

Final Quantification of Cleaning Products and Related Consumer Products

Pollution Source: Cleaning Products and Related Consumer Products

Illinois 1996 Emissions Inventory

Approximate Contribution to Ozone: 65.72 tons VOC per day consumer and commercial solvents

Activity: Use purchasing power to buy lower VOC content cleaning products and related consumer products.

Potential Reduction: 2.66 tons per day, or about 970 tons per year of VOC reductions can be obtained by strategies that require switching to lower VOC consumer products that are currently available

Cost Estimates: Variable cost differential

Description/Calculations:

Consumer and Commercial Solvents contributed 65.72 tons VOC per day (tpd) in the Chicago Nonattainment Area (Chicago NAA) during 1996, as documented in Illinois EPA's 1996 Periodic Inventory and Demonstration Plan. Of this total, 22.95 tpd is from household products, 14.6 tpd from personal care products, 6.26 tpd from auto aftermarket products, 3.13 tpd from adhesive products, 1.04 tpd from pesticide products, and 17.73 tpd from miscellaneous consumer products. EPA estimates that 2.2 pounds of VOC emissions are generated per year per person from use of household products.

Emission Reduction Calculations

The Illinois emission inventory is based on total cleaning products and related consumer products by population. It is not broken into the detail of the California program below. Emissions estimates were made by applying the California breakdown of categories by population to the Chicago nonattainment area population in order estimate emissions of the subcategories. California's 1997 Consumer and Commercial Products Survey provides sales and VOC emission information for all categories. The following lists California's 1997 VOC emissions for certain significant household/cleaning categories and compares CARB's most stringent limits with the limits in EPA's national Consumer Products rule.

Consumer products emissions are proportional to the population. The Chicago NAA has 24% of the population of the State of California. Therefore, with the same emission reduction requirements, the VOC emissions in the Chicago NAA would be 24% of the emissions indicated above for the corresponding category. A control factor profile table prepared by CARB provides the percent reduction for each of its limits for each category. This can be used to determine the emission reduction potential for several of the categories listed below.

Category	1997 CA VOC Emissions (tpd)	CARB % VOC Limits	EPA % VOC Limits	Potential Chicago Area Reduction (tpd)
Carpet and Upholstery Cleaners	1.13	0.1-3% (2001) non-aerosols	None	0.14
Rubber and Vinyl Protection	1.53	3% (2003) non-aerosols	None	0.34
Spot Removers	0.71	8% (2001) non-aerosols	None	0.11
Fabric Protectants	0.41	60% (1997)	75%	0.01
Floor Wax Strippers	4.01	3-12% (2002) on label	None	0.52
General Purpose Cleaners	8.18	4% (2004) non-aerosols	10%	0.20
General Purpose Degreasers	2.31	4% (2004) non-aerosols	None	0.36
Glass Cleaners	3.70	4% (2004) non-aerosols	8%	0.33
Metal Polishers and Cleaners	0.47	30% (2005)	None	0.05
Oven Cleaners	0.49	5-8%	5-8%	0.0
Bathroom and Tile Cleaners	0.66	5-7%	5-7%	0.0
Laundry Prewash	0.23	5-22%	5-22%	0.0
Laundry Starch Products	1.26	5%	5%	0.0
Dusting Aids	0.45	7% non-aerosol	7%	0.0
Flex. Floor Wash/Polish	1.34	7%	7%	0.0
Nonresilient Floor Wax	0.07	10%	10%	0.0
Wood Floor Wax	0.73	90%	90%	0.0
Furn. Waxes and Polishes	2.15	7-17%	25% (aerosol)	0.09

Multi-Purpose Lubricant	4.66	50% (2003)	None	0.38
Silicone Based Lubricant	0.84	60% (2005)	None	0.07
Penetrant	1.20	50% (2003)	None	0.06

CARB developed a control factor profile table that has estimates for the percent reduction of VOC resulting from the adoption of increasingly stringent limits. These control factors are calculated using a 1990 baseline and change each time a standard kicks in. Where there is an EPA limit, the percent reduction is based upon the difference in control factors corresponding to the CARB and EPA limit. This is an accurate way to determine the emission reductions because even when there is an EPA limit the actual VOC levels are not necessarily at that limit.

These calculations for the potential reductions in the Chicago nonattainment area are as follows:

A) Carpet and Upholstery Cleaners

$$(1.13 \text{ tpd}) (.24)(.53) = 0.14 \text{ tpd}$$

The 1.13tpd is the California emissions in 1997.

The 0.24 is the population correction factor.

The 0.53 is based on a 53% reduction from implementing California's limit for this category, based upon CARB's control factor profile table. The 0.53 is taken directly from the CARB table.

The following calculations are all done the same way.

B) Rubber and Vinyl Protectants

$$(1.53)(0.24)(0.93) = 0.34 \text{ tpd}$$

C) Spot Removers

$$(0.71)(0.24)(0.67) = 0.11 \text{ tpd}$$

D) Fabric Protectants

$$(0.41)(0.24)(0.13) = 0.01 \text{ tpd}$$

E) Floor Wax Strippers

$$(4.01)(0.24)(0.54) = 0.52 \text{ tpd}$$

F) General Purpose Cleaners

$$(8.18)(0.24)(0.10) = 0.20 \text{ tpd}$$

G) General Purpose Degreasers

$$(2.31)(0.24)(0.65) = 0.36 \text{ tpd}$$

H) Glass Cleaners

$$(3.70)(0.24)(0.37) = 0.33 \text{ tpd}$$

I) Metal Polishes/Cleaners

$$(0.47)(0.24)(0.42) = 0.05 \text{ tpd}$$

J) Furniture Waxes & Polishes

$$(2.15)(0.24)(0.18) = 0.09 \text{ tpd}$$

K) Multi-Purpose Lubricant

$$(4.66)(0.24)(0.34) = 0.38 \text{ tpd}$$

L) Silicone Based Lubricant

$$(0.84)(0.24)(0.34) = 0.07 \text{ tpd}$$

M) Penetrant

$$(1.20)(0.24)(0.22) = 0.06 \text{ tpd}$$

TOTAL = 2.66 tpd, or about 970 tons per year of VOC reductions can be obtained by strategies that require switching to lower VOC consumer products that are currently available. The consumer product categories listed above are those which are more likely to be purchased by a municipality.

III. Technical Support and Product Availability

A) GSA's Cleaning Products Catalogue, which can be accessed at <http://www.fss.gsa.gov/environ/clean-prod-catalog.cfm>, can be used to implement Environmentally Preferable Purchasing for a variety of cleaning products. In addition to describing the product and ordering information, the catalog rates these cleaning products on seven environmental attributes, including VOC content.

B) EPA's Cleaning Products Pilot Project (CPPP) web site, <http://www.epa.gov/opptintr/epp/cleaners/select/>, is intended to encourage environmentally preferable purchasing decisions. This web site provides information related to biodegradable cleaners and degreasers offered in the GSA's Commercial Cleaning Supplies Catalog (discussed above). This project identified the relevant environmental attributes and comparative effectiveness of various cleaning products.

C) A Case Study of The City of Santa Monica's Environmental Purchasing Program can be found at www.epa.gov/opptintr/epp. Santa Monica first did research to determine the environmental impacts and performance characteristics of alternative cleaning products and used this information to prepare a comprehensive list of specifications, including VOC levels, toxicity, biodegradability, and corrosiveness. They required vendors to provide information on a wide range of environmental criteria, including the previously listed criteria. This case study can be used as a model for other communities to develop environmentally preferable purchasing programs for cleaning products.

D) To better safeguard the health of custodial workers, building occupants, and the environment, the State of Minnesota added environmental specifications to the state cleaning supplies contract.

Minnesota's cleaning product purchasing program is described at <http://www.moea.state.mn.us/lc/purchasing/cleaners.cfm>. When products were reviewed for its state contract for cleaners, vendors were asked to include information about the environmental performance of 33 categories of cleaning products. All products selected for the State contract were screened and rated for cleaning performance and environmental characteristics.

E) Green Seal has a March 1998 report on General Purpose Cleaners and a September-October 1999 report on Industrial and Institutional Cleaners. These reports discuss the important environmental criteria, including VOC content, and list a number recommended cleaners with product and % VOC information: <http://www.greenseal.org/products.htm>.