RESIDENTIAL	11.00	32.05%
BACK YARD BURNING	3.57	10.40%
FUEL OIL RESIDENTIAL	1.76	5.13%
LPG RESIDENTIAL	1.12	3.26%
LAWN EQUIPMENT	0.32	0.94%
STRUCTURAL FIRES	0.06	0.19%
TOBACCO	0.04	0.12%
BARBECUES	0.00	0.00%
PAINT APPLICATION	0.00	0.00%
CONSUMER PRODUCTS	0.00	0.00%
Total NOx Loading to the Airshed from Resdiential Sources	34.34	100.00%



APPENDIX C – Sulphur Oxides (SOx)

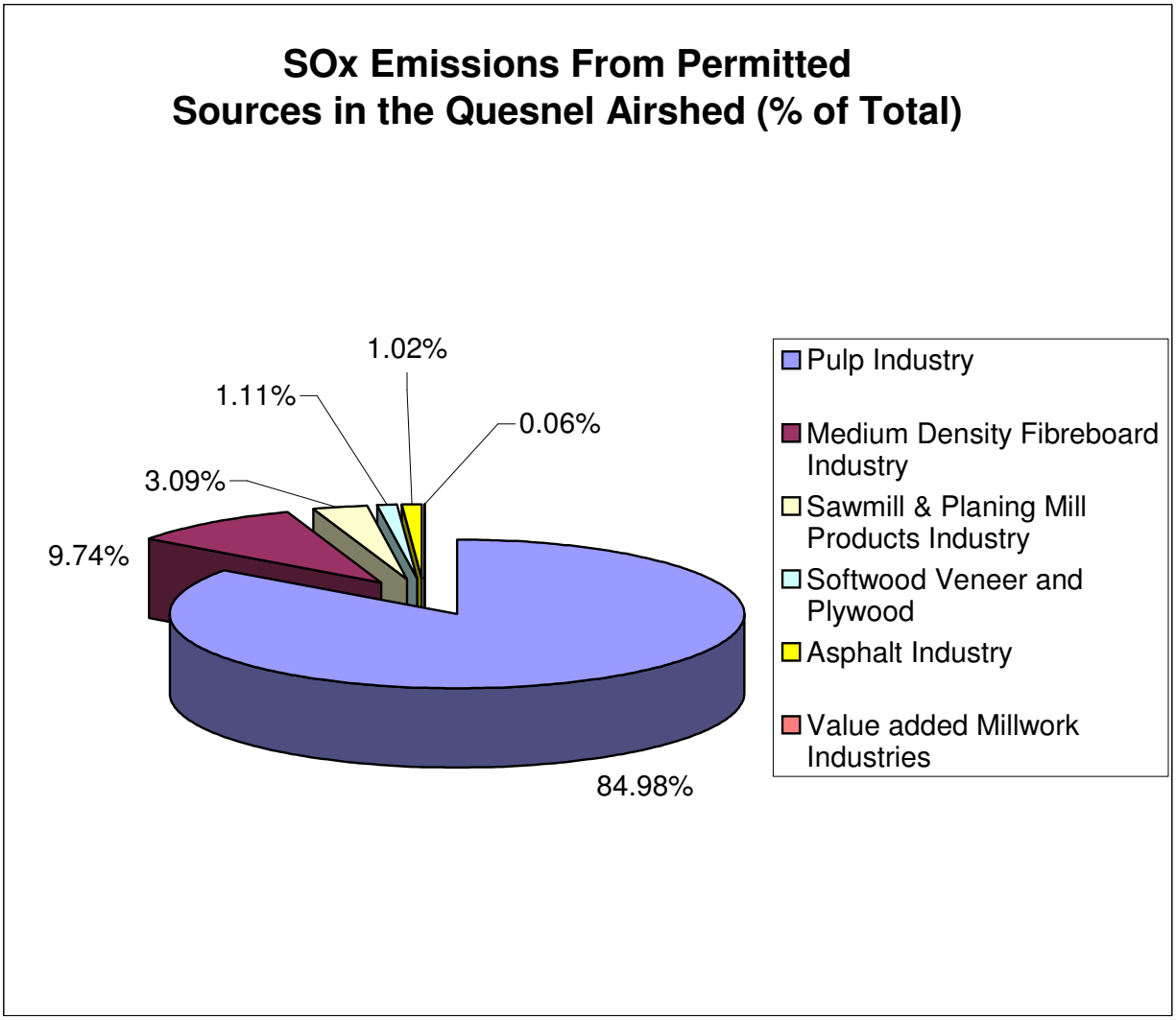
Sulphur Oxides (SOx) Emissions from All Sources in the Quesnel Airshed 1995 Baseline (adjusted to 2000)

	SOX (T/Y)	% of Total	
Permitted Sources	518.01	94.04%	
Mobile sources	24.30	4.41%	
Residential Sources	6.18	1.12%	
Commercial Sources	2.38	0.43%	
Natural Sources	0.00	0.00%	no factors available
Total SOx Loading to the Airshed	550.86	100.00%	



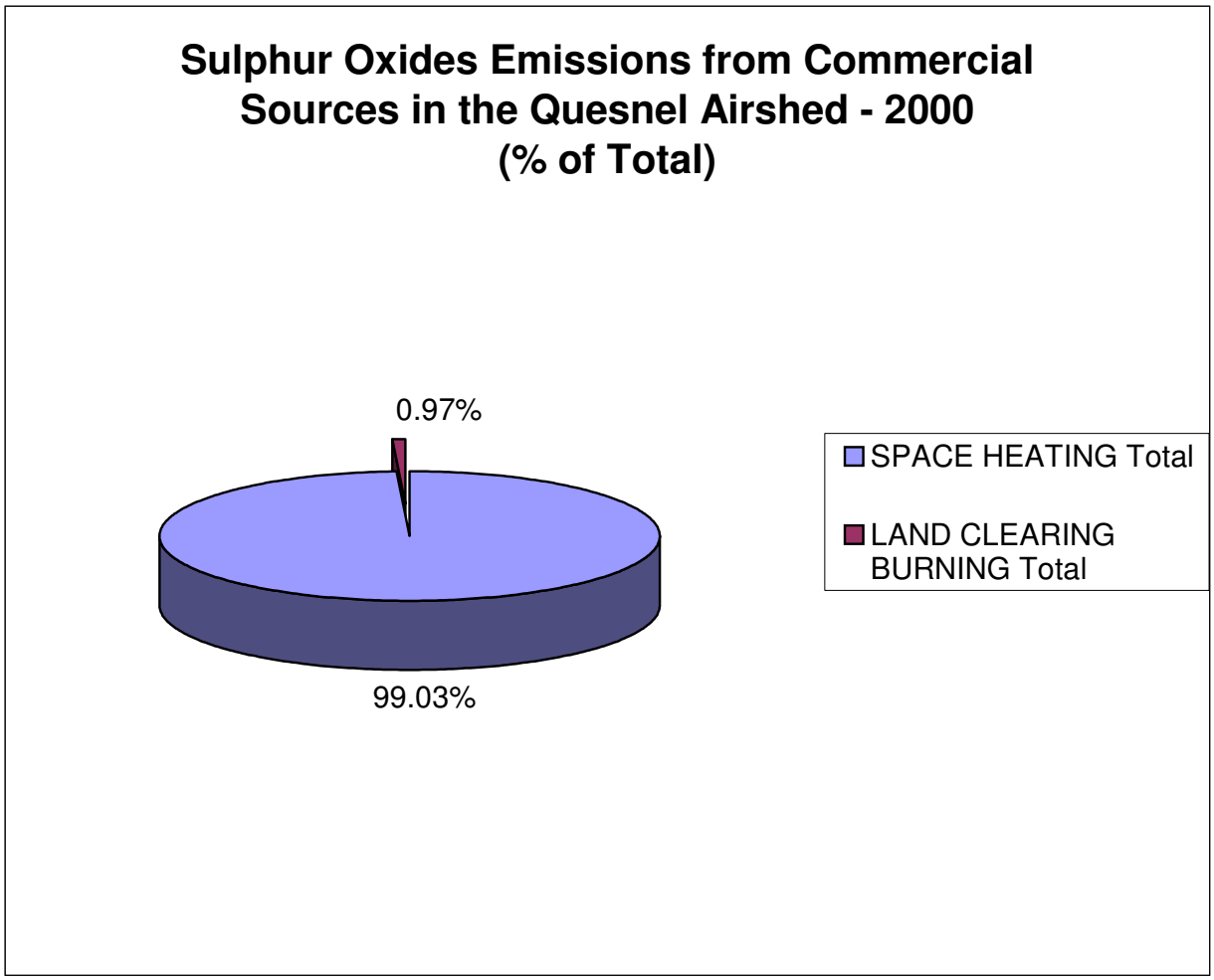
Sulphur Oxide (Sox) Emissions from Permitted Sources in Quesnel - 2000

	SOX (T/Y)	% of Total
Pulp Industry	440.2	84.98%
Medium Density Fibreboard Industry	50.5	9.74%
Sawmill & Planing Mill Products Industry	16.0	3.09%
Softwood Veneer and Plywood	5.7	1.11%
Asphalt Industry	5.3	1.02%
Value added Millwork Industries	0.3	0.06%
Electrical Industrial Equipment Industries	0.0	0.00%
Petroleum Products, Wholesale	0.0	0.00%
Ready-Mix Concrete Industry	0.0	0.00%
Total SOx loading to Airshed:	518.0	100%



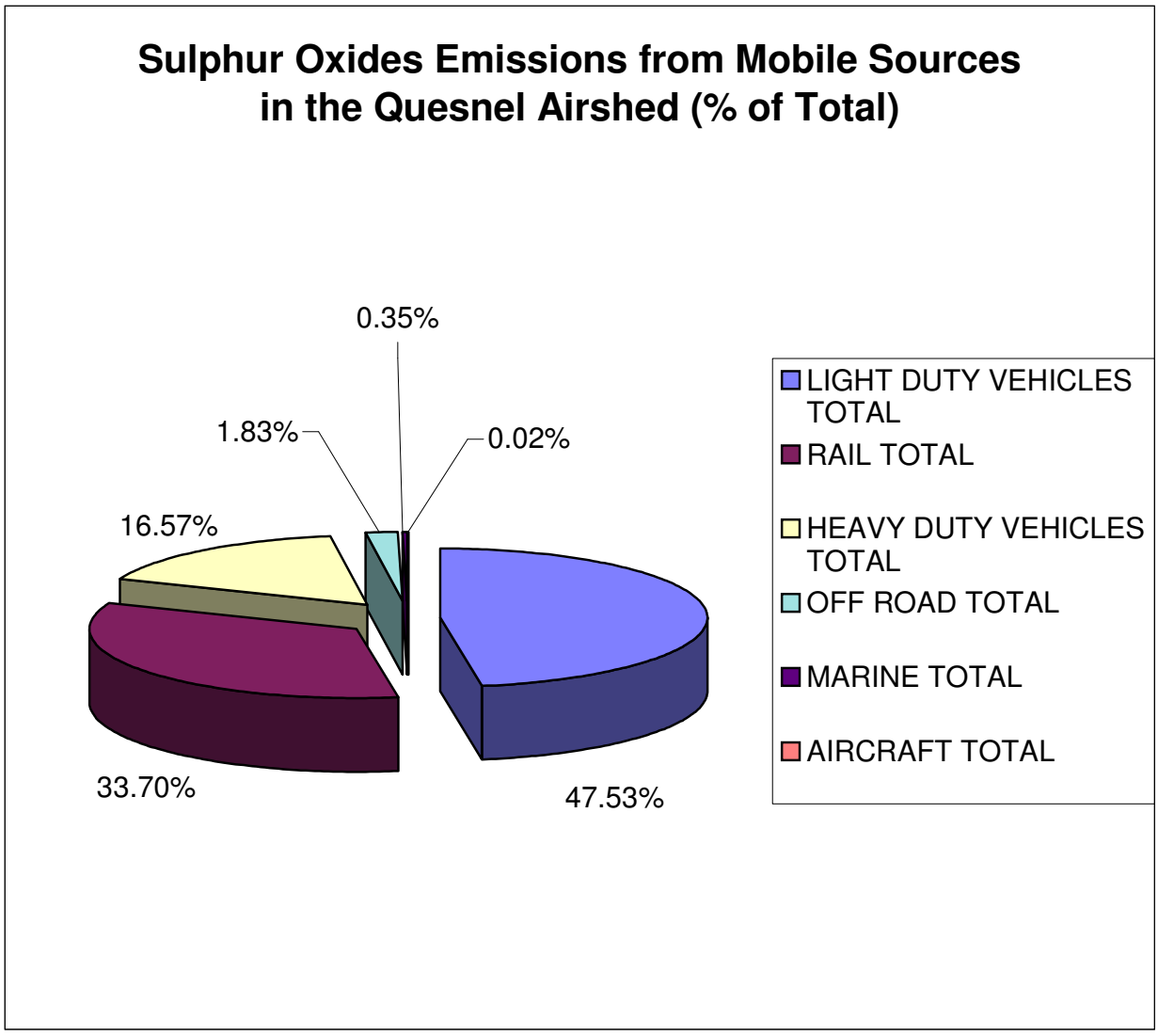
Sulphur Oxides (Sox) Emissions from Commercial Sources in the Quesnel Airshed - 2000

	SOX (T/Y)	% of Total
SPACE HEATING Total	2.35	99.03%
LAND CLEARING BURNING Total	0.02	0.97%
OIL and GAS Total	0.00	0.00%
RESTAURANTS Total	0.00	0.00%
GRAVEL PITS Total	0.00	0.00%
WELDING SHOPS Total	0.00	0.00%
LANDFILLS Total	0.00	0.00%
CONSTRUCTION/DEMOLITION Total	0.00	0.00%
BAKERIES Total	0.00	0.00%
LIGHT INDUSTRIAL GENERAL PARTICULATE	0.00	0.00%
Asphalt Application Total	0.00	0.00%
DRY CLEANING Total	0.00	0.00%
METAL DEGREASING Total	0.00	0.00%
PRINTING INKS Total	0.00	0.00%
GLUES ADHESIVES SEALANTS Total	0.00	0.00%
PAINT APPLICATIONS Total	0.00	0.00%
AGRICULTURE Total	0.00	0.00%
Total SOx Loading from Commercial Sources	2.38	100%



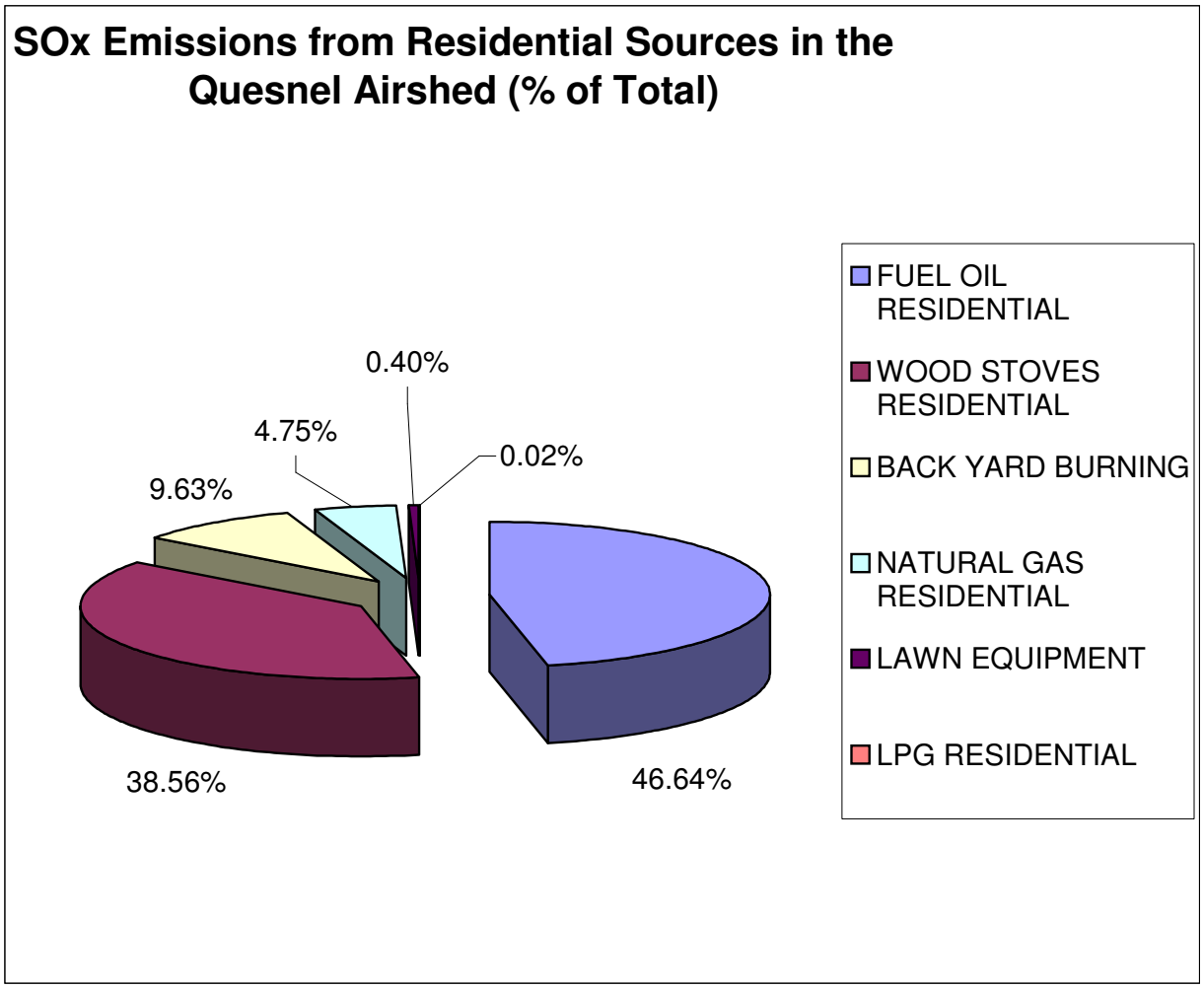
Sulphur Oxides (Sox) Emissions from Mobile Sources in the Quesnel Airshed (1995 Baseline - adjusted to 2000)

	SOX (T/Y)	% of Total
LIGHT DUTY VEHICLES TOTAL	11.55	47.53%
RAIL TOTAL	8.19	33.70%
HEAVY DUTY VEHICLES TOTAL	4.03	16.57%
OFF ROAD TOTAL	0.44	1.83%
MARINE TOTAL	0.09	0.35%
AIRCRAFT TOTAL	0.01	0.02%
Total SOx Loading to the Airshed from Mobile Sources	24.29	100.00%



Sulphur Oxides (SOx) Emissions from Residential Sources in the Quesnel Airshed - 2000

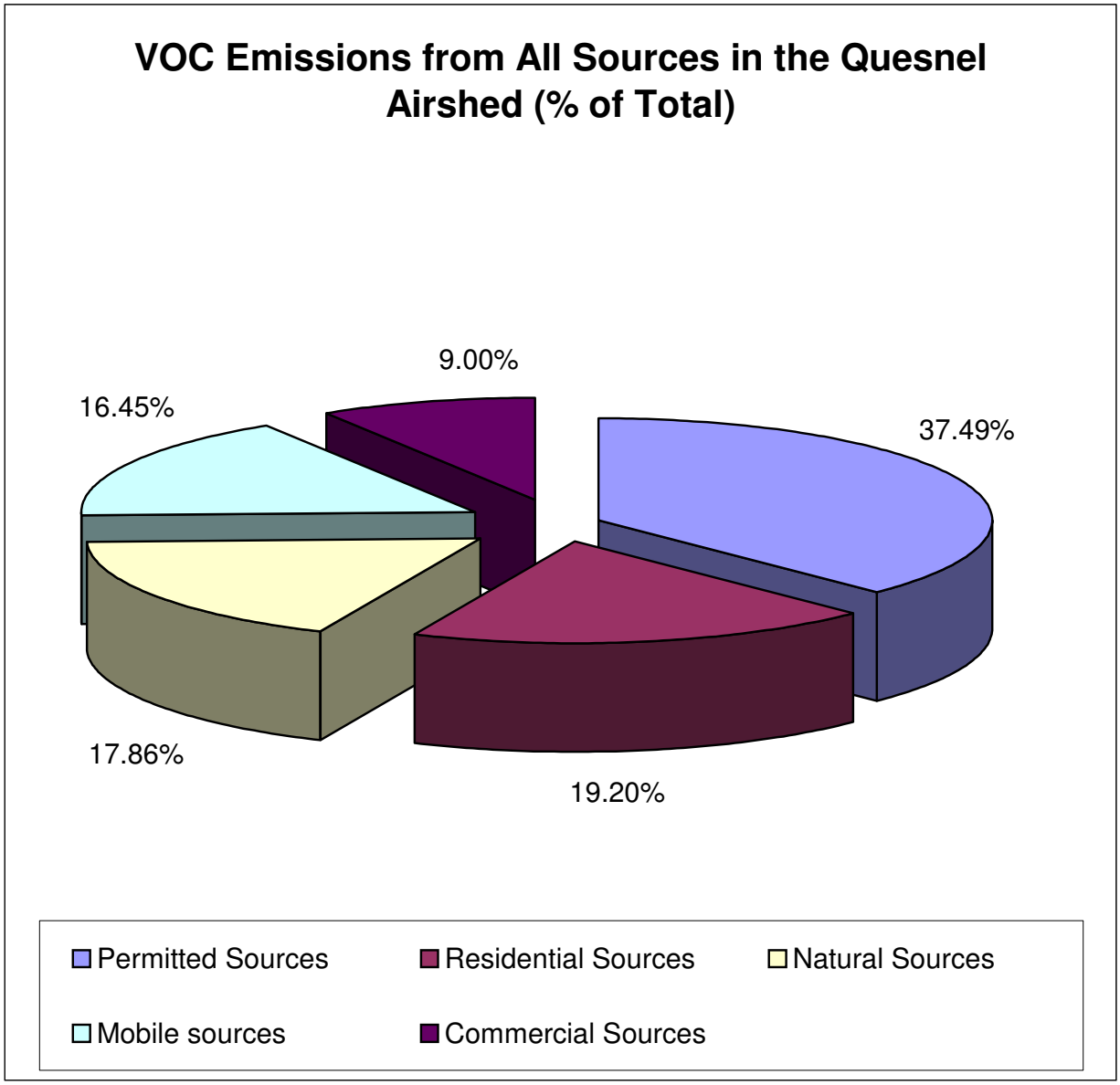
	SOX (T/Y)	% of Total	
FUEL OIL RESIDENTIAL	2.88	46.64%	
WOOD STOVES RESIDENTIAL	2.38	38.56%	
BACK YARD BURNING	0.60	9.63%	
NATURAL GAS RESIDENTIAL	0.29	4.75%	
LAWN EQUIPMENT	0.02	0.40%	
LPG RESIDENTIAL	0.00	0.02%	
STRUCTURAL FIRES	0.00	0.00%	
BARBECUES	0.00	0.00%	
TOBACCO	0.00	0.00%	no factors given
PAINT APPLICATION	0.00	0.00%	
CONSUMER PRODUCTS	0.00	0.00%	
Total SOx Loading to the Airshed from Resdiential Sources	6.18	100.00%	



APPENDIX D – Volatile Organic Compounds (VOC)

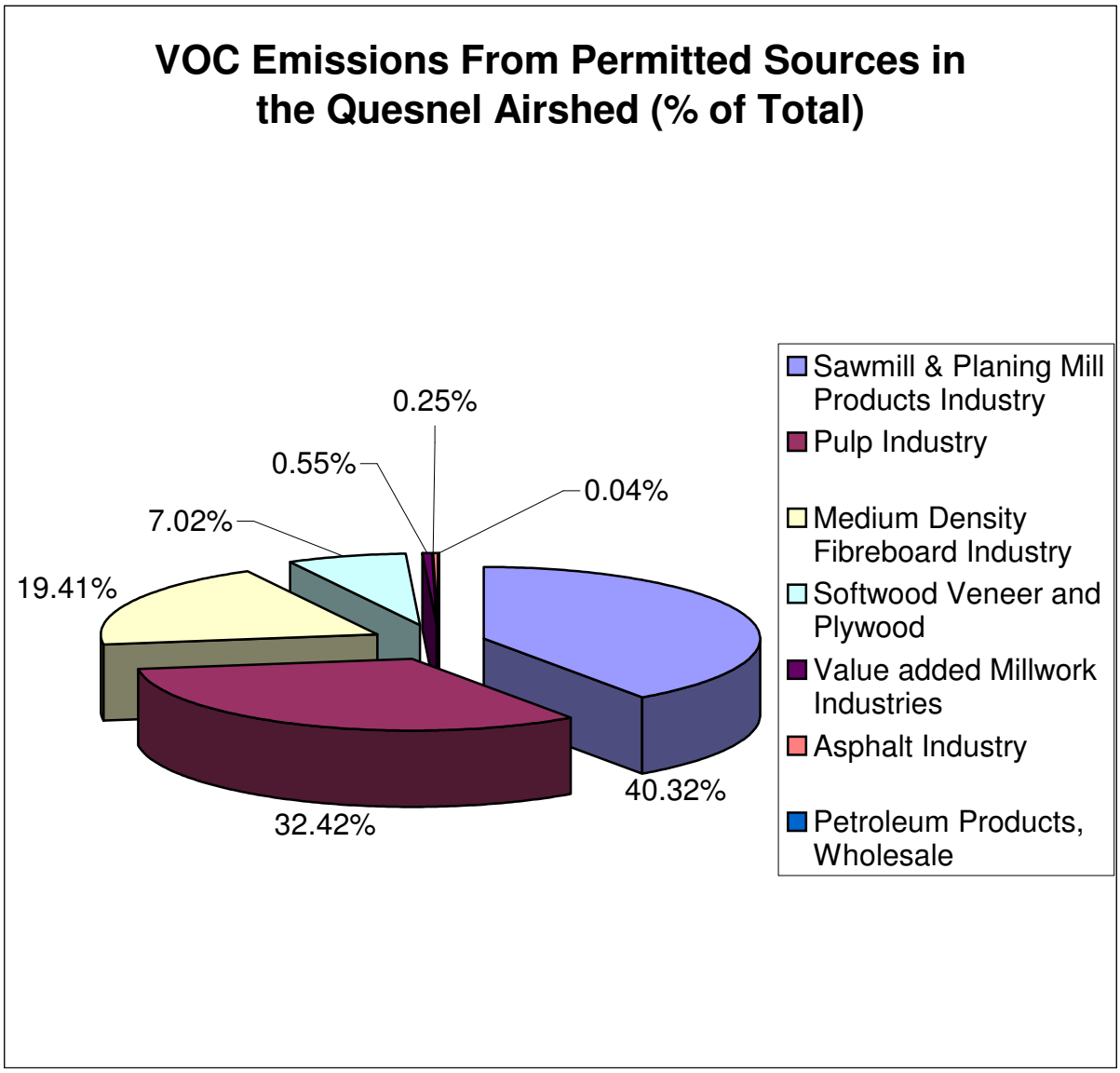
Volatile Organic Compounds (VOC) Emissions from All Sources in the Quesnel Airshed - 1995 Baseline (adjusted to 2000)

	VOC (T/Y)	% of Total
Permitted Sources	1039.43	37.49%
Residential Sources	532.40	19.20%
Natural Sources	495.25	17.86%
Mobile sources	456.00	16.45%
Commercial Sources	249.49	9.00%
Total VOC Loading to the Airshed	2772.57	100.00%



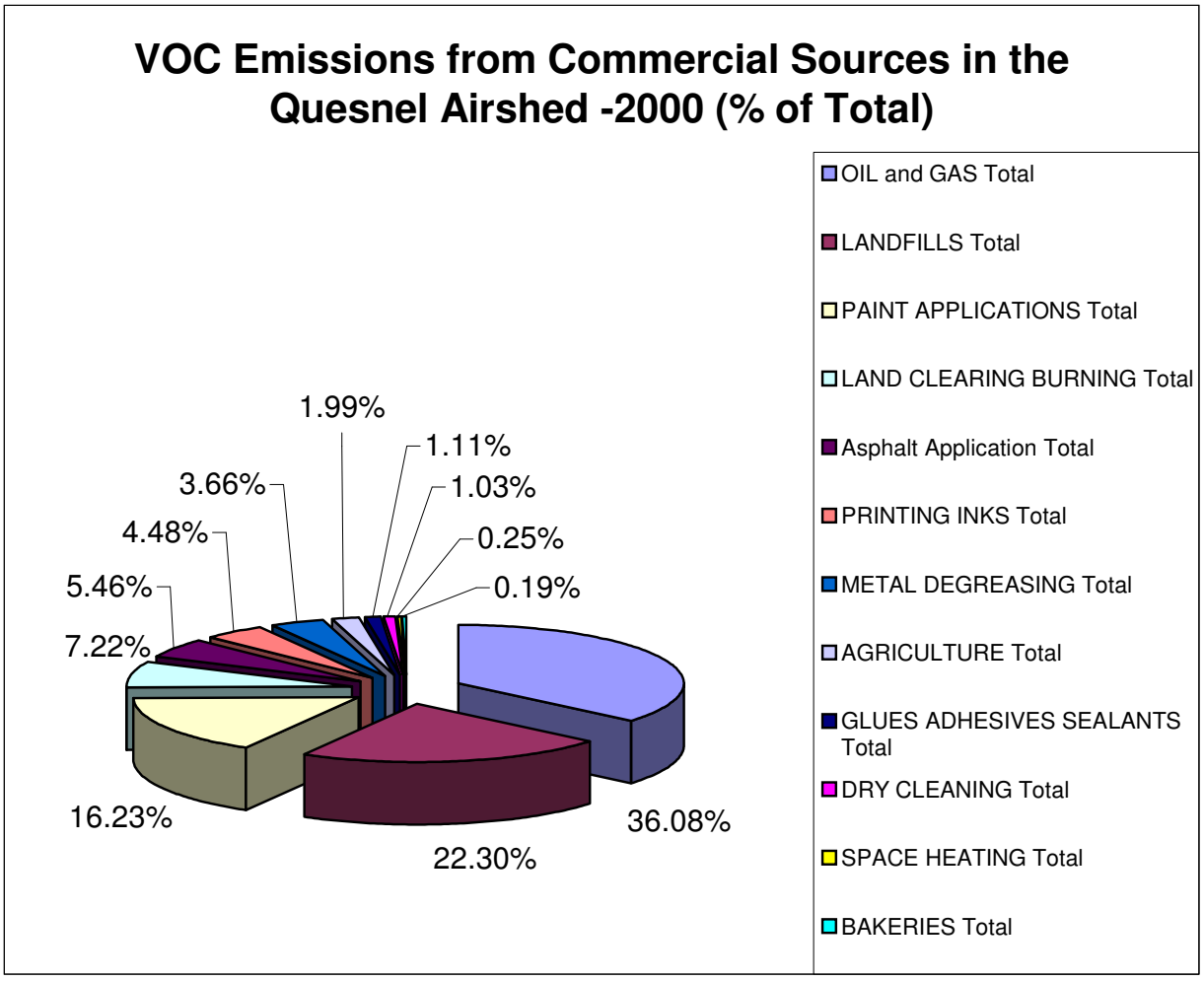
Volatile Organic Compound (VOC) Emissions from Permitted Sources in Quesnel - 2000

	VOC (T/Y)	% of Total
Sawmill & Planing Mill Products Industry	419.1	40.32%
Pulp Industry	337.0	32.42%
Medium Density Fibreboard Industry	201.7	19.41%
Softwood Veneer and Plywood	72.9	7.02%
Value added Millwork Industries	5.7	0.55%
Asphalt Industry	2.5	0.25%
Petroleum Products, Wholesale	0.4	0.04%
Electrical Industrial Equipment Industries	0.0	0.00%
Ready-Mix Concrete Industry	0.0	0.00%
Total VOC loading to Airshed:	1039.4	100%



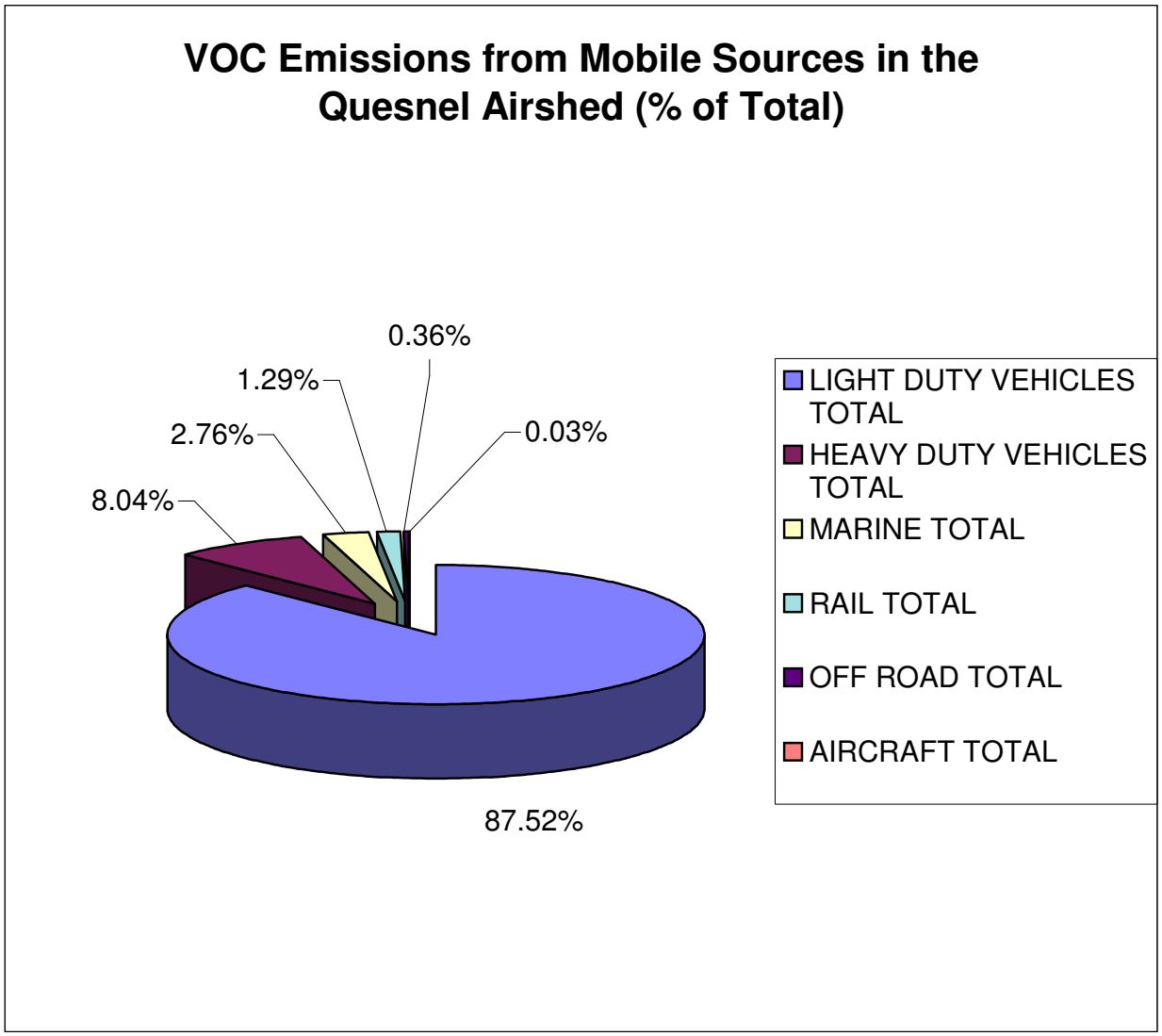
Volatile Organic Compounds (VOC) Emissions from Commercial Sources in the Quesnel Airshed - 2000

	VOC (T/Y)	% of Total	
OIL and GAS Total	98.41	36.08%	
LANDFILLS Total	60.81	22.30%	
PAINT APPLICATIONS Total	44.27	16.23%	
LAND CLEARING BURNING Total	19.70	7.22%	
Asphalt Application Total	14.89	5.46%	
PRINTING INKS Total	12.21	4.48%	
METAL DEGREASING Total	9.98	3.66%	
AGRICULTURE Total	5.44	1.99%	
GLUES ADHESIVES SEALANTS Total	3.01	1.11%	
DRY CLEANING Total	2.80	1.03%	
SPACE HEATING Total	0.68	0.25%	
BAKERIES Total	0.53	0.19%	
RESTAURANTS Total	0.00	0.00%	no factors available
GRAVEL PITS Total	0.00	0.00%	
WELDING SHOPS Total	0.00	0.00%	
CONSTRUCTION/DEMOLITION Total	0.00	0.00%	
LIGHT INDUSTRIAL GENERAL PARTICULATE	0.00	0.00%	
Total VOC Loading from Commercial Sources	272.72	100%	



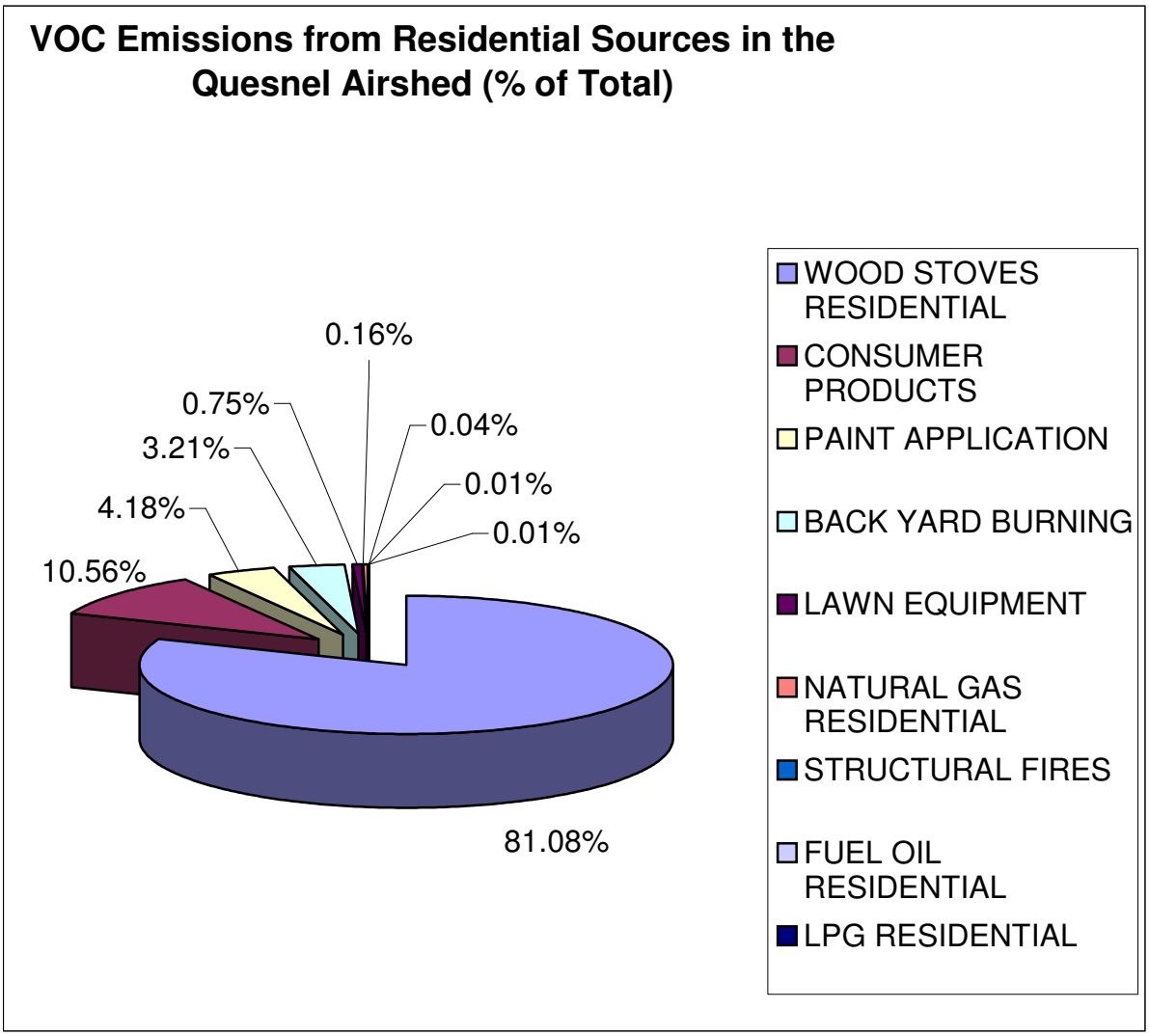
Volatile Organic Compounds (VOC) Emissions from Mobile Sources in the Quesnel Airshed (1995 Baseline - adjusted to 2000)

	VOC (T/Y)	% of Total
LIGHT DUTY VEHICLES TOTAL	399.08	87.52%
HEAVY DUTY VEHICLES TOTAL	36.65	8.04%
MARINE TOTAL	12.61	2.76%
RAIL TOTAL	5.90	1.29%
OFF ROAD TOTAL	1.63	0.36%
AIRCRAFT TOTAL	0.13	0.03%
Total VOC Loading to the Airshed from Mobile Sources	456.00	100.00%



Volatile Organic Compound (VOC) Emissions from Residential Sources in the Quesnel Airshed - 2000

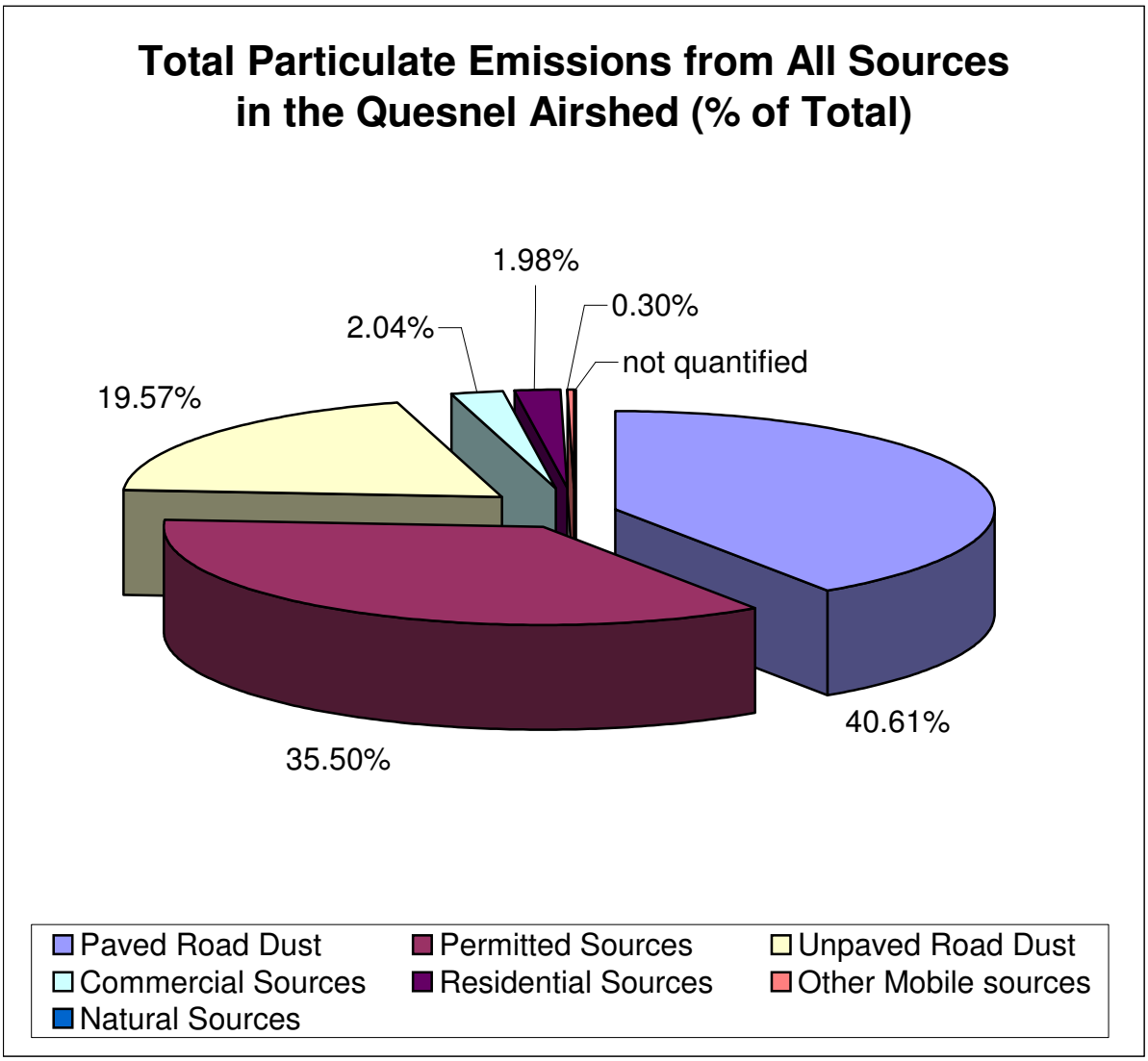
	VOC (T/Y)	% of Total	
WOOD STOVES RESIDENTIAL	450.48	81.08%	
CONSUMER PRODUCTS	58.69	10.56%	
PAINT APPLICATION	23.23	4.18%	
BACK YARD BURNING	17.85	3.21%	
LAWN EQUIPMENT	4.17	0.75%	
NATURAL GAS RESIDENTIAL	0.87	0.16%	
STRUCTURAL FIRES	0.22	0.04%	
FUEL OIL RESIDENTIAL	0.07	0.01%	
LPG RESIDENTIAL	0.04	0.01%	
BARBECUES	0.00	0.00%	
TOBACCO	0.00	0.00%	No factors
Total VOC Loading to the Airshed from Resdiential Sources	555.62	100.00%	



APPENDIX E – Total Particulate (TPT)

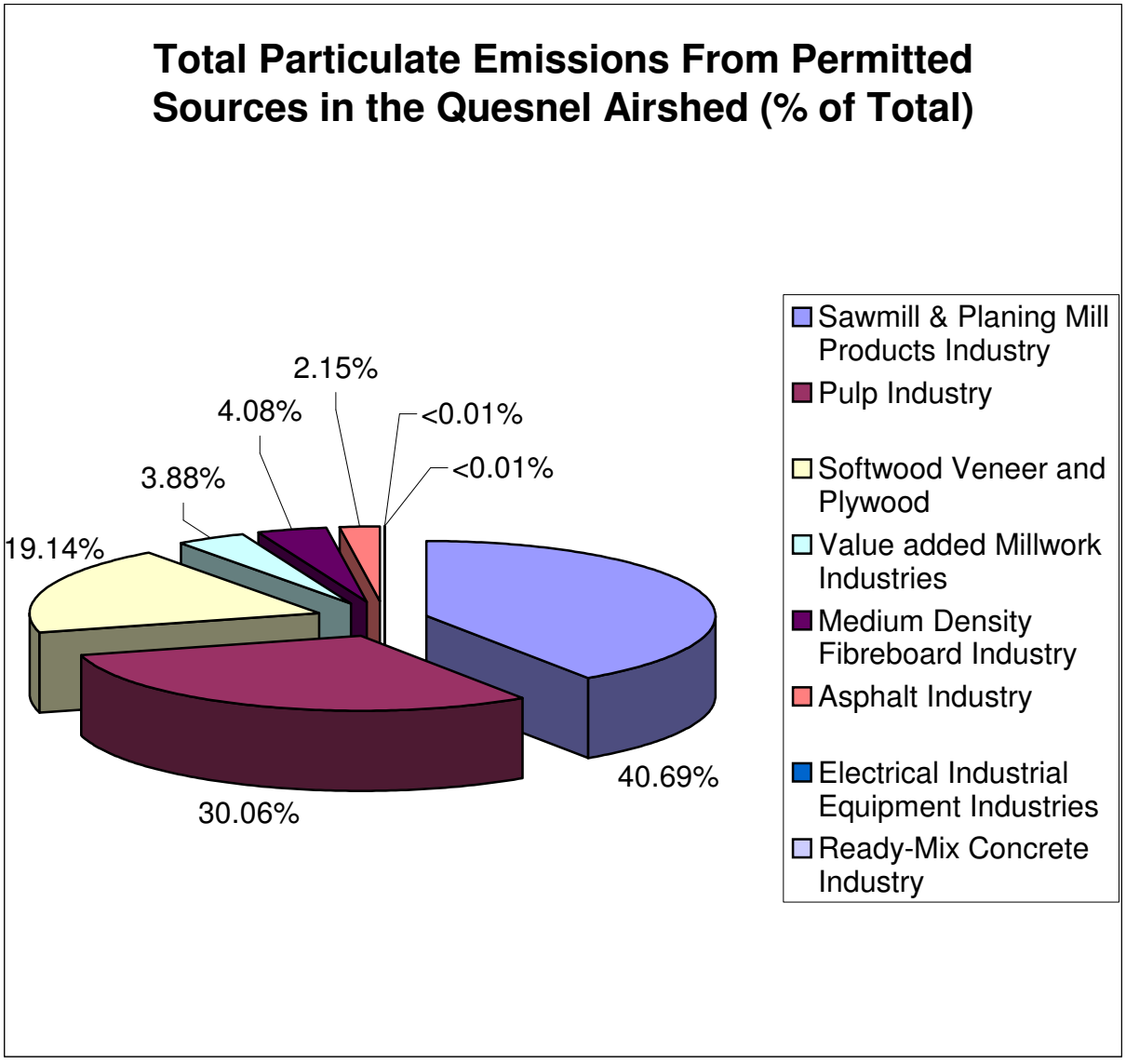
Total Particulate (TPT) Emissions from All Sources in the Quesnel Airshed 1995 Baseline (adjusted to 2000)

	TPT (T/Y)	% of Total	From winter sanding (T/Y)
Paved Road Dust	3847.05	40.61%	742
Permitted Sources	3362.97	35.50%	
Unpaved Road Dust	1853.86	19.57%	
Commercial Sources	192.78	2.04%	
Residential Sources	187.75	1.98%	
Other Mobile sources	28.16	0.30%	
Natural Sources	0.00	0.00%	No factor available for fugitive dust
Total TPT Loading to the Airshed	9472.56	100.00%	



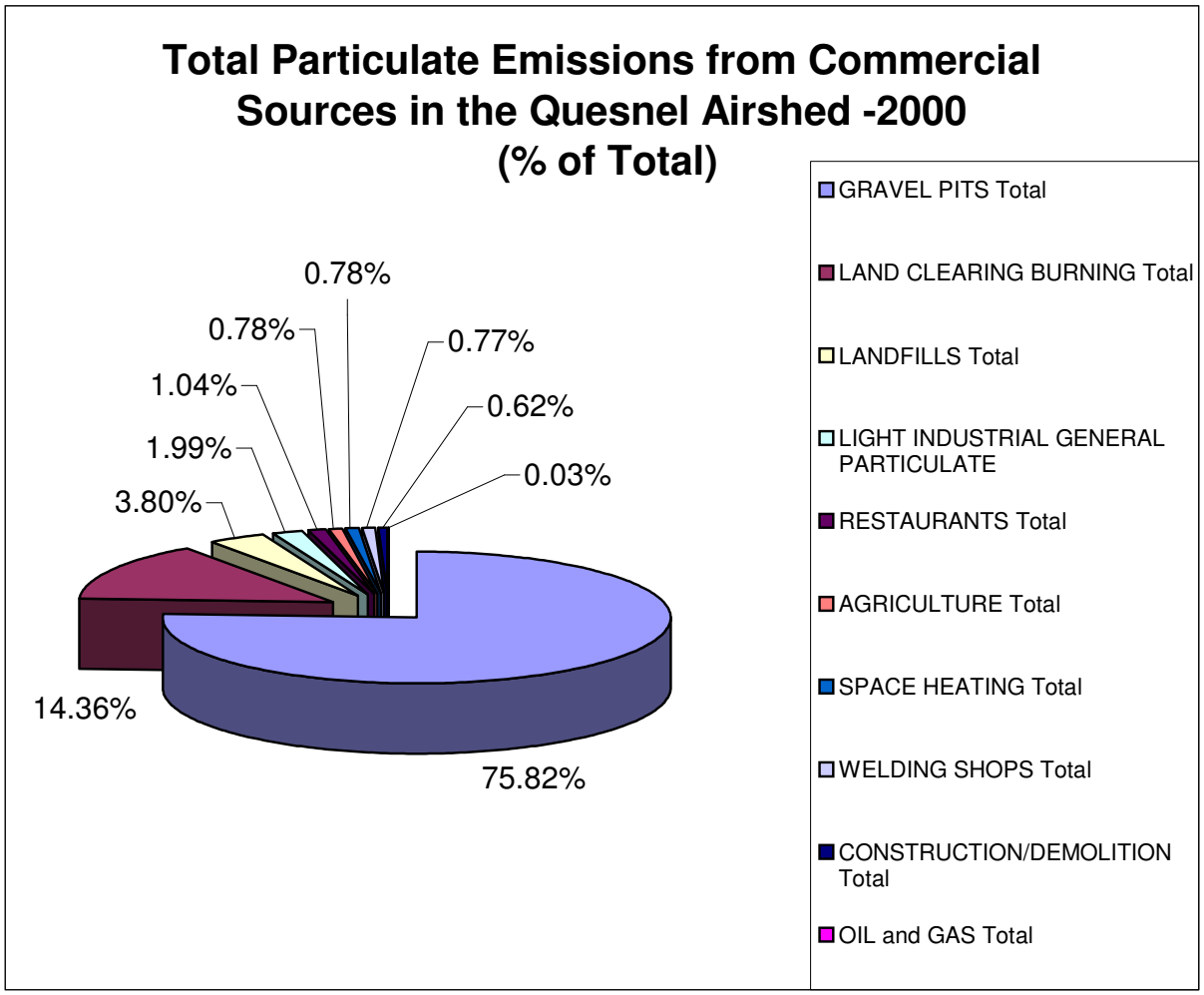
Total Particulate (TPT) Emissions from Permitted Sources in Quesnel - 2000

	TPT (T/Y)	% of Total
Sawmill & Planing Mill Products Industry	1368.3	40.7%
Pulp Industry	1011.0	30.1%
Softwood Veneer and Plywood	643.6	19.1%
Value added Millwork Industries	130.4	3.9%
Medium Density Fibreboard Industry	137.2	4.1%
Asphalt Industry	72.3	2.2%
Electrical Industrial Equipment Industries	0.1	<0.01%
Ready-Mix Concrete Industry	0.0	<0.01%
Petroleum Products, Wholesale	0.0	0.0%
Total TPT loading to Airshed:	3363	100%



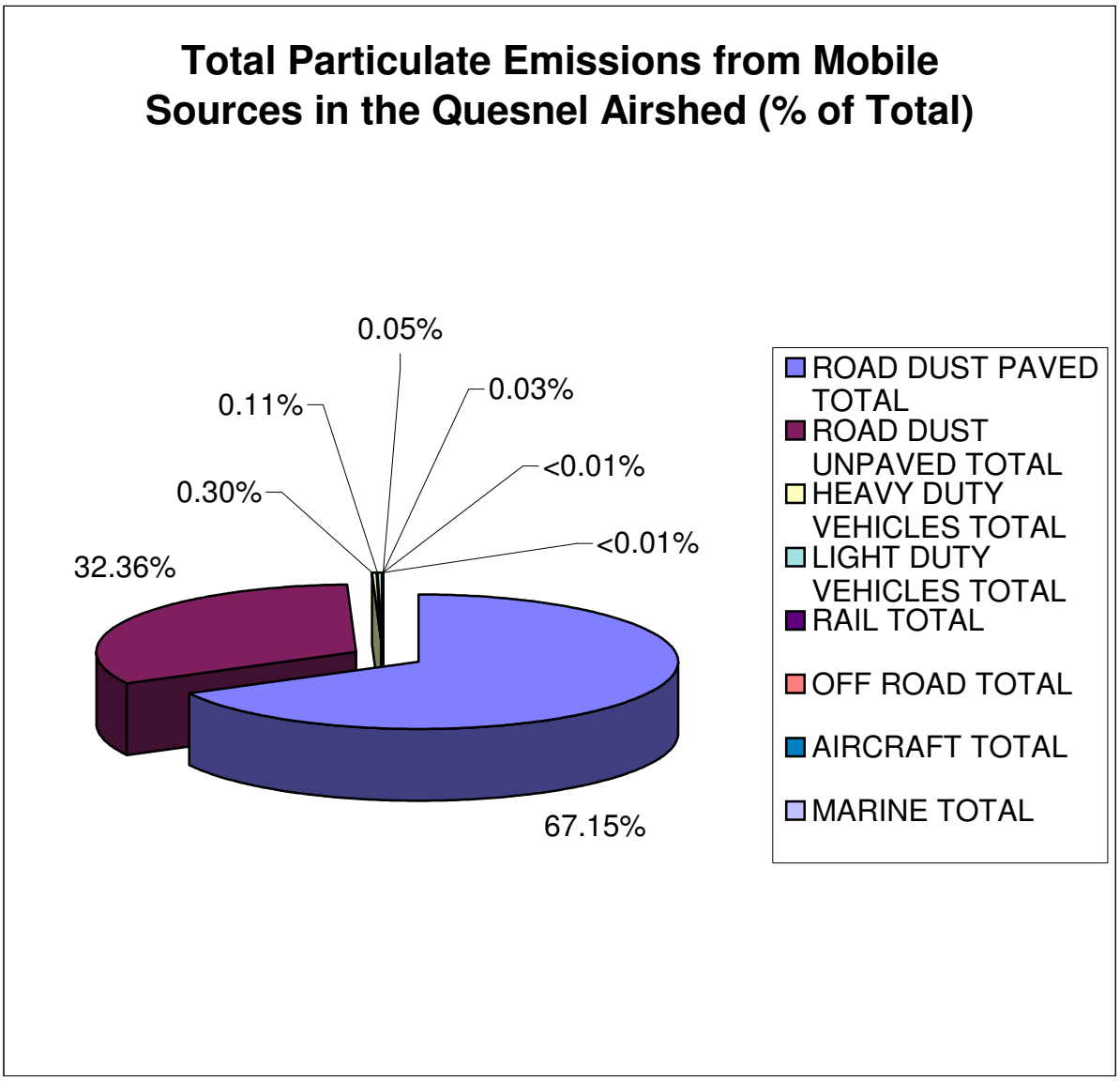
Total Particulate (TPT) Emissions from Commercial Sources in the Quesnel Airshed - 2000

	TPT (T/Y)	% of Total
GRAVEL PITS Total	146.16	75.82%
LAND CLEARING BURNING Total	27.68	14.36%
LANDFILLS Total	7.33	3.80%
LIGHT INDUSTRIAL GENERAL PARTICULATE	3.84	1.99%
RESTAURANTS Total	2.00	1.04%
AGRICULTURE Total	1.51	0.78%
SPACE HEATING Total	1.51	0.78%
WELDING SHOPS Total	1.49	0.77%
CONSTRUCTION/DEMOLITION Total	1.20	0.62%
OIL and GAS Total	0.06	0.03%
BAKERIES Total	0.00	0.00%
Asphalt Application Total	0.00	0.00%
DRY CLEANING Total	0.00	0.00%
METAL DEGREASING Total	0.00	0.00%
PRINTING INKS Total	0.00	0.00%
GLUES ADHESIVES SEALANTS Total	0.00	0.00%
PAINT APPLICATIONS Total	0.00	0.00%
Total TPT Loading from Commercial Sources	192.78	100%



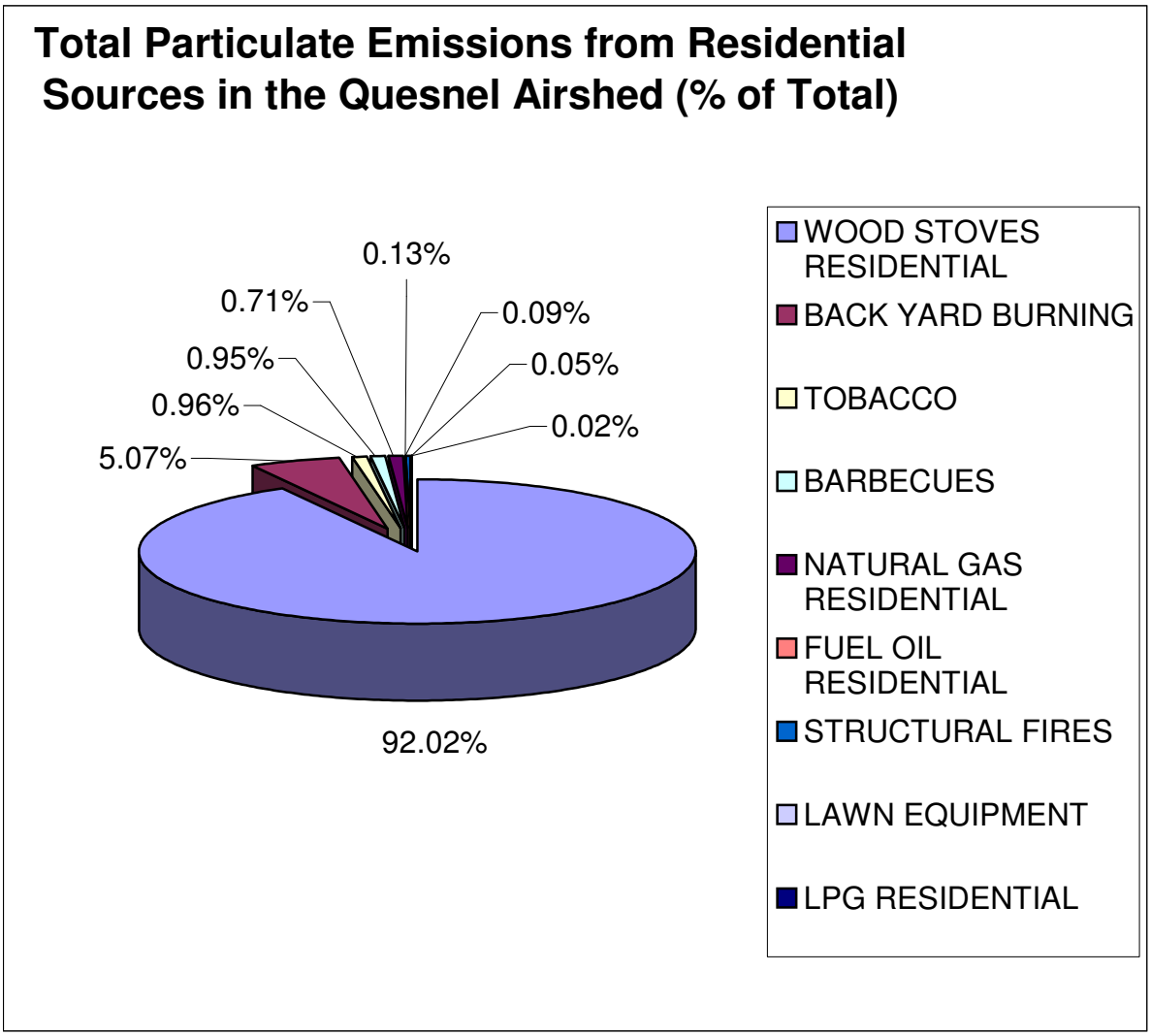
Total Particulate (TPT) Emissions from Mobile Sources in the Quesnel Airshed (1995 Baseline - adjusted to 2000)

	TPT (T/Y)	% of Total	Winter sanding
ROAD DUST PAVED TOTAL	3847.05	67.15%	741.54 T/Y
ROAD DUST UNPAVED TOTAL	1853.86	32.36%	
HEAVY DUTY VEHICLES TOTAL	17.22	0.30%	
LIGHT DUTY VEHICLES TOTAL	6.50	0.11%	
RAIL TOTAL	2.74	0.05%	
OFF ROAD TOTAL	1.64	0.03%	
AIRCRAFT TOTAL	0.04	<0.01%	
MARINE TOTAL	0.02	<0.01%	
TPT Loading to the Airshed from Mobile Sources	5729.05	100.00%	



Total Particulate (TPT) Emissions from Residential Sources in the Quesnel Airshed - 2000

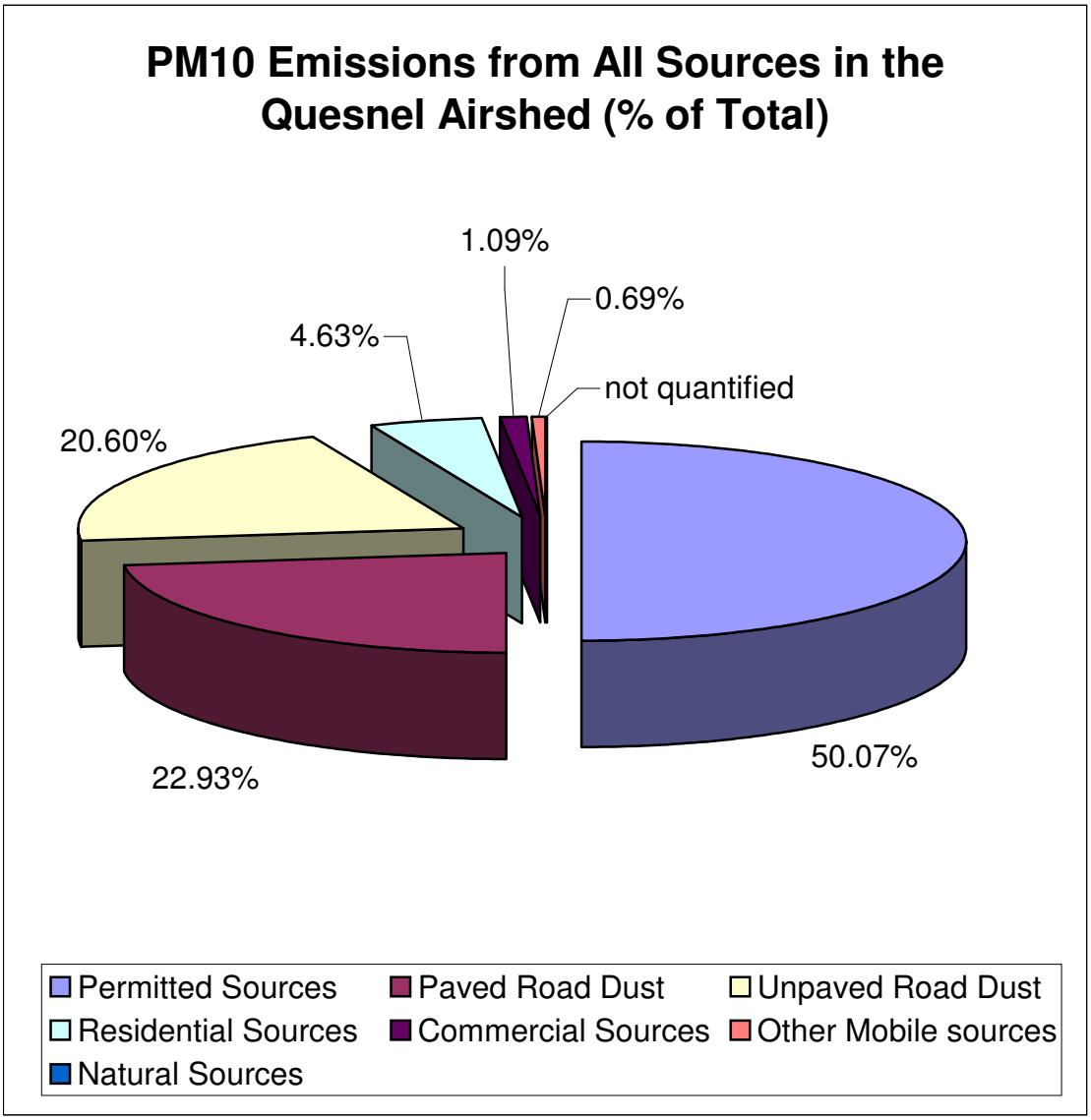
	TPT (T/Y)	% of Total
WOOD STOVES RESIDENTIAL	172.76	92.02%
BACK YARD BURNING	9.52	5.07%
TOBACCO	1.81	0.96%
BARBECUES	1.78	0.95%
NATURAL GAS RESIDENTIAL	1.34	0.71%
FUEL OIL RESIDENTIAL	0.24	0.13%
STRUCTURAL FIRES	0.17	0.09%
LAWN EQUIPMENT	0.10	0.05%
LPG RESIDENTIAL	0.03	0.02%
PAINT APPLICATION	0.00	0.00%
CONSUMER PRODUCTS	0.00	0.00%
Total TPT Loading to the Airshed from Resdiential Sources	187.75	100.00%



APPENDIX F - PM_{10}

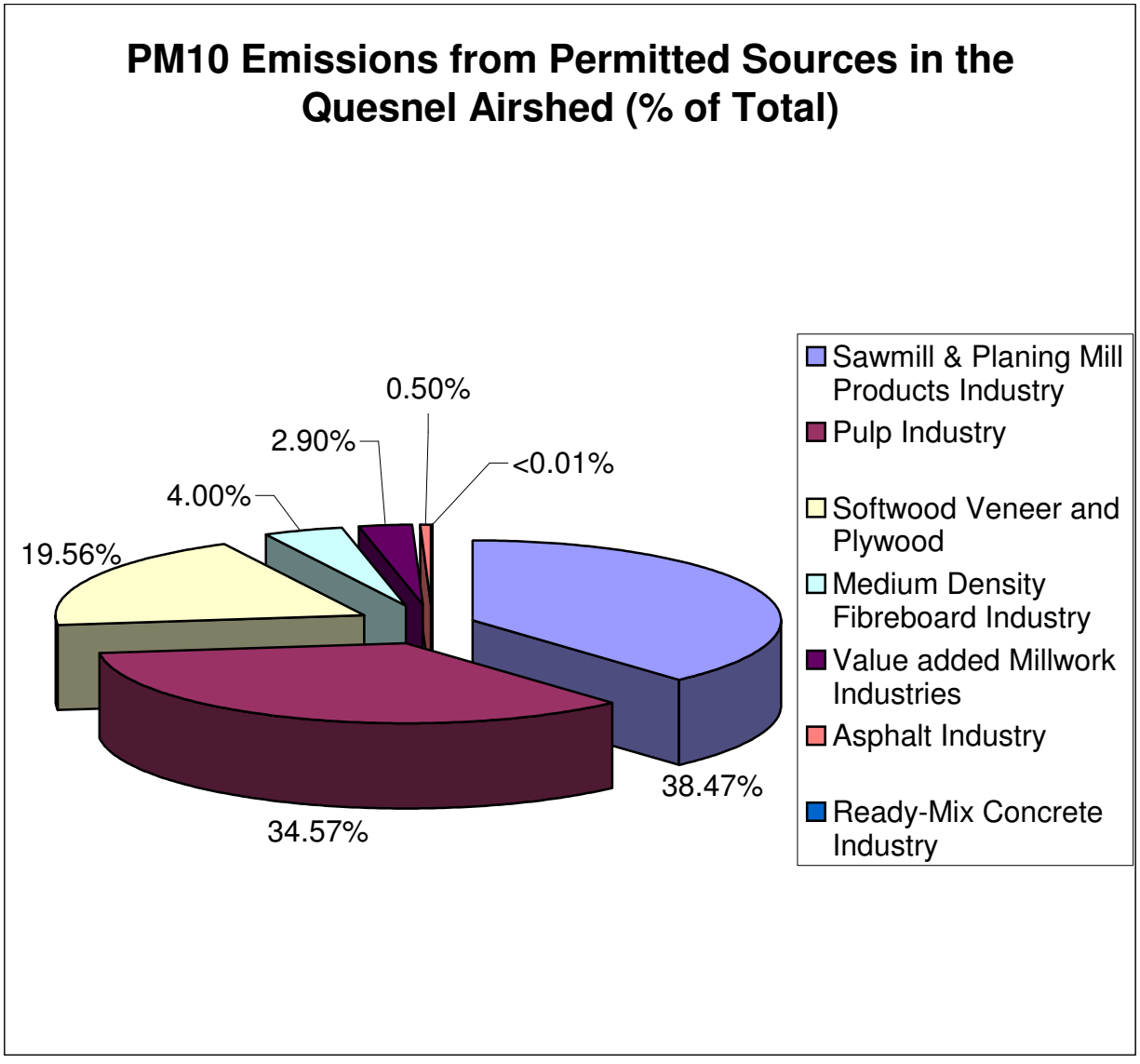
PM10 Emissions from All Sources in the Quesnel Airshed
1995 Baseline (adjusted to 2000)

	PM10 (T/Y)	% of Total	from winter sanding (T/Y)
Permitted Sources	2027.76	50.07%	
Paved Road Dust	928.59	22.93%	333.67
Unpaved Road Dust	834.17	20.60%	
Residential Sources	187.49	4.63%	
Commercial Sources	44.05	1.09%	
Other Mobile sources	27.86	0.69%	
Natural Sources	0.00	0.00%	no factors available
Total PM10 Loading to the Airshed	4049.93	100.00%	



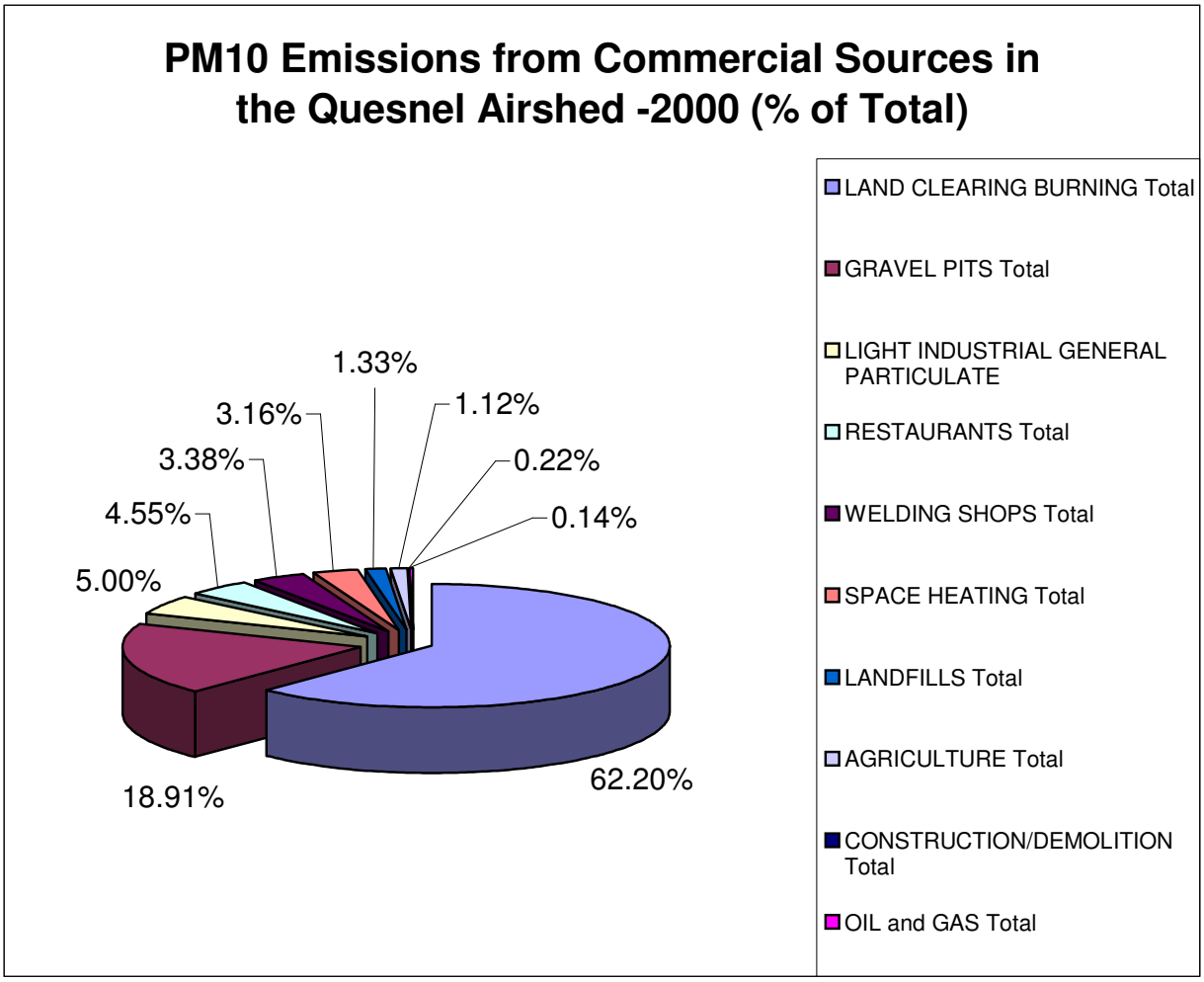
PM10 Emissions from Permitted Sources in Quesnel - 2000

	PM10 (T/Y)	% of Total
Sawmill & Planing Mill Products Industry	780.0	38.5%
Pulp Industry	701.0	34.6%
Softwood Veneer and Plywood	396.7	19.6%
Medium Density Fibreboard Industry	81.1	4.0%
Value added Millwork Industries	58.8	2.9%
Asphalt Industry	10.2	0.5%
Ready-Mix Concrete Industry	0.0	<0.01%
Electrical Industrial Equipment Industries	0.0	0.0%
Petroleum Products, Wholesale	0.0	0.0%
Total PM10 loading to Airshed:	2028	100%



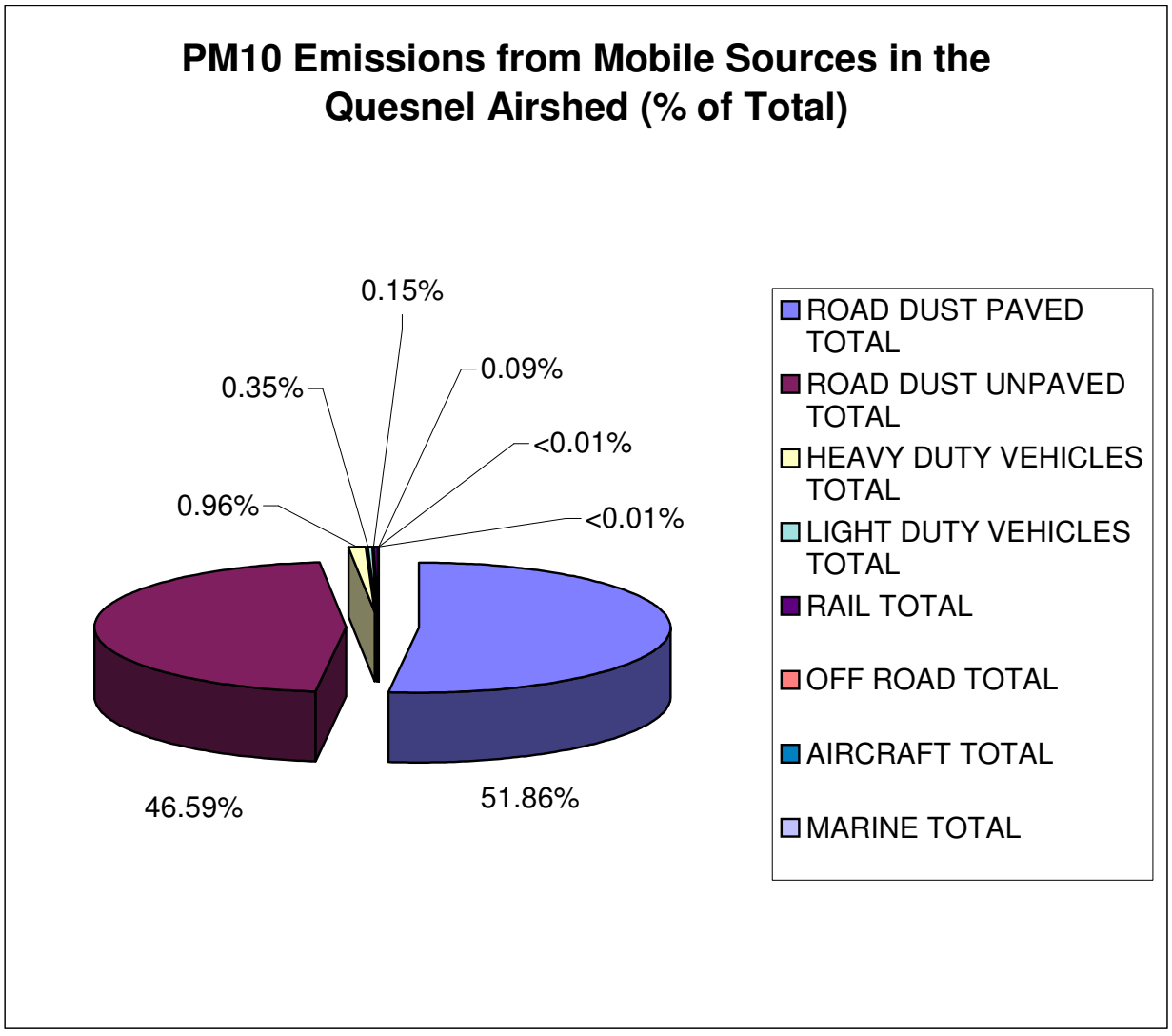
PM10 Emissions from Commercial Sources in the Quesnel Airshed - 2000

	PM10 (T/Y)	% of Total
LAND CLEARING BURNING Total	27.40	62.20%
GRAVEL PITS Total	8.33	18.91%
LIGHT INDUSTRIAL GENERAL PARTICULATE	2.20	5.00%
RESTAURANTS Total	2.00	4.55%
WELDING SHOPS Total	1.49	3.38%
SPACE HEATING Total	1.39	3.16%
LANDFILLS Total	0.58	1.33%
AGRICULTURE Total	0.49	1.12%
CONSTRUCTION/DEMOLITION Total	0.10	0.22%
OIL and GAS Total	0.06	0.14%
BAKERIES Total	0.00	0.00%
Asphalt Application Total	0.00	0.00%
DRY CLEANING Total	0.00	0.00%
METAL DEGREASING Total	0.00	0.00%
PRINTING INKS Total	0.00	0.00%
GLUES ADHESIVES SEALANTS Total	0.00	0.00%
PAINT APPLICATIONS Total	0.00	0.00%
Total PM10 Loading from Commercial Sources	44.05	100%



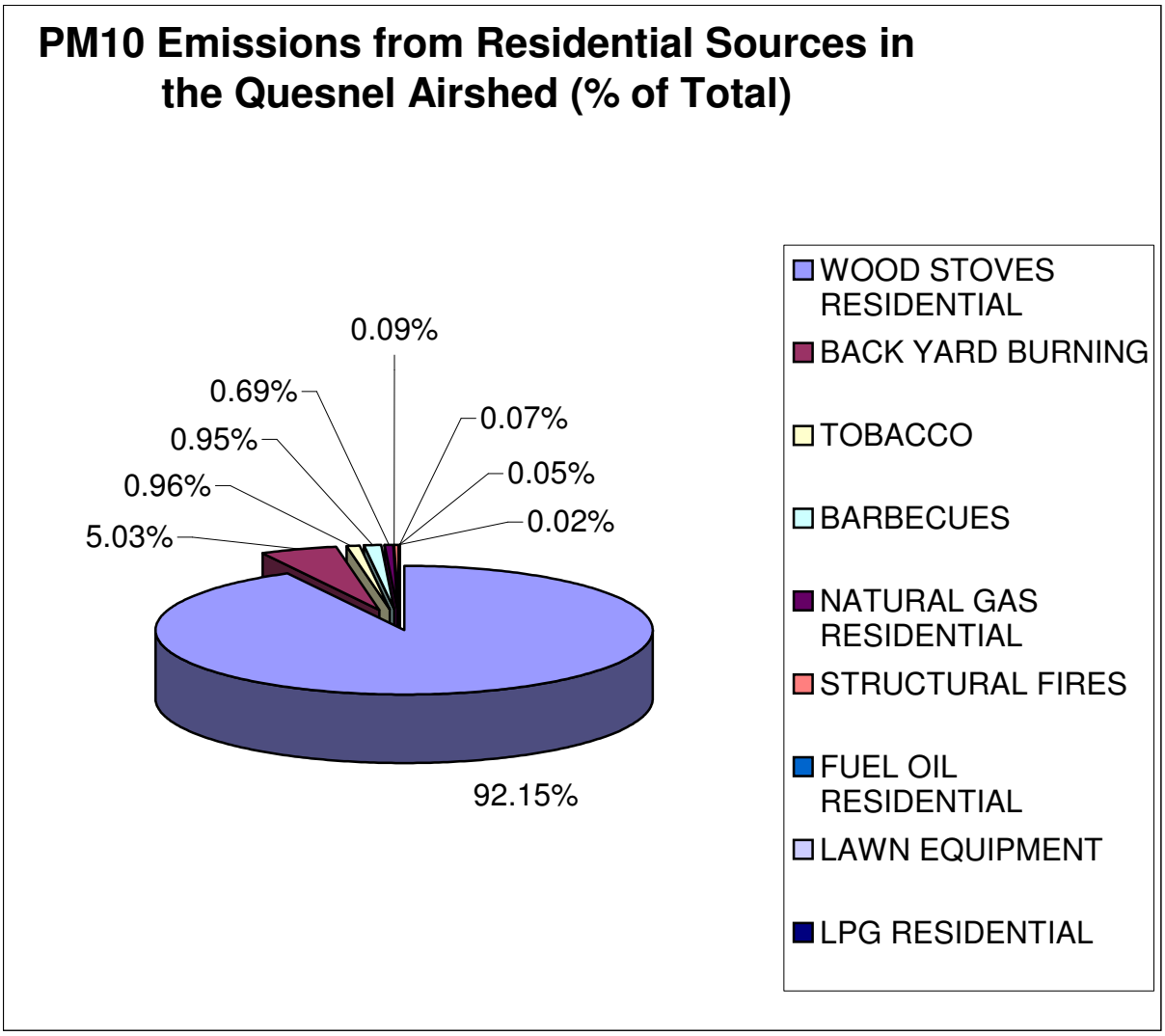
PM10 Emissions from Mobile Sources in the Quesnel Airshed (1995 Baseline - adjusted to 2000)

	PM10 (T/Y)	% of Total	Winter sanding
ROAD DUST PAVED TOTAL	928.59	51.86%	333.67 T/Y
ROAD DUST UNPAVED TOTAL	834.17	46.59%	
HEAVY DUTY VEHICLES TOTAL	17.19	0.96%	
LIGHT DUTY VEHICLES TOTAL	6.26	0.35%	
RAIL TOTAL	2.74	0.15%	
OFF ROAD TOTAL	1.64	0.09%	
AIRCRAFT TOTAL	0.02	<0.01%	
MARINE TOTAL	0.02	<0.01%	
Total PM10 Loading to the Airshed from Mobile Sources	1790.63	100.00%	



PM10 Emissions from Residential Sources in the Quesnel Airshed - 2000

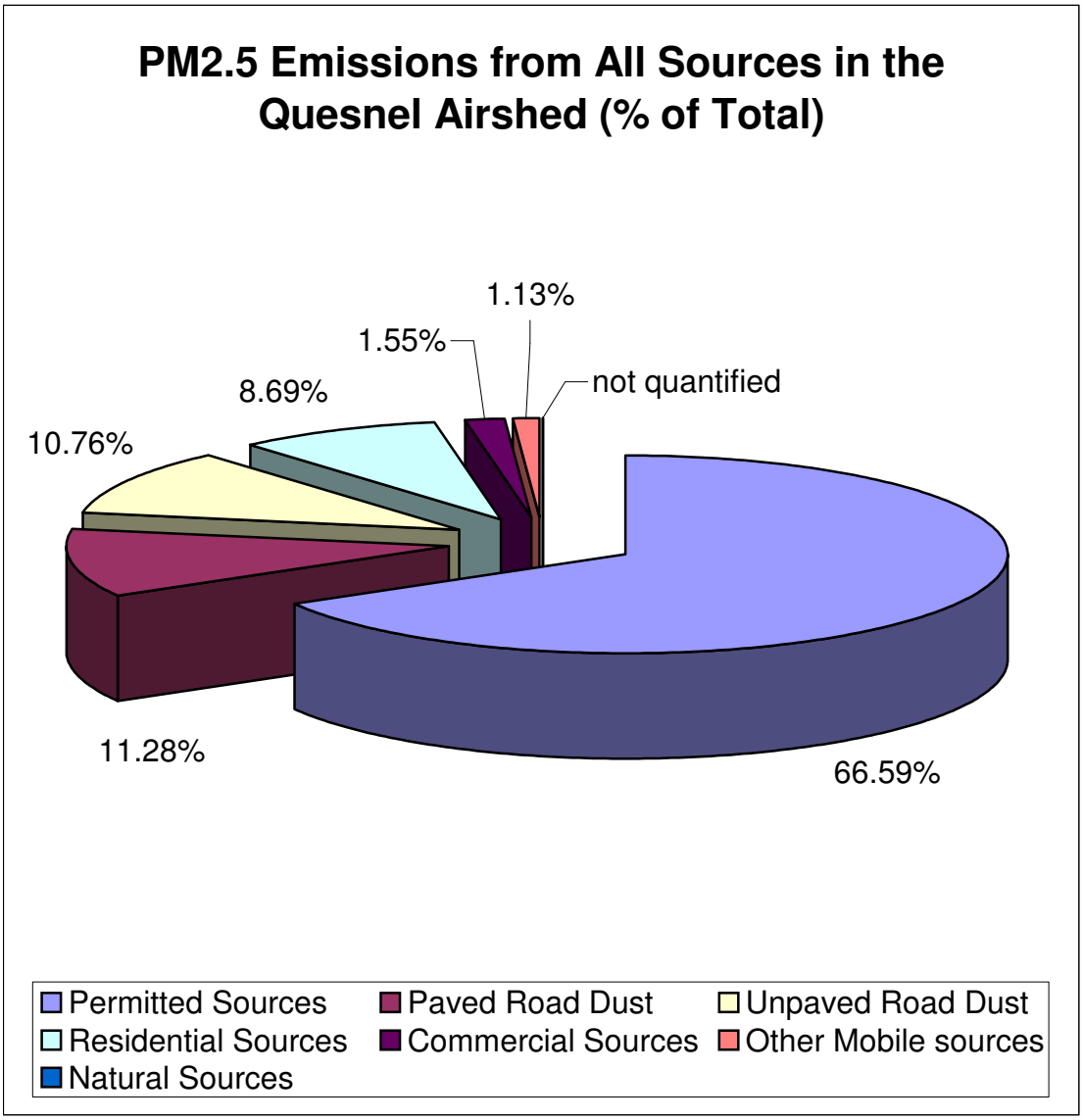
	PM10 (T/Y)	% of Total
WOOD STOVES RESIDENTIAL	172.76	92.15%
BACK YARD BURNING	9.43	5.03%
TOBACCO	1.81	0.96%
BARBECUES	1.78	0.95%
NATURAL GAS RESIDENTIAL	1.29	0.69%
STRUCTURAL FIRES	0.17	0.09%
FUEL OIL RESIDENTIAL	0.13	0.07%
LAWN EQUIPMENT	0.09	0.05%
LPG RESIDENTIAL	0.03	0.02%
PAINT APPLICATION	0.00	0.00%
CONSUMER PRODUCTS	0.00	0.00%
Total PM10 Loading to the Airshed from Resdiential Sources	187.49	100.00%



APPENDIX G – $PM_{2.5}$

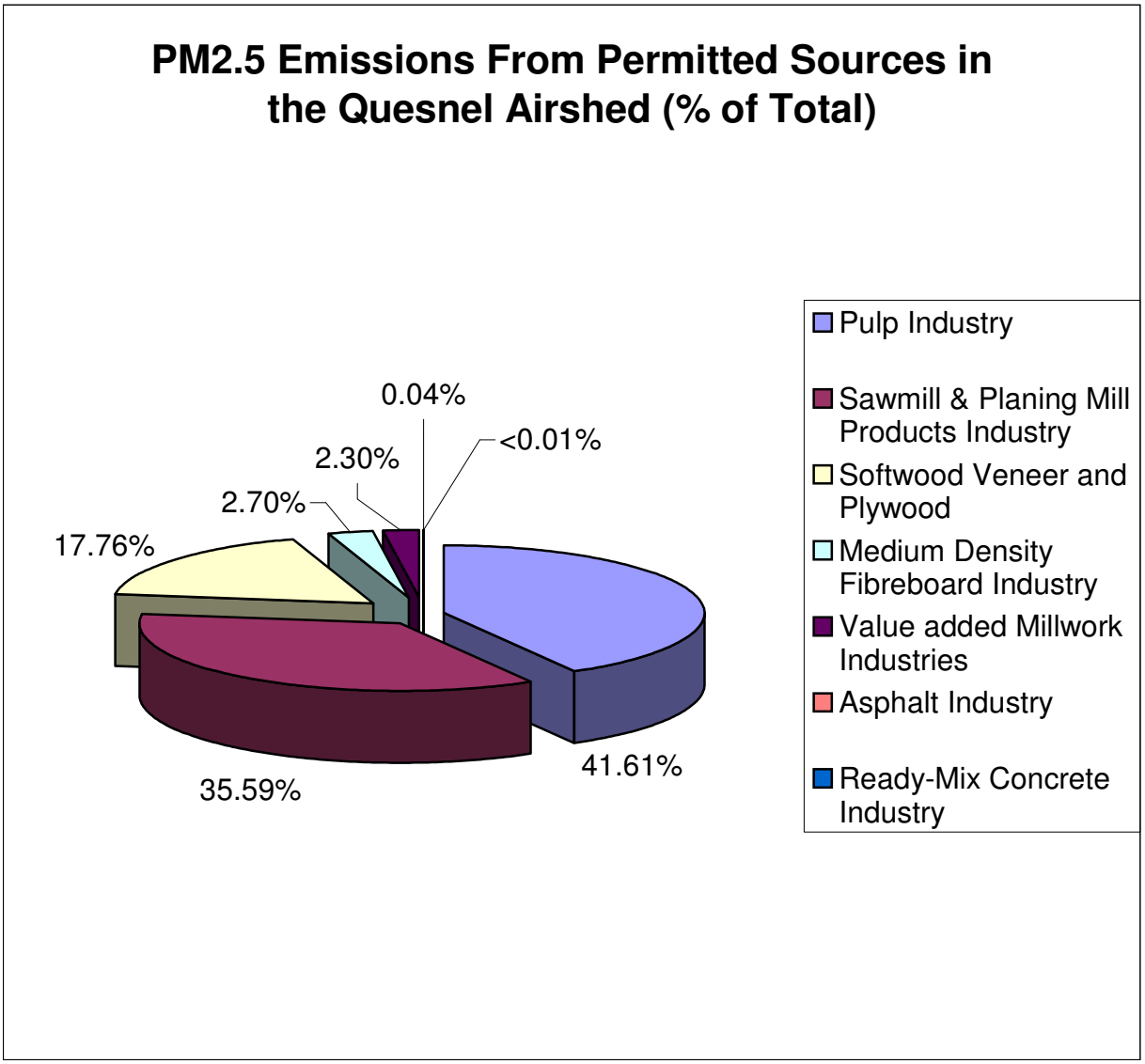
PM2.5 Emissions from All Sources in the Quesnel Airshed
1995 Baseline (adjusted to 2000)

	PM25 (T/Y)	% of Total	From winter sanding (T/Y)
Permitted Sources	1362.31264	66.59%	
Paved Road Dust	230.80	11.28%	88.02
Unpaved Road Dust	220.06	10.76%	
Residential Sources	177.87	8.69%	
Commercial Sources	31.61	1.55%	
Other Mobile sources	23.21	1.13%	
Natural Sources	0.00	0.00%	no factors available
Total PM2.5 Loading to the Airshed	2045.86	100.00%	



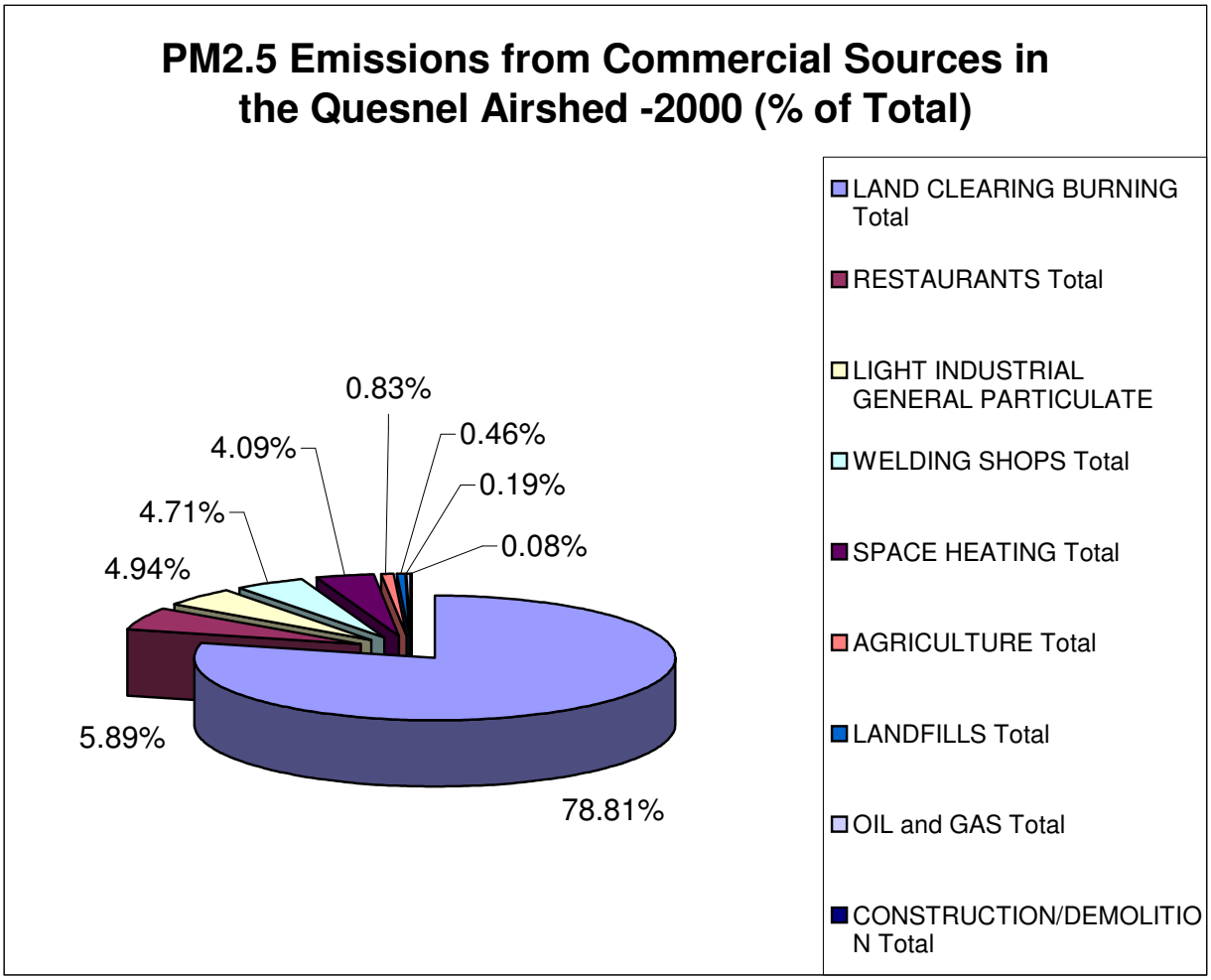
PM2.5 Emissions from Permitted Sources in Quesnel - 2000

	PM25 (T/Y)	% of Total
Pulp Industry	566.9	41.61%
Sawmill & Planing Mill Products Industry	484.9	35.59%
Softwood Veneer and Plywood	242.0	17.76%
Medium Density Fibreboard Industry	36.7	2.70%
Value added Millwork Industries	31.3	2.30%
Asphalt Industry	0.6	0.04%
Ready-Mix Concrete Industry	0.0	<0.01%
Electrical Industrial Equipment Industries	0.0	0.00%
Petroleum Products, Wholesale	0.0	0.00%
Total PM2.5 loading to Airshed:	1362	100%



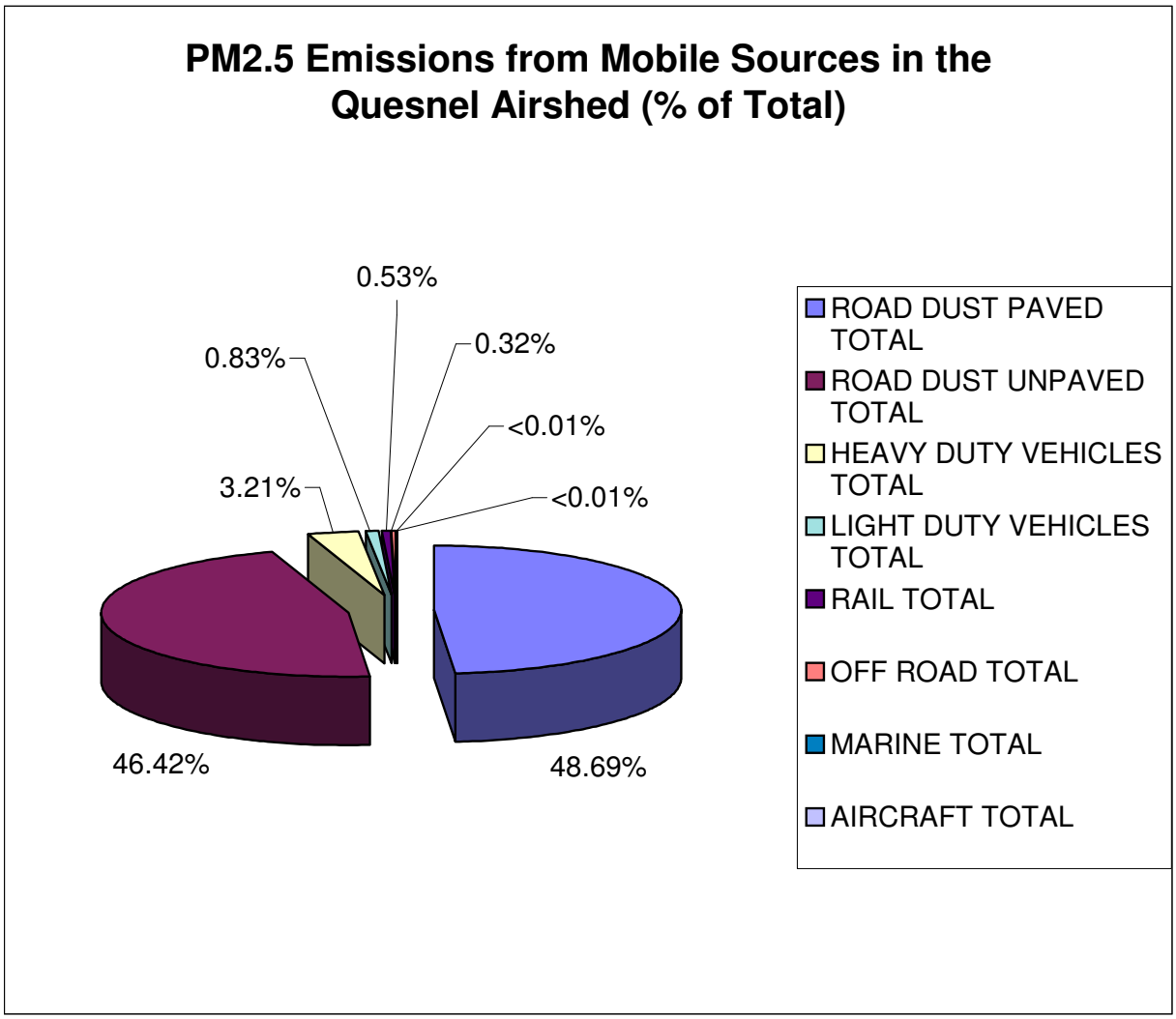
PM2.5 Emissions from Commercial Sources in the Quesnel Airshed - 2000

	PM25 (T/Y)	% of Total
LAND CLEARING BURNING Total	24.91	78.81%
RESTAURANTS Total	1.86	5.89%
LIGHT INDUSTRIAL GENERAL PARTICULATE	1.56	4.94%
WELDING SHOPS Total	1.49	4.71%
SPACE HEATING Total	1.29	4.09%
AGRICULTURE Total	0.26	0.83%
LANDFILLS Total	0.14	0.46%
OIL and GAS Total	0.06	0.19%
CONSTRUCTION/DEMOLITION Total	0.02	0.08%
GRAVEL PITS Total	0.00	0.00%
BAKERIES Total	0.00	0.00%
Asphalt Application Total	0.00	0.00%
DRY CLEANING Total	0.00	0.00%
METAL DEGREASING Total	0.00	0.00%
PRINTING INKS Total	0.00	0.00%
GLUES ADHESIVES SEALANTS Total	0.00	0.00%
PAINT APPLICATIONS Total	0.00	0.00%
Total PM2.5 Loading from Commercial Sources	31.61	100%



PM2.5 Emissions from Mobile Sources in the Quesnel Airshed (1995 Baseline - adjusted to 2000)

	PM25 (T/Y)	% of Total	Winter sanding T/Y
ROAD DUST PAVED TOTAL	230.80	48.69%	88.02
ROAD DUST UNPAVED TOTAL	220.06	46.42%	
HEAVY DUTY VEHICLES TOTAL	15.22	3.21%	
LIGHT DUTY VEHICLES TOTAL	3.93	0.83%	
RAIL TOTAL	2.52	0.53%	
OFF ROAD TOTAL	1.51	0.32%	
MARINE TOTAL	0.02	<0.01%	
AIRCRAFT TOTAL	0.02	<0.01%	
Total PM2.5 Loading to the Airshed from Mobile Sources	474.07	100.00%	



PM2.5 Emissions from Residential Sources in the Quesnel Airshed - 2000

	PM25 (T/Y)	% of Total
WOOD STOVES RESIDENTIAL	164.13	92.27%
BACK YARD BURNING	8.57	4.82%
TOBACCO	1.81	1.02%
BARBECUES	1.78	1.00%
NATURAL GAS RESIDENTIAL	1.21	0.68%
STRUCTURAL FIRES	0.17	0.09%
FUEL OIL RESIDENTIAL	0.10	0.06%
LAWN EQUIPMENT	0.08	0.05%
LPG RESIDENTIAL	0.03	0.02%
PAINT APPLICATION	0.00	0.00%
CONSUMER PRODUCTS	0.00	0.00%
Total PM2.5 Loading to the Airshed from Resdiential Sources	177.87	100.00%