02/07/1980 VOC480207801

Category: 48 – General VOC Issues

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

DATE: February 7, 1980

SUBJECT: Regional Consistency in the Inventory Approach for "Miscellaneous Other" Solvent Usage

FROM: G. T. Helms, Chief
Control Programs Operations Branch, CPDD (MD-15)

TO: Winston Smith, Chief
Air Programs Branch, Region IV

This is in response to your memorandum of December 27, 1979 concerning your request for inventory guidance on "miscellaneous other" solvent usage.

In preparing emission inventories for ozone SIP revisions and in revising existing SIP inventories, a factor of 10 lbs/capita/year is recommended in urban areas to estimate VOC emissions from miscellaneous commercial/consumer solvent use.[1] The following list shows the end use sectors/products that comprise this miscellaneous solvent use:

Aerosol products	3.8	lb/capita/yr
Household products	2.1	lb/capita/yr
Toiletries	1.5	lb/capita/yr
Rubbing compounds	0.7	lb/capita/yr
Windshield washing	0.7	lb/capita/yr
Polishes and waxes	0.5	lb/capita/yr
Nonindustrial adhesives	0.3	lb/capita/yr
Space deodorant	0.2	lb/capita/yr
Moth control	0.1	lb/capita/yr
Laundry treatment	<0.1	lb/capita/yr
	10	lb/capita/yr

It is recommended that this source be treated as a distinct area source category in the VOC emission inventory, with the associated emission total determined by population. This factor supersedes the factor of 24lbs/capita/yr suggested in Volume I.[2]

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[1] Ostojic, N. End Uses of Solvents Containing Volatile OrganicCompounds. Parts I, II, and III. EPA 450/3-79-032. Prepared for EPA byTRC. Wethersfield, Conn. May, 1979.

[2] Procedures for the Preparation of Emission Inventories ofVolatile Organic Corpounds. Volume I. OAQPS, EPA. EPA Publication450/2-77-028. December, 1977.

Projections

Because miscellaneous commercial/consumer solvent use is determined on a per capita basis, projected emissions will automatically result from substituting future year population estimates in the calculation. It is not known to what extent the 10 lb/capita/yr itself will change due to shortages, changes in lifestyles, etc. There is sone indication of a shift occurring, for example, away from halogenated aerosol propellants to paraffinic-based propellants. However, since no quantitative data are available to substantiate any change, the same factor should be used for projection years.

Caveat

This miscellaneous commercial/consumer solvent factor should not be construed to be any sort of catchall estimate to correct for shortcomings in the inventory of point source industrial solvent use. Moreover this 10 lb/capita/year factor does not cover certain solvent uses that are sometimes covered as area source by per capita factors. Specifically, it does not cover small degreasing (cold cleaning) operations, dry cleaning plants, auto refinishing plants, architectural surface coating applications (trade paint sales), pesticides, or cutback asphalts. These categories must be covered elsewhere in the inventory either as point sources or by other area source procedures.

cc: Chief, Air Programs Branch, Regions I-III, V-X

Attachments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region IV

DATE: December 27, 1979

SUBJECT: Inventory Guidance on "Miscellaneous Other" Solvent Usage

FROM: Winston Smith, Chief
Air Programs Branch, Region IV

TO: G. T. Helms, Chief
Control Programs Operations Branch
Research Triangle Park, North Carolina

Discussion

As noted in the attached series of memos, the VOC Quantity (lbs./capita/year) to be used for inventorying miscellaneous other" usage has not been conclusively determined.

During the 1979 SIP process, this inventory category was handled differently in each region. Given the need for regional consistency in the inventory approach for 1982 SIPS, Region IV feels that uniform national guidance is necessary.

Action

Distribute inventory guidance for "miscellaneous other" category.

Background

Attached draft memo from Richard G. Rhoads.

Winston A. Smith
Chief
Air Programs Branch

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

SUBJECT: Inclusion of Miscellaneous Solvent Evaporation VOC Emissions in Nonattainment Inventories

DATE: 12/27/79

FROM: Richard G. Rhoads, Director
Control Programs Development Division (MD-15)

TO: Air Branch Chief, Regions I – X

Because of Regional inconsistency problems, it has come to our attention that certain volatile organic compound (VOC) emission inventories developed for oxidant control strategies have not adequately considered miscellaneous solvent evaporation losses which are generally classified in inventories as "other solvent use." In some areas, these emissions can constitute as much as twenty percent of all stationary source emissions. Since this category may have a significant impact upon the resultant control strategy requirements, I ask that you carefully review all VOC inventories and strategies to determine if this category is adequately addressed. At this point in the SIP revision process, we are not asking that inventories and strategies for the old oxidant standard be redone; however, in cases where States are making revisions addressing the new ozone standard, an estimate of this category must be made.

Current Agency guidance recommends as a crude estimator an emission factor of 24 lb VOC/capita/year.[3] Since the magnitude of this value is currently undergoing review, in order to assure Regional consistency as well as an accounting of this category, we recommend that all States use a factor of 8 lb VOC/capita/year for "other solvent use."

If you have questions or desire additional information, please contact Susi Jackson (629-5365).

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[3] Procedures for the Preparation of Emission Inventories for Organic Compounds, Vol. I (EPA-450/2-27-028), p. 5.2-9.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

DATE: January 2, 1979

SUBJECT: TRC's Report on Solvent Use

FROM: Thomas Lahre, Engineer
Source Analysis Section, AMTB

TO: James H. Southerland, Chief
Source Analysis Section, AMTB

Edward J. Lillis, Chief
Air Management Technology Branch

Enclosed, for your information, is a copy of TRC's draft final report on "miscellaneous other" solvent usage. As was suggested in Ed Vincent's November 7, 1978 memo, the total unidentified solvent usage has been reduced to about 2 billion pounds/year, or 1 million tons. This is considerably lower than ESED's recent estimate of about 3 million tons of unidentified solvent use. As indicated in Table 3 (Attachment 1), TRC has identified specific end uses for 7.6 of the 8.6 million tons of solvent estimated to be produced annually in the U.S., which represents a significant improvement over either Waden's or ESED's previous estimates (Attachment 2.) Assuming TRC's 1 million ton figure is correct, the nationwide per capita figure for unidentified solvent usage is about 9.2 pounds/capita/year, compared with a figure of 24 lb/capita/year suggested in EPA-450/2-77-028.

Several consideration should be made before we modify our inventory guidance to reflect the TRC data:

- Table 3 of TRC's report identifies a specific household solvent usage of 173,300 tons/year. Since this end use would not be expected to be covered in local emission inventories by questionnaires or other standard procedures, it may be necessary to include this total in with the unidentified solvent use factor. This would raise the 9.2 lb/capita/year figure to about 10.8 lb/capita/year. An alternative would be to add a distinct area source category for household solvent use and estimate emissions therefrom by using a factor of 1.6 lb/capita/year.

- Table 3 also identifies a large solvent usage that cannot be specifically associated with either the industrial/commercial or consumer sectors. This5quantity of solvent use is 3.9 million tons/year, or about 37 lb/capita/year, nationwide. Presumably, a significant fraction of this would be covered as industrial/commercial point sources in local inventories based on questionnaire data or by using prediction equations such as Walden has recently developed (See my December 21 memo.) However, that fraction of this total that is consumer (i.e., household) related would not likely be accounted for directly in local inventories, and

thus, should possibly be included in a per capita "catchall" solvent use category, as well. Unfortunately, as stated above, TRC could not distinguish what fraction of this 3.9 million tons/year is industrially/commercially used opposed to being used in the consumer sector. Additional work would be extremely helpful in this area.

- A possibility exists that some fraction of the 1 million tons/year of unidentified solvent may be accounted for in local inventories by using our existing procedures. This would be the case if some of this unidentified solvent were associated with industrial or commercial uses that may be accounted for by general solvent use questionnaires. Of course, this same possibility exists with the current 24 lb/capita factor. Indeed, the TRC report states "that a large fraction of the unidentified solvent consumption in the current EPA estimates may in fact belong to various industrial processes." Additional effort would be helpful in this area, too.

In conclusion, even though TRC's report extends our data base on the end uses of solvents, some gaps remain that preclude our issuing of much more definitive guidance on the matter. First, while the unidentified solvent use has been lowered significantly from previous estimates, we do not know if the remaining quantity (1 million ton/year) would typically be covered or not in local inventories using existing procedures. Second, some of the previously unidentified solvent use whose end use has now been identified may be associated with the consumer sector, in which case this solvent use still may not be covered when using existing inventory procedures. Unfortunately, the specific fraction of this solvent use that is associated with households as opposed to commercial/industrial establishments cannot be estimated at this time for a large (3.9 million tons/year) quantity of solvent.

It is apparent that some sort of per capita (or similar) factor will still have to be prescribed in our procedures manual to account for miscellaneous solvent use. At a minimum, the factor would be 1.6 lb/capita/year to account for the household use identified by TRC. If TRC's unidentified solvent use is accounted for in this manner as well, a factor of about 9.2 lb/capita/year could be added. Also, some part of the 3.9 million tons/year (which represents combined industrial, commercial, and consumer uses) may have to be accounted for by a per capita factor to encompass that fraction that represent household use. This fraction could be as much as 37 lb/capita/year, although as a rough guess, I would expect it to be much less. We should press ESED/TRC to see if this latter area can be resolved better because of the large amount of solvent that is involved.

Attachment

cc: C. Mann

Attachment

TECHNICAL MEMORANDUM

NORTHEAST CORRIDOR REGIONAL MODELING PROJECT

SUBJECT: MISCELLANEOUS COMMERCIAL/CONSUMER SOLVENT USE

EMISSION INVENTORY

TECHNICAL MEMORANDUM #2

DATE: JANUARY, 1980

U. S. Environmental Protection Agency
Source Analysis Section
Air Management Technology Branch
Monitoring and Data Analysis Division
Office of Air Quality Planning and Standards
Office of Air, Noise and Radiation
MD-14
Research Triangle Park, North Carolina 27711

Summary

A factor of 10 lb/capita/yr is recommended in urban areas to estimate VOC emissions from miscellaneous commercial/consumer solvent use (see footnote 1). The following list shows the end use sectors/products that comprise this miscellaneous solvent use:

aerosol products	3.8	lb/capita/yr
household products	2.1	lb/capita/yr
toiletries	1.5	lb/capita/yr
rubbing compounds	0.7	lb/capita/yr
windshield washing	0.7	lb/capita/yr
polishes and waxes	0.5	lb/capita/yr
nonindustrial adhesives	0.3	lb/capita/yr
space deodorant	0.2	lb/capita/yr
moth control	0.1	lb/capita/yr
laundry treatment	<0.1	lb/capita/yr
	10	lb/capita/yr

It is recommended that this source be treated as a distinct area source category in the VOC emission inventory, with the associated emission total determined by population. This factor supercedes the factor of 24 lb/capita/yr suggested in Volume 1 (see footnote 2).

Projections

Because miscellaneous commercial/consumer solvent use is determined on a per capita basis, projected emissions will automatically result from substituting future year population estimates in the calculation. It is not known to what extent the 10 lb/capita/yr itself will change due to shortages, changes in lifestyles, etc. There is sone indication of a shift occurring, for example, away from halogenated aerosol propellants to paraffinic-based propellants. However, since no quantitative data are available to substantiate any change, the same factor should be used for projection years.

Temporal Resolution

Assume a uniform use pattern throughout the year and throughout each week. Assume 80 percent of daily emissions occur uniformly from 0700 to 1900 (local time) and 20 percent from 1900 to 2400.

Spatial Allocation

Apportion the area total to grid cells based on residential and/or commercial land use, depending on what information is maintained at the local level.

VOC Allocation Into Classes

Assume the following classification, by weight percent, and average molecular weights:

Class	Weight Percent	Average Molecular Weight
Paraffins	24	114
Aromatics	6	114
Alcohols	34	48
Other (halogenated organics)	36	
	100	

Caveat

This miscellaneous commercial/consumer solvent factor should not be construed to be any sort of catchall estimate to correct for shortcomings in the inventory of point source industrial solvent use. (A methodology for covering small point source industrial solvent use via emission-per-employee ratios in various SIC's will be the subject of a subsequent tech memo.) Moreover this 10 lb/capita/year factor does not cover certain solvent uses that are sometimes covered as area source by per capita factors. Specifically, it does not cover small degreasing (cold cleaning) operations, dry cleaning plants, auto refinishing plants, architectural surface coating applications (trade paint sales), pesticides, or cutback asphalts. These categories must be covered elsewhere in the inventory either as point sources or by other area source procedures.

References

1. Ostojic, N. End Uses of Solvents Containing Volatile Organic Compounds. Parts 1, II, and III. EPA 450/3-79-032. Prepared for EPA by TRC. Wethersfield, Conn. May, 1979.

2. Procedures for the Preparation of Emission Inventories of Volatile Organic Compounds. Volume I. OAQPS, EPA. EPA Publication 450/2-77-028. December, 1977.