Chapter 4

Solvent and Other Product Use

4.1 Introduction

New Zealand's relatively small manufacturing base means that solvent use is lower than in many other countries. Ethanol and methanol are produced domestically while other solvents are imported.

4.2 Country-specific approaches different from the IPCC methodology

The IPCC has not yet provided methodologies for emissions from solvents and other product use.

4.3 Emissions calculation methodology

Estimates of Non Methane Volatile Organic Substance (NMVOC) emissions were made with a consumption-based approach. Further information is contained in Montgomery Watson (2002). Per capita emission factors have been developed and used as the basis for the calculations. Emission factors have been checked against USEPA AP-42 and other emissions references such as the World Health Organisation (WHO) *Rapid Techniques for Pollution Sources*.

The four categories of solvents and other products given in the reporting tables are used in the New Zealand inventory.

Paint application

Consumption and emissions from paints and thinners are based on information from Nelson (1992) and the Auckland Regional Council (1997). Additional information for 1993 to 1996 was provided by the New Zealand Paint Manufacturers' Association.

Degreasing and dry cleaning

Data represents imports of perchlorethylene from Statistics New Zealand.

Chemical products (manufacturing and processing)

Data refers to the use of solvents in the production of hydrogen peroxide and steel. It is provided by industry.

Other

This includes NMVOC emissions from domestic and commercial solvent use in the following areas: household products, toiletries, rubbing compounds, windshield washing

fluids, adhesives, polishes and waxes, space deodorants and laundry detergents and treatments. Use of these products is based on United States Environmental Protection Authority (USEPA) information on consumption rates in the United States. This rate is 2.54kg of all the above products per capita per year. Population numbers are from Statistics New Zealand.

This category also includes NMVOC emissions from printing ink. Around 50% of printing inks are liquid, of which around 60% are solvent based. It is assumed that the solvent component in these inks is emitted as NMVOCs. The remaining 50% of ink is oil-based paste ink. Emissions from these inks are minimised by their treatment in a "solvent burner" as they evaporate during heating.

4.4 Changes since the last inventory submission

Data in this sector for the 2001 calendar year were derived using the same method used for previously reported data and a new survey was carried out in 2002 of emissions in this sector. No changes have been made to the methodology or to previously reported data.

4.5 Uncertainty

As with other sections of the inventory, uncertainty arises from estimating the activity data and from estimating the emission factors. The combination of these uncertainties for NMVOC emissions from solvent and other product use is considered to be ±22% (Montgomery Watson 1998).

4.6 References

Auckland Regional Council, 1997, *Auckland Emissions Inventory*, report by the Victorian Environmental Protection Agency, New Zealand.

Montgomery Watson, 1998, *Inventory of Non-CO_2 Greenhouse Gas Emissions from Industrial Sources and Solvent and Other Product Use*, report to the Ministry of Commerce, New Zealand.

Montgomery Watson, 2002, *Inventory of Non-CO_2 Greenhouse Gas Emissions from Industrial Sources and Solvent and Other Product Use, HFCs and PFCs and SF_6*, report to the Ministry for the Environment, April 2002.

Nelson, P, 1992, Waste Control and Pollution Prevention in the Paint Industry, *Surface Coatings Australia*, July.

Appendix to Chapter 4:
Solvent amd Other Product Use calculation tables 2001

Module 2001 Solvent and other product use (New Zealand)
Worksheet NZ 3a
Sheet Non-CO_2 emissions

Source Categories	ACTIVITY DATA Quanity Consumed tonnes	Emission Estimates B (Gg)			Emission Factors C kg/year/person			
		N_20	HFC	NMVOC	CO	N_20	HFC	NMVOC
TOTAL SOLVENT EMISSIONS								
A Surface Coatings								
Architectural/ Decorative	**58036**			**15.7822**				
Organic Base	**4310.2848**			**1.4339**				
Primers and Undercoats	1620			0.4374				0.1118
Finishing Coats - Gloss	1292			0.4391				0.1122
Finishing Coats - Semi Gloss	337			0.0876				0.0224
Finishing Coats - Flat	255			0.0662				0.0169
Clears and Stains	807			0.4036				0.1032
Water Base	**31694.6112**			**2.0344**				
Primers and Undercoats	2646			0.1852				0.0473
Finishing Coats - Gloss	12451			0.8715				0.2228
Finishing Coats - Semi Gloss	7071			0.4950				0.1265
Finishing Coats - Flat	8897			0.4449				0.1137
Clears and Stains	630			0.0378				0.0097
Industrial								
Organic Base	**16714.1889**			**8.2821**				
Primers and Undercoats	6397			2.1751				0.5560
Finishing Coats	9486			5.6914				1.4548
Clears	831			0.4155				0.1062
Water Base	**1381.3183**			**0.0967**				
Primers and Undercoats	1242			0.0869				0.0222
Finishing Coats	140			0.0098				0.0025
Thinners	**3935.1732**			**3.9352**				
Solvents/Thinners	3935			3.9352				1.0059
B Degreasing and Drycleaning	2439			**2.4394**				
Drycleaning	991			0.9913				0.2534
Metal Degreasing	1448			1.4482				0.3702
C Chemical Products	**3912.1000**			**3.9199**				
Ethanol	3912			3.9121				1.0000
Hydrogen Peroxide				0.0078				0.0020
D Other	**21733.5032**			**15.9275**				
Total printing	**8294**			**2.4883**				
Printing	5290			1.5871				0.4057
Small Commercial	3004			0.9012				0.2304
Industrial	3502			3.5022				0.8952
Aerosols				0.0000				0.000000005
Steel production[1]	9937			9.9369				2.5400
Total commercial and domestic	**13439**			**13.4391**				
Other Solvents Use								
	86120.60			**38.07**				

Emission factors derived on a kg/person/year basis

1. Emissions calculated on production not consumption data.

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