6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OAR-2009-0927; FRL-9799-4]

Mandatory Reporting of Greenhouse Gases: Notice of Data Availability Regarding Global Warming Potential Values for Certain Fluorinated Greenhouse Gases and Fluorinated Heat Transfer Fluids

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of data availability and request for comment.

SUMMARY: The EPA is announcing to the public the availability of estimated global warming potentials, as well as data and analysis submitted in support of them, for eight fluorinated heat transfer fluids. We are requesting comments on the estimated global warming potentials and the data and analysis supporting them. We are also requesting comment on the cited global warming potentials for 35 other fluorinated greenhouse gases and fluorinated heat transfer fluids for which we do not currently possess supporting data and analysis. The EPA is requesting comment on the global warming potentials of all 43 chemicals as we consider adding these global warming potentials to the Greenhouse Gas Reporting rule.

DATES: Comments must be received on or before [INSERT THE DATE 30 DAYS AFTER THE DATE OF PUBLICATION OF THIS NOTICE IN THE FEDERAL REGISTER].

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2009-0927, by one of the following methods:

- Federal eRulemaking Portal: http://www.regulations.gov: Follow the online instructions for submitting comments.
- Email: GHGReportingFGHG@epa.gov.
- Fax: (202) 566-1741.
- Mail: EPA Docket Center, Attention Docket EPA-HQ-OAR-2009-0927, Mail code: 2822T, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.
- Hand Delivery: EPA Docket Center, Public Reading Room, Room 3334, EPA West Building, Attention Docket EPA-HQ-OAR-2009-0927, 1301 Constitution Avenue, NW, Washington, DC 20004. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OAR-2009-0927. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at http://www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through http://www.regulations.gov. The http://www.regulations.gov website is an "anonymous access" system, which means EPA will not know your identity or contact

information unless you provide it in the body of your comment. If you send an email comment directly to EPA without going through http://www.regulations.gov your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

Docket: All documents in the docket are listed in the http://www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in http://www.regulations.gov or in hard copy at EPA's Docket Center, Public Reading Room, EPA West Building, Room 3334, 1301 Constitution Avenue, NW, Washington, DC 20004. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through

Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT: Deborah Ottinger, Climate Change Division, Office of Atmospheric Programs (6207J), Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460; telephone number: (202) 343-9149; fax number: (202) 343-2342; email address: ottinger.deborah@epa.gov.

SUPPLEMENTARY INFORMATION:

I. General Information

A. What is today's notice about?

- The EPA is making available for public comment estimated GWPs for the eight fluorinated heat transfer fluids (HTFs) listed in Table 1 of this notice as well as data and analysis submitted in support of those GWPs.
- The EPA is also making available for public comment cited GWPs for the 35 fluorinated GHGs and fluorinated HTFs listed in Table 2 of this notice. The EPA does not currently possess supporting data and analysis for these GWPs.
- Both sets of chemicals and their GWPs are being considered for addition to Table A-1 to subpart A of part 98, the compendium of GWPs used to convert tons of chemical into tons of carbon dioxide equivalent (CO_2e) under the Greenhouse Gas Reporting Program.

B. How does this notice relate to the forthcoming proposed rule titled "2013 Revisions to the Greenhouse Gas Reporting Rule and Proposed Confidentiality Determinations for New or Substantially Revised Data Elements"?

In the proposed rule signed March 8, 2013, titled "2013 Revisions to the Greenhouse Gas Reporting Rule and Proposed Confidentiality Determinations for New or Substantially Revised Data Elements" (hereinafter referred to as the "2013 Technical Corrections Proposed Rule"), the EPA is proposing to amend subpart A, General Provisions, to propose GWPs for certain fluorinated greenhouse gases not currently listed in Table A-1 to subpart A. This notice requests comment on GWPs for fluorinated GHGs and fluorinated HTFs for which documented GWPs were not available in time for inclusion in the 2013 Technical Corrections Proposed Rule. The comments submitted in response to this notice are intended to inform a potential future rulemaking to amend Table A-1 to subpart A to add the GWPs of some or all of the fluorinated GHGs and fluorinated HTFs listed in this notice.

C. Where can I get the information?

All of the information can be obtained through the Docket and at http://www.regulations.gov (see **ADDRESSES** section above for docket contact information).

D. What is the EPA taking comment on and what supporting documentation do I need to include in my comments?

The EPA requests comment on topics including but not limited to the following:

- For the fluorinated HTFs in Table 1 of this notice, the reliability, including the likely accuracy and precision, of the GWPs listed in Table 1 given the data and analysis submitted in support of them, and
- The completeness, quality, and transparency of the data and analysis submitted in support of the GWPs in Table 1 of this notice.
- For the fluorinated GHGs and HTFs in Table 2 of this notice, the reliability, including the likely accuracy and precision, of the GWPs listed, and
- The accuracy of the chemical names and formulas listed.

For the fluorinated HTFs in Table 1 of this notice, the EPA is specifically seeking comment on the extent to which the supporting data and analysis includes the following:

- Data and analysis related to the low-pressure gas phase infrared absorption spectrum of the fluorinated GHG.
- Data and analysis related to the estimated atmospheric lifetime of the fluorinated GHG (reaction mechanisms and rates, including e.g., photolysis and reaction with atmospheric components such as OH, O_3, CO, and water), including descriptions of the measurements or modeling.
- The radiative transfer analysis that integrates the lifetime and infrared absorption spectrum data to calculate the GWP.
- Any published or unpublished studies of the GWP of the gas.

Where quantitative structure–activity relationship (QSAR) models have been used, the EPA is seeking comment on the extent to which the data and analysis include information documenting the level of accuracy of the QSAR-derived GWP, including:

- Information on how the structure of the "target" fluorinated GHG is similar to the structures of the fluorinated GHGs used to model the radiative forcing and/or reaction rate of the "target" fluorinated GHG.

- Information on the quality (i.e., accuracy and precision) and quantity of the measurements of the radiative forcings and/or reaction rates of the fluorinated GHGs used to model these parameters for the "target" fluorinated GHG.
- Estimated uncertainties of the modeled forcings and/or reaction rates.
- Descriptions and results of any efforts to validate the QSAR model(s).

E. What should I consider as I prepare my comments for EPA?

- Explain your views as clearly as possible.
- Describe any assumptions that you used.
- Provide any technical information or data you used that support your views.
- Provide specific examples to illustrate your concerns.
- Offer alternatives.
- Make sure to submit your comments by the comment period deadline identified.
- To ensure proper receipt by EPA, identify the appropriate docket identification number in the subject line on the first page of your response. It would also be helpful if you provided the name, date, and Federal Register citation related to your comments.

F. Submitting Confidential Business Information (CBI)

Do not submit information you are claiming as CBI to EPA through http://www.regulations.gov or email. Clearly mark the part of the information that you claim to be CBI. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2. For CBI information in a disk or CD ROM that you mail to EPA, mark the outside of the disk or CD ROM as CBI and then identify electronically within the disk or CD ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that

includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket.

II. Background

Table A-1 to subpart A of 40 CFR part 98 ("Table A-1") is a compendium of GWP values of certain GHGs that are required to be reported under one or more subparts of the Greenhouse Gas Reporting rule ("Part 98"). These GWPs are used to convert tons of chemical into tons of CO_2-equivalent for purposes of various calculations and reporting under the rule. As acknowledged in the Federal Register notice for the final Part 98 (74 FR 56348, October 30, 2009), it is the EPA's intent to periodically update Table A-1 as GWPs are evaluated or re-evaluated by the scientific community. This will provide a more accurate and complete account of the atmospheric impacts of GHG emissions and supplies.

Table A-1 of Part 98 currently includes 10 fluorinated HTFs of which EPA is aware, but there are a number that it does not include. Of the 42 fluorinated HTFs listed in this notice (none of which is on Table A-1 of Part 98), electronics facilities reported emissions of 17 under the Greenhouse Gas Reporting Program (GHGRP). Electronics facilities reported use of another four in a 2009 industry survey by the International SEMATECH Manufacturing Initiative (Technology Transfer #09065014A-TR).

Other HTFs (those with vapor pressures below 1 mm Hg at 25 degrees C) may be reported for the first time this year because of an expanded definition of fluorinated HTF that went into effect in 2012. Several of the fluorinated HTFs in this notice are fully fluorinated. Fully fluorinated compounds are likely to have long atmospheric lifetimes and high GWPs.[1]

There are two primary suppliers of fluorinated HTFs used in the United States: 3M Company (3M) and Solvay. After evaluating the reports submitted under subpart I, the EPA contacted 3M and Solvay and requested any data and information they had regarding the GWPs of the fluorinated HTFs that they supplied.

3M responded with estimated GWPs and supporting data and analysis for eight fluorinated HTFs collectively composed of nine fluorinated compounds. (One of the HTFs, FC-77, is a blend of two fluorinated compounds.) For one of the fluorinated compounds, C_8F_{18}, the EPA is proposing a GWP in the 2013 Technical Corrections Proposed Rule. Thus, the EPA is not requesting comment on the GWP of C_8F_{18} through this action. However, the EPA is requesting comment on the GWPs and supporting data and analysis for the other eight compounds, which are listed in Table 1 of this notice. These compounds

[1] Fully fluorinated compounds are defined as compounds that contain only single bonds and in which all available valence locations are filled by fluorine atoms (e.g., saturated perfluorocarbons; fully fluorinated linear, branched and cyclic alkanes; fully fluorinated ethers; fully fluorinated tertiary amines; fully fluorinated aminoethers; and perfluoropolyethers).

(along with the 3M HTFs already included on Table A-1 of Part 98) account for most of the emissions of 3M-supplied HTFs reported to EPA under subpart I to date (i.e., in 2012).

Solvay indicated that it generally did not possess data and analysis to support estimated GWPs for the Solvay-supplied HTFs that are not already on Table A-1 of Part 98.[2] Table 2 of this notice therefore includes all of the Solvay-supplied fluorinated HTFs of which EPA is aware and which are not already included on Table A-1. It also includes some 3M-supplied fluorinated HTFs (and one fluorinated GHG used as a chamber cleaning gas) for whose estimated GWPs 3M did not submit supporting data and analysis. 3M indicates that some of these HTFs are no longer produced.

For several of the fluorinated HTFs (and for the fluorinated GHG) in Table 2 of this notice, approximate GWPs have been presented or published (e.g., in presentations to the EPA or in material safety data sheets (MSDSs)) without accompanying explanation or documentation of how those GWPs have been developed. For a large subset of these fully fluorinated chemicals, GWPs of 10,000 were identified in a presentation

[2] Solvay provided a peer-reviewed paper regarding a fluorinated compound, PFPMIE, that is already on Table A-1 and that is sold under the trade name of Galden HT 70. (There are multiple PFPMIEs, which have the general chemical structure $F_3C(OCFCF_3CF_2)_m(OCF_2)_nOCF_3$. The PFPMIE that is listed on Table A-1 and is the primary component of HT 70 is the simplest version, with m=n=1.) In addition, Solvay submitted an infrared absorption spectrum for another fluorinated HTF that it imports into the U.S., Galden HT-110.

given by 3M to EPA. For some of these chemicals, different GWPs were identified in other sources, such as MSDSs issued by 3M or Solvay. These are the GWPs that are included in Table 2. The EPA does not intend to add the cited GWPs for these compounds to Table A-1 of Part 98 without supporting data and analysis. We are therefore continuing to assemble and evaluate information regarding the GWPs for the compounds in Table 2 of this notice. We request comment on these GWPs and on the accuracy of the listed chemical names and formulas for the compounds.

III. GWP Values on Which EPA is Seeking Comment

Table 1. F-HTFs with Documented GWPs

Trade Name(s)	**CAS No.**	**Chemical Name and Formula**	**Submitted GWP**	**Source of Submitted GWP**
Fluorinert FC-77 (component); Fluorinert FC-75	335-36-4	Perfluoro-2-butyltetrahydro-furan $C_8F_{16}O$	9,600	GWP and calculation methodology provided by manufacturer
Fluorinert FC-3283	338-83-0	Perfluoro-tripropylamine (PTPA) $(C_3F_7)_3N$	8,690	GWP and calculation methodology provided by manufacturer
Fluorinert FC-40	1064698-37-8	Perfluoro-tributylamine (PTBA) $(C_4F_{9)3}N$	9,020	GWP and calculation methodology provided by manufacturer
Fluorinert FC-3284, PF-5052	382-28-5	Perfluoromethyl morpholine (PMM) $C_5F_{11}NO$	9,500	GWP and calculation methodology provided by manufacturer
Fluorinert FC-770	1093615-61-2	Perfluoro-isopropyl morpholine (PIPM) $C_7F_{15}NO$	11,000	GWP and calculation methodology provided by manufacturer

Trade Name(s)	CAS No.	Chemical Name and Formula	Submitted GWP	Source of Submitted GWP
Novec 7300, HFE-7300	132182-92-4	1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-trifluoromethyl-pentane $CF_3CF_2CF(OCH_3)CF(CF_3)_2$	310	GWP and calculation methodology provided by manufacturer
Novec 7500, HFE-7500	297730-93-9	3-ethoxy-1,1,1,2,3,4,4,5,5,6,6,6-dodecafluoro-2-trifluoromethyl-hexane $CF_3CF_2CF_2CF(OC_2H_5)CF(CF_3)_2$	100	GWP and calculation methodology provided by manufacturer
F-HTFs with Vapor Pressure Less than 1 mm Hg				
Fluorinert FC-70	338-84-1	Perfluoro-triamylamine (PTAA) $(C_5F_{11})_3N$	8,900	GWP and calculation methodology provided by manufacturer

Table 2. F-GHGs and F-HTFs for whose GWPs Documentation is Not Available

Trade Name (s)	CAS No.	Chemical Name and Formula	Cited GWP	Source of Cited GWP
Heptafluorobutanoyl fluoride	773-14-8	C_4F_8O	8,700	Identified in Pruette et al. (2000)[a]
Fluorinert FC-3255, FC-104	335-36-4	Predominantly C_5-C_{18}	10,000	Identified in presentation to EPA[b]
Fluorinert FC-5311, Phenanthrene	306-91-2	Perfluoroperhydrophenanthrene $C_{14}F_{24}$	10,000	Identified in presentation to EPA[b]
Fluorinert FC-5320	86508-42-1	Perfluoro-compounds C_5-C_{18}	>5,000	Identified in manufacturer's literature[c]
Fluorinert FC-8270	338-83-0	Perfluoro compounds (primarily compounds with 9 carbons)	10,000	Identified in presentation to EPA[b]
Novec 7600, HFE-7600	870778-34-0	1,1,1,2,3,3-Hexafluoro-4-(1,1,2,3,3,3-hexafluoroprop-oxy)-pentane $C_8H_6F_{12}O$	700	Identified in manufacturer's literature[d]
H-Galden ZT-130	188690–77–9	$HCF_2OCF_2OCF_2CF_2OCF_2H$	3000-5000	Identified in presentation to EPA[b]

Trade Name (s)	CAS No.	Chemical Name and Formula	Cited GWP	Source of Cited GWP
H-Galden ZT-150	188690-77-9	$HCF_2OCF_2OCF_2CF_2OCF_2H$	3000-5000	Identified in presentation to EPA[b]
H-Galden ZT-180	188690-77-9	$HCF_2OCF_2OCF_2CF_2OCF_2H$	3000-5000	Identified in presentation to EPA[b]
H-Galden ZV60	Not Available	$HCF_2O-(CF_2O)_p-(CF_2CF_2O)_q-CF_2H$ (ratio of p/q is 2/3)	3,000 – 5,000	Identified in presentation to EPA[b]
H-Galden ZV85, ZT-85	Not Available	Not Available	3,000 – 5,000	Identified in presentation to EPA[b]
H-Galden ZV100	Not Available	Not Available	3,000 – 5,000	Identified in presentation to EPA[b]
H-Galden ZV135	Not Available	Not Available	3,000 – 5,000	Identified in presentation to EPA[b]
Galden DET	Not Available	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$	10,000	Identified in presentation to EPA[b]
Galden E85	Not Available	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$	10,000	Identified in presentation to EPA[b]
Galden HT-55	69991-67-9	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$ n = 2.03 to 9.26[h] m = 0.04 to 0.19	10,000	Identified in presentation to EPA[b]
Galden HT-90	69991-67-9	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$ n = 2.03 to 9.26[h] m = 0.04 to 0.19	10,000	Identified in presentation to EPA[b]
Galden HT-110	69991-67-9	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$ n = 2.03 to 9.26[h] m = 0.04 to 0.19	10,000	Identified in presentation to EPA[b,e]
Galden HT-135	69991-67-9	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$ n = 2.03 to 9.26[h] m = 0.04 to 0.19	10,000	Identified in presentation to EPA[b]
Galden HT-170	69991-67-9	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$ n = 2.03 to 9.26[h] m = 0.04 to 0.19	10,000	Identified in presentation to EPA[b]
Galden D02 – TS	69991-67-9	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$	10,000	Identified in presentation to EPA[b]
Galden D02 – TSX	69991-67-9	$CF_3(OCFCF_3CF_2)_n-(OCF_2)_m-OCF_3$	None provided	No GWP found

Trade Name (s)	CAS No.	Chemical Name and Formula	Cited GWP	Source of Cited GWP
Galden PFS 2	69991-67-9 and 9002-84-0	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3	None provided	HTF identified in distributor's literature[f]
F-HTFs with Vapor Pressure Less than 1 mm Hg				
Fluorinert FC-43	311-89-7	$N(CF_2CF_2CF_2CF_3)_3$	10,000	Identified in presentation to EPA[b]
Fluorinert FC-5312	338-84-1	Perfluoro compounds (primarily with 15 carbons)	10,000	Identified in presentation to EPA[b]
Galden D02	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3	10,000	Identified in presentation to EPA[b]
Galden D03	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3	10,000	Identified in presentation to EPA[b]
Galden D05	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3	10,000	Identified in presentation to EPA[b]
Galden HS-240	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3 n = 6.4 to 7.3[h] m = 0.1 to 0.15	10,000	Identified in presentation to EPA[b]
Galden HS-260	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3 n = 6.4 to 7.3[h] m = 0.1 to 0.15	10,000	Identified in presentation to EPA[b]
Galden HT-200	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3 n = 2.03 to 9.26[h] m = 0.04 to 0.19	10,000	Identified in presentation to EPA[b]
Galden HT-230	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3 n = 2.03 to 9.26[h] m = 0.04 to 0.19	None provided	HTF identified in distributor's literature[g]
Galden LS-200	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3 n = 5.2 to 6.1[h] m = 0.1 to 0.12	10,000	Identified in presentation to EPA[b]
Galden LS-215	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3 n = 5.2 to 6.1[h] m = 0.1 to 0.12	10,000	Identified in presentation to EPA[b]
Galden LS-230	69991-67-9	$CF_3(OCFCF_3CF_2)_n$-$(OCF_2)_m$-OCF_3 n = 5.2 to 6.1[h] m = 0.1 to 0.12	10,000	Identified in presentation to EPA[b]

[a] Pruette, L., S. Karecki, R. Reif, L. Tousignant, W. Reagan, S. Kesari, and L. Zazzera. "Evaulation of C4F8O as an Alternative Plasma-Enhanced Chemical Vapor Deposition Chamber Clean Chemistry." Journal of the Electrochemical Society, 147 (3): 1149-1153, 2000.
[b] 3M Company. "Greenhouse Gas Reporting of Heat Transfer Fluids." Presentation by Kurt Werner of 3M Electronics Markets Materials Division. Presented to the EPA, January 2011. Available in Docket No. EPA-HQ-OAR-2011-0512.
[c] 3M Company. "Material Safety Data Sheet: 3M™ Fluorinert™ FC-5320 Electronic Liquid." 2012. Available online at: http://multimedia.3m.com/mws/mediawebserver?SSSSSuUn_zu8l00x4xtZm8m94v70k17zHvu9lxtD7SSSSSS--
[d] 3M Company. "Material Safety Data Sheet: 3M™ Novec™ 7600 Engineered Fluid." 2011. Available online at: http://multimedia.3m.com/mws/mediawebserver?mwsId=SSSSSuUn_zu8l00xMxmGmxtx4v70k17zHvu9lxtD7SSSSSS--.
[e] Solvay provided an infrared (IR) spectrum for this compound, but not an estimated atmospheric lifetime or GWP.
[f] http://www.sigmaaldrich.com/catalog/product/aldrich/374431?lang=en&region=US
[g] https://www.lesker.com/newweb/fluids/msds/Galden_HT230.pdf
[h] In the chemical formulas for the Galden series, "n" and "m" indicate the number of times each group (in parentheses) is repeated in the compound. While "n" and "m" are integers in any single molecule, the Galden HTFs are typically made up of mixtures of different molecules. The values for "n" and "m" for any single Galden HTF represent averages for that HTF. Table 2 provides the ranges of the average values of "n" and "m" for the Solvay HTFs in each Galden series (Galden HT, LS, etc.)

IV. Summary of EPA Assessment of Submitted GWPs and the Data and Analysis Supporting Them

The EPA completed a review of the GWPs listed in Table 1 of this notice and the data and analysis submitted in support of them. That assessment is available in the docket, together with the submitted data and analyses. In general, we found that the data and methods used to estimate the GWPs were reasonable and that the GWPs were consistent with what would be expected for compounds of the types analyzed. However, there were some limitations to the data and analysis. First, in some cases the transparency of the data and analysis were limited because some of the reports containing the detailed background information

were not available for review in time for this notice. Second, some of the data were of uncertain quality because they were based on an unpublished master's thesis. Third, because some of the analyses were performed in the early 1990s, some of the models used to estimate lifetimes or radiative efficiencies were out of date. Fourth, in one case (PTAA), radiative efficiency estimates were based on a quantitative structural activity relationship (QSAR) of uncertain predictive ability. Fifth, the atmospheric lifetime for one of the short-lived compounds (HFE-7300) was estimated based on an atmospheric lifetime for methane that is lower than the currently accepted lifetime, resulting in an underestimated lifetimes for that compound. Finally, for the six long-lived compounds, experimental limitations prevented 3M or its researchers from establishing more than minimum atmospheric lifetimes, and the GWPs based on these lifetimes are therefore also minimums.

Overall, we do not expect that these limitations resulted in large errors in the resulting GWPs; and with the exception of the errors attributable to the last two issues (related to atmospheric lifetimes), we expect that these are random rather than systematic errors. To address the last two issues, we

examined the sensitivity of the GWPs of the compounds to atmospheric lifetime. In general, 100-year GWPs for very long-lived compounds are relatively insensitive to increases in assumed atmospheric lifetime, and our analysis confirmed this. However, the 100-year GWPs for the short-lived compounds are sensitive to increases in the assumed atmospheric lifetime. For example, updating the atmospheric lifetime for HFE-7300 based on the currently accepted atmospheric lifetime of methane increases the estimated GWP of HFE-7300 by 10 percent.

Dated: April 1, 2013.

Sarah Dunham, Director,
Office of Atmospheric Programs.

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