ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 51

[FRL-5880-7]
RIN 2060-AH27

Air Quality: Revision to Definition of Volatile Organic Compounds - Exclusion of Methyl Acetate

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: This action proposes to revise EPA's definition of volatile organic compounds (VOC) for purposes of preparing State implementation plans (SIP's) to attain the national ambient air quality standards (NAAQS) for ozone under title I of the Clean Air Act (Act) and for any Federal implementation plan (FIP) for an ozone nonattainment area. This proposed revision would add methyl acetate to the list of compounds excluded from the definition of VOC on the basis that this compound has negligible contribution to tropospheric ozone formation. This compound has potential for use as a solvent in paints, inks and adhesives. Methyl acetate appears to be promising as a solvent for wood furniture coatings.

DATES: Comments on this proposal must be received by September 24, 1997. Requests for a hearing must be submitted by September 24, 1997.

ADDRESSES: Comments should be submitted in duplicate (if possible) to: Air and Radiation Docket and Information

Center (6102), Attention: Docket No. A-97-32, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460. Comments should be strictly limited to the subject matter of this proposal, the scope of which is discussed below.

Public Hearing: If anyone contacts EPA requesting a public hearing, it will be held at Research Triangle Park, NC. Persons wishing to request a public hearing/wanting to attend the hearing or wishing to present oral testimony should notify Mr. William Johnson, Air Quality Management Division (MD-15), U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, telephone (919) 541-5245. The EPA will publish notice of a hearing, if requested, in the Federal Register. Any hearing will be strictly limited to the subject matter of the proposal, the scope of which is discussed below.

The EPA has established a public docket for this action, A-97-32, which is available for public inspection and copying between 8 a.m. and 4 p.m., Monday through Friday, at EPA's Air and Radiation Docket and Information Center, (6102), 401 M Street, SW, Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: William Johnson, Office of Air Quality Planning and Standards, Air Quality Management Division (MD-15), Research Triangle Park, NC 27711, phone

(919) 541-5245. Interested persons may call Mr. Johnson to see if a hearing will be held and the date and location of any hearing.

SUPPLEMENTARY INFORMATION:

Regulated entities. Entities potentially regulated by this action are those which use and emit VOC and States which have programs to control VOC emissions.

Category	Examples of regulated entities
Industry	Industries that manufacture and use paints, inks and adhesives
States	States which have regulations to control volatile organic compounds

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding "FOR FURTHER INFORMATION CONTACT" section.

I. Background

On July 30, 1996 Eastman Chemical Company submitted a petition to the EPA which requested that methyl acetate be added to the list of compounds which are considered to be negligibly reactive in the definition of VOC at 40 CFR 51.100(s). The petitioner based the request on a comparison of the reactivity of methyl acetate to that of ethane which has already been listed since 1977 as having negligible reactivity. In a number of cases in the past, EPA has accepted compounds with lower reactivity than ethane as negligibly reactive (see for example 62 FR 12583, 61 FR 52848, and 61 FR 4588).

One common way to evaluate reactivity is to look at the reaction rate constant (k_{OH}) value which is a measure of the rate with which the compound reacts with hydroxyl (OH) radical. This reaction is usually the first step in a series through which the compound breaks down and participates in increased ozone formation. If the OH reaction step is slow, the compound usually will not react rapidly to form ozone. A k_{OH} value higher than that of ethane indicates that the compound reacts rapidly with OH. The high k_{OH} value generally indicates a high ozone formation rate, but this may or may not be true depending on how the VOC behaves subsequent to the OH attack.

The best available k_{OH} value available for methyl acetate is 3.4×10^{-13} cm^3 $molecule^{-1}$ sec^{-1} which is larger

than the k_{OH} value for ethane (i.e. 2.4 x 10^{-13} cm^3 $molecule^{-1}$ sec^{-1}). This seems to indicate that methyl acetate is more reactive than ethane, but additional studies have shown that this in not actually the case. These studies, which were carried out by Dr. William P. L. Carter of the University of California at Riverside indicate that the reactivity of methyl acetate is comparable to that of ethane.

Based on literature information, Dr. Carter conceived two alternative mechanisms for the atmospheric photooxidation of methyl acetate - one leading to a higher ozone yield and one to a lower yield - and tested them against his smog chamber data. The mechanism that showed the best agreement with his data was the one leading to low ozone yield. Using that mechanism in a mechanistic model, Dr. Carter computed the reactivity (i.e., maximum incremental reactivity) of methyl acetate relative to that of ethane for 39 different sets of urban conditions. Results showed methyl acetate reactivity to be significantly lower (on an ozone formed per gram VOC basis) than that of ethane for all sets of conditions. The average value is only 40% of that of ethane. Based on these results, Dr. Carter concluded that methyl acetate is less reactive than ethane.

Some uncertainties are due to the assumptions imbedded in the mechanism used by Dr. Carter to compute reactivities.

Dr. Carter made one assumption concerning the nature of the main intermediate product from the photooxidation of methyl acetate, and another one concerning the atmospheric chemistry of that product. While the assumptions are consistent with existing knowledge, and are supported also by the good agreement between mechanism and smog chamber data, they were nevertheless accepted without direct experimental verification (e.g. the analytical system used was not sufficient for identifying the "assumed" intermediate product), and are, therefore, subject to some uncertainty. Even so, the data presented are sufficiently valid to strongly support acceptance of the petition.

As mentioned above, the data presented in Dr. Carter's study are reported on a weight basis, i.e. grams of ozone formed per gram of VOC reacted. In one case in the past (60 FR 31633) where maximum incremental reactivity data was presented, EPA has examined a reactivity petition solely on a weight basis. However for the methyl acetate petition, EPA has also looked at the data on a mole basis, i.e. amount of ozone formed per mole of VOC reacted. Use of a per mole basis is consistent with previous reactivity determinations based on k_{OH} values expressed in units of cm^3 $molecule^{-1}$ $sec^{)1}$. This is also consistent with the experimental work, done on a mole basis, which was used to originally list ethane as negligibly reactive. The choice of weight basis

versus mole basis is significant. Given the relative low molecular weight of ethane, use of the per gram basis tends to result in more VOC's (higher molecular weight ones) falling into the "negligibly reactive" class relative to the per mole basis.

On a mole basis, the average reactivity value of methyl acetate for the 39 cities is lower than that for ethane. In 28 out of the 39 cases, methyl acetate's reactivity is less than that of ethane. Based on these results, EPA concludes that the existing scientific evidence does not support a methyl acetate reactivity higher than that of ethane.

II. Proposed Action

Today's proposed action is based on EPA's review of the material in Docket No. A-97-32. The EPA hereby proposes to amend its definition of VOC at 40 CFR 51.100(s) to exclude methyl acetate as a VOC for ozone SIP and ozone control for purposes of attaining the ozone national ambient air quality standard. The revised definition will also apply for purposes of any Federal implementation plan for ozone nonattainment areas (see e.g., 40 CFR 52.741(a)(3)). States are not obligated to exclude from control as a VOC those compounds that EPA has found to be negligibly reactive. However, if this action is made final, States should not include these compounds in their VOC emissions inventories

for determining reasonable further progress under the Act (e.g., section 182(b)(1)) and may not take credit for controlling these compounds in their ozone control strategy.

III. Administrative Requirements

A. Docket

The docket is an organized and complete file for all information submitted or otherwise considered by EPA in the development of this proposed rulemaking. The principle purposes of the docket are: (1) To allow interested parties to identify and locate documents so that they can effectively participate in the rulemaking process; and, (2) to serve as the record in case of judicial review (except for interagency review materials) (section 307(d)(7)(A)).

B. Executive Order 12866

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether a regulatory action is "significant" and therefore subject to Office of Management and Budget (OMB) review and the requirements of this Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State,

local, or tribal governments or communities;

(2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs, or the rights and obligation of recipients thereof; or

(4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of Executive Order 12866, it has been determined that this rule is not "significant" because none of the listed criteria apply to this action. Consequently, this action was not submitted to OMB for review under Executive Order 12866.

C. Unfunded Mandates Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), PL. 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with "Federal mandates" that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before

promulgation of an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost effective, or least burdensome alternative that achieves the objective of the rule, unless EPA publishes with the final rule an explanation of why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments including tribal governments, it must have developed under section 203 of the UMRA a small government plan which informs, educates and advises small governments on compliance with the regulatory requirements. Finally, section 204 provides that for any proposed or final rule that imposes a mandate on a State, local or tribal government of $100 million or more annually, the Agency must provide an opportunity for such governmental entities to provide input in development of the proposed rule.

Since today's rulemaking is deregulatory in nature and does not impose any mandate on governmental entities or the private sector, EPA has determined that sections 202, 203, 204 and 205 of the UMRA do not apply to this action.

D. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) of 1980 requires the identification of potentially adverse impacts of Federal

regulations upon small business entities. The Act specifically requires the completion of an RFA analysis in those instances where the regulation would impose a substantial impact on a significant number of small entities. Because this proposed rulemaking imposes no adverse economic impacts, an analysis has not been conducted. Pursuant to the provision of 5 U.S.C. 605(b), I hereby certify that the proposed rule will not have a significant impact on a substantial number of small entities because no additional costs will be incurred.

E. Paperwork Reduction Act

This proposed rule does not change any information collection requirements subject to OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq.

List of Subjects in 40 CFR Part 51

Administrative practice and procedure, Air pollution control, Carbon monoxide, Intergovernmental relations, Lead, Nitrogen dioxide, Ozone, Particulate matter, Reporting and recordkeeping requirements, Sulfur oxides, Volatile organic compounds.

Dated: August 18, 1997

Carol M. Browner
Administrator

For reasons set forth in the preamble, part 51 of chapter I of title 40 of the Code of Federal Regulations is proposed to be amended as follows:

Part 51-REQUIREMENTS FOR PREPARATION, ADOPTION, AND SUBMITTAL OF IMPLEMENTATION PLANS.

1. The authority citation for part 51 continues to read as follows:

Authority: 42 U.S.C. 7401-7671q

2. Section 51.100 is proposed to be amended by revising paragraph (s) introductory text and paragraph (s)(1) to read as follows:

51.100 Definitions

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(s) "Volatile organic compounds (VOC)" means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions.

(1) This includes any such organic compound other than the following, which have been determined to have negligible photochemical reactivity: methane; ethane; methylene chloride (dichloromethane); 1,1,1-trichloroethane (methyl chloroform); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (HCFC-22); trifluoromethane (HFC-23); 1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114); chloropentafluoroethane (CFC-115); 1,1,1-trifluoro 2,2-dichloroethane (HCFC-123); 1,1,1,2-tetrafluoroethane (HFC-134a); 1,1-dichloro 1-fluoroethane (HCFC-141b); 1-chloro 1,1-difluoroethane (HCFC-142b); 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); pentafluoroethane (HFC-125); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1-trifluoroethane (HFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); cyclic, branched, or linear completely methylated siloxanes; acetone; perchloroethylene (tetrachloroethylene); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee); difluoromethane (HFC-32); ethylfluoride (HFC-161); 1,1,1,3,3,3-hexafluoropropane (HFC-236fa); 1,1,2,2,3-pentafluoropropane (HFC-245ca); 1,1,2,3,3-pentafluoropropane (HFC-245ea); 1,1,1,2,3-pentafluoropropane (HFC-245eb); 1,1,1,3,3-pentafluoropropane (HFC-245fa); 1,1,1,2,3,3-hexafluoropropane (HFC-236ea); 1,1,1,3,3-pentafluorobutane (HFC-365mfc); chlorofluoromethane (HCFC-31); 1 chloro-1-fluoroethane (HCFC-151a);

1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a); 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane ($C_4F_9OCH_3$); 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane ($(CF_3)_2CFCF_2OCH_3$); 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane ($C_4F_9OC_2H_5$); 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ($(CF_3)_2CFCF_2OC_2H_5$); and perfluorocarbon compounds which fall into these classes:

(i) Cyclic, branched, or linear, completely fluorinated alkanes;
(ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;
(iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and
(iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

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