ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 98

[EPA–HQ–OAR–2019–0424; FRL–7230–03–OAR]

RIN 2060–AU35

Revisions and Confidentiality Determinations for Data Elements Under the Greenhouse Gas Reporting Rule

AGENCY: Environmental Protection Agency (EPA).

ACTION: Supplemental notice of proposed rulemaking.

SUMMARY: The EPA is issuing this supplemental proposal that would amend specific provisions in the Greenhouse Gas Reporting Rule to improve the quality and consistency of the rule by providing for the collection of improved data that would better inform and be relevant to a wide variety of Clean Air Act provisions that the EPA carries out. The EPA recently evaluated the requirements of the Greenhouse Gas Reporting Rule to identify areas of improvement, including updates to the existing calculation, recordkeeping, and reporting requirements, and requested information for collection of additional data to understand new source categories in a proposed rule (June 21, 2022). In this notification, the EPA is proposing additional amendments to the Greenhouse Gas Reporting Rule, including updates to the General Provisions to reflect revised global warming potentials, and is proposing to require reporting of greenhouse gas data from additional sectors—specifically energy consumption; coke calcining; ceramics production; calcium carbide production; and caprolactam, glyoxal, and glyoxylic acid production. The EPA is also proposing additional revisions that would improve implementation of the Greenhouse Gas Reporting Rule, such as updates to emissions calculation methodologies; revisions to reporting requirements to improve verification of reported data and the accuracy of the data collected; and other minor technical amendments, corrections, or clarifications. The EPA intends to consider the information received in response to this supplemental proposal prior to finalizing the amendments to the Greenhouse Gas Reporting Rule proposed on June 21, 2022. This action also proposes to establish and amend confidentiality determinations for the reporting of certain data elements to be added or substantially revised in these proposed amendments.

DATES:

Comments. Comments must be received on or before July 21, 2023. Comments on the information collection provisions submitted to the Office of Management and Budget (OMB) under the Paperwork Reduction Act (PRA) are best assured of consideration by OMB if OMB receives a copy of your comments on or before June 21, 2023.

Public hearing. The EPA does not plan to conduct a public hearing unless requested. If anyone contacts us requesting a public hearing on or before May 30, 2023, we will hold a virtual public hearing. See **SUPPLEMENTARY INFORMATION** for information on requesting and registering for a public hearing.

ADDRESSES:

Comments. You may submit comments, identified by Docket Id. No. EPA–HQ–OAR–2019–0424, by any of the following methods:

Federal eRulemaking Portal: www.regulations.gov (our preferred method). Follow the online instructions for submitting comments.

Mail: U.S. Environmental Protection Agency, EPA Docket Center, Air and Radiation Docket, Mail Code 28221T, 1200 Pennsylvania Avenue NW, Washington, DC 20460.

Hand Delivery or Courier (by scheduled appointment only): EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue NW, Washington, DC 20004. The Docket Center's hours of operations are 8:30 a.m.–4:30 p.m., Monday–Friday (except Federal holidays)

Instructions: All submissions received must include the Docket Id. No. for this proposed rulemaking. Comments received may be posted without change to *www.regulations.gov/,* including any personal information provided. For detailed instructions on sending comments and additional information on the rulemaking process, see the ''Public Participation'' heading of the **SUPPLEMENTARY INFORMATION** section of this document.

The virtual hearing, if requested, will be held using an online meeting platform, and the EPA will provide information on its website (*www.epa.gov/ghgreporting*) regarding how to register and access the hearing. Refer to the **SUPPLEMENTARY INFORMATION** section for additional information.

FOR FURTHER INFORMATION CONTACT: Jennifer Bohman, Climate Change Division, Office of Atmospheric Programs (MC–6207A), Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, DC 20460; telephone number: (202) 343–9548; email address: *GHGReporting@epa.gov.* For technical information, please go to the Greenhouse Gas Reporting Program (GHGRP) website, *www.epa.gov/ghgreporting.* To submit a question, select Help Center, followed by ''Contact Us.''

World wide web (WWW). In addition to being available in the docket, an electronic copy of this proposal will also be available through the WWW. Following the Administrator's signature, a copy of this proposed rule will be posted on the EPA's GHGRP website at *www.epa.gov/ghgreporting.*

SUPPLEMENTARY INFORMATION:

Written comments. Submit your comments, identified by Docket Id. No. EPA–HQ–OAR–2019–0424, at *www.regulations.gov* (our preferred method), or the other methods identified in the **ADDRESSES** section. Once submitted, comments cannot be edited or removed from the docket. The EPA may publish any comment received to its public docket. Do not submit to the EPA's docket at *www.regulations.gov* any information you consider to be confidential business information (CBI), proprietary business information (PBI), or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.,* on the web, cloud, or other file sharing system). Please visit *www.epa.gov/dockets/commenting-epa-dockets* for additional submission methods; the full EPA public comment policy; information about CBI, PBI, or multimedia submissions, and general guidance on making effective comments.

Participation in virtual public hearing. To request a virtual public hearing, please contact the person listed in the following **FOR FURTHER INFORMATION CONTACT** section by May 30, 2023. If requested, the virtual hearing will be held on June 6, 2023. The hearing will convene at 9 a.m. Eastern Time (ET) and will conclude at 3 p.m. ET. The EPA may close the hearing 15 minutes after the last pre-registered speaker has testified if there are no additional speakers. The EPA will provide further information about the hearing on its website (*www.epa.gov/ghgreporting*) if a hearing is requested.

If a public hearing is requested, the EPA will begin pre-registering speakers for the hearing no later than one business day after a request has been received. To register to speak at the virtual hearing, please use the online registration form available at *www.epa.gov/ghgreporting* or contact us by email at *GHGReporting@epa.gov.* The last day to pre-register to speak at the hearing will be June 5, 2023. On June 5, 2023, the EPA will post a general agenda that will list pre-registered speakers in approximate order at: *www.epa.gov/ghgreporting.*

The EPA will make every effort to follow the schedule as closely as possible on the day of the hearing; however, please plan for the hearings to run either ahead of schedule or behind schedule.

Each commenter will have 5 minutes to provide oral testimony. The EPA encourages commenters to provide the EPA with a copy of their oral testimony electronically (via email) by emailing it to *GHGReporting@epa.gov.* The EPA also recommends submitting the text of your oral testimony as written comments to the rulemaking docket.

The EPA may ask clarifying questions during the oral presentations but will not respond to the presentations at that time. Written statements and supporting information submitted during the comment period will be considered with the same weight as oral testimony and supporting information presented at the public hearing.

Please note that any updates made to any aspect of the hearing will be posted online at *www.epa.gov/ghgreporting.* While the EPA expects the hearing to go forward as set forth above, please monitor our website or contact us by email at *GHGReporting@epa.gov* to determine if there are any updates. The EPA does not intend to publish a document in the **Federal Register** announcing updates.

If you require the services of an interpreter or special accommodation such as audio description, please pre-register for the hearing with the public hearing team and describe your needs by May 30, 2023. The EPA may not be able to arrange accommodations without advanced notice.

Regulated entities. This is a proposed regulation. If finalized, these proposed revisions would affect certain entities that must submit annual greenhouse gas (GHG) reports under the GHGRP (40 CFR part 98). These are proposed amendments to existing regulations. If finalized, these amended regulations would also affect owners or operators of certain industry sectors that are direct emitters of GHGs. Regulated categories and entities include, but are not limited to, those listed in Table 1 of this preamble:

TABLE 1—EXAMPLES OF AFFECTED ENTITIES BY CATEGORY

Category	North American Industry Classification System (NAICS)	Examples of facilities that may be subject to part 98:
Adipic Acid Production	325199	All other basic organic chemical manufacturing: Adipic acid manufacturing.
Aluminum Production	331313	Primary aluminum production facilities.
Ammonia Manufacturing	325311	Anhydrous ammonia manufacturing facilities.
Calcium Carbide Production	325180	Other basic inorganic chemical manufacturing: calcium carbide manufacturing.
Carbon Dioxide Enhanced Oil Recovery Projects	211120	Oil and gas extraction projects using carbon dioxide enhanced oil recovery.
Caprolactam, Glyoxal, and Glyoxylic Acid Production	325199	All other basic organic chemical manufacturing.
Cement Production	327310	Cement manufacturing.
Ceramics Manufacturing	327110	Pottery, ceramics, and plumbing fixture manufacturing.
	327120	Clay building material and refractories manufacturing.
Coke Calcining	299901	Coke; coke, petroleum; coke, calcined petroleum.
Electronics Manufacturing	334111	Microcomputers manufacturing facilities.
	334413	Semiconductor, photovoltaic (PV) (solid-state) device manufacturing facilities.
	334419	Liquid crystal display (LCD) unit screens manufacturing facilities; Microelectromechanical (MEMS) manufacturing facilities.
Electrical Equipment Manufacture or Refurbishment	33531	Power transmission and distribution switchgear and specialty transformers manufacturing facilities.
Electricity generation units that report through 40 CFR part 75	221112	Electric power generation, fossil fuel (*e.g.,* coal, oil, gas).
Electrical Equipment Use	221121	Electric bulk power transmission and control facilities.
Electrical transmission and distribution equipment manufacture or refurbishment.	33361	Engine, Turbine, and Power Transmission Equipment Manufacturing.
Ferroalloy Production	331110	Ferroalloys manufacturing.
Fluorinated Greenhouse Gas Production	325120	Industrial gases manufacturing facilities.
Geologic Sequestration	NA	CO_2 geologic sequestration sites.
Glass Production	327211	Flat glass manufacturing facilities.
	327213	Glass container manufacturing facilities.
	327212	Other pressed and blown glass and glassware manufacturing facilities.
HCFC–22 Production	325120	Industrial gas manufacturing: Hydrochlorofluorocarbon (HCFC) gases manufacturing.
HFC–23 destruction processes that are not collocated with a HCFC–22 production facility and that destroy more than 2.14 metric tons of HFC–23 per year.	325120	Industrial gas manufacturing: Hydrofluorocarbon (HFC) gases manufacturing.
Hydrogen Production	325120	Hydrogen manufacturing facilities.
Industrial Waste Landfill	562212	Solid waste landfill.
Industrial Wastewater Treatment	221310	Water treatment plants.
Injection of Carbon Dioxide	211	Oil and gas extraction.
Iron and Steel Production	333110	Integrated iron and steel mills, steel companies, sinter plants, blast furnaces, basic oxygen process furnace (BOPF) shops.
Lead Production	331	Primary metal manufacturing.
Lime Manufacturing	327410	Lime production.
Magnesium Production	331410	Nonferrous metal (except aluminum) smelting and refining: Magnesium refining, primary.
Nitric Acid Production	325311	Nitrogenous fertilizer manufacturing: Nitric acid manufacturing.
Petroleum and Natural Gas Systems	486210	Pipeline transportation of natural gas.

TABLE 1—EXAMPLES OF AFFECTED ENTITIES BY CATEGORY—Continued

Category	North American Industry Classification System (NAICS)	Examples of facilities that may be subject to part 98:
	221210	Natural gas distribution facilities.
	211120	Crude petroleum extraction.
	211130	Natural gas extraction.
Petrochemical Production	324110	Petrochemicals made in petroleum refineries.
Petroleum Refineries	324110	Petroleum refineries.
Phosphoric Acid Production	325312	Phosphatic fertilizer manufacturing.
Pulp and Paper Manufacturing	322110	Pulp mills.
	322120	Paper mills.
	322130	Paperboard mills.
Miscellaneous Uses of Carbonate	Facilities included elsewhere	
Municipal Solid Waste Landfills	562212	Solid waste landfills.
	221320	Sewage treatment facilities.
Silicon Carbide Production	327910	Silicon carbide abrasives manufacturing.
Soda Ash Production	325180	Other basic inorganic chemical manufacturing: Soda ash manufacturing.
Suppliers of Carbon Dioxide	325120	Industrial gas manufacturing facilities.
Suppliers of Industrial Greenhouse Gases	325120	Industrial greenhouse gas manufacturing facilities.
Titanium Dioxide Production	325180	Other basic inorganic chemical manufacturing: Titanium dioxide manufacturing.
Underground Coal Mines	212115	Underground coal mining.
Zinc Production	331410	Nonferrous metal (except aluminum) smelting and refining: Zinc refining, primary.
Importers and Exporters of Pre-charged Equipment and Closed-Cell Foams.	423730	Air-conditioning equipment (except room units) merchant wholesalers.
	333415	Air-conditioning equipment (except motor vehicle) manufacturing.
	423620	Air-conditioners, room, merchant wholesalers.
	449210	Electronics and Appliance retailers.
	326150	Polyurethane foam products manufacturing.
	335313	Circuit breakers, power, manufacturing.
	423610	Circuit breakers and related equipment merchant wholesalers.

Table 1 of this preamble is not intended to be exhaustive, but rather provides a guide for readers regarding facilities likely to be affected by this proposed action. This table lists the types of facilities that the EPA is now aware could potentially be affected by this action. Other types of facilities than those listed in the table could also be subject to reporting requirements. To determine whether you would be affected by this proposed action, you should carefully examine the applicability criteria found in 40 CFR part 98, subpart A (General Provisions) and each source category. Many facilities that are affected by 40 CFR part 98 have greenhouse gas emissions from multiple source categories listed in Table 1 of this preamble. If you have questions regarding the applicability of this action to a particular facility, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

Acronyms and Abbreviations. The following acronyms and abbreviations are used in this document.

AGA	American Gas Association
AIM	American Innovation and Manufacturing Act of 2020
ANSI	American National Standards Institute
API	American Petroleum Institute
AR5	Fifth Assessment Report
AR6	Sixth Assessment Report
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BACT	best available control technology
BAMM	best available monitoring methods
BCFC	bromochlorofluorocarbons
BFC	bromofluorocarbons
BOPF	basic oxygen process furnace
CAA	Clean Air Act
CAS	Chemical Abstract Service
CBI	confidential business information
CBP	U.S. Customs and Border Protection
CCUS	carbon capture, utilization, and sequestration
CDC	Centers for Disease Control and Prevention
CEMS	continuous emission monitoring system
CFC	chlorofluorocarbons
CFR	Code of Federal Regulations
CGA	cylinder gas audit
CF_4	perfluoromethane
CH_4	methane
CHP	combined heat and power
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COVID–19	Coronavirus 2019
CSA	CSA Group
DOC	degradable organic carbon
DOE	Department of Energy
DRE	destruction and removal efficiency
EGU	electricity generating unit
e-GGRT	electronic Greenhouse Gas Reporting Tool
eGRID	Emissions & Generation Resource Database
EF	emission factor
EG	emission guidelines
EIA	Energy Information Administration
EOR	enhanced oil recovery
EPA	U.S. Environmental Protection Agency
ET	Eastern time
FAQ	frequently asked question
FR	Federal Register
F–GHG	fluorinated greenhouse gas
F–HTFs	fluorinated heat transfer fluids
GHG	greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GWP	global warming potential
HAWK	HFC and ODS Allowance Tracking
HBCFC	hydrobromochlorofluorocarbons
HBFC	hydrobromofluorocarbons
HCFC	hydrochlorofluorocarbons
HCFE	hydrochlorofluoroethers
HFC	hydrofluorocarbons
HFE	hydrofluoroethers
HTF	heat transfer fluid
HTS	Harmonized Tariff System
ICR	Information Collection Request
IPCC	Intergovernmental Panel on Climate Change
ISBN	International Standard Book Number
ISO	International Standards Organization
IVT	Inputs Verification Tool
k	first order decay rate
kWh	kilowatt hour
LDC	local distribution company
MECS	Manufacturing and Energy Consumption Survey
MEMP	Metered Energy Monitoring Plan
mmBtu	million British thermal units

MRV	monitoring, reporting, and verification plan
mt	metric tons
mtCO$_2$e	metric tons carbon dioxide equivalent
MWh	megawatt-hour
MSW	municipal solid waste
N_2O	nitrous oxide
NAICS	North American Industry Classification System
NIST	National Institute of Standards and Technology
NSPS	new source performance standards
OMB	Office of Management and Budget
PBI	proprietary business information
PFC	perfluorocarbon
POX	partial oxidation
ppm	parts per million
PRA	Paperwork Reduction Act
PSA	pressure swing adsorption
PSD	prevention of significant deterioration
QA/QC	quality assurance/quality control
RFA	Regulatory Flexibility Act
REC	renewable energy credit
RY	reporting year
SAR	Second Assessment Report
SDI	Strategic Defense Initiative
SF6	sulfur hexafluoride
SMR	steam methane reforming
TRL	technology readiness level
TSD	technical support document
UIC	underground injection control
U.S.	United States
UMRA	Unfunded Mandates Reform Act of 1995
UNFCCC	United Nations Framework Convention on Climate Change
WGS	water gas shift
WWW	World Wide Web

Contents

I. Background

A. How is this preamble organized?

Section I of this preamble contains background information on the June 21, 2022 proposed rule (87 FR 36920, hereafter referred to as ''2022 Data Quality Improvements Proposal'') and how the EPA identified additional information to support further revisions to improve the GHGRP that are included in this supplemental proposal. This section also discusses the EPA's legal authority under the Clean Air Act (CAA) to promulgate (including subsequent amendments to) the GHG Reporting Rule, codified at 40 CFR part 98 (hereinafter referred to as ''part 98''), and the EPA's legal authority to make confidentiality determinations for new or revised data elements required by these amendments or for existing data elements for which a confidentiality determination has not previously been proposed. Section II of this preamble describes the types of amendments included in this proposed rule and includes the rationale for each type of proposed change. Section III of this preamble is organized by existing part 98 subpart and contains detailed information on the proposed revisions and the rationale for the proposed amendments in each section. Section IV of this preamble describes five newly proposed part 98 subparts and contains detailed information and rationale for the requirements for each proposed source category. Section V of this preamble discusses the proposed schedule for implementing these revisions to part 98. Section VI of this preamble discusses the proposed confidentiality determinations for new or substantially revised (*i.e.,* requiring additional or different data to be reported) data reporting elements, as well as for certain existing data elements for which the EPA is proposing a new determination. Section VII of this preamble discusses the impacts of the proposed amendments. Section VIII of this preamble describes the statutory and Executive order requirements applicable to this action.

B. Background on This Supplemental Proposed Rule

In the 2022 Data Quality Improvements Proposal, the EPA proposed amendments to specific provisions of the GHGRP where we identified opportunities for improvement, such as where the rule may be modified to reflect the EPA's current understanding of U.S. GHG emission trends, or to improve data collection and reporting where additional data may be necessary to better understand emissions from specific sectors or inform future policy decisions (87 FR 36920, June 21, 2022). The 2022 Data Quality Improvements Proposal included updates to emission factors and refinements to existing emissions estimation methodologies to reflect an improved understanding of emission sources and end uses of GHGs. Additionally, it proposed to collect additional data to understand new source categories or new emission sources for specific sectors; to improve the EPA's understanding of the sector-specific processes or other factors that influence GHG emission rates; to improve verification of collected data; and to provide additional data to complement or inform other EPA programs. In other cases, we proposed revisions to resolve gaps in the current coverage of the GHGRP that leave out potentially significant sources of GHG emissions or end uses. For example, the proposed revisions included new reporting of direct air capture as a carbon capture option for suppliers of carbon dioxide; addition of a new subpart for quantifying geologic sequestration in association with enhanced oil recovery operations; and an updated calculation methodology to estimate emissions from large, atypical release events at oil and gas facilities. The EPA also proposed revisions that clarify or update provisions that may be unclear, or where we identified specific provisions in part 98 that would streamline calculation, monitoring, or reporting to provide flexibility or increase the efficiency of data collection. Finally, the EPA also solicited comment on expanding the GHGRP to include several new source categories that could improve the EPA's understanding of GHGs, including energy consumption; ceramics production; calcium carbide production; caprolactam, glyoxal, and glyoxylic acid production; coke calcining; and CO_2 utilization (see section IV of the 2022 Data Quality Improvements Proposal at 87 FR 37016), as well as requesting comment on potential future amendments to add new calculation, monitoring, and reporting requirements.

As stated in the 2022 Data Quality Improvements Proposal, the data collected under part 98 are used to inform the EPA's understanding of the relative emissions and distribution of emissions from specific industries, the factors that influence GHG emission rates, and to inform policy options and potential regulations. Since publishing the proposed amendments, the EPA has received or identified new information to further improve the data collected under the GHGRP, and has subsequently identified additional amendments that the EPA is putting forward in this supplemental proposal. Some of the additional amendments are informed by a review of comments raised by stakeholders on the 2022 Data Quality Improvements Proposal (*e.g.,* see sections III.J and III.P of this preamble). Other proposed changes are based on additional data gaps the EPA has observed in collected data, either where additional data would improve verification of data reported to the GHGRP (see section II.D of this preamble) or where additional data is needed to help our understanding of changing industry emission trends (see sections II.B and II.C of this preamble). Based on review of this information, the EPA is proposing additional amendments to part 98, described in sections II through IV of this preamble, that build on and improve the amendments proposed in the 2022 Data Quality Improvements Proposal or that would further enhance the quality of part 98 and implementation of the GHGRP.

In some cases, the EPA has identified updated guidance on GHG estimation methods or advances in the scientific literature. For example, through this notification, the EPA is proposing a comprehensive update to the global warming potentials (GWPs) in Table A–1 to subpart A of part 98, in part to ensure that the GWPs used in the GHGRP are consistent with those recently agreed upon by the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) for purposes of GHG reporting. The Parties specified the agreed-on GWPs in November 2021 (see section III.A.1 of this preamble), which was too late to allow the EPA to consider proposing a comprehensive GWP update in the 2022 Data Quality Improvement Proposal.[1] We have subsequently reviewed and are proposing to include updated GWPs in this proposed rule.

In other cases, we have identified new data supporting additional improvements to the calculation, monitoring, and recordkeeping requirements, including revisions and clarifications not previously proposed, that would address potential data gaps and improve the quality of the data collected in the GHGRP. For example, the EPA is proposing to incorporate additional revisions to the Municipal Solid Waste (MSW) landfill source category in light of recent aerial studies that indicate that methane emissions from landfills may be considerably higher than the methane emissions currently reported under subpart HH of part 98 (Municipal Solid Waste Landfills). The proposed amendments incorporate an updated emissions estimation methodology that would improve the accuracy and coverage of the greenhouse gas data from landfills. These data would be used to inform the EPA's understanding of methane emissions from MSW landfills and future policy decisions under the CAA. For example, the current equations account for fugitive methane emissions passing through intact cover systems. Collecting surface emissions data under the proposed revisions would inform the EPA's understanding of the degree to which breakdown in cover materials is occurring and the impacts on methane emission rates.

This supplemental proposal also incorporates consideration of information received in response to our request for comment on certain topics in the 2022 Data Quality Improvement Proposal. In that proposal, we requested comment on potential future amendments to improve the coverage of U.S. GHG emissions and supply captured by the GHGRP. The EPA has reviewed comments received in response to the call for information, along with additional data that the EPA has collected, and is proposing to establish new subparts with specific reporting provisions under part 98 for the source categories of energy consumption; coke calciners; ceramics production; calcium carbide production; and caprolactam, glyoxal, and glyoxylic acid production. The proposed revisions would improve the data collected under the GHGRP by better capturing the changing landscape of greenhouse gas emissions, providing for more complete coverage of U.S. GHG emission sources, and providing a more comprehensive approach to understanding GHG emissions.

For other revisions, we are proposing to clarify or correct specific proposed provisions of the 2022 Data Quality Improvements Proposal. For instance, we are proposing to clarify the applicability requirements of proposed subpart VV of part 98 (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916), a new subpart for quantifying geologic sequestration in association with enhanced oil recovery (EOR) operations, which was included in the 2022 Data Quality Improvements Proposal. Following the initial proposal, we received feedback from stakeholders highlighting ambiguity in the applicability of the proposed source category and questioning whether EOR operators electing to use the International Standards Organization (ISO) standard designated as CSA Group (CSA)/American National Standards Institute (ANSI) ISO 27916:2019, *Carbon Dioxide Capture, Transportation*

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[1] Although we proposed changes to certain chemical specific and default global warming potentials in Table A–1 to subpart A of part 98 in the 2022 Data Quality Improvements Proposal, these were limited updates to GWPs of fluorinated GHGs that are not required to be reported under the UNFCCC because they are not hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, or nitrogen trifluoride.

and Geological Storage—Carbon Dioxide Storage Using Enhanced Oil Recovery (CO_2-EOR) (hereafter referred to as ''CSA/ANSI ISO 27916:2019''), must mandatorily report under the new proposed subpart VV or would have the option to continue reporting under subpart UU (Injection of Carbon Dioxide). We are proposing the applicability of the source category in this supplemental notification to better reflect our initial intent, which was that operators electing to use CSA/ANSI ISO 27916:2019 to quantify geologic sequestration of CO_2 would be required to report under subpart VV, and proposing harmonizing revisions to subpart UU (Injection of Carbon Dioxide). This supplemental proposal provides information about these proposed updates for public review and comment.

This supplemental proposal does not address implementation of provisions of the Inflation Reduction Act which was signed into law on August 16, 2022. Section 60113 of the Inflation Reduction Act amended the CAA by adding section 136, ''Methane Emissions and Waste Reduction Incentive Program for Petroleum and Natural Gas Systems.'' The EPA intends to take one or more separate actions in the coming months related to implementation of the Methane Emissions and Waste Reduction Incentive Program, including a future rulemaking to propose revisions to certain requirements of subpart W of part 98 (Petroleum and Natural Gas Systems). Accordingly, the Methane Emissions and Waste Reduction Incentive Program is outside the scope of this supplemental proposed rule.

C. Legal Authority

The EPA is proposing these rule amendments under its existing CAA authority provided in CAA section 114. As stated in the preamble to the *Mandatory Reporting of Greenhouse Gases* final rule (74 FR 56260, October 30, 2009) (hereinafter referred to as ''2009 Final Rule''), CAA section 114(a)(1) provides the EPA broad authority to require the information proposed to be gathered by this rule because such data would inform and are relevant to the EPA's carrying out of a variety of CAA provisions. See the preambles to the proposed GHG Reporting Rule (74 FR 16448, April 10, 2009) (hereinafter referred to as ''2009 Proposed Rule'') and the 2009 Final Rule for further information.

II. Overview and Rationale for Proposed Amendments to 40 CFR Part 98

In general, this supplemental proposal includes the following proposed revisions to better inform EPA policies and programs under the CAA:

- Revisions to Table A–1 to the General Provisions of part 98 to include updated GWPs to reflect advances in scientific knowledge and better characterize the climate impacts of certain GHGs, including agreed-upon values established by the UNFCCC, and to maintain comparability and consistency with the *Inventory of U.S. Greenhouse Gas Emissions and Sinks*[2] (hereafter referred to as ''the Inventory'') and other analyses produced by the EPA;
- Revisions to expand source categories or add new source categories to address potential gaps in reporting of emissions data for specific sectors in order to improve the accuracy and completeness of the data provided by the GHGRP;
- Revisions to refine existing calculation methodologies to reflect an improved understanding of emissions sources and end uses of GHGs, to incorporate more recent research on GHG emissions or formation, or to improve verification of reported emissions;
- Revisions to add or modify reporting requirements to eliminate data gaps and improve verification of emissions estimates; and
- Revisions that clarify requirements that reporters have previously found vague to ensure that accurate data are being collected, and editorial corrections or harmonizing changes that would improve the public's understanding of the rule.

Overall, the proposed changes in this supplemental notification would provide a more comprehensive, nationwide GHG emissions profile reflective of the origin and distribution of GHG emissions in the United States and would more accurately inform EPA policy options for potential regulatory or non-regulatory CAA programs. The EPA additionally uses the data from the GHGRP, which would include data from these proposed changes, to improve estimates used in the Inventory.

Sections II.A through II.E of this preamble provide additional rationale for the proposed changes. Details for the specific amendments proposed for each subpart are included in sections III and IV of this preamble. We are seeking public comment only on the proposed revisions and issues specifically identified in this supplemental notification for the identified subparts. We expect to deem any comments received in response to this notification that address other aspects of 40 CFR part 98 to be outside of the scope of this supplemental proposed rulemaking.

A. Revisions to Global Warming Potentials

Table A–1 to subpart A of 40 CFR part 98 (''Table A–1'') is a compendium of chemical-specific and default GWP values of GHGs that are required to be reported under one or more subparts of the GHG Reporting Rule. These GWPs are used to convert tons of chemical into tons of CO_2-equivalent (CO_2e) for purposes of various calculations and reporting under the rule. The EPA is proposing revisions to Table A–1 to update the chemical-specific GWP values of certain GHGs to reflect GWPs from the IPCC Fifth Assessment Report (hereinafter referred to as ''AR5'')[3] and, for certain GHGs that do not have chemical-specific GWPs listed in AR5, to adopt GWP values from the IPCC Sixth Assessment Report (hereinafter referred to as ''AR6'').[4] The EPA is also proposing to revise and expand the set of default GWPs in Table A–1, which are applied to GHGs for which peer-reviewed chemical-specific GWPs are not available. With these changes, the GWP values in Table A–1 would reflect more recent science regarding the atmospheric impacts of non-CO_2 GHGs, and the GWP values used for the GHGRP would continue to be consistent with the GWP values used for the Inventory and other EPA programs. (As

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[2] The EPA's GHG Inventory is available at *https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks.*

[3] IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp. The GWPs are listed in Table 8.A.1 of Appendix 8.A: Lifetimes, Radiative Efficiencies and Metric Values, which appears on pp. 731–737 of Chapter 8, ''Anthropogenic and Natural Radiative Forcing.''

[4] Smith, C., Z.R.J. Nicholls, K. Armour, W. Collins, P. Forster, M. Meinshausen, M.D. Palmer, and M. Watanabe, 2021: The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity Supplementary Material. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Available from *www.ipcc.ch/* The AR6 GWPs are listed in Table 7.SM.7, which appears on page 16 of the Supplementary Material.

discussed further below, the Inventory incorporates the GWP values agreed on by the parties to the UNFCCC, who agreed to use the GWP values in AR5 beginning in 2024.)

As discussed in this section of the preamble, the GWP values currently in Table A–1 to part 98 are drawn both from the IPCC Fourth Assessment Report[5] (hereinafter referred to as ''AR4'') and, for multiple GHGs that do not have GWPs listed in AR4, from AR5. The proposed GWP values are drawn from AR5, and for multiple GHGs that do not have GWPs listed in AR5, from AR6. Consistent with our approach since the inception of the GHGRP, we are proposing to adopt the AR5 and AR6 GWPs based on a 100-year time horizon. Note that these proposed revisions are in addition to the 2022 Data Quality Improvements Proposal to add a chemical-specific GWP of 0.14 for carbonic difluoride and to expand the fluorinated greenhouse gas (F–GHG) group for several types of unsaturated compounds to include additional types of unsaturated compounds. GWPs that have been newly evaluated or reevaluated in the peer-reviewed scientific literature are periodically consolidated and published by the IPCC. Since 1990, there have been six IPCC Assessment Reports, each of which included a set of revised and expanded GWPs. For purposes of reporting their GHG emissions under the UNFCCC, the Parties to the UNFCCC have successively adopted the 100-year GWPs in three of the IPCC Assessment Reports, beginning with the SAR, advancing to AR4 and, starting in 2024, moving to AR5.

Published in 2014, AR5 includes revised GWPs for the GHGs with GWPs in AR4 as well as for multiple additional GHGs. The revised GWPs reflect advances in scientific knowledge on the radiative efficiencies, atmospheric lifetimes, and other characteristics of these GHGs and of CO_2, and they also account for the growing background concentrations of GHGs (particularly CO_2) in the atmosphere.[6] AR5 therefore reflects an improved scientific understanding of the radiative effects[7] of these gases in the atmosphere. As noted in the preamble to the 2009 Final Rule, it is the EPA's intent to periodically update Table A–1 through notice and comment rulemaking as GWPs are evaluated or re-evaluated by the scientific community (74 FR 56348; October 30, 2009). Further, as noted in the preamble to the *2013 Revisions to the Greenhouse Gas Reporting Rule and Final Confidentiality Determinations for New or Substantially Revised Data Elements* (78 FR 71904, 71911; November 29, 2013, hereafter ''the 2013 Final Rule''), which updated GWPs in Table A–1, ''each successive assessment provides more accurate GWP estimates as experiments and improved computational methods lead to more accurate estimates of the radiative efficiencies, atmospheric lifetimes, and indirect effects of the various gases. Additionally, the more recent assessments reflect more up-to-date background concentrations, which are necessary for accurately calculating the radiative efficiency of the different gases.'' Therefore, adopting the GWP values in AR5 (and in AR6 for GHGs that do not have GWPs in AR5) would support the overall goals of the GHGRP to collect high-quality GHG data and to incorporate metrics that reflect scientific updates as they are adopted.

The proposed changes to Table A–1 would also ensure that the data collected in the GHGRP can be compared to the data collected and presented by other EPA programs and by national and international GHG inventories. The proposed changes, with a proposed effective date of January 1, 2025 (therefore applicable to data submitted for calendar year/reporting year 2024, *i.e.,* RY2024),[8] would maintain long-term consistency between the GHGRP GWPs and the GWPs used for the Inventory, which are scheduled to change from the AR4 GWPs to the AR5 GWPs for the 1990–2022 Inventory.[9]

The Inventory is a comprehensive assessment of U.S. GHG emissions based on national-level data and follows the reporting guidelines set by the UNFCCC.[10] The United States is a party to the UNFCCC and submits the Inventory to the Secretariat of the UNFCCC as part of annual obligations under the treaty. To ensure consistency and comparability with national inventory data submitted by other UNFCCC Parties, the Inventory submitted to the UNFCCC uses internationally accepted methods and common reporting metrics agreed upon by the Parties (including the United States) to develop and characterize emission estimates.

As described in the preamble of the 2009 Proposed Rule, the GHGRP is intended to gather information that is relevant to the EPA's carrying out a wide variety of CAA provisions, with the goal of supplementing and complementing existing U.S. Government programs related to climate policy and research, including the Inventory submitted to the UNFCCC. The GHGRP provides data that can inform analysis of potential U.S. climate policies and programs, which is also one of the uses for the data developed for the Inventory. The GHGRP complements the Inventory and other U.S. programs by providing data from certain individual facilities and suppliers, generally those above certain thresholds. Collected facility, unit, and process-level GHG data from the GHGRP are also used to develop and confirm the national statistics and emission estimates presented in the Inventory, which are calculated using aggregated national data.

Throughout the development and implementation of the GHG Reporting Rule, the EPA has proposed and finalized calculation methodologies and reporting metrics that were consistent with the international reporting standards under the UNFCCC. This approach has allowed the data collected under the GHGRP to be easily compared to the data in the Inventory and to data from other national and international programs, facilitating the analysis of potential U.S. climate policies and programs. Specifically, in the 2009 Final Rule, the EPA generally promulgated

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[5] IPCC Fourth Assessment Report (AR4), 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

[6] Increasing background concentrations of a GHG in the atmosphere can lower the impact of subsequent emissions.

[7] Radiative forcing is the measurement of the capacity of a gas or other forcing agent to affect the balance of energy in Earth's atmosphere based in the difference in incoming solar radiation and outgoing infrared radiation.

[8] As discussed in section III.A.2 of the preamble, current 40 CFR 98.3(k) provides that facilities or suppliers that first become subject to any subpart of part 98 solely due to an amendment to Table A–1 are not required to submit an annual GHG report (or, for facilities or suppliers that already report under the GHGRP, a report for the subpart to which they are newly subject) for the reporting year during which the change in GWPs is published. However, they are required to begin monitoring their emissions and supplies for the subpart(s) to which they are newly subject beginning on January 1 of the year following publication of the amendment to Table A–1.

[9] Due to the time required to complete this proposed rule to adopt the AR5 GWPs, if this proposed rule is finalized, emissions from at least two years, 2022 and 2023, would be weighted by different sets of GWPs under part 98 and the Inventory.

[10] See Articles 4 and 12 of the Convention on Climate Change. Parties to the Convention, by ratifying, ''shall develop, periodically update, publish and make available * * * national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies * * *.'' See *https://unfccc.int/resource/docs/convkp/conveng.pdf.*

GWP values published in the IPCC Second Assessment Report[11] (hereafter referred to as ''SAR GWP values'') to convert mass emissions (or supplies) of each GHG into a common unit of measure, CO_2e, for final reporting. Although the IPCC published AR4 prior to publication of the 2009 Final Rule, the UNFCCC continued to require the use of SAR GWP values for reporting in the Inventory at the time the rule was promulgated, and up until 2014.[12] In the 2013 Final Rule, the EPA revised the GHGRP's GWP values, after consideration of a UNFCCC decision reached by UNFCCC member parties and published on March 15, 2012, to require countries submitting an annual inventory report in 2015 and beyond to use AR4 GWP values.[13] The 2013 Final Rule adopted the IPCC AR4 GWP values in Table A–1, in part in order to maintain comparability and consistency with the updated international reporting standards under the UNFCCC and the revised requirements for official emission estimates to be reported by the United States and other parties. Following the 2013 Final Rule, the EPA published a separate rule to add GWPs to Table A–1 for a number of F–GHGs and fluorinated heat transfer fluids (F–HTFs) for which GWPs were not provided in AR4 or previous scientific assessments (79 FR 73750, December 11, 2014, hereinafter referred to as the ''2014 Fluorinated GHG Final Rule'').[14] The 2014 Fluorinated GHG Final Rule included chemical-specific GWPs primarily drawn from AR5, as well as default GWPs intended for F–GHGs and F–HTFs for which peer-reviewed GWPs were not available in AR4, AR5, or other sources. The default GWPs were calculated and applied to 12 fluorinated GHG groups composed of compounds with similar chemical structures, atmospheric lifetimes, and GWPs, and were based on the average GWPs of the chemically similar fluorinated GHGs for which a chemical-specific GWP was available in Table A–1 or AR5. As such, the changes from the 2014 Fluorinated GHG Final Rule reflected the latest scientific consensus regarding F–GHGs that did not have GWPs in earlier assessments and expanded the number of compounds reflected in Table A–1, resulting in more accurate and complete estimates of GHG emissions. At the same time, the 2014 Fluorinated GHG Final Rule maintained consistency between the GHGRP and the Inventory by retaining the AR4 GWP values where those were available.

In the 2013 Final Rule, we noted ''the EPA may consider adoption of AR5 GWPs or other GWP values for compounds currently listed in Table A–1 (*i.e.,* compounds for which AR4 GWPs are currently listed in Table A–1) if these values are adopted by the UNFCCC and the global community'' (78 FR 71912; November 29, 2013).

In December 2018, the Parties to the UNFCCC agreed to require use of the 100-year time-horizon GWP values from AR5 in annual inventory reports submitted in 2024 and future years.[15] In November 2021, the parties clarified which of the two sets of GWPs in AR5 were to be used: those in Table 8.A.1.[16] Accordingly, the United States has an annual commitment to submit the Inventory for 2024 and subsequent years using the revised AR5 GWP values in Table 8.A.1. The Inventory for 2024 will contain national-level estimates of emissions for each year from 1990–2022. In order to ensure that the GHGRP continues to rely on recent scientific data and uses methods consistent with UNFCCC guidelines, as the EPA intended in the development of the 2009 Final Rule and in revisions to the GHGRP since then, we are proposing to revise the GWP values in Table A–1 of part 98 to reflect updated AR5 GWP values, which would apply to annual reports beginning with RY2024. The proposed changes would continue to keep the reporting metrics in part 98 consistent with the updated international reporting standards followed by the Inventory and allow the GHGRP to continue to provide the additional benefit of complementing and informing the Inventory submitted to the UNFCCC.[17]

For GHGs that do not have GWPs in AR5 but do have GWPs in AR6, we are proposing to adopt the AR6 GWPs. Currently, default GWPs are applied to these compounds based on the fluorinated GHG group to which they belong. While the default GWPs are, on average, expected to be reasonably accurate across the fluorinated GHGs within a fluorinated GHG group, the AR6 GWP for an individual compound is expected to be more accurate for that compound than the corresponding default GWP. This is because the AR6 GWP takes into consideration the radiative efficiency and atmospheric lifetime of the individual compound. Thus, adopting the AR6 GWPs for GHGs that do not have GWPs in AR5 is expected to improve the accuracy with which the atmospheric impacts of the gases are reflected in annual reports, threshold determinations, and other calculations. The specific changes that we are proposing to Table A–1 and the rationale for the GWPs proposed to be adopted are described further in section III.A.1 of this preamble.

We recognize that some other EPA programs use the GWP values in Table A–1 to determine the applicability of their individual program requirements to direct emitters or suppliers above certain thresholds. Issues related to other EPA programs that use the GHGRP GWP values in Table A–1 are outside the scope of this proposed rule. To the extent that a Table A–1 amendment raises such questions or concerns, please work with the respective EPA office for that other EPA program. We also recognize that non-EPA programs use the GWP values in Table A–1 to part 98. Issues related to non-EPA programs that use the GHGRP GWP values in

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[11] IPCC Second Assessment Report (SAR), 1995. Climate Change 1995: The Science of Climate Change, Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T.; Meira Filho, L.G.; Callander, B.A.; Harris, N.; Kattenberg, A.; Maskell, K. (eds.)., Cambridge University Press, Cambridge, United Kingdom, 572 pp.

[12] As discussed further in this section of this preamble, the EPA did adopt AR4 values in 2009 for GHGs that did not have SAR GWP values because doing so increased the accuracy and completeness of the GWP-weighted emissions calculated and reported under the GHGRP without introducing any inconsistency with UNFCCC reporting.

[13] Refer to *https://unfccc.int/*. See Decision 15/CP.17, Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention.

[14] As noted in the 2014 Fluorinated GHG Final Rule, the addition of GWPs for compounds that did not have GWPs in AR4 was consistent with the UNFCCC Reporting Guidelines, which ''strongly encourage'' Annex I Parties ''to also report emissions and removals of additional GHGs'' (*i.e.,* GHGs whose GWPs are not included in AR4).

[15] Refer to *https://unfccc.int/*. See Annex to Decision 18/CMA.1, paragraph 37. ''Each Party shall use the 100-year time-horizon global warming potential (GWP) values from the IPCC Fifth Assessment Report, or 100-year time-horizon GWP values from a subsequent IPCC assessment report as agreed upon by the [Conference of the Parties serving as the meeting of the Parties to the Paris Agreement] (CMA), to report aggregate emissions and removals of GHGs, expressed in CO2 eq.''

[16] Decision 5/CMA.3, paragraph 25 reads ''the 100-year time-horizon global warming potential values referred to in decision 18/CMA.1, annex, paragraph 37, shall be those listed in Table 8.A.1 of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, excluding the value for fossil methane.'' See *https://unfccc.int/sites/default/files/resource/CMA2021_L10a2E.pdf.*

[17] The updates to Table A–1 would not affect the GWP-weighted, CO_2-equivalent totals certified by facilities or suppliers in their annual reports for reporting years before RY2023. However, to ensure that GWP-weighted totals are used in analyses and displayed to the public in a consistent manner from RY2010/2011 through RY2023 and later years, the updated GWPs would be applied to the entire time series in analyses and in EPA's Facility Level Information on GreenHouse gases Tool (FLIGHT) at *https://ghgdata.epa.gov/ghgp/main.do.* This approach is consistent with the approach taken for previous updates of Table A–1. See, *e.g.,* 78 FR 71937.

Table A–1 are also outside the scope of this proposed rule. As explained in this section above, this rulemaking proposes to update GWPs for the GHGRP consistent with recent science and the intent the EPA expressed at the time the GHGRP was first promulgated. Thus, under this supplemental proposal, we are seeking comments on the specific GWP values proposed in this action for the GHGRP.

B. Revisions To Expand Source Categories and Address Potential Gaps in Reporting of Emissions Data for Specific Sectors

In the 2022 Data Quality Improvements Proposal, the Agency stated that it was considering future revisions to the GHG Reporting Rule to potentially expand existing source categories or develop new source categories that would add calculation, monitoring, reporting, and recordkeeping requirements for certain sectors of the economy. Specifically, the 2022 Data Quality Improvements Proposal solicited comment on the potential addition of GHG reporting requirements related to energy consumption; CO_2 utilization; ceramics production; calcium carbide production; caprolactam, glyoxal, and glyoxylic acid production; and coke calcining. The EPA solicited comment on these six source categories where we identified that additional data from these emission sources would help eliminate data gaps, improve the coverage of the GHGRP, and better inform future EPA policy and programs under the CAA. We identified cases where certain emission sources may potentially contribute significant GHG emissions that are not currently reported, or where facilities representative of these source categories may currently report under another part 98 source category using methodologies that may not provide complete or accurate emissions. We also identified where the inclusion of potential source categories would improve the completeness of the emissions estimates presented in the Inventory, such as collection of data on ceramics production, calcium carbide production, and caprolactam, glyoxal, and glyoxylic acid production. The 2022 Data Quality Improvements Proposal also included similar amendments to add reporting of new emissions or emissions sources for certain existing sectors to address potential gaps in reporting, *e.g.,* where we proposed to add requirements for the monitoring, calculation, and reporting of F–GHGs other than SF_6 and perfluorocarbons (PFCs) under subpart DD (Electrical Equipment and Distribution Equipment Use) to account for the introduction of alternative technologies and replacements for SF_6, including fluorinated gas mixtures such as fluoronitriles or fluoroketones mixed with carrier gases, as a replacement for dielectric insulation gases (87 FR 37000; June 21, 2022).

Following the June 21, 2022 request for comment, the EPA has reviewed information provided from stakeholders and considered additional data to further support the development of reporting requirements for five source categories. After that consideration, we are proposing to add annual reporting requirements for greenhouse gases from the following sources categories in new subparts to part 98 as follows: subpart B (Energy Consumption); subpart WW (Coke Calciners); subpart XX (Calcium Carbide Production); subpart YY (Caprolactam, Glyoxal, and Glyoxylic Acid Production); and subpart ZZ (Ceramics Production). As explained in the 2022 Data Quality Improvements Proposal, the collection of such data would continue to inform, and are relevant to, the EPA's carrying out a wide variety of CAA provisions. Additional information on the data and rationale informing the proposed definition of the source category, reporting thresholds, calculation, monitoring, quality assurance, missing data, verification, and data reporting and recordkeeping requirements for these five proposed new source categories are included in section IV of this preamble.

The EPA is also proposing amendments that would expand the coverage of the GHGRP for one subpart not included in the 2022 Data Quality Improvements Proposal. Since the publication of the proposed rule, we have identified a gap in coverage for certain emission sources, where revisions to existing applicability and reporting requirements would help the EPA to better understand and track emissions in specific sectors and better inform future EPA policy and programs under the CAA. In this supplemental proposal, we are proposing to amend the applicability of subpart P (Hydrogen Production) to expand reporting to include all hydrogen plants. The current source category definition in subpart P is limited to merchant hydrogen production facilities, including facilities that sell hydrogen and that may be located within another facility if they are not owned by, or under the direct control of, the other facility's owner and operator. The current definition inadvertently excludes non-merchant hydrogen production facilities (*i.e.,* facilities that do not sell hydrogen or captive hydrogen plants). Although some non-merchant hydrogen production facilities may report under subpart Y (Petroleum Refineries), the EPA has identified that there may be other non-merchant or captive hydrogen plants whose emissions are not currently captured by part 98. The proposed amendments would address this gap in reporting and allow the EPA to better understand and track emissions from these facilities, which would better inform future EPA policy and programs under the CAA. Section III.G of this preamble provides additional information on the proposed amendments.

Additionally, we are proposing to amend subpart HH (Municipal Solid Waste Landfills) to expand reporting to account for methane emissions from large releases that are currently not quantified under the GHGRP. Specifically, we are proposing to revise calculation methodologies in subpart HH to account for cover system leaks to better account for large release events. The EPA has identified recent studies indicating that methane emissions from landfills may be considerably higher than what is currently reported to part 98 due to emissions from poorly operating gas collection systems or destruction devices and cover system leaks. We are proposing to revise the monitoring and calculation methodologies in subpart HH to account for these scenarios. Specifically, we note that owners or operators of landfills with gas collection systems subject to the control requirements in the new source performance standards (NSPS) as implemented in 40 CFR part 60, subparts WWW or XXX, emission guidelines (EG) as implemented in 40 CFR part 60, subparts Cc or Cf, or the Federal plan as implemented in 40 CFR part 62, subparts GGG and OOO are required to conduct surface methane concentration measurements to ensure proper operation of the gas collection system. We are proposing that subpart HH reporters with landfills for which surface methane concentration measurements are conducted under the NSPS, EG, or Federal plan would estimate emissions for cover leaks based on a count of the number of exceedances identified during the surface measurement period and the proposed revised equations HH–6, HH–7, and HH–8 to adjust reported methane emissions to account for these exceedances. Subpart HH reporters with landfills with gas collection systems that are not required to conduct surface methane concentration measurements under the NSPS, EG, or Federal plan may elect to conduct these measurements according to the method provided in the proposal and adjust the emissions based on the number of exceedances identified. If such subpart HH reporters do not elect to conduct such measurements, the EPA is proposing that reporters with these landfills would use a surface methane collection efficiency that is 10 percent lower than for landfills with gas collection systems that are conducting surface methane concentration measurements. These proposed amendments would address a potentially large subset of emissions that are currently omitted in reporting and improve the EPA's understanding of emissions from these facilities. The improved data would subsequently better inform Agency policies and programs under the CAA.

C. Improvements to Existing Emissions Estimation Methodologies

The EPA is proposing several additional revisions to modify calculation equations to incorporate refinements to methodologies based on an improved understanding of emission sources. In the 2022 Data Quality Improvements Proposal, we identified amendments to emission estimation methodologies where there are discrepancies between assumptions in the current emission estimation methods and the processes or activities conducted at specific facilities, or where we identified more recent studies on GHG emissions or formation that reflect updates to scientific understanding of GHG emissions sources. We proposed changes that are intended to improve the quality and accuracy of the data collected under the GHGRP, increase our understanding of the relative distribution of GHGs that are emitted, and better reflect GHG end uses or where GHGs are bound in products.

Since the development of the 2022 Data Quality Improvements Proposal, we have identified several calculation provisions of part 98 that would benefit from amendments that update, clarify, or improve the calculation methodology. For example, we are proposing to revise calculation methodologies in subpart HH (Municipal Solid Waste Landfills) to more clearly delineate the calculations needed when there are multiple landfill gas recovery systems in place. During verification of subpart HH reports, we identified issues in how the electronic Greenhouse Gas Reporting Tool (e-GGRT) system calculates emissions when multiple control devices are associated with a single measurement location and when multiple measurement locations may be used for a single recovery system. If a single recovery system is used, but an additional measurement location is added to the system in mid-year, the ''$f_{Rec,c}$'' term associated with the new measurement location (currently, the fraction of annual operating hours the associated recovery system was operating) is calculated as 0.5 and assumes the recovery system operated only half the year. The current equations (equations HH–7 and HH–8) are set up with the assumption that each measurement location is associated with a single recovery system, however this is not always the case. We also found errors in determining the ''f_{Dest}'' term (fraction of annual hours the destruction device was operating) in equations HH–6 and HH–8 when multiple destruction devices are used for a single measurement location. If, for example, a measurement location operates continuously (8,760 hours per year), with flow from the measurement location directed to an engine (approximately 8,400 hours per year), diverted to a flare when the engine is down for maintenance (approximately 360 hours per year), and if the control devices were operating at all times gas was directed to the device, the f_{Dest} term should be 1 for each device. However, the f_{Dest} term is often calculated as the average of 0.959 (8400/8760) and 0.041 (360/8760), resulting in a value of 0.5. Therefore, we are proposing revisions to equations HH–6, HH–7, and HH–8 to more clearly define these terms, as well as to adjust the equations to be able to account for landfills with multiple gas collection systems or for a single gas collection system with multiple measurement locations. These proposed revisions would improve the quality and accuracy of the data collected under subpart HH.

We are proposing to clarify the calculation methodology for reporters whose hydrogen unit routes process emissions to a stack with CEMS, but fuel combustion emissions from the unit are routed to a different stack which is not monitored with a CEMS. The proposed rule would require reporters to calculate the CO_2 emissions from fuel combustion from the hydrogen process unit using the mass balance equations in subpart P (Hydrogen Production) considering only fuel inputs and report the sum of these emissions plus the process CO_2 emissions measured by the CEMS. The proposed amendments would clarify the reporting requirements for cases where hydrogen production process and combustion emissions are emitted through separate stacks and the process emissions are measured with a CEMS, but the combustion emissions are not.

We are also proposing to revise subpart AA (Pulp and Paper Manufacturing) to add a calculation methodology for biogenic CO_2 emissions from the combustion of biomass other than spent liquor solids. The rule currently only includes methodologies to calculate CO_2, CH_4, and N_2O emissions from the combustion of fossil fuels, and CH_4, N_2O, and biogenic CO_2 emissions from the combustion of spent liquor solids. Therefore, we are proposing to add methodologies to calculate CH_4, N_2O, and biogenic CO_2 emissions from the combustion of biomass fuels other than spent liquor solids, as well as the combustion of biomass other than spent liquor solids with other fuels. The proposed amendments would provide a more accurate accounting of CO_2 and biogenic CO_2 for subpart AA units in this situation. See section III.I of this preamble for additional information.

D. Revisions To Reporting Requirements To Improve Verification and the Accuracy of the Data Collected

In the 2022 Data Quality Improvements Proposal, the EPA proposed several revisions to existing reporting requirements to improve the quality of the data that are currently reported, to collect more useful data to improve verification of reported data, to better characterize U.S. GHG emissions and trends, and to extend the usefulness of the GHGRP to inform and improve the EPA's ability to carry out other CAA programs. See section II.A.4 of the 2022 Data Quality Improvements Proposal for additional information. In this supplemental proposal, the EPA is proposing new revisions to reporting requirements where we have identified additional data that would further support these goals and improve the quality of the GHGRP.

In some cases, the EPA is proposing to collect additional information that would better inform the development of GHG policies and programs by providing information on GHG uses and their relative importance in specific sectors. For example, we are proposing to add reporting requirements to subpart OO (Suppliers of Industrial Greenhouse Gases) to require industrial gas suppliers to identify the end-use applications for which F–HTFs are used and the approximate quantities used in each application. The EPA recently proposed a similar requirement for N_2O, PFCs, and SF_6 in the 2022 Data Quality Improvements Proposal; this supplemental notification extends the proposed revisions to include F–HTFs to better account for emissions from the use and distribution of F–HTFs which are not otherwise accounted for in the current source categories under part 98. See section III.K of this preamble for additional information.

The proposed revisions would also provide more useful data that would improve verification of reported data. For example, we are proposing to revise the existing reporting and recordkeeping requirements in subpart N (Glass Production) for both facilities using continuous electronic monitoring systems (CEMS) and non-CEMS facilities (*i.e.,* facilities that use a mass balance calculation method) to require reporting and recordkeeping of the annual amounts of recycled scrap glass (cullet) used as a raw material. The EPA is proposing to collect this information because the use of cullet, which contains no carbonates that can be converted to CO_2 emissions, can lead to reductions in emissions from the production of various glass types. The proposed data element would help to inform the EPA's understanding of the variations and differences in emissions estimates within this sector, improve understanding of industry trends, and improve verification of collected data. As discussed in section II of this preamble and in prior amendments, the GHGRP is intended to supplement and complement other EPA programs by advancing the understanding of emission processes and monitoring methodologies for particular source categories or sectors.

Similarly, for subpart Y (Petroleum Refineries), we are proposing to include a requirement to report the capacity of each asphalt blowing unit. Although subpart Y currently includes unit-level capacity reporting requirements for other emission units (*e.g.,* catalytic cracking units, fluid coking units, sulfur recovery plants, coke calcining units, delayed coking units), the EPA lacks data on the capacities of asphalt blowing units. Individual unit information allows the EPA to aggregate emissions according to unit type and size and provides a better understanding of the emissions from specific unit types. Therefore, the proposed revisions to subpart Y would improve emissions analysis and verification for these units.

The proposed changes to reporting requirements in this supplemental notification would further enable the EPA to obtain data that is of sufficient quality that it can be used to support a range of future climate change policies and regulations, in keeping with the EPA's CAA section 114 authorities.

E. Technical Amendments, Clarifications, and Corrections

This supplemental proposal includes several other proposed technical amendments, corrections, and clarifications that have been identified following the 2022 Data Quality Improvements Proposal and that would improve understanding of the rule. The proposed amendments include revisions that better reflect the EPA's intent and include editorial changes, revisions that resolve uncertainties in the regulatory text, and amendments that would increase the likelihood that reporters will submit accurate reports. Some of the proposed changes result from consideration of questions raised by reporters through the GHGRP Help Desk or e-GGRT. For example, we are proposing to add a definition for the term ''offshore'' to subpart RR (Geologic Sequestration of Carbon Dioxide) to clarify questions raised by stakeholders regarding the applicability of subpart RR to specific offshore geologic sequestration activities. Although the EPA previously noted that the source category covers both onshore and offshore injection of CO_2 in its 2010 final rule (75 FR 75060, December 1, 2010), we are aware that we have not previously provided a definition for the term ''offshore.'' The proposed definition would clarify the boundaries of injection activities that are currently covered under the source category and improve reporting to the GHGRP.

We are proposing similar revisions to clarify definitions. For example, we are proposing to revise subpart A (General Provisions) to amend the definition of the term ''Bulk'' to address questions raised by certain suppliers as to whether imports or exports of GHGs in small containers are reportable to the GHGRP. The proposed revision is a clarification of the existing definition and would provide clarity regarding the size of containers that should be included in the reported supply.

Finally, the EPA is proposing minor changes such as edits to fix typos, minor clarifications such as adding a missing word, and harmonizing changes to match other proposed revisions. For example, we are clarifying the 2022 Data Quality Improvements Proposal regarding proposed destruction and removal efficiency (DRE) and gamma factors in Tables I–16 and I–18 of subpart I (Electronics Manufacturing), respectively, to correct inadvertent errors in the relevant proposed regulatory text. We are also proposing to correct subpart AA (Pulp and Paper Manufacturing) at 40 CFR 98.276 to correct a reporting requirement that incorrectly refers to biogenic CH_4 and N_2O. All proposed minor corrections and clarifications are reflected in the draft proposed redline regulatory text in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

III. Proposed Amendments to Part 98

This section summarizes the specific substantive amendments proposed for each subpart, as generally described in section II of this preamble. The impacts of the proposed revisions are summarized in section VII of this preamble. A full discussion of the cost impacts for the proposed revisions may be found in the memorandum, *Assessment of Burden Impacts for Proposed Supplemental Revisions for the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

A. Subpart A—General Provisions

1. Proposed Revisions to Global Warming Potentials in Table A–1

For the reasons described here and in section II.A of this preamble, we are proposing to revise Table A–1 to subpart A of part 98 (General Provisions) to update the GWP values of certain GHGs to reflect GWPs from Table 8.A.1 of AR5 and, for certain GHGs that do not have GWPs listed in AR5, to adopt GWP values from AR6. We are also proposing to add default GWPs for two new fluorinated GHG groups, to slightly modify an existing GHG group, and to update the default GWPs for all the existing fluorinated GHG groups. The chemical-specific GWP values currently in Table A–1 are drawn both from AR4 and, for multiple GHGs that do not have GWPs listed in AR4, from AR5. The current GWPs drawn from AR4 would be updated to values from AR5, while the current GWPs drawn from AR5 would remain the same. AR6 GWPs would be added for GHGs that do not have GWPs listed in AR5. Under the current rule, default GWPs are applied to GHGs that do not have GWPs listed in AR5 based on the fluorinated GHG group to which they belong.

By proposing (1) to adopt (or maintain) AR5 GWPs for GHGs that have GWPs listed in AR5, and (2) to adopt AR6 GWPs for GHGs that do not have GWPs listed in AR5, we are taking the approach to establishing and updating GWPs that we have taken since the beginning of the GHGRP. That is, for GHGs with GWPs listed in the IPCC Assessment Report that the parties to the UNFCCC have agreed to use as the source of GWPs, we are proposing to use the GWPs in the agreed-upon

Assessment Report to maintain consistency with the Inventory and other analyses. For GHGs that do not have GWPs listed in the agreed-upon Assessment Report, but that do have GWPs listed in a more recent IPCC Assessment Report, we are proposing to use the GWPs in the most recent report to increase the accuracy of the calculations and reporting under part 98. Where the UNFCCC-referenced Assessment Report does not include a GWP for a GHG, adopting the GWP from a more recent Assessment Report does not introduce inconsistency with Inventory reporting. In fact, as noted in the 2014 Fluorinated GHG Final Rule updating GWPs, adopting GWPs in the most recent Scientific Assessment Report would facilitate U.S. reporting under the UNFCCC Reporting Guidelines, which state: ''Annex I Parties are strongly encouraged to also report emissions and removals of additional GHGs, such as hydrofluoroethers (HFEs), perfluoropolyethers (PFPEs), and other gases for which 100-year global warming potential values are available from the IPCC but have not yet been adopted by the [Conference of the Parties to the UNFCCC].'' [18]

Specifically, the first set of GWPs adopted under part 98 in 2009 consisted of (1) GWPs from the SAR for GHGs that had GWPs listed in the SAR (consistent with the UNFCCC reporting guidelines in effect at the time) and (2) GWPs from AR4 (the most recent IPCC Assessment Report available at the time) for GHGs that did not have GWPs listed in the SAR.[19] The second set of GWPs adopted under part 98, in 2013 and 2014, consisted of (1) GWPs from AR4 (consistent with the UNFCCC reporting guidelines going into effect at the time), and (2) GWPs from AR5 (the most recent IPCC Assessment Report available at the time) for GHGs that did not have GWPs listed in AR4.

Two decisions by the parties to the UNFCCC require countries to use the AR5 values from Table 8.A.1 for their Inventories and other reporting, beginning with the reports due in 2024. Decision 18/CMA.1, annex, paragraph 37 (December, 2018) reads, ''Each Party shall use the 100-year time-horizon global warming potential (GWP) values from the IPCC Fifth Assessment Report, or 100-year time-horizon GWP values from a subsequent IPCC assessment report as agreed upon by the [Conference of the Parties serving as the meeting of the Parties to the Paris Agreement] (CMA), to report aggregate emissions and removals of GHGs, expressed in CO_2 eq.'' Decision 5/CMA.3, paragraph 25 (November, 2021) reads, ''the 100-year time-horizon global warming potential values referred to in decision 18/CMA.1, annex, paragraph 37, shall be those listed in Table 8.A.1 of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, excluding the value for fossil methane.'' [20]

The second decision, specifying that Parties must use the GWP values in Table 8.A.1 of AR5, excluding the value for ''fossil methane,'' was important for two reasons. First, AR5 includes two tables of GWPs. Table 8.A.1 includes GWPs that reflect the climate-carbon feedbacks of CO_2 but not the GHG whose GWP is being evaluated, while the other table includes GWPs that reflect the climate-carbon feedbacks of both CO_2 and the GHG whose GWP is being evaluated. (The same GHGs are in both tables.) Second, for methane, AR5 includes two GWP values in each table. In each table, one methane GWP accounts for the influence of CO_2 produced by the oxidation of methane (the value for ''fossil'' methane) and one methane GWP does not account for the influence of CO_2 produced by the oxidation of methane.

Consistent with the 2021 UNFCCC decision, we are proposing to use (1) for GHGs with GWPs in AR5, the AR5 GWP values in Table 8.A.1 (that reflect the climate-carbon feedbacks of CO_2 but not the GHG whose GWP is being evaluated), and (2) for methane, the GWP that is not the GWP for fossil methane in Table 8.A.1 (*i.e.,* the GWP for methane that does not reflect either the climate-carbon feedbacks for methane or the atmospheric CO_2 that would result from the oxidation of methane in the atmosphere). In addition to maintaining consistency with recent UNFCCC decisions, using a single GWP for methane that does not reflect the CO_2 oxidation product would be consistent with prior IPCC practice, avoid the potential for double counting, and reduce complexity in accounting.[21]

As noted above, we are also proposing to adopt AR6 GWPs for 31 GHGs that have GWPs listed in AR6 but not AR5. All of these are fluorinated GHGs. Currently, default GWPs based on each GHG's fluorinated GHG group are applied to these GHGs. Each default value reflects the average of the known GWPs of the GHGs in a group of chemically similar fluorinated GHGs. While the default value is expected to be an unbiased estimate of the GWPs of other fluorinated GHGs in that group, it is not expected to be as accurate as a chemical-specific GWP for any given GHG, which reflects the radiative efficiency and atmospheric lifetime of that GHG. The chemical-specific GWPs in each group vary over a range. For example, the chemical-specific AR5 GWPs in each group show relative standard deviations between 30 and 170 percent, depending on the group. Thus, using chemical-specific GWPs instead of default values would better reflect the atmospheric impacts of these gases.

The AR6 GWPs reflect the climate-carbon feedbacks for the GHG whose GWP is being evaluated, while the AR5 GWPs that we are proposing to adopt (from Table 8.A.1) do not. GWPs that reflect the climate-carbon feedbacks for the GHG whose GWP is being evaluated are slightly larger than GWPs that do not. Thus, this difference could potentially result in over-weighting the atmospheric impacts of GHGs whose GWPs are drawn from AR6 relative to GHGs whose GWPs are drawn from Table 8.A.1 of AR5. However, our analysis indicates that using chemical-specific GWPs will lead to more accurate estimates, even if there are some inconsistencies among those GWPs.[22] In AR5, reflecting climate-carbon feedbacks for the GHG whose GWP is being evaluated results in an increase in the evaluated GWP of 11 to 22 percent, with the higher fractional increase being associated with shorter-lived gases with lower GWPs.[23] In contrast, using default GWPs based on AR5 rather than chemical-specific GWPs from AR6 would result in overestimating GWPs by as much as 3,000 (equivalent to a relative error of 1,200 percent) and underestimating GWPs by as much as 5,000 (equivalent to a relative error of −35 percent), with over- and underestimates averaging 1,200 and 950 respectively (and relative

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[18] See Decision 24, CP.19 at *https://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf.*

[19] *Mandatory Reporting of Greenhouse Gases,* proposed pule published on April 10, 2009 (74 FR 16453).

[20] Refer to *https://unfccc.int/.*

[21] Paragraph 52 of the annex to 18/CMA.1 encourages parties to the UNFCCC to report indirect CO_2 emissions separately: ''Each Party may report indirect CO2 from the atmospheric oxidation of CH4, CO and NMVOCs. For Parties that decide to report indirect CO2, the national totals shall be presented with and without indirect CO_2.'' Refer to *https://unfccc.int/.* Using the fossil methane GWP, which incorporates the impact of the indirect CO_2, would double count those emissions.

[22] See the memorandum, *Proposed Updates to Chemical-Specific and Default GWPs for the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

[23] The authors of AR6 estimated smaller impacts from climate-carbon feedbacks, meaning that the difference between accounting and not accounting for them is likely smaller than 11 to 22 percent. (See AR6, Chapter 7, page 121.)

errors averaging 770 percent and −60 percent, respectively).[24] Overall, these potential errors are substantially larger than the differences between GWPs that do and do not reflect climate-carbon feedbacks for the GHGs whose GWPs were evaluated.

Table 2 of this preamble lists the GHGs whose GWP values we are proposing to revise, along with the GWP values currently listed in Table A–1 and the proposed revised GWP values based on either AR5 or AR6. Additional information regarding the EPA's rationale for the proposed GWPs may be found in the memorandum, *Proposed Updates to Chemical-Specific and Default GWPs for the Greenhouse Gas Reporting Rule,* in the docket for this rulemaking, (Docket Id. No. EPA–HQ–OAR–2019–0424).

TABLE 2—PROPOSED REVISED CHEMICAL-SPECIFIC GWPS FOR COMPOUNDS IN TABLE A–1

Name	CAS No.	Chemical formula	Current global warming potential (100 yr.)	Proposed global warming potential (100 yr.)
Chemical-Specific GWPs				
Carbon dioxide	124–38–9	CO_2	1	1
Methane	74–82–8	CH_4	25	28
Nitrous oxide	10024–97–2	N_2O	298	265
Fully Fluorinated GHGs				
Sulfur hexafluoride	2551–62–4	SF_6	22,800	23,500
Trifluoromethyl sulphur pentafluoride	373–80–8	SF_5CF_3	17,700	17,400
Nitrogen trifluoride	7783–54–2	NF_3	17,200	16,100
PFC–14 (Perfluoromethane)	75–73–0	CF_4	7,390	6,630
PFC–116 (Perfluoroethane)	76–16–4	C_2F_6	12,200	11,100
PFC–218 (Perfluoropropane)	76–19–7	C_3F_8	8,830	8,900
Perfluorocyclopropane	931–91–9	c-C_3F_6	17,340	9,200
PFC–3–1–10 (Perfluorobutane)	355–25–9	C_4F_{10}	8,860	9,200
PFC–318 (Perfluorocyclobutane)	115–25–3	c-C_4F_8	10,300	9,540
Perfluorotetrahydrofuran	773–14–8	c-C_4F_8O	*10,000	13,900
PFC–4–1–12 (Perfluoropentane)	678–26–2	C_5F_{12}	9,160	8,550
PFC–5–1–14 (Perfluorohexane, FC–72)	355–42–0	C_6F_{14}	9,300	7,910
PFC–6–1–12	335–57–9	C_7F_{16}; $CF_3(CF_2)_5CF_3$	7,820	7,820
PFC–7–1–18	307–34–6	C_8F_{18}; $CF_3(CF_2)_6CF_3$	7,620	7,620
PFC–9–1–18	306–94–5	$C_{10}F_{18}$	7,500	7,190
PFPMIE (HT–70)	NA	$CF_3OCF(CF_3)CF_2OCF_2OCF_3$	10,300	9,710
Perfluorodecalin (cis)	60433–11–6	Z–$C_{10}F_{18}$	7,236	7,240
Perfluorodecalin (trans)	60433–12–7	E–$C_{10}F_{18}$	6,288	6,290
Perfluorotriethylamine	359–70–6	$N(C_2F_5)_3$	*10,000	10,300
Perfluorotripropylamine	338–83–0	$N(CF_2CF_2CF_3)_3$	*10,000	9,030
Perfluorotributylamine	311–89–7	$N(CF_2CF_2CF_2CF_3)_3$	*10,000	8,490
Perfluorotripentylamine	338–84–1	$N(CF_2CF_2CF_2CF_2CF_3)_3$	*10,000	7,260
Saturated Hydrofluorocarbons (HFCs) With Two or Fewer Carbon-Hydrogen Bonds				
(4s,5s)-1,1,2,2,3,3,4,5-octafluorocyclopentane	158389–18–5	trans-cyc $(-CF_2CF_2CF_2CHFCHF-)$	*3,700	258
HFC–23	75–46–7	CHF_3	14,800	12,400
HFC–32	75–10–5	CH_2F_2	675	677
HFC–125	354–33–6	C_2HF_5	3,500	3,170
HFC–134	359–35–3	$C_2H_2F_4$	1,100	1,120
HFC–134a	811–97–2	CH_2FCF_3	1,430	1,300
HFC–227ca	2252–84–8	$CF_3CF_2CHF_2$	2,640	2,640
HFC–227ea	431–89–0	C_3HF_7	3,220	3,350
HFC–236cb	677–56–5	$CH_2FCF_2CF_3$	1,340	1,210
HFC–236ea	431–63–0	CHF_2CHFCF_3	1,370	1,330
HFC–236fa	690–39–1	$C_3H_2F_6$	9,810	8,060
HFC–329p	375–17–7	$CHF_2CF_2CF_2CF_3$	2,360	2,360
HFC–43–10mee	138495–42–8	$CF_3CFHCFHCF_2CF_3$	1,640	1,650
Saturated Hydrofluorocarbons (HFCs) With Three or More Carbon-Hydrogen Bonds				
1,1,2,2,3,3-hexafluorocyclopentane	123768–18–3	cyc $(-CF_2CF_2CF_2CH_2CH_2-)$	*930	120
1,1,2,2,3,3,4-heptafluorocyclopentane	15290–77–4	cyc $(-CF_2CF_2CF_2CHFCH_2-)$	*930	231
HFC–41	593–53–3	CH_3F	92	116
HFC–143	430–66–0	$C_2H_3F_3$	353	328
HFC–143a	420–46–2	$C_2H_3F_3$	4,470	4,800
HFC–152	624–72–6	CH_2FCH_2F	53	16
HFC–152a	75–37–6	CH_3CHF_2	124	138
HFC–161	353–36–6	CH_3CH_2F	12	4

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[24] To avoid skewing the results with inconsequential differences, instances where the default GWP would differ from the chemical-specific GWP by less than one were excluded from the analysis. In all these cases, the default GWP was one.

TABLE 2—PROPOSED REVISED CHEMICAL-SPECIFIC GWPS FOR COMPOUNDS IN TABLE A–1—Continued

Name	CAS No.	Chemical formula	Current global warming potential (100 yr.)	Proposed global warming potential (100 yr.)
HFC–245ca	679–86–7	$C_3H_3F_5$	693	716
HFC–245cb	1814–88–6	$CF_3CF_2CH_3$	4,620	4,620
HFC–245ea	24270–66–4	$CHF_2CHFCHF_2$	235	235
HFC–245eb	431–31–2	$CH_2FCHFCF_3$	290	290
HFC–245fa	460–73–1	$CHF_2CH_2CF_3$	1,030	858
HFC–263fb	421–07–8	$CH_3CH_2CF_3$	76	76
HFC–272ca	420–45–1	$CH_3CF_2CH_3$	144	144
HFC–365mfc	406–58–6	$CH_3CF_2CH_2CF_3$	794	804
Saturated Hydrofluoroethers (HFEs) and Hydrochlorofluoroethers (HCFEs) With One Carbon-Hydrogen Bond				
HFE–125	3822–68–2	CHF_2OCF_3	14,900	12,400
HFE–227ea	2356–62–9	$CF_3CHFOCF_3$	1,540	6,450
HFE–329mcc2	134769–21–4	$CF_3CF_2OCF_2CHF_2$	919	3,070
HFE–329me3	428454–68–6	$CF_3CFHCF_2OCF_3$	4,550	4,550
1,1,1,2,2,3,3-Heptafluoro-3-(1,2,2,2-tetrafluoroethoxy)-propane.	3330–15–2	$CF_3CF_2CF_2OCHFCF_3$	6,490	6,490
Saturated HFEs and HCFEs With Two Carbon-Hydrogen Bonds				
HFE–134 (HG–00)	1691–17–4	CHF_2OCHF_2	6,320	5,560
HFE–236ca	32778–11–3	$CHF_2OCF_2CHF_2$	4,240	4,240
HFE–236ca12 (HG–10)	78522–47–1	$CHF_2OCF_2OCHF_2$	2,800	5,350
HFE–236ea2 (Desflurane)	57041–67–5	$CHF_2OCHFCF_3$	989	1,790
HFE–236fa	20193–67–3	$CF_3CH_2OCF_3$	487	979
HFE–338mcf2	156053–88–2	$CF_3CF_2OCH_2CF_3$	552	929
HFE–338mmz1	26103–08–2	$CHF_2OCH(CF_3)_2$	380	2,620
HFE–338pcc13 (HG–01)	188690–78–0	$CHF_2OCF_2CF_2OCHF_2$	1,500	2,910
HFE–43–10pccc (H-Galden 1040x, HG–11)	E1730133	$CHF_2OCF_2OC_2F_4OCHF_2$	1,870	2,820
HCFE–235ca2 (Enflurane)	13838–16–9	CHF_2OCF_2CHFCl	583	583
HCFE–235da2 (Isoflurane)	26675–46–7	$CHF_2OCHClCF_3$	350	491
HG–02	205367–61–9	$HF_2C\text{-}(OCF_2CF_2)_2\text{-}OCF_2H$	3,825	2,730
HG–03	173350–37–3	$HF_2C\text{-}(OCF_2CF_2)_3\text{-}OCF_2H$	3,670	2,850
HG–20	249932–25–0	$HF_2C\text{-}(OCF_2)_2\text{-}OCF_2H$	5,300	5,300
HG–21	249932–26–1	$HF_2C\text{-}OCF_2CF_2OCF_2OCF_2O\text{-}CF_2H$	3,890	3,890
HG–30	188690–77–9	$HF_2C\text{-}(OCF_2)_3\text{-}OCF_2H$	7,330	7,330
1,1,3,3,4,4,6,6,7,7,9,9,10,10,12,12,13,13,15,15-eicosafluoro-2,5,8,11,14-Pentaoxapentadecane.	173350–38–4	$HCF_2O(CF_2CF_2O)_4CF_2H$	3,630	3,630
1,1,2-Trifluoro-2-(trifluoromethoxy)-ethane	84011–06–3	$CHF_2CHFOCF_3$	1,240	1,240
Trifluoro(fluoromethoxy)methane	2261–01–0	CH_2FOCF_3	751	751
Saturated HFEs and HCFEs With Three or More Carbon-Hydrogen Bonds				
HFE–143a	421–14–7	CH_3OCF_3	756	523
HFE–245cb2	22410–44–2	$CH_3OCF_2CF_3$	708	654
HFE–245fa1	84011–15–4	$CHF_2CH_2OCF_3$	286	828
HFE–245fa2	1885–48–9	$CHF_2OCH_2CF_3$	659	812
HFE–254cb2	425–88–7	$CH_3OCF_2CHF_2$	359	301
HFE–263fb2	460–43–5	$CF_3CH_2OCH_3$	11	1
HFE–263m1; R–E–143a	690–22–2	$CF_3OCH_2CH_3$	29	29
HFE–347mcc3 (HFE–7000)	375–03–1	$CH_3OCF_2CF_2CF_3$	575	530
HFE–347mcf2	171182–95–9	$CF_3CF_2OCH_2CHF_2$	374	854
HFE–347mmy1	22052–84–2	$CH_3OCF(CF_3)_2$	343	363
HFE–347mmz1 (Sevoflurane)	28523–86–6	$(CF_3)_2CHOCH_2F$	216	216
HFE–347pcf2	406–78–0	$CHF_2CF_2OCH_2CF_3$	580	889
HFE–356mec3	382–34–3	$CH_3OCF_2CHFCF_3$	101	387
HFE–356mff2	333–36–8	$CF_3CH_2OCH_2CF_3$	17	17
HFE–356mmz1	13171–18–1	$(CF_3)_2CHOCH_3$	27	14
HFE–356pcc3	160620–20–2	$CH_3OCF_2CF_2CHF_2$	110	413
HFE–356pcf2	50807–77–7	$CHF_2CH_2OCF_2CHF_2$	265	719
HFE–356pcf3	35042–99–0	$CHF_2OCH_2CF_2CHF_2$	502	446
HFE–365mcf2	22052–81–9	$CF_3CF_2OCH_2CH_3$	58	58
HFE–365mcf3	378–16–5	$CF_3CF_2CH_2OCH_3$	11	0.99
HFE–374pc2	512–51–6	$CH_3CH_2OCF_2CHF_2$	557	627
HFE–449s1 (HFE–7100) Chemical blend	163702–07–6	$C_4F_9OCH_3$	297	421
	163702–08–7	$(CF_3)_2CFCF_2OCH_3$		
HFE–569sf2 (HFE–7200) Chemical blend	163702–05–4	$C_4F_9OC_2H_5$	59	57
	163702–06–5	$(CF_3)_2CFCF_2OC_2H_5$		
HFE–7300	132182–92–4	$(CF_3)_2CFCFOC_2H_5CF_2CF_2CF_3$	*270	405

TABLE 2—PROPOSED REVISED CHEMICAL-SPECIFIC GWPS FOR COMPOUNDS IN TABLE A–1—Continued

Name	CAS No.	Chemical formula	Current global warming potential (100 yr.)	Proposed global warming potential (100 yr.)
HFE–7500	297730–93–9	$n\text{-}C_3F_7CFOC_2H_5CF(CF_3)_2$	*270	13
HG′-01	73287–23–7	$CH_3OCF_2CF_2OCH_3$	222	222
HG′-02	485399–46–0	$CH_3O(CF_2CF_2O)_2CH_3$	236	236
HG′-03	485399–48–2	$CH_3O(CF_2CF_2O)_3CH_3$	221	221
Difluoro(methoxy)methane	359–15–9	CH_3OCHF_2	144	144
2-Chloro-1,1,2-trifluoro-1-methoxyethane	425–87–6	CH_3OCF_2CHFCl	122	122
1-Ethoxy-1,1,2,2,3,3,3-heptafluoropropane	22052–86–4	$CF_3CF_2CF_2OCH_2CH_3$	61	61
2-Ethoxy-3,3,4,4,5-pentafluorotetrahydro-2,5-bis[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-furan.	920979–28–8	$C_{12}H_5F_{19}O_2$	56	56
1-Ethoxy-1,1,2,3,3,3-hexafluoropropane	380–34–7	$CF_3CHFCF_2OCH_2CH_3$	23	23
Fluoro(methoxy)methane	460–22–0	CH_3OCH_2F	13	13
1,1,2,2-Tetrafluoro-3-methoxy-propane; Methyl 2,2,3,3-tetrafluoropropyl ether.	60598–17–6	$CHF_2CF_2CH_2OCH_3$	0.5	0.49
1,1,2,2-Tetrafluoro-1-(fluoromethoxy)ethane	37031–31–5	$CH_2FOCF_2CF_2H$	871	871
Difluoro(fluoromethoxy)methane	461–63–2	CH_2FOCHF_2	617	617
Fluoro(fluoromethoxy)methane	462–51–1	CH_2FOCH_2F	130	130
Saturated Chlorofluorocarbons (CFCs)				
E–R316c	3832–15–3	trans-cyc $(\text{-}CClFCF_2CF_2CClF\text{-})$	*2000	4,230
Z–R316c	3934–26–7	cis-cyc $(\text{-}CClFCF_2CF_2CClF\text{-})$	*2000	5,660
Fluorinated Formates				
Trifluoromethyl formate	85358–65–2	$HCOOCF_3$	588	588
Perfluoroethyl formate	313064–40–3	$HCOOCF_2CF_3$	580	580
1,2,2,2-Tetrafluoroethyl formate	481631–19–0	$HCOOCHFCF_3$	470	470
Perfluorobutyl formate	197218–56–7	$HCOOCF_2CF_2CF_2CF_3$	392	392
Perfluoropropyl formate	271257–42–2	$HCOOCF_2CF_2CF_3$	376	376
1,1,1,3,3,3-Hexafluoropropan-2-yl formate	856766–70–6	$HCOOCH(CF_3)_2$	333	333
2,2,2-Trifluoroethyl formate	32042–38–9	$HCOOCH_2CF_3$	33	33
3,3,3-Trifluoropropyl formate	1344118–09–7	$HCOOCH_2CH_2CF_3$	17	17
Fluorinated Acetates				
Methyl 2,2,2-trifluoroacetate	431–47–0	CF_3COOCH_3	52	52
1,1-Difluoroethyl 2,2,2-trifluoroacetate	1344118–13–3	$CF_3COOCF_2CH_3$	31	31
Difluoromethyl 2,2,2-trifluoroacetate	2024–86–4	$CF_3COOCHF_2$	27	27
2,2,2-Trifluoroethyl 2,2,2-trifluoroacetate	407–38–5	$CF_3COOCH_2CF_3$	7	7
Methyl 2,2-difluoroacetate	433–53–4	HCF_2COOCH_3	3	3
Perfluoroethyl acetate	343269–97–6	$CH_3COOCF_2CF_3$	2.1	2
Trifluoromethyl acetate	74123–20–9	CH_3COOCF_3	2.0	2
Perfluoropropyl acetate	1344118–10–0	$CH_3COOCF_2CF_2CF_3$	1.8	2
Perfluorobutyl acetate	209597–28–4	$CH_3COOCF_2CF_2CF_2CF_3$	1.6	2
Ethyl 2,2,2-trifluoroacetate	383–63–1	$CF_3COOCH_2CH_3$	1.3	1
Carbonofluoridates				
Methyl carbonofluoridate	1538–06–3	$FCOOCH_3$	95	95
1,1-Difluoroethyl carbonofluoridate	1344118–11–1	$FCOOCF_2CH_3$	27	27
Fluorinated Alcohols Other Than Fluorotelomer Alcohols				
Bis(trifluoromethyl)-methanol	920–66–1	$(CF_3)_2CHOH$	195	182
2,2,3,3,4,4,5,5-Octafluorocyclopentanol	16621–87–7	cyc $(\text{-}(CF_2)_4CH(OH)\text{-})$	73	13
2,2,3,3,3-Pentafluoropropanol	422–05–9	$CF_3CF_2CH_2OH$	42	19
2,2,3,3,4,4,4-Heptafluorobutan-1-ol	375–01–9	$C_3F_7CH_2OH$	25	34
2,2,2-Trifluoroethanol	75–89–8	CF_3CH_2OH	20	20
2,2,3,4,4,4-Hexafluoro-1-butanol	382–31–0	$CF_3CHFCF_2CH_2OH$	17	17
2,2,3,3-Tetrafluoro-1-propanol	76–37–9	$CHF_2CF_2CH_2OH$	13	13
2,2-Difluoroethanol	359–13–7	CHF_2CH_2OH	3	3
2-Fluoroethanol	371–62–0	CH_2FCH_2OH	1.1	1.1
4,4,4-Trifluorobutan-1-ol	461–18–7	$CF_3(CH_2)_2CH_2OH$	0.05	0.05
Non-Cyclic, Unsaturated Perfluorocarbons (PFCs)				
PFC–1114; TFE	116–14–3	$CF_2{=}CF_2$; C_2F_4	0.004	0.004
PFC–1216; Dyneon HFP	116–15–4	C_3F_6; $CF_3CF{=}CF_2$	0.05	0.05

TABLE 2—PROPOSED REVISED CHEMICAL-SPECIFIC GWPS FOR COMPOUNDS IN TABLE A–1—Continued

Name	CAS No.	Chemical formula	Current global warming potential (100 yr.)	Proposed global warming potential (100 yr.)
Perfluorobut-2-ene	360–89–4	$CF_3CF=CFCF_3$	1.82	1.82
Perfluorobut-1-ene	357–26–6	$CF_3CF_2CF=CF_2$	0.10	0.10
Perfluorobuta-1,3-diene	685–63–2	$CF_2=CFCF=CF_2$	0.003	0.003
Non-Cyclic, Unsaturated Hydrofluorocarbons (HFCs) and Hydrochlorofluorocarbons (HCFCs)				
HFC–1132a; VF2	75–38–7	$C_2H_2F_2$, $CF_2=CH_2$	0.04	0.04
HFC–1141; VF	75–02–5	C_2H_3F, $CH_2=CHF$	0.02	0.02
(E)-HFC–1225ye	5595–10–8	$CF_3CF=CHF(E)$	0.06	0.06
(Z)-HFC–1225ye	5528–43–8	$CF_3CF=CHF(Z)$	0.22	0.22
Solstice 1233zd(E)	102687–65–0	$C_3H_2ClF_3$; $CHCl=CHCF_3$	1.34	1.34
HCFO–1233zd(Z)	99728–16–2	(Z)-$CF_3CH=CHCl$	*1	0.45
HFC–1234yf; HFO–1234yf	754–12–1	$C_3H_2F_4$; $CF_3CF=CH_2$	0.31	0.31
HFC–1234ze(E)	1645–83–6	$C_3H_2F_4$; trans-$CF_3CH=CHF$	0.97	0.97
HFC–1234ze(Z)	29118–25–0	$C_3H_2F_4$; cis-$CF_3CH=CHF$; $CF_3CH=CHF$.	0.29	0.29
HFC–1243zf; TFP	677–21–4	$C_3H_3F_3$, $CF_3CH=CH_2$	0.12	0.12
(Z)-HFC–1336	692–49–9	$CF_3CH=CHCF_3(Z)$	1.58	1.58
HFO–1336mzz(E)	66711–86–2	(E)-$CF_3CH=CHCF_3$	*1	18
HFC–1345zfc	374–27–6	$C_2F_5CH=CH_2$	0.09	0.09
HFO–1123	359–11–5	$CHF=CF_2$	*1	0.005
HFO–1438ezy(E)	14149–41–8	(E)-$(CF_3)_2CFCH=CHF$	*1	8.2
HFO–1447fz	355–08–8	$CF_3(CF_2)_2CH=CH_2$	*1	0.24
Capstone 42–U	19430–93–4	$C_6H_3F_9$, $CF_3(CF_2)_3CH=CH_2$	0.16	0.16
Capstone 62–U	25291–17–2	$C_8H_3F_{13}$, $CF_3(CF_2)_5CH=CH_2$	0.11	0.11
Capstone 82–U	21652–58–4	$C_{10}H_3F_{17}$, $CF_3(CF_2)_7CH=CH_2$	0.09	0.09
(e)-1-chloro-2-fluoroethene	460–16–2	(E)-$CHCl=CHF$	*1	0.004
3,3,3-trifluoro-2-(trifluoromethyl)prop-1-ene	382–10–5	$(CF_3)_2C=CH_2$	*1	0.38
Non-Cyclic, Unsaturated CFCs				
CFC–1112	598–88–9	$CClF=CClF$	*1	0.13
CFC–1112a	79–35–6	$CCl_2=CF_2$	*1	0.021
Non-Cyclic, Unsaturated Halogenated Ethers				
PMVE; HFE–216	1187–93–5	$CF_3OCF=CF_2$	0.17	0.17
Fluoroxene	406–90–6	$CF_3CH_2OCH=CH_2$	0.05	0.05
Methyl-perfluoroheptene-ethers	N/A	$CH_3OC_7F_{13}$	*1	15
Non-Cyclic, Unsaturated Halogenated Esters				
Ethenyl 2,2,2-trifluoroacetate	433–28–3	$CF_3COOCH=CH_2$	*1	0.008
Prop-2-enyl 2,2,2-trifluoroacetate	383–67–5	$CF_3COOCH_2CH=CH_2$	*1	0.007
Cyclic, Unsaturated HFCs and PFCs				
PFC C–1418	559–40–0	c-C_5F_8	1.97	2
Hexafluorocyclobutene	697–11–0	cyc (-$CF=CFCF_2CF_2$-)	*1	126
1,3,3,4,4,5,5-heptafluorocyclopentene	1892–03–1	cyc (-$CF_2CF_2CF_2CF=CH$-)	*1	45
1,3,3,4,4-pentafluorocyclobutene	374–31–2	cyc (-$CH=CFCF_2CF_2$-)	*1	92
3,3,4,4-tetrafluorocyclobutene	2714–38–7	cyc (-$CH=CHCF_2CF_2$-)	*1	26
Fluorinated Aldehydes				
3,3,3-Trifluoro-propanal	460–40–2	CF_3CH_2CHO	0.01	0.01
Fluorinated Ketones				
Novec 1230 (perfluoro (2-methyl-3-pentanone))	756–13–8	$CF_3CF_2C(O)CF(CF_3)_2$	0.1	0.1
1,1,1-trifluoropropan-2-one	421–50–1	CF_3COCH_3	*1	0.09
1,1,1-trifluorobutan-2-one	381–88–4	$CF_3COCH_2CH_3$	*1	0.095
Fluorotelomer Alcohols				
3,3,4,4,5,5,6,6,7,7,7-Undecafluoroheptan-1-ol	185689–57–0	$CF_3(CF_2)_4CH_2CH_2OH$	0.43	0.43
3,3,3-Trifluoropropan-1-ol	2240–88–2	$CF_3CH_2CH_2OH$	0.35	0.35
3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-Pentadecafluorononan-1-ol.	755–02–2	$CF_3(CF_2)_6CH_2CH_2OH$	0.33	0.33

TABLE 2—PROPOSED REVISED CHEMICAL-SPECIFIC GWPS FOR COMPOUNDS IN TABLE A–1—Continued

Name	CAS No.	Chemical formula	Current global warming potential (100 yr.)	Proposed global warming potential (100 yr.)
3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,11-Nonadecafluoroundecan-1-ol.	87017–97–8	$CF_3(CF_2)_8CH_2CH_2OH$	0.19	0.19
Fluorinated GHGs With Carbon-Iodine Bond(s)				
Trifluoroiodomethane	2314–97–8	CF_3I	0.4	0.4
Remaining Fluorinated GHGs With Chemical-Specific GWPs				
Dibromodifluoromethane (Halon 1202)	75–61–6	CBr_2F_2	231	231
2-Bromo-2-chloro-1,1,1-trifluoroethane (Halon-2311/Halothane).	151–67–7	$CHBrClCF_3$	41	41
Heptafluoroisobutyronitrile	42532–60–5	$(CF_3)_2CFCN$	* 2000	2,750
Carbonyl fluoride	353–50–4	COF_2	* 2000	** 0.14

* Table A–1 does not include a chemical-specific value for this GHG; the value shown is the current default GWP for the fluorinated GHG group of which the GHG is currently a member.

** Proposed in 2022 Data Quality Improvements Proposal.

We are also proposing to revise the default GWPs in Table A–1 by adding two new fluorinated GHG groups, modifying an existing group, and updating the existing default values to reflect the chemical-specific GWPs that we are proposing to adopt from AR5 and AR6.[25] The two new groups that we are proposing to add are for saturated chlorofluorocarbons (CFCs) and for cyclic forms of unsaturated halogenated compounds. We have not previously included a group for saturated CFCs because the GHGRP does not require reporting of most CFCs. The GHGRP definition of ''fluorinated greenhouse gas'' (that is itself referenced in the GHGRP definition of ''greenhouse gas'') at 40 CFR 98.6, includes ''sulfur hexafluoride (SF_6), nitrogen trifluoride (NF_3), and any fluorocarbon except for controlled substances as defined at 40 CFR part 82, subpart A and substances with vapor pressures of less than 1 mm of Hg absolute at 25 degrees C.'' Although CFCs are fluorocarbons, most CFCs are defined as ''controlled substances'' under the EPA's ozone protection regulations at 40 CFR part 82, excluding them from GHGRP coverage. However, some CFCs are not defined as ''controlled substances'' under part 82 and are therefore reportable under the GHGRP. These include two saturated CFCs ((E)-1,2-dichlorohexafluoro cyclobutane and (Z)-1,2-dichlorohexafluorocyclobutane) and two unsaturated CFCs (CFC 1112 and CFC 1112a) for which GWPs are provided in AR6. In the 2022 Data Quality Improvements Proposal, we have proposed to include unsaturated CFCs with unsaturated HFCs and PFCs in the current ninth fluorinated GHG group, which is assigned a default GWP of 1. (The unsaturated CFCs both have GWPs below 1.) The saturated CFCs have GWPs of 4,230 and 5,660 respectively, placing their proposed default GWP (4,900) between the updated default GWPs proposed for saturated HFCs with two or fewer carbon-hydrogen bonds (3,000) and for saturated HFEs and HCFEs with one carbon-hydrogen bond (6,600). Given the numerical differences between the GWP for the saturated CFC group and the GWPs for the other groups, as well as the chemical differences between CFCs, HFCs, and HFEs, we are proposing a separate group and separate default GWP for saturated CFCs.

We are also proposing to establish a separate group for cyclic unsaturated halogenated compounds, specifically, for the cyclic forms of the following: unsaturated PFCs, unsaturated HFCs, unsaturated CFCs, unsaturated hydrochlorofluorocarbons (HCFCs), unsaturated bromofluorocarbons (BFCs), unsaturated bromochlorofluorocarbons (BCFCs), unsaturated hydrobromofluorocarbons (HBFCs), unsaturated hydrobromochlorofluoro carbons (HBCFCs), unsaturated halogenated ethers, and unsaturated halogenated esters. AR6 includes GWPs for five members of this set (all unsaturated HFCs or PFCs), ranging from 25.6 to 126. These GWPs are markedly larger than the GWPs for the non-cyclic unsaturated halogenated compounds currently in the ninth fluorinated GHG group, most of which are less than 1.[26] The default GWP proposed for the new group is 58, far higher than the value of 1 currently in effect for the unsaturated halogenated compounds in the ninth fluorinated GHG group. The new group would affect how the cyclic unsaturated halogenated compounds are classified for reporting under subparts A and L (Fluorinated Gas Production), and the corresponding default GWP would be applied to cyclic unsaturated halogenated compounds that do not have chemical-specific GWPs listed in AR5 or AR6. One cyclic unsaturated PFC that is currently included in the unsaturated group with the default GWP of 1, perfluorocyclopentene, would be moved into the new group for purposes of classification and calculation of the default GWP of the group.[27]

The proposed new and revised fluorinated GHG groups and their proposed new and revised GWPs are listed in Table 3 of this preamble.

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[25] In the 2014 Fluorinated GHG Final Rule, we established 12 default GWPs intended for fluorinated GHGs and fluorinated HTFs for which peer-reviewed GWPs were not available in AR4, AR5, or other sources. The default GWPs were calculated based on the average of the chemical-specific GWPs of the compounds in each fluorinated GHG group. Each fluorinated GHG group is composed of compounds with similar chemical structures, which have similar atmospheric lifetimes and GWPs.

[26] This is true for both the AR5 and AR6 GWP values for the non-cyclic unsaturated compounds. Twenty-six of the 32 AR6 GWP values for these compounds fall under 1 while six fall above 1, with a maximum value of 18.

[27] Perfluorocyclopentene is assigned GWP values of 2 and 78 in AR5 and AR6 respectively. The AR5 value was used in the calculation of the proposed default value for the cyclic unsaturated halogenated compounds.

TABLE 3—PROPOSED FLUORINATED GHG GROUPS AND DEFAULT GWPS

Fluorinated GHG group	Current global warming potential (100 yr.)	Proposed global warming potential (100 yr.)
Fully fluorinated GHGs	10,000	9,200
Saturated hydrofluorocarbons (HFCs) with two or fewer carbon-hydrogen bonds	3,700	3,000
Saturated HFCs with three or more carbon-hydrogen bonds	930	840
Saturated hydrofluoroethers (HFEs) and hydrochlorofluoroethers (HCFEs) with one carbon-hydrogen bond	5,700	6,600
Saturated HFEs and HCFEs with two carbon-hydrogen bonds	2,600	2,900
Saturated HFEs and HCFEs with three or more carbon-hydrogen bonds	270	320
Saturated chlorofluorocarbons (CFCs)	*2,000	4,900
Fluorinated formates	350	350
Cyclic forms of the following: unsaturated perfluorocarbons (PFCs), unsaturated HFCs, unsaturated CFCs, unsaturated hydrochlorofluorocarbons (HCFCs), unsaturated bromofluorocarbons (BFCs), unsaturated bromochlorofluorocarbons (BCFCs), unsaturated hydrobromofluorocarbons (HBFCs), unsaturated hydrobromochlorofluorocarbons (HBCFCs), unsaturated halogenated ethers, and unsaturated halogenated esters	**1	58
Fluorinated acetates, carbonofluoridates, and fluorinated alcohols other than fluorotelomer alcohols	30	25
Fluorinated aldehydes, fluorinated ketones, and non-cyclic forms of the following: unsaturated PFCs, unsaturated HFCs, unsaturated CFCs, unsaturated HCFCs, unsaturated BFCs, unsaturated BCFCs, unsaturated HBFCs, unsaturated HBCFCs, unsaturated halogenated ethers, and unsaturated halogenated esters	1	1
Fluorotelomer alcohols	1	1
Fluorinated GHGs with carbon-iodine bond(s)	1	1
Remaining fluorinated GHGs	2,000	1,800

* Based on current classification as "Other fluorinated GHGs."

** Based on current classification as "Unsaturated perfluorocarbons (PFCs), unsaturated HFCs, unsaturated hydrochlorofluorocarbons (HCFCs), unsaturated halogenated ethers, unsaturated halogenated esters."

2. Additional Proposed Revisions To Improve the Quality of Data Collected for Subpart A

The EPA is proposing several revisions to subpart A to align with the proposed addition of subparts B (Energy Consumption), WW (Coke Calciners), XX (Calcium Carbide Production), YY (Caprolactam, Glyoxal, and Glyoxylic Acid Production), and ZZ (Ceramics Manufacturing), as described in sections II.B and IV of this preamble. First, we are proposing to revise 40 CFR 98.2(a)(1) through (3) to clarify that (1) direct emitters required to report under any source category listed in Tables A–3 or A–4 to subpart A of part 98 or stationary fuel combustion sources that meet the requirements of 40 CFR 98.2(a)(3), or required to resume reporting under §§ 98.2(i)(1), (2), or (3); and (2) that are not eligible to discontinue reporting under the provisions of 40 CFR 98.2(i)(1) through (3), would be required to cover metered purchased energy consumption (proposed subpart B) in their annual GHG report. As described in section IV.A of this preamble, direct emitters subject to part 98 would be required to report the annual quantity of electricity purchased and the annual quantity of thermal energy products purchased. Specifically, we are proposing to revise paragraphs 98.2(a)(1) through (3) to add that the annual GHG report must cover "energy consumption (subpart B of this part)" for facilities that are subject to direct emitter subparts. Additionally, we are proposing to revise the reporting requirements for the annual GHG report in 40 CFR 98.3(c)(4) to add a requirement for facilities to report the annual quantities of electricity purchased and the annual quantities of thermal energy products purchased. The proposed requirements ensure that facilities that report emissions of GHGs include total energy consumption data with the annual report. Additional information on proposed subpart B may be found in section IV.A of this preamble.

Similarly, we are proposing to revise Table A–3 and Table A–4 to part 98 to clarify the reporting applicability for facilities included in the proposed new source categories described in sections IV.B through E of this preamble. Currently, a facility included in a source category listed in Table A–3 to subpart A of part 98 is subject to reporting under part 98. Source categories in Table A–3 are referred to as "all-in" source categories because reporting applies regardless of other source category or stationary fuel combustion emissions at the facility. The EPA's "all-in" approach generally applies for industries for which all facilities are emitters of a similar quantity, or where the EPA has determined it requires more data on certain industries to identify the parameters that influence GHG emissions from the source category. A facility that contains a source category listed in Table A–4 to subpart A of part 98 must report only if estimated annual emissions from all applicable source categories in Tables A–3 and Table A–4 of part 98 are 25,000 metric tons carbon dioxide equivalents (mtCO$_2$e) or more. Source categories in Table A–4 are referred to as "threshold" source categories. The EPA's "threshold" approach generally applies when a source category contains emitters with a range in emissions quantity and the EPA wants to collect information from those facilities within the source category with larger total emissions from multiple process units or collocated source categories that emit larger levels of GHGs collectively, and not burden smaller emitters with a reporting obligation.

We are proposing to revise Table A–3 to subpart A of part 98 to include new source categories for coke calciners (subpart WW), calcium carbide production (subpart XX), and caprolactam, glyoxal, and glyoxylic acid production (subpart YY). For coke calciners (subpart WW), as discussed in section IV.B of this preamble, we are proposing to include the source category as an "all-in" source category in Table A–3; based on the threshold analysis, most coke calciners are large emission sources that would be expected to exceed all of the thresholds considered, with no significant differences in the coverage of reporting facilities or the total U.S. emissions covered. As described in section IV.C of this preamble, we determined in a threshold analysis for the calcium carbide production source category that there is a single producer of calcium carbide in the United States whose known emissions would well exceed the 25,000 mtCO$_2$e threshold currently referenced in 40 CFR 98.2(a)(2). Therefore, we are proposing to require that all facilities report in this source category, which would capture all U.S. emissions and avoid the need for the facility to calculate whether GHG emissions exceed the threshold value. The threshold analysis for the caprolactam, glyoxal, and glyoxylic acid production source category, as described in detail in section IV.D of this preamble, identified and estimated emissions for six facilities and concluded that setting a threshold of 25,000 $mtCO_2e$ would cover only half of the identified facilities but result in only a small difference in the total U.S. emissions that would be covered. After considering this information, we are proposing to add the caprolactam, glyoxal, and glyoxylic acid production source category as an ''all-in'' source category to Table A–3 to subpart A of part 98 to gather information from all applicable facilities, in order to account for the uncertainty in the data and assumptions used in the threshold analysis (see section IV.D.4 of this preamble for additional information). The proposed revisions to Table A–3 specify that new subparts WW, XX, and YY would become applicable in RY2025 (see section V of this preamble for additional details).[28]

We are proposing to revise Table A–4 to subpart A of part 98 to include a new source category for ceramics production (subpart ZZ). As described in sections IV.E of this preamble, we conducted a threshold analysis for the ceramics production source category and determined the facilities in this source category have a broader range in emissions quantity. In order to collect information from those facilities within the source category with larger total emissions from multiple process units, or collocated source categories that emit larger levels of GHGs collectively, we are proposing to assign a threshold of 25,000 $mtCO_2e$. For ceramics production (subpart ZZ), we are proposing that part 98 would apply to certain ceramics production processes that exceed a minimum production level (*i.e.,* annually consume at least 2,000 tons of carbonates or 20,000 tons of clay heated to a temperature sufficient to allow the calcination reaction to occur) and that exceed the 25,000 $mtCO_2e$ threshold. The proposed requirements would ensure coverage of large ceramics production facilities, while reducing the reporting burden for facilities with collocated source categories that may have already met GHGRP reporting thresholds under a different subpart of part 98 but may only have a small artisan-level ceramics process on site. We are proposing to revise Table A–4 such that new subpart ZZ would become applicable in RY2025. See section V of this preamble for additional details on the anticipated schedule for the proposed amendments.

In keeping with the proposed revisions discussed in section II.A.1 of this preamble, we are proposing minor clarifications to the reporting and special provisions for best available monitoring methods in 40 CFR 98.3(k) and (l), which apply to owners or operators of facilities or suppliers that first become subject to any subpart of part 98 due to amendment to Table A–1 to subpart A. The current provisions, which were incorporated in the 2014 Fluorinated Gas Final Rule, require that these facilities or suppliers must start monitoring and collecting GHG data in compliance with the applicable subparts of part 98 to which the facility is subject ''starting on January 1 of the year after the year during which the change in GWPs is published,'' and provide for the use of best available monitoring methods, as applicable, for a period of three months ''of the year after the year during which the change in GWPs is published.'' Specifically, we are proposing to revise the term ''published'' to add ''in the **Federal Register** as a final rulemaking.'' The proposed changes would clarify the EPA's intent that the requirements apply to facilities or supplies that are first subject to the GHGRP in the year after the year the GWP is published as part of a final rule.

For the reasons described in section II.E of this preamble, the EPA is proposing amendments to several defined terms in the General Provisions. First, we are proposing to revise the definition of ''bulk'' to provide clarity to the regulated community. Under 40 CFR 98.6 ''bulk'' is currently defined as ''with respect to industrial GHG suppliers and CO_2 suppliers, [bulk] means the transfer of a product inside containers, including, but not limited to tanks, cylinders, drums, and pressure vessels.'' Importers of industrial GHGs have had questions regarding this definition, particularly whether imports of motor vehicle air conditioner charging kits would fall within this definition given that the gas is in small cans in this case. The EPA notes that the current definition does not include any limit or restriction based on the size of the vessel in which the industrial GHG or CO_2 is transferred. Therefore, we maintain that the imports of industrial GHGs and CO_2 in small cans, such as motor vehicle air conditioner charging kits, would be reportable under subpart OO (Suppliers of Industrial Greenhouse Gases) based on our current definition of bulk. However, to improve clarity, the EPA is proposing to revise the definition of bulk to read that ''*Bulk,* with respect to industrial GHG suppliers and CO_2 suppliers, means a transfer of gas in any amount that is in a container for the transportation or storage of that substance such as cylinders, drums, ISO tanks, and small cans. An industrial gas or CO_2 that must first be transferred from a container to another container, vessel, or piece of equipment in order to realize its intended use is a bulk substance. An industrial GHG or CO_2 that is contained in a manufactured product such as electrical equipment, appliances, aerosol cans, or foams is not a bulk substance.''

The revised definition would provide clarity to the regulated community regarding whether the import or export of gas in small containers would be considered ''bulk.'' The definition also provides additional details for suppliers to determine whether different types of imports or exports would fall within the definition. For example, this definition makes it clear that imports of motor vehicle air conditioner charging kits would qualify as imports of bulk substances, because the gas must first be transferred from a container (*i.e.,* the kit) to another container, vessel, or piece of equipment (*i.e.,* the motor vehicle) in order to realize its intended use (*i.e.,* comfort cooling). In addition, the revised definition makes it clear that gas contained in pre-charged equipment, appliances, foams, or aerosol cans would not qualify as bulk substances. This is consistent with the EPA's consideration of bulk in the past. In response to comments on the 2009 Final Rule (see ''Mandatory Greenhouse Gas Reporting Rule: EPA's Response to Public Comments Volume No.: 40 Subpart OO—Suppliers of Industrial Greenhouse Gases, September 2009''), we stated that the ''term 'bulk' is intended to distinguish imports and exports in containers (cylinders, drums, etc.) from imports and exports in products; it is not intended to establish a minimum container or shipment size below which reporting would not be required.'' After considering comments, the EPA did include provisions in the industrial gas supply reporting requirements (40 CFR 98.416) that exempt small shipments (those including less than 25 kilograms) from the import and export reporting requirements. However, a minimum

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[28] The proposed revisions to Table A–3 to subpart A also include the proposed source category for Geologic Sequestration of Carbon Dioxide with Enhanced Oil Recovery Using ISO 27916, proposed as subpart VV of part 98 in the 2022 Data Quality Improvements Proposal. Under this supplemental proposal, we are now proposing this rule, if finalized, would be applicable in RY2025.

shipment size does not imply a minimum container size.

Finally, the revised definition would align the definition of ''bulk'' for industrial GHGs and CO_2 under the GHG Reporting Rule (40 CFR part 98) with the definition of ''bulk'' under the regulations to phasedown hydrofluorocarbons (40 CFR part 84). We recognize that some importers and exporters of industrial gases would be covered under both programs, and that a consistent definition would promote efficiency and clarity for implementation of both programs. For example, we anticipate that importers and exporters may use the data entered in the EPA's HFC and ODS Allowance Tracking (HAWK) system to generate draft reporting forms that could be reviewed and submitted to the EPA's e-GGRT annual reporting system under subpart OO of 40 CFR part 98. A consistent set of definitions between the two programs would simplify reporting. Relatedly, we seek comment on whether this definition of bulk would be useful for suppliers of carbon dioxide (subpart PP of part 98).

Next, the EPA is proposing to revise the definition of ''greenhouse gas or GHG'' to clarify the treatment of fluorinated greenhouse gases. The definition of ''greenhouse gas or GHG'' currently includes both a reference to the definition of ''fluorinated greenhouse gas'' and a partial list of the fluorinated GHGs that are encompassed by the definition of ''fluorinated greenhouse gas.'' To simplify and clarify the definition of ''greenhouse gas or GHG,'' we are proposing to remove the partial list of fluorinated GHGs currently included in the definition and to simply refer to the definition of ''fluorinated greenhouse gas (GHGs).'' We are also proposing to explicitly include the acronym ''(GHGs)'' after the term ''fluorinated greenhouse gas'' both in the definition of ''greenhouse gas or GHG'' and in the definition of ''fluorinated greenhouse gas.'' This change would not affect the scope of substances that are considered GHGs under part 98 but would avoid redundancy and potential confusion between the definitions of ''greenhouse gas'' and ''fluorinated greenhouse gas.'' With this revision, the definition of ''Greenhouse gas or GHG'' would read: ''Greenhouse gas or GHG means carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated greenhouse gases (GHGs) as defined in this section.''

Consistent with our proposed revisions of the fluorinated GHG groups used to assign default GWPs, discussed in section III.A.1 of this preamble, the EPA is also proposing to add seven definitions and to revise two definitions of fluorinated GHG groups or of compound types or molecular structures within those groups. Specifically, we are proposing to add definitions of ''unsaturated chlorofluorocarbons (CFCs),'' ''saturated chlorofluorocarbons (CFCs),'' ''unsaturated bromofluorocarbons (BFCs),'' ''unsaturated bromochlorofluorocarbons (BCFCs),'' ''unsaturated hydrobromofluorocarbons (HBFCs),'' and ''unsaturated hydrobromochlorofluorocarbons (HBCFCs).'' In addition, we are proposing to add a definition of ''cyclic'' as it applies to molecular structures of various fluorinated GHGs. We are also proposing to revise the definition of ''fluorinated greenhouse (GHG) group'' to include the new and revised groups.

We are also proposing to revise the term ''other fluorinated GHGs,'' which is the name of the last of the twelve fluorinated GHG groups that are used to assign default GWPs to compounds that do not have chemical-specific GWPs in Table A–1 to subpart A of part 98. The term ''other fluorinated GHGs'' is intended to encompass fluorinated GHGs that are not included in any of the first eleven fluorinated GHG groups that are specified based on their molecular compositions and structures. However, the phrase ''other fluorinated GHGs'' is also used in other contexts in part 98, potentially leading to confusion. For example, the phrase ''other fluorinated GHGs'' occurs but is not intended to mean the twelfth fluorinated GHG group in subpart L of part 98 (Fluorinated Gas Production) at 40 CFR 98.122(d), 98.124(g)(1)(iv), 98.124(g)(4), and 98.126(a)(4)(ii). We are therefore proposing to revise the term ''other fluorinated GHGs'' to ''remaining fluorinated GHGs'' to avoid such confusion.[29] In addition, we are proposing to revise the definition of the term to reflect the new and revised fluorinated GHG groups discussed in section III.A.1 of this preamble.

We are proposing to revise the definition of ''fluorinated heat transfer fluids'' and to move it from 40 CFR 98.98 to 40 CFR 98.6 to harmonize with proposed changes to subpart OO of part 98 (Suppliers of Industrial Greenhouse Gases), as discussed in section III.K of this preamble. Fluorinated compounds used as F–HTFs include, but are not limited to, perfluoropolyethers (including PFPMIE), perfluoroalkylamines, perfluoroalkylmorpholines, perfluoroalkanes, perfluoroethers, perfluorocyclic ethers, and hydrofluoroethers. Many of these compounds have GWPs near 10,000 and atmospheric lifetimes near 1,000 years. Currently, the term ''fluorinated heat transfer fluids'' is defined under subpart I of part 98 (Electronics Manufacturing) in the context of electronics manufacturing, but we have become aware of uses of F–HTFs that are chemically similar to those listed above in industries other than electronics. For this reason, we are proposing to require suppliers of F–HTFs that report under subpart OO to identify the end uses for which the heat transfer fluid is used and the aggregated annual quantities of each F–HTF transferred to each end use. To clarify that the supplier reporting requirement would apply to F–HTFs that are used outside of the electronics industry, we are proposing to move the definition of ''fluorinated heat transfer fluids'' to subpart A and to revise the definition (1) to explicitly include industries other than electronics manufacturing, and (2) to exclude most hydrofluorocarbons (HFCs), which are widely used as heat transfer fluids outside of electronics manufacturing (in household, mobile, commercial, and industrial air conditioning and refrigeration) and are regulated under the American Innovation and Manufacturing Act of 2020 (AIM) regulations at 40 CFR part 84.[30] Including all HFCs in the definition of ''fluorinated heat transfer fluids'' would expand the definition, and the associated reporting requirements, far beyond our intent, which is to gather information on supplies and end uses of F–HTFs used in electronics manufacturing and in similar specialized applications. The one HFC that would remain in the definition is HFC–43–10mee, which is used as an F–HTF in electronics manufacturing and which, like most other F–HTFs used in electronics manufacturing (and unlike most HFCs used as refrigerants), is a liquid at room temperature and pressure. With these changes, the proposed definition of ''fluorinated heat transfer fluids'' would read:

> Fluorinated heat transfer fluids means fluorinated GHGs used for temperature control, device testing, cleaning substrate surfaces and other parts, other solvent

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[29] As discussed in section II.A.1 of this preamble regarding the update of global warming potentials, we are proposing to add two new fluorinated GHG groups in this notification. If these two new fluorinated GHG groups are added and the term ''other fluorinated GHGs'' is revised to ''remaining fluorinated GHGs'' in the final rule, then the group ''remaining fluorinated GHGs'' would become the fourteenth fluorinated GHG group.

[30] Hydrofluorocarbons would continue to be considered ''fluorinated greenhouse gases'' and therefore reportable under other provisions of part 98.

applications, and soldering in certain types of electronics manufacturing production processes and in other industries. Fluorinated heat transfer fluids do not include fluorinated GHGs used as lubricants or surfactants in electronics manufacturing. For fluorinated heat transfer fluids, the lower vapor pressure limit of 1 mm Hg in absolute at 25 °C in the definition of ''fluorinated greenhouse gas'' in § 98.6 shall not apply. Fluorinated heat transfer fluids include, but are not limited to, perfluoropolyethers (including PFPMIE), perfluoroalkylamines, perfluoroalkylmorpholines, perfluoroalkanes, perfluoroethers, perfluorocyclic ethers, and hydrofluoroethers. Fluorinated heat transfer fluids include HFC–43–10meee but do not include other hydrofluorocarbons.

We request comment on the proposed definition. We also request comment on other options to avoid requiring suppliers to report uses of HFCs (and potentially other F–GHGs) used in most air-conditioning and refrigeration applications, including the option of revising the definition to explicitly include only fluorinated GHGs that are liquid at room temperature (*e.g.,* that have boiling points below 27 degrees C [about 81 degrees F] at one atmosphere, which is a few degrees below the boiling point of the F–GHG with the lowest boiling point that is marketed for use as an HTF, 3M™ Fluorinert™ FC–87.).

In addition, the EPA is proposing to update 40 CFR 98.7 *What standardized methods are incorporated by reference into this part?* To reflect harmonizing changes based on the proposed addition of subparts B (Energy Consumption), WW (Coke Calciners), and XX (Calcium Carbide Production) to part 98, as well as the proposed revisions to subpart Y of part 98 (Petroleum Refineries). The proposed revisions surrounding these subparts include test methods. Specifically, the proposed revisions to subparts B and XX add one test method to 40 CFR 98.24(b), and two test methods to 40 CFR 98.504(b), respectively. The proposed revisions to remove coke calciners from subpart Y and add them to new subpart WW require not only the removal of monitoring requirements and associated test methods for coke calciners from subpart Y, but also reflect the latest versions of those test methods.

As described in section IV.A of this preamble, under newly proposed subpart B, facilities would need to develop a written Metered Energy Monitoring Plan (MEMP). In that MEMP, facilities would be required to specify recordkeeping activities for electric meters, including an indication of whether the meter conforms to American National Standards Institute (ANSI) standard C12.1–2022 *Electric Meters—Code for Electricity Metering* or another, similar consensus standard with accuracy specifications at least as stringent as one of the cited ANSI standards. We are proposing to incorporate by reference this ANSI test method as indicated in 40 CFR 98.24(b) and 40 CFR 98.7(a).

Per section IV.C of this preamble, calcium carbide production facilities would be required to analyze carbon content at least annually using standard ASTM methods that are currently used in similar source categories under part 98, including the American Society for Testing and Materials (ASTM) D5373–08 *Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Laboratory Samples of Coal* or ASTM C25–06, *Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime.* We are proposing to revise paragraphs 40 CFR 98.7(e)(1) and (27) to add a reference to proposed 40 CFR 98.504(b) to clarify these methods are incorporated by reference for the calcium carbide production source category.

As described in section III.H of this preamble, the EPA is proposing to remove coke calciners from subpart Y. Instead of reporting coke calcining unit emissions under subpart Y, facilities with coke calciners are proposed to report those emissions in the new proposed subpart WW. Subpart Y at 40 CFR 98.254(h) currently requires the determination of the mass of petroleum coke using *Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices,* National Institute of Standards and Technology (NIST) Handbook 44 (2009) and the calibration of the measurement device according to the procedures specified the same handbook. Those requirements are proposed to be removed from subpart Y and the updated version, *Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices,* NIST Handbook 44 (2022), is proposed for subpart WW. These changes are reflected in subparts A, Y, and WW. Likewise, three methods used to help determine the carbon content of petroleum coke are proposed to be removed from subpart Y (40 CFR 98.254(i)) and updated versions of those same methods are proposed for new subpart WW. Those methods are (1) ASTM D3176–15 *Standard Practice for Ultimate Analysis of Coal and Coke,* (2) ASTM D5291–16 *Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants,* and (3) ASTM D5373–21 *Standard Test Methods for Determination of Carbon, Hydrogen, and Nitrogen in Analysis Samples of Coal and Carbon in Analysis Samples of Coal and Coke.*

In the 2022 Data Quality Improvements Proposal, we proposed to add subpart VV to part 98 (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916). It is likely that many reporters that would be subject to the new proposed subpart VV would have previously been subject to subpart UU of part 98 (Injection of Carbon Dioxide). We received comments saying that the applicability of proposed subpart VV was unclear. Therefore, as described in sections III.O and III.P of this preamble, the EPA is now proposing to revise section 98.470 of subpart UU of part 98 and sections 98.480 and 98.481 of proposed subpart VV to clarify the applicability of each subpart when a facility chooses to quantify their geologic sequestration of CO_2 in association with EOR operations through the use of the CSA/ANSI ISO 27916:2019 method. The proposed changes also would clarify how CO_2-EOR projects that may transition to use of the CSA/ANSI ISO 27916:2019 method during a reporting year would be required to report for the portion of the reporting year before they began using CSA/ANSI ISO 27916:2019 (under subpart UU) and for the portion after they began using CSA/ANSI ISO 27916:2019 (under proposed subpart VV). Additionally, we previously proposed to incorporate by reference the CSA/ANSI ISO 27916:2019 test method in the 2022 Data Quality Improvements Proposal. In light of these supplemental proposed revisions, we are proposing to modify the proposed incorporation by reference regulatory text at 40 CFR 98.7(g) consistent with these proposed revisions, such that the regulatory text would also reference paragraphs 40 CFR 98.470(c) and 98.481(c).

B. Subpart C—General Stationary Fuel Combustion

For the reasons described in section II.D of this preamble, we are proposing to add requirements for facilities under subpart C of part 98 (General Stationary Fuel Combustion) to report whether the unit is an electricity generating unit (EGU) for each configuration that reports emissions under either the individual unit provisions at 40 CFR 98.36(b) or the multi-unit provisions at 40 CFR 98.36(c). Additionally, for multi-unit reporting configurations, we are proposing to add requirements for facilities to report an estimated decimal fraction of total emissions from the group that are attributable to EGU(s) included in the group.

Under the current subpart C reporting requirements, the EPA cannot determine the quantity of EGU emissions included in the reported total emissions for the subpart. The proposed changes would allow the EPA to estimate the EGU emissions included in the subpart C emission totals. Understanding subpart C EGU GHG emissions is important to ensure more accurate data analysis, to understand attribution of GHG emissions to the power plant sector, and to inform policy goals under the CAA. For example, the EPA's current data publication products attribute subpart C emissions to the power plant sector based on the reported NAICS code for the facility. However, some manufacturing facilities, such as petroleum refineries and pulp and paper manufacturers, operate stationary combustion sources that generate electricity. Reporting of an EGU indicator for these units would allow the EPA to assign the emissions from any electricity generating units at the facility more appropriately to the power plant sector. Similarly, data analyses, including those used for policy development, would be able to use the EGU indicator to ensure a more comprehensive EGU data set was used.

We do not anticipate that the proposed data elements would require any additional monitoring or data collection by reporters, because the only added data elements would be whether any subpart C unit(s) included in the report are EGU(s), and, for multi-unit configurations, an estimated fraction of total emissions from the group that are attributable to EGU(s) included in the group. I proposed changes would result in minimal additional burden to reporters because the reporter knows if the unit is an EGU and, if so, the estimated fraction of total emissions attributable to the EGU can be determined by engineering estimates. We are also proposing related confidentiality determinations for the additional data elements, as discussed in section VI of this preamble.

C. Subpart F—Aluminum Production

For the reasons described in section II.D of this preamble, we are proposing to revise the reporting requirements of subpart F of part 98 (Aluminum Production). We are proposing to revise the reporting requirements at 40 CFR 98.66(a) and (g) to require that facilities report the facility's annual production capacity and annual days of operation for each potline. The capacity of the facility and capacity utilization would provide useful information for understanding variations in annual emissions, to understand trends across the sector and to support analysis of this source. We often contact facilities seeking to understand yearly variations in the facility emissions, and facilities explain that the variation was due to a smelter not operating for a particular time period. Currently it is difficult to determine without correspondence with the facility whether variations in emissions are due to changes in yearly production or efforts to improve operations to decrease emissions. If data on the production capacity and annual days of operation for each potline are included in the annual report, it could explain the variation and eliminate the need for correspondence with facilities. We are also proposing related confidentiality determinations for the additional data elements, as discussed in section VI of this preamble.

D. Subpart G—Ammonia Manufacturing

For the reasons described in section II.D of this preamble, we are proposing a revision to the reporting requirements of subpart G of part 98 (Ammonia Manufacturing) to enhance the quality and accuracy of the data collected under the GHGRP. As discussed in section III.G of this preamble, to increase the GHGRP's coverage of facilities in the hydrogen production sector we are proposing to amend the applicability of subpart P (Hydrogen Production) to include all facilities that produce hydrogen gas as a product regardless of whether the product is sold, with exemptions for any process unit for which emissions are reported under another subpart of part 98, including ammonia production units that report emissions under subpart G. However, we are proposing to amend subpart G in this action to include a reporting requirement for facilities to report the annual quantity of excess hydrogen produced that is not consumed through the production of ammonia. This change would ensure that revisions to subpart P to exclude reporting from facilities that are subject to subpart G would not result in the exclusion of reporting of any excess hydrogen production at facilities that are subject to subpart G from the GHGRP. The proposed revision would also help the EPA to understand facilities that engage in captive hydrogen production and better inform our knowledge of industry emissions and trends. We are also proposing related confidentiality determinations for the additional data element, as discussed in section VI of this preamble.

E. Subpart I—Electronics Manufacturing

We are clarifying a proposed revision to Table I–16 to subpart I of part 98 (Electronics Manufacturing) to correct a typographical error in the 2022 Data Quality Improvements Proposal. The June 21, 2022 proposed rule's amendatory text shows the current DRE for NF_3 of 88 percent instead of the DRE proposed of 96 percent. The DRE calculated for NF_3 is 96 percent based on data submitted to the EPA, as shown in the supplemental material ''combined DRE data sets.xlsx'' in the docket for the proposed rule. For more information on the how the DREs were calculated, see the preamble to the 2022 Data Quality Improvements Proposal and the memorandum, *Revised Technical Support for Revisions to Subpart I: Electronics Manufacturing,* available in the docket for this rulemaking, Docket Id. No. EPA–HQ–OAR–2019–0424.

We are also proposing revisions to Table I–18 to subpart I of part 98 to correct the proposed gamma factors to estimate by-products for NF_3 used in remote plasma cleaning for facilities manufacturing both wafers <= to 200 mm and 300 mm or greater. The by-product gamma for CHF_3, CH_2F_2 and CH_3F for facilities manufacturing both wafer sizes should be equal to the by-product gamma factor for 300 mm and not an average of the 200 mm gamma (which is zero) and the 300 mm gamma. More information can be found in the revised technical support document (TSD), *Revised Technical Support for Revisions to Subpart I: Electronics Manufacturing,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

F. Subpart N—Glass Production

For the reasons described in section II.D of this preamble, we are proposing revisions to the recordkeeping and reporting requirements of subpart N of part 98 (Glass Production) to enhance the quality and accuracy of the data collected under the GHGRP. We are proposing to revise the existing reporting and recordkeeping requirements for both CEMS and non-CEMS facilities to require that they report and maintain records of recycled scrap glass (cullet) used as a raw material. Specifically, we are proposing to add provisions to 40 CFR 98.146 to require reporting of the annual quantity of cullet used (in tons) in each continuous glass melting furnace and in all furnaces combined by glass type (*e.g.,* container, flat glass, fiber glass, or specialty glass). This quantity would include both recycled glass that was brought in from other facilities or purchased from external sources (*e.g.,* recycling programs) and glass that has been produced at the facility and then added back into the production process (sometimes referred to as ''run-around''). We are also proposing to add provisions to 40 CFR 98.147 to require recordkeeping of the monthly quantity of cullet used (in tons) in each continuous glass melting furnace by product type (*e.g.,* container, flat glass, fiber glass, or specialty glass), and the number of times in the reporting year that missing data procedures were used to measure monthly quantities of cullet used.

Although there are variations in the types of carbonates used at different facilities and some facilities use other carbonate raw materials in much smaller quantities, the major raw materials (*i.e.,* fluxes and stabilizers) that emit process-related CO_2 emissions in glass production are limestone, dolomite, and soda ash. In general, the composition profile of raw materials is relatively consistent among individual glass types, however, some facilities use cullet in their production process. Unlike carbonate-based raw materials, cullet does not produce process GHG emissions when used in the glass production process. Therefore, differences in the quantities of cullet used can lead to variations in emissions from the production of different glass types. Furthermore, the production of some glass types (*e.g.,* container, flat glass, fiber glass, specialty glass) consumes more cullet than others. The amount of cullet used at individual facilities can also vary from year to year, which can cause related changes in emissions. Additionally, due to its lower melting temperature, mixing cullet with other raw materials can reduce the amount of energy required to produce glass and thus also reduce combustion emissions related to glass production.

The annual quantities of cullet used would provide a useful metric for understanding variations and differences in emissions estimates that may not be apparent in the existing data collected, improve our understanding of industry trends, and improve verification for the GHGRP. The proposed data elements would also provide useful information to improve analysis of this sector in the Inventory. As noted in the 2019 Inventory report,[31] the EPA reviews the GHGRP data during the development of inventory estimates for this sector to help understand the completeness of emission estimates and for quality control. Including cullet use would increase the transparency and accuracy of the data set produced by the Inventory. Additionally, collecting more detailed data on raw materials would improve analysis of this sector by other EPA programs.

While we are proposing to collect the sum of both externally-sourced recycled glass and facility ''run-around'' recycled glass, we seek comment on the degree to which each of these types of recycled glass are tracked by facilities, and/or what kinds of cullet use data are readily available. Furthermore, we seek comment on the degree to which recycled glass use is tracked by produced glass type, and whether it is common for a glass melting furnace to be used to produce more than one glass type in a reporting year. We do not anticipate that the proposed data elements would require any additional monitoring or data collection by reporters, as cullet use data are likely available in existing company records. The proposed changes would therefore result in minimal additional burden to reporters. We are also proposing related confidentiality determinations for the additional data elements, as discussed in section VI of this preamble.

G. Subpart P—Hydrogen Production

The EPA is proposing several amendments to subpart P of part 98 (Hydrogen Production) that include expanding the source category to include non-merchant hydrogen production facilities, as well as clarifications and additions to the reporting elements resulting in enhanced unit-level reporting for facilities in the hydrogen production sector. As discussed in sections II.B and II.D of this preamble, these amendments would address potential gaps in applicability and reporting, allowing the EPA to better understand and track facilities and emissions. These data would inform future policy considerations under the CAA, and additionally could inform future policy considerations like those set forth by other Government programs.

Currently, section 98.160 states, ''A hydrogen production source category consists of facilities that produce hydrogen gas sold as a product to other entities.'' This provision notably limits applicability to so-called ''merchant'' plants that sell hydrogen produced as a product. Based on requirements in subpart Y of part 98 (Petroleum Refineries), hydrogen production units at petroleum refineries are required to report hydrogen production GHG emissions under subpart P even though they do not sell the hydrogen gas to other entities. Similarly, subpart G of part 98 (Ammonia Manufacturing) essentially provides calculation methodologies analogous to subpart P to account for GHG emissions from ammonia production, which entails the use of captive hydrogen production. However, through external analysis and communications with facilities reporting to the GHGRP, we understand that there are other facilities that produce hydrogen and consume it onsite (*i.e.,* captive plants), that are not required to report their hydrogen production GHG emissions under subpart P or any other GHGRP subpart. To increase the GHGRP's coverage of facilities in the hydrogen production sector, we are proposing to amend the source category definition in 40 CFR 98.160 to include all facilities that produce hydrogen gas as a product regardless of whether the product is sold. We are also proposing to categorically exempt any process unit for which emissions are reported under another subpart of part 98. This includes, but is not necessarily limited to, ammonia production units that report emissions under subpart G of part 98, catalytic reforming units located at petroleum refineries that produce hydrogen as a by-product for which emissions are reported under subpart Y of part 98, and petrochemical production units that report emissions under subpart X of part 98 (Petrochemical Production). We are also proposing to exempt process units that only separate out diatomic hydrogen from a gaseous mixture and are not associated with a unit that produces diatomic hydrogen created by transformation of one or more feedstocks, which would codify the existing interpretation currently included in FAQ #695.[32] We note that the EPA is also proposing to amend subpart G of part 98 in this action to include a reporting requirement for facilities to report the annual quantity of excess hydrogen produced that is not consumed through the production of ammonia (see section III.C of the preamble for additional details).

Additionally, the EPA is proposing to amend the source category definition to clarify that stationary combustion sources that are part of the hydrogen production unit (*e.g.,* the reforming furnace and hydrogen production process unit heater) are part of the hydrogen production source category and that their emissions are to be reported under subpart P. Depending on the configuration of the hydrogen production unit, the exhaust gases from

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[31] See Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2017 (2019), available at *www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990–2017.*

[32] See GHGRP FAQ #695 ''What is a hydrogen production process unit?'' Available at: *https://ccdsupport.com/confluence/pages/viewpage.action?pageId=173080687.*

the combustion of fuel used to raise the temperature of the feedstocks and supply energy needed for the transformation reaction may be emitted through the same stack as the ''process'' emissions (*i.e.,* CO_2 produced from the transformation of feedstocks) or through separate stacks. Currently, 40 CFR 98.162 requires reporting of GHG emissions ''from each hydrogen production process unit'' under subpart P and reporting of GHG emissions from ''each stationary combustion unit other than hydrogen production process units'' under subpart C of part 98 (General Stationary Fuel Combustion Sources). This has led to some confusion regarding whether hydrogen production unit furnaces or process heaters that exhaust through a separate stack than the process emissions should be reported under subpart P or subpart C of this part. This proposed amendment to the source category definition seeks to clarify that these furnaces or process heaters are part of the hydrogen production process unit regardless of where the emissions are exhausted. We are also proposing to clarify that, if a hydrogen production unit with separate stacks for ''process'' emissions and ''combustion'' emission uses a CEMS for the process emissions stack, reporters must calculate and report the CO_2 emissions from the hydrogen production unit's fuel combustion using the mass balance equations in subpart P (equations P–1 through P–3) in addition to the CO_2 emissions measured by the CEMS. Although this circumstance is expected to be rare, these amendments are necessary to clarify the reporting requirements for cases where hydrogen production process and combustion emissions are emitted through separate stacks. These amendments also allow for a more direct comparison of the GHG emission intensities for hydrogen production units using single versus dual stack configurations.

Hydrogen production can be achieved through a variety of chemical processes including the use of steam methane reforming (SMR), SMR followed by water gas shift (WGS) reaction, partial oxidation (POX), POX followed by WGS, and water or brine electrolysis. Each chemical production process has different yields of hydrogen and, depending on the desired product, the product stream may require purification. There are different purification processes that most commonly include pressure swing adsorption (PSA), amine adsorption, or membrane separation. Similar to the chemical production process, each purification process may yield products of different hydrogen purity and have different energy requirements. It is also worth noting that some hydrogen plants may perform purification of hydrogen that is included in the feedstock entering the plant. An example would be a refinery that directs the exhaust gas from a process unit that has elevated levels of hydrogen to its hydrogen plant. In this case, the hydrogen plant acts to both ''produce hydrogen'' (by reforming, gasification, oxidation, reaction, or other feedstock transformations) and ''purify hydrogen'' that exists in the feedstock to the plant. That is, the total quantity of hydrogen exiting the hydrogen plant may consist of hydrogen chemically produced (and subsequently purified) within the unit as well as hydrogen merely purified by the unit.

For the reasons described in section II.D of this preamble, in order to best understand the reported data, we are proposing to add requirements for facilities to the report the process type for each hydrogen production unit (*i.e.,* SMR, SMR–WGS, POX, POX–WGS, Water Electrolysis, Brine Electrolysis, or Other (specify)), the purification type for each hydrogen production unit (*i.e.,* PSA, Amine Adsorption, Membrane Separation, Other (specify), or none), and the annual quantity of hydrogen that is only purified by each hydrogen production unit. We note that subpart P currently requires reporting of the quantity of hydrogen that is produced by each hydrogen production unit. We intended this quantity to only include that quantity of hydrogen produced in the unit by reforming, gasification, oxidation, reaction, or other transformations of feedstocks. Through verification efforts, we identified some facilities that were reporting the total quantity of hydrogen exiting the hydrogen production unit, not just the quantity of hydrogen produced within the unit via reforming, gasification, oxidation, reaction, or other transformations of feedstocks. We could identify these facilities because the ratio of hydrogen produced to feedstock consumed was outside of the expected range. We developed and posted a frequently asked question (FAQ #698)[33] to clarify this reporting element, but some reporters may still be reporting their combined quantity of hydrogen produced plus the quantity of hydrogen merely purified. In addition to proposing to add the annual quantity of hydrogen that is only purified by each hydrogen production unit, we are also proposing to clarify that the current reporting requirement is the annual quantity of hydrogen that is produced ''. . . by reforming, gasification, oxidation, reaction, or other transformations of feedstocks.''

We are also proposing to amend the current reporting requirement in 40 CFR 98.166(c) regarding the facility-level quantity of CO_2 that is collected and transferred offsite to require the quantity of CO_2 collected and transferred offsite to be reported on a unit-level. This is consistent with other revisions proposed in subpart P in the 2022 Data Quality Improvements Proposal (*e.g.,* mass of non-CO_2 carbon (excluding methanol) collected and transferred offsite) and would allow the EPA to perform unit-level analyses. We are also proposing to require reporting of the annual net quantity of steam consumed by the unit, which would be a positive quantity if the hydrogen production unit is a net steam user (*i.e.,* uses more steam than it produces) and a negative quantity if the hydrogen production unit is a net steam producer (*i.e.,* produces more steam than it uses). Together, these proposed additional, amended, and clarified reporting requirements would enable us to perform benchmarking across process types at the unit-level, conduct more rigorous verification of the reported data, better understand production quantities, and collect more comprehensive and accurate data to inform future policy decisions.

Because we are proposing to require all data elements be reported at the unit level, we are also proposing to reorganize and consolidate all of the reporting elements reported at the unit level under 40 CFR 98.166(b) regardless of the calculation method (*i.e.,* mass balance or CEMS). We are also proposing reporters provide the emissions calculation method used (CEMS for single hydrogen production unit; CEMS on a common stack for multiple hydrogen production units; CEMS on a common stack with hydrogen production unit(s) and other sources; CEMS measuring process emissions alone plus mass balance for hydrogen production unit fuel combustion using equations P–1 through P–3; mass balance using equations P–1 through P–3 only; mass balance using equations P–1 through P–4). If a common stack CEMS is used, either for multiple hydrogen production units or that includes emissions from other sources, we are proposing to require that the estimated fraction of CO_2 emissions attributable to each hydrogen production unit be reported so

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[33] See GHGRP FAQ #698 ''How do I determine the quantity of hydrogen produced?'' Available at: *https://ccdsupport.com/confluence/pages/viewpage.action?pageId=173080692.*

we can estimate unit-level CO_2 emissions for each hydrogen production unit. The revisions in 40 CFR 98.166(b) also require a proposed revision to 40 CFR 98.167(b) to broaden the recordkeeping requirements related to elements reported under 40 CFR 98.166(b).

We are also proposing to remove and reserve the recordkeeping requirements in 40 CFR 98.167(c). We determined that these recordkeeping requirements at 40 CFR 98.167(c)(1) are redundant to the general requirements already specified in 40 CFR 98.3(g) and that the requirements at 40 CFR 98.167(c)(2) and (3) are not applicable to hydrogen production units using the calculation method in 40 CFR 98.163(b).

We anticipate that the proposed data elements would require some additional monitoring or data collection by reporters. First, we are proposing to add several reporting elements to better characterize the type of hydrogen production unit and the type of associated purification process used. This information is readily available by hydrogen production unit owners or operators, so the data collection effort would be minimal and would not require any additional monitoring. We are also proposing to require reporting of emission and activity on a process unit basis, some of which was previously required only at the facility level. For reporters with multiple hydrogen production units, this may lead to a slight increase in the data collected by reporters. Finally, by proposing to broaden the source category to include captive hydrogen production units, there may be new reporters under subpart P. We expect that the number of new reporters would be small, because captive hydrogen production units at petroleum refineries were already required to report under subpart P due to requirements in subpart Y. However, there may be additional captive hydrogen production units that would newly have to report under subpart P and these reporters would have additional monitoring or data collection requirements. The proposed changes would therefore result in minimal additional burden to current subpart P reporters and more substantive additional burden to new reporters to subpart P. We are also proposing related confidentiality determinations for the additional data elements, as discussed in section VI of this preamble.

Due to the expected importance of hydrogen in future energy supply, the EPA is considering additional revisions to subpart P. The first revision would be to make subpart P an ''all-in'' subpart, such that any facility meeting the definition of the hydrogen production source category at 40 CFR 98.160 would be required to report under the GHGRP. This would entail moving subpart P from Table A–4 to Table A–3 so that it would no longer be subject to the 25,000 $mtCO_2e$ applicability threshold at 40 CFR 98.2(a)(2). The purpose of this potential revision would be to collect information on hydrogen production facilities that use electrolysis or other production methods that may have small direct emissions but use relatively large quantities of offsite energy to power the process. So, although the emissions occurring onsite at these hydrogen production facilities may fall below the current applicability threshold, the combined direct emissions (*i.e.,* ''scope 1'' emissions) and emissions attributable to energy consumption (*i.e.,* ''scope 2'' emissions)[34] could be significant. These considerations are especially important in understanding hydrogen as a fuel source. The EPA is aware of two concerns with this potential revision. First, it may be burdensome to small hydrogen producers. Second, even if small producers were exempted, the remaining newly applicable facilities (*i.e.,* those that have small direct emissions but use large quantities of offsite energy) may be eligible to cease reporting after three to five years, resulting in a limited data set.

To address the first concern, the EPA is considering including a minimum annual hydrogen production quantity within the subpart P source category definition to limit the applicability of the subpart to larger hydrogen production facilities. The current 25,000 $mtCO_2e$ threshold for subpart P translates to the production of approximately 2,500 metric tons (mt) of hydrogen for a steam methane reformer, a process which typically produces approximately 10 mt CO_2 per mt of hydrogen produced. We request comment on updating the subpart P source category definition to require reporting from hydrogen production processes that exceed a 2,500 mt hydrogen production threshold or other metric rather than a production threshold. We request comment on the appropriate production threshold and other approaches for revising the source category definition while also excluding small producers.

Regarding the second concern, 40 CFR 98.2(i) enables reporters to ''off-ramp'' (stop reporting) after three years if their emissions are under 15,000 $mtCO_2e$ or after five years if their emissions are between 15,000 and 25,000 $mtCO_2e$. As discussed above, EPA anticipates that hydrogen production facilities that use electrolysis or other production methods that may have smaller direct emissions (*i.e.,* scope 1 emissions) would likely qualify to cease reporting after three to five years. We are seeking comment on potential options for how we could require continued reporting for the newly applicable subpart P reporters when a reporter would normally be eligible to stop reporting, to enable collection of a more comprehensive data set over time. Two examples of how this could be accomplished would be to exempt subpart P reporters from the provisions at 40 CFR 98.2(i) or develop a subpart P-specific off-ramp provision tied to hydrogen production levels consistent with the potential revised source category definition.

Finally, the EPA is considering revising subpart P to require hydrogen production facilities to report the quantity of hydrogen provided to each end-user (including both onsite use and delivered hydrogen) and, if the end-user reports to GHGRP, the GHGRP ID for that customer. Because hydrogen production can be GHG intensive, we consider it important to understand the demand for and use of hydrogen for carrying out a wide variety of CAA provisions. We request comment on the approach to collecting this sales information and the burden such a requirement may impose. One potential option would be to limit the reporting requirement to bulk hydrogen sales, and we request comment on the quantity of hydrogen that should qualify as bulk under this scenario. In addition, the EPA anticipates that some facilities may deliver hydrogen to a pipeline and may not know the end customers for these deliveries. However, the EPA anticipates that this situation could be mitigated by only requiring facilities to report information on sales where the customers are known to the facility.

H. Subpart Y—Petroleum Refineries

We are proposing several amendments to subpart Y of part 98 (Petroleum Refineries) that would provide clarification and consistency to the rule requirements.

First, for the reasons described in section II.B of this preamble, we are proposing to delete reference to non-merchant hydrogen production plants in paragraph 40 CFR 98.250(c) and to delete and reserve paragraphs 40 CFR 98.252(i), 98.255(d), and 98.256(b). We are proposing these deletions because of

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[34] See section IV.A.1 of this preamble for additional information on the EPA's collection of data related to energy consumption.

the proposed revisions to subpart P of part 98 (Hydrogen Production) that broaden the applicability of subpart P beyond merchant hydrogen production units. Hydrogen production units collocated at petroleum refineries would continue to have their emissions reported under subpart P, but subpart Y would no longer have to specifically require the non-merchant hydrogen production units to be reported under subpart P because subpart P would directly apply to these units.

Second, we are proposing to delete reference to coke calcining units in paragraphs 40 CFR 98.250(c) and 98.257(b)(16) through (19) and to remove and reserve paragraphs 40 CFR 98.252(e), 98.253(g), 98.254(h), 98.254(i), 98.256(i), and 98.257(b)(27) through (31). We are proposing these removals because of the proposed addition of subpart WW to part 98 (Coke Calciners) (see section IV.B of this preamble for additional information). With the addition of subpart WW, these provisions would no longer be necessary in subpart Y. Facilities with coke calciners would report their coke calcining unit emissions in the new proposed subpart WW, therefore maintaining these requirements in subpart Y would be duplicative.

Third, for the reasons described in section II.D of this preamble, we are proposing to include a requirement to report the capacity of each asphalt blowing unit. Unlike other emission units subject to reporting in subpart Y, asphalt blowing units currently do not have a reporting requirement for the unit-level capacity. Consistent with the existing reporting requirements for other emissions units under subpart Y, we are proposing to include a requirement for the maximum rated unit-level capacity of the asphalt blowing unit, measured in mt of asphalt per day, in 40 CFR 98.256(j)(2). These data would be used by the EPA for emissions analysis, data normalization, benchmarking, and emissions verification.

We do not anticipate that the proposed data elements would require any additional monitoring or data collection by reporters, because the only added data element is the capacity of each asphalt blowing unit, which is expected to be readily available on the equipment or in the operating permit for the unit. The proposed changes would therefore result in minimal additional burden to reporters. We are also proposing related confidentiality determinations for the additional data element, as discussed in section VI of this preamble.

I. Subpart AA—Pulp and Paper Manufacturing

For the reasons described in section II.C of this preamble, the EPA is proposing to amend specific provisions in the GHG Reporting Rule to require additional calculation requirements under subpart AA of part 98 (Pulp and Paper Manufacturing). We are proposing to revise 40 CFR 98.273 to include calculation requirements for the combustion of biomass fuels from Table C–1 to subpart C of part 98 (General Stationary Fuel Combustion Sources) and for the combustion of biomass with other fuels for each reported unit-type. For the units reported under this subpart, the rule currently includes methodologies to calculate CO_2, CH_4 and N_2O emissions from the combustion of fossil fuels, and CH_4, N_2O and biogenic CO_2 emissions from the combustion of spent liquor solids. However, there is no calculation methodology provided for a scenario in which biomass other than spent liquor solids are fired within a unit or co-fired or blended with fossil fuels. Therefore, we are proposing to revise 40 CFR 98.273 to include methodologies to calculate CH_4, N_2O and biogenic CO_2 emissions from the combustion of biomass fuels other than spent liquor solids, as well as the combustion of biomass other than spent liquor solids with other fuels, according to the applicable methodology from the provisions for stationary combustion sources found at 40 CFR 98.33(a), 40 CFR 98.33(c), and 40 CFR 98.33(e).

For the reasons described in section II.E of this preamble, we are also proposing to revise the subpart AA reporting requirements at 40 CFR 98.276(a) to remove references to biogenic CH_4 and biogenic N_2O. These terms have no meaning in the rule as CH_4 and N_2O are treated the same whether from biomass or fossil fuel combustion. This change aligns subpart AA with the terminology used for stationary combustion sources in subpart C and other combustion emissions throughout the rule.

Lastly, we are proposing to correct a typographical error at 40 CFR 98.277(d) by revising ''detemining'' to ''determining''.

J. Subpart HH—Municipal Solid Waste Landfills

For the reasons described in sections II.B and II.C of this preamble, we are proposing several revisions to subpart HH of part 98 (Municipal Solid Waste Landfills) to improve the quality of data collected under the GHGRP. First, for the reasons described in section II.B of this preamble, we are proposing to account for methane emissions from large release events that are currently not quantified under the GHGRP. In light of recent aerial studies indicating that methane emissions from landfills may be considerably higher than methane emissions quantified/reported under subpart HH,[35] the EPA reviewed the current subpart HH equations and available literature [36] to determine methods by which the subpart HH calculation methodologies could be modified or improved to account for these high emission events, particularly for landfills with gas collection systems. The following three likely reasons for high emission events were identified: (1) a poorly operating or non-operating gas collection system; (2) a poorly operating or non-operating destruction device; and (3) a leaking cover system due to cracks, fissures, or gaps around protruding wells. With respect to a poorly operating or non-operating gas collection system, equations HH–7 and HH–8 account for this in the ''f_{Rec}'' term (*i.e.,* the fraction of annual operating hours the associated recovery system was operating). In reviewing equations HH–7 and HH–8, we realized that the equations suggest that the f_{Rec} term is a function of the measurement location. For the reasons described in section II.C of this preamble, we are proposing revisions to equations HH–7 and HH–8 to more clearly indicate that the f_{Rec} term is dependent on the gas collection system. This proposed revision clarifies how the equation should apply to landfills that may have more than one gas collection system and may have multiple measurement locations associated with a single gas collection system. For the reasons discussed in section II.B of this preamble, we are also proposing that recovery system operating hours would only include those hours when the system is operating normally. We are proposing that facilities would not include hours when the system is shut down or when the system is poorly operating (*i.e.,* not operating as intended). We anticipate that poorly operating systems could be identified when pressure, temperature, or other parameters indicative of system performance are outside of normal variances for a significant portion of the system's gas collection wells. We are

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[35] Duren, R.M., et al. 2019. ''California's methane super-emitters.'' *Nature* 575, 180–184. 7 November 2019. Available at: *https://doi.org/10.1038/s41586-019-1720-3.*

[36] See *Technical Support for Supplemental Revisions to Subpart HH: Municipal Solid Waste Landfills,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

seeking comment on what set of parameters should be used to identify these poorly operating periods and whether a threshold on the proportion of wells operating outside of their normal operating variance should be included in the definition of the f_{Rec} term to define these periods of poor performance, which we are proposing to exclude from the ''normal'' operating hours. With respect to a poorly operating or non-operating destruction device, equations HH–6, HH–7 and HH–8 account for this in the ''f_{Dest}'' term (*i.e.,* the fraction of annual hours the destruction device was operating). We are also proposing revisions to f_{Dest} to clarify that the destruction device operating hours exclude periods when the destruction device is poorly operating. We are proposing that facilities should only include those periods when flow was sent to the destruction device and the destruction device was operating at its intended temperature or other parameter that is indicative of effective operation. For flares, we are proposing that periods when there is no pilot flame would be considered a poorly operating period that is excluded from destruction device operating hours. The proposed revisions would ensure that the equations account for emissions from periods in which the gas collection systems or destruction devices are poorly operating or non-operating.

With respect to emissions from leaking cover systems due to cracks, fissures, or gaps around protruding wells, these issues would reduce the landfill gas collection efficiency and would also reduce the fraction of methane oxidized near the surface of the landfill. We found that equations HH–6, HH–7, and HH–8 do not directly account for periods where surface issues reduce the gas collection efficiency and/or reduce the fraction of methane oxidized. Owners or operators of landfills with gas collection systems subject to the control requirements in the NSPS as implemented in 40 CFR part 60, subpart WWW or XXX, EG in 40 CFR part 60, subparts Cc or Cf as implemented in approved state plans, or Federal plans as implemented at 40 CFR part 62, subparts GGG or OOO must operate the gas collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To demonstrate compliance with this requirement, landfill owners or operators must monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30-meter intervals for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the rule's specifications. The probe inlet must be placed within 5 to 10 centimeters of the ground. Any reading of 500 parts per million or more above background at any location must be recorded as a monitored exceedance and corrective actions must be taken.

Considering the applicability of the landfill NSPS (40 CFR part 60, subpart WWW or XXX), state plans implementing the EG (40 CFR part 60, subparts Cc or Cf), or Fplans (40 CFR part 62, subparts GGG or OOO), we estimate that more than 70 percent of landfills with gas collection systems must make these surface measurements. Data presented by Heroux, et al.,[37] suggests that the methane flux is proportional to the measured methane concentration at 6 centimeters above the ground. We are proposing to add a term to equations HH–6, HH–7, and HH–8 based on this correlation to adjust the estimated methane emissions for monitoring exceedances. We are proposing to add surface methane concentration monitoring methods at 40 CFR 98.344(g) commensurate with the monitoring requirements in the landfill NSPS, EG, or Federal plans. We are proposing to require landfill owners and operators that must already conduct these surface measurements to conduct the measurements as specified in 40 CFR 98.344(g), provide a count of the number of exceedances identified during the required surface measurement period, including exceedances when re-monitoring (if re-monitoring is conducted), and use an additional equation term to adjust the reported methane emissions to account for these exceedances. For more information on the assessment of landfills subject to the NSPS, state plans implementing the EG, or Federal plan and the development of the additional equation term, see *Technical Support for Supplemental Revisions to Subpart HH: Municipal Solid Waste Landfills,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

Comments received on the 2022 Data Quality Improvements Proposal cited a Maryland study in which the collection efficiencies for non-regulated landfills were 20 percent lower, on average, than for regulated landfills (*i.e.,* subject to NSPS, state plans implementing EG, or Federal plan).[38] These results make sense because the objective of the surface methane concentration measurements are to ensure proper gas collection and non-regulated landfills that do not conduct these measurements would not necessarily have such checks in place and may be expected to have higher emissions. However, the landfill gas collection efficiency for a given landfill depends on numerous factors. Specifically, the subpart HH calculation methodology will yield different average gas collection efficiencies based on the relative area of the landfill affected by the gas collection system and the type of soil cover used in those areas affected by the gas collection system, as provided in Table HH–3 to subpart HH of part 98. Therefore, we reviewed the Maryland study data and compared the Maryland study data results with the collection efficiencies reported under subpart HH (for Maryland landfills also reporting to the GHGRP). For the subset of Maryland landfills also reporting to the GHGRP, the Maryland study gas collection efficiencies for non-regulated landfills was 20 percent lower than for regulated landfills, which is consistent with the findings using the full set of Maryland landfills. However, the GHGRP reported gas collection efficiencies for non-regulated landfills in Maryland were 10 percent lower than for regulated landfills. Thus, it appears that some of the observed differences in the gas collection efficiencies for the Maryland landfills may already be accounted for by the subpart HH calculation methodology. If the default gas collection efficiencies provided in Table HH–3 were 10 percent lower than the existing values for non-regulated landfills, the GHGRP calculated collection efficiencies would agree with the 20 percent overall differences observed in the Maryland study. For more detail regarding our review of the Maryland study data, see *Technical Support for Supplemental Revisions to Subpart HH: Municipal Solid Waste Landfills,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

Based on our review of the Maryland study data along with the existing methodologies in subpart HH, we are proposing to include a new set of gas collection efficiency values in Table HH–3 that are applicable to landfills that do not conduct surface methane

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[37] Heroux, M., C. Guy, and D. Millete. 2010. ''A Statistical Model for Landfill Surface Emissions.'' *Journal of the Air & Waste Management Association,* 60:2, 219–228. *https://doi.org/10.3155/1047-3289.60.2.219.*

[38] Environmental Integrity Project. Public Comments on Docket Id. No. EPA–HQ–OAR–2019–0424, Revisions and Confidentiality Determinations for Data Elements Under the Greenhouse Gas Reporting Rule, Proposed Rule, 87 FR 36920 (June 21, 2022).

concentration measurements (*i.e.,* facilities that are not subject to the landfill NSPS, EG, or Federal plan or that do not elect to monitor their landfill cover according to the landfill rule requirements at 40 CFR 98.344(g)(7)). These new factors are 10 percent lower than the current values in Table HH–3. We are proposing to also retain the current set of collection efficiencies, but to modify the provision such that these values would only be applicable for landfills that are conducting surface methane concentration measurements according to the landfills rule requirements. We are proposing that facilities that are not subject to the landfill NSPS (40 CFR part 60, subpart WWW or XXX), state plans implementing the EG (40 CFR part 60, subparts Cc or Cf), or Federal plans (40 CFR part 62, subparts GGG or OOO) must either: (1) use the proposed lower gas collection efficiency values; or (2) monitor their landfill cover and use the current set of collection efficiency values. We are also proposing to add surface methane concentration monitoring methods at 40 CFR 98.344, which would require landfill owners and operators that elect to conduct these surface measurements to conduct the measurements using the methods in NSPS 40 CFR part 60, subpart XXX; provide a count of the number of locations with concentration above 500 parts per million above background identified during the surface measurement period; and to use the proposed equation term to adjust the reported methane emissions to account for these occurrences.

We are requesting comment on the new set of proposed collection efficiencies for landfills with gas collection systems that do not conduct surface methane concentration measurements. Specifically, we request comment on our selection of 10 percent lower collection efficiencies for landfills that are not monitored for surface methane rather than selecting a 20 percent lower value as suggested by commenters that referenced the Maryland study data. We also request comment along with supporting data on whether the EPA should select an alternative collection efficiency value than the proposed 10 percent difference or the 20 percent difference we considered in response to comment.

The EPA is also proposing to revise the reporting requirements for landfills with gas collection systems consistent with the proposed revisions in the methodology. We are proposing to separately require reporting for each gas collection systems and for each measurement location within a gas collection system. We are also proposing that, for each measurement location that measures gas to an on-site destruction device, certain information be reported about the destruction device, including: type of destruction device; the annual hours gas was sent to the destruction device; the annual operating hours where active gas flow was sent to the destruction device and the destruction device was operating at its intended temperature or other parameter indicative of effective operation; and the fraction of the recovered methane reported for the measurement location directed to the destruction device. Note, for sites that have a single measurement location that subsequently sends gas to multiple destruction devices, we realize the hours gas is sent to each device and the fraction of recovered methane sent to each device would have to be estimated based on best available data or engineering judgement. We are also proposing to require reporting of identifying information for each gas collection system, each measurement location within a gas collection system, and each destruction device.

These reporting requirements are similar to those currently included in subpart HH but have been restructured to more clearly identify reporting elements associated with each gas collection system, each measurement location within a gas collection system, and each control device associated with a measurement location.

We are also adding reporting requirements for landfills with gas collection systems to indicate the applicability of Federal rules or state and Federal implementation plans that require quarterly surface monitoring, an indication of whether surface methane concentration monitoring is conducted, the frequency of monitoring, and the information for each instance surface methane concentrations exceeded 500 parts per million above background, including re-monitoring exceedances. These additional reporting elements are being proposed to better understand the applicability of the NSPS (40 CFR part 60, subpart WWW or XXX), state plans implementing the EG (40 CFR part 60, subparts Cc or Cf), and Federal plans (40 CFR part 62, subparts GGG or OOO), and to support verification of the reported emissions given the additional term added to equations HH–6, HH–7, and HH–8 and the different gas collection efficiency values.

Currently, subpart HH estimates of methane emissions from landfills are based on modeling data and methane measurement data from landfill gas collection systems. In addition to our proposal of using methane surface emissions monitoring to better quantify subpart HH estimates, the EPA is seeking comment on how other methane monitoring technologies, *e.g.,* satellite imaging, aerial measurements, vehicle-mounted mobile measurement, or continuous sensor networks, might enhance subpart HH emissions estimates. Specifically, the EPA is seeking comment for examples of methane data collected from available monitoring methodologies and how such data might be incorporated into subpart HH for estimating annual emissions.

Finally, we are clarifying a proposed revision included in the 2022 Data Quality Improvements Proposal. As described in the preamble of that document, for Table HH–1, we proposed to revise the first order of decay rate (k) for bulk waste under both the ‘‘Bulk waste option’’ and the ‘‘Modified bulk MSW option’’ to 0.055 to 0.142 per year. However, we inadvertently included the current k value for bulk waste under the Modified bulk MSW option (0.02 to 0.057 per year) in the amendatory text of that document. Therefore, in today’s proposal, we are correcting this oversight and proposing to revise the k value for bulk waste under the Modified bulk MSW option in Table HH–1 to be 0.055 to 0.142 per year. For more information on the proposed k value for bulk waste under the Modified bulk MSW option, see the preamble to the 2022 Data Quality Improvements Proposal and the memorandum, *Multivariate analysis of data reported to the EPA’s Greenhouse Gas Reporting Program (GHGRP), Subpart HH (Municipal Solid Waste Landfills) to optimize DOC and k values,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

In addition to the proposed revisions, we are also providing notification of additional materials available for review related to proposed revisions to subpart HH included in the 2022 Data Quality Improvements Proposal (87 FR 37008; June 21, 2022). As discussed in the June 21, 2022 proposed rule, the EPA previously conducted a multivariate analysis based on 6 years of data from 355 landfills reporting under subpart HH, which we subsequently relied on to propose revised degradable organic carbon (DOC) and first order decay rate (k) values for the Bulk Waste and Modified Bulk Waste streams in Table HH–1. We summarized the methodology and findings of the analysis in the memorandum from Meaghan McGrath, Kate Bronstein, and Jeff Coburn, RTI International, to Rachel Schmeltz, EPA, *Multivariate analysis of data reported to* *the EPA's Greenhouse Gas Reporting Program (GHGRP), Subpart HH (Municipal Solid Waste Landfills) to optimize DOC and k values,* (June 11, 2019), available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

Following the 2022 Data Quality Improvements Proposal, we received requests from waste industry stakeholders regarding the referenced memorandum and the availability of the cohort data supporting the analysis, the input files used in the analysis, and the summary of the analysis results that were used to support the proposed revised DOC and k values. These materials are referred to within the docketed memorandum but were inadvertently not included as attachments to the document in the proposed rule docket. On recognizing this oversight, we subsequently uploaded the materials as attachments to the original memorandum on August 11, 2022, found at *www.regulations.gov/document/EPA-HQ-OAR-2019-0424-0170.* In this supplemental proposal, we are providing further notification that these materials are available, and we are seeking additional comment on these materials during the comment period of this supplemental proposal. Note that some of the file types supporting the analysis, including files generated by RStudio (an open source statistical programming software), are not supported by *www.regulations.gov/;* however, interested parties may reference the directions at *www.regulations.gov/document/EPA-HQ-OAR-2019-0424-0170* to contact the EPA Docket Center Public Reading Room to request to view or receive a copy of all documents.

K. Subpart OO—Suppliers of Industrial Greenhouse Gases

For the reasons provided in section II.A of this preamble, the EPA is proposing revisions to subpart OO of part 98 (Suppliers of Industrial Greenhouse Gases) that would improve the quality of the data collected under the GHGRP and that would clarify certain provisions. To improve the quality of the data collected under the GHGRP, we are proposing to add requirements for bulk importers of F–GHGs to provide, as part of the information required for each import in the annual report, copies of the corresponding U.S. Customs and Border Protection (CBP) entry forms (*e.g.,* CBP Form 7501), and that suppliers of F–HTFs identify the end uses for which F–HTFs are used and the quantity of each F–HTF transferred for each end use, if known. The EPA currently requires at 40 CFR 98.417(c) that bulk importers of fluorinated GHGs retain records substantiating each of the imports that they report, including: a copy of the bill of lading for the import, the invoice for the import, and the CBP entry form. Under the existing regulations, these records must be made available to the EPA upon request by the administrator (40 CFR 98.3(g)). In conducting verification reviews of the historically reported import data related to HFCs, the EPA discovered discrepancies between data reported to e-GGRT and those reported to CBP with an entry. The EPA contacted the corresponding suppliers to request substantiating documentation and found several erroneous subpart OO submissions for various suppliers and years, with some of these errors representing significant CO_2e quantities. Furthermore, the data in e-GGRT and those entry data reported to CBP are not directly comparable (due to differences in scope, HTS codes that cover broad groups of chemicals, etc.), so while this comparison can lead to the discovery of some errors, such comparison does not result in robust verification. Additionally, subpart OO imports can vary greatly from year to year for an individual supplier, so the EPA's standard verification checks (*e.g.,* looking at outliers or changes from year to year) are not as effective at identifying errors in subpart OO reports as they are for other GHGRP subparts. Therefore, requiring that suppliers submit substantiating records (*i.e.,* the CBP forms) as a part of the annual report would improve verification and data quality for subpart OO. The EPA would be able to review the documentation to ensure that supplier-level and national-level fluorinated gas import data are accurate. The proposed changes would add a reporting requirement to 40 CFR 98.416(c). Because the entry form is already required to be retained as a record at 40 CFR 98.417(c)(3) for each of the imports reported, it is not anticipated that this reporting requirement would cause a significant change in burden.

However, because certain information related to HFC imports is now being tracked under 40 CFR part 84 (the AIM Act phasedown of hydrofluorocarbons), we are proposing that the documentation reporting requirement would not apply to imports of HFCs that are regulated substances under 40 CFR part 84. For example, if a supplier imported both SF_6 and HFC–134a in a reporting year, the supplier would only submit the entry forms associated with the imports of SF_6 in their annual GHG report submitted under 40 CFR part 98. As HFC–134a is a regulated substance under 40 CFR part 84, the importer would already provide substantiating information to the EPA under that part. This would reduce potential duplicative burden on the suppliers that are subject to both 40 CFR part 98 and 40 CFR part 84. We seek comment on this possible exception for AIM HFC suppliers.

Although we are proposing to collect copies of the CBP entry form for each import, we seek comment on whether other types of documentation associated with an import may be more useful, *e.g.,* the bill of lading. We seek comment on the type of information available in these forms in practice, and which would best suit the verification goals of the GHGRP. We are also proposing a related confidentiality determination for the documentation reporting requirement, as discussed in section VI of this preamble.

Additionally, we are proposing to require at 40 CFR 98.416(k) that suppliers of F–HTFs, including but not limited to perfluoroalkylamines, perfluoroalkylmorpholines, hydrofluoroethers, and perfluoropolyethers (including PFPMIE), identify the end uses for which the heat transfer fluid is used and the aggregated annual quantities of each F–HTF transferred to each end use, if known. This proposed requirement, which is patterned after a similar requirement under subpart PP of part 98 (Suppliers of Carbon Dioxide), would help to inform the development of GHG policies and programs by providing information on F–HTF uses and their relative importance. This proposed requirement supplements our 2022 Data Quality Improvements Proposal to require similar information for N_2O, SF_6, and PFCs. We are proposing the requirement for F–HTFs because: (1) the GWP-weighted quantities of these compounds that are supplied annually to the U.S. economy are relatively large; and (2) the identities and magnitudes of the uses of these compounds are less well understood than those of some other industrial GHGs, such as HFCs used in traditional air-conditioning and refrigeration applications. Fluorinated HTFs are known to be used in electronics manufacturing for temperature control (process cooling), thermal shock testing of devices, cleaning substrate surfaces and other parts, and soldering, but the total quantity of F–HTFs that are emitted from electronics manufacturing has fallen significantly below the total quantity of F–HTFs supplied annually to the U.S. economy from 2011 through 2019. Discussions with F–HTF suppliers indicate that this shortfall is at least partly attributable to substantial uses of F–HTFs outside of the electronics industry. To better understand the magnitudes and trends of these uses, we are proposing to collect information from suppliers of these compounds on how their customers use the compounds, and in what quantities. This issue is discussed further in the *Technical Support Document on Use of Fluorinated HTFs Outside of Electronics Manufacturing* included in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424). As discussed in section II.A.2 of this preamble, we are also proposing to revise the definition of ''fluorinated HTF,'' currently included in subpart I of part 98 (Electronics Manufacturing), and to move the definition to subpart A of part 98 (General Provisions) to harmonize with the proposed changes to subpart OO.

To inform the revision of the subpart OO electronic reporting form in the event that this proposed amendment is finalized, we request comment on the end use applications for which F–HTFs are used and their relative importance. The EPA is aware of the following end uses of F–HTFs:

The following applications within electronics manufacturing:

- temperature control;
- device testing (thermal shock testing);
- cleaning substrate surfaces and other parts; and
- soldering.

The following applications outside of electronics manufacturing:

- Temperature control within data center operations (including cryptocurrency mining);
- Immersion cooling;
- Direct-to-chip (*i.e.,* plate) cooling;
- Temperature control for military purposes, including cooling of electronics in ground and airborne radar (klystrons); avionics; missile guidance systems; ECM (Electronic Counter Measures); sonar; amphibious assault vehicles; other surveillance aircraft; lasers; SDI (Strategic Defense Initiative; stealth aircraft; and electric motors;
- Temperature control in pharmaceutical manufacturing;
- Temperature control in medical applications;
- Solvent use outside the electronics manufacturing industry (*e.g.,* use as a deposition solvent in filter and aerospace manufacturing, use to clean medical devices);
- Coatings for adhesives; and
- Thermal shock testing outside the electronics manufacturing industry.

Finally, we are also proposing to clarify certain exceptions to the subpart OO reporting requirements for importers and exporters. Currently, the importer reporting requirement at 40 CFR 98.416(c) reads:

''Each bulk importer[/exporter] of fluorinated GHGs, fluorinated HTFs, or nitrous oxide shall submit an annual report that summarizes its imports[/exports] at the corporate level, except for shipments including less than twenty-five kilograms of fluorinated GHGs, fluorinated HTFs, or nitrous oxide, transshipments, and heels that meet the conditions set forth at § 98.417(e).''

The exporter reporting requirement at 40 CFR 98.416(d) is similar, except heels are not required to meet the conditions set forth at 40 CFR 98.417(e).

We are proposing to revise 40 CFR 98.416(c) and (d) to clarify that the exceptions are voluntary, consistent with our original intent. This proposed change would also minimize the burden of reporting HFC imports and exports under subpart OO after reporting HFC imports and exports under 40 CFR part 84 (the AIM Act phasedown of hydrofluorocarbons) for reporters who are subject to both programs. Under subpart A of part 84, there are no exceptions for reporting imports or exports of shipments of less than 25 kilograms, transshipments, or heels.

To implement this change, we are proposing to insert ''importers may exclude'' between ''except'' and ''for shipments'' in the first sentence of paragraphs 98.416(c) and (d), deleting the ''for.'' We are also proposing to clarify that imports and exports of transshipments would both have to be either included or excluded for any given importer or exporter, and we are proposing a similar clarification for heels. The last two clarifications are intended to prevent the bias in the net supply estimate (the difference between imports and exports) that would occur if, for example, transshipments were counted as imports but not exports or vice versa.

Because the exceptions under subpart OO were intended to reduce burden rather than to increase data quality, we do not anticipate that data quality would be negatively affected by clarifying that the exceptions are voluntary, as long as the exceptions are treated consistently by individual reporters as described in this section. (In fact, as discussed further in this section, including heels is expected to increase data quality.) The only potential concerns that we have identified are potential inconsistencies among importers or exporters or for the same importer or exporter over time. Inconsistency among importers or exporters could occur if some importers or exporters chose to include the excepted quantities in their reports while others did not.[39] Inconsistency for individual importers or exporters over time could occur if some importers or exporters who have not previously reported the excepted quantities decided to begin reporting them. However, because the quantities affected by the exceptions are expected to be small, we anticipate that these inconsistencies would also be small.

If these inconsistencies (or other data quality issues raised by commenters) did pose a concern, one way of minimizing such concerns while minimizing the burden of reporting HFC imports and exports under both subpart OO and part 84 would be to eliminate the exceptions as they apply to HFCs regulated under part 84, which would harmonize the data requirements of the two programs for importers and exporters. We request comment on this option.

We are also requesting comment on the option of specifically eliminating the exception for heels from 40 CFR 98.416(c) and (d) for importers and exporters of all industrial gases and fluorinated HTFs. A heel is the quantity of gas that remains in a container after most of the gas has been extracted.[40] Not reporting heels can result in bias in net supply estimates. This is because the exception for heels does not apply when the heel is part of the contents of a full container on its way to gas users (*e.g.,* exported), but the exception does apply when the heel is the only gas in the container being returned to producers or distributors (*e.g.,* imported). For example, in the typical scenario where a heel makes up about 10 percent of the contents of a full container, 100 percent of the gas would be reported as exported, but, if the exception for heels were used, none of the gas would be reported as imported when the container was returned, even though 10 percent of the original contents would in fact be imported. This would result in an estimate that 100 percent of the gas was permanently exported when only 90 percent of the gas was actually permanently exported. Eliminating the exception for heels would eliminate this bias, improving the quality of the data collected under the GHGRP. However, this change could also increase burden for importers and exporters reporting

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[39] This presumes that the importers and exporters are not already reading the exceptions as voluntary.

[40] A heel is often left in the container because removing it would require special equipment (*e.g.,* a pump).

imports and exports of industrial gases and fluorinated HTFs other than HFCs.

L. Subpart PP—Suppliers of Carbon Dioxide

For the reasons provided in section II.D of this preamble, the EPA is proposing revisions to subpart PP of part 98 (Suppliers of Carbon Dioxide) that would improve the quality of the data collection under the GHGRP. Specifically, the EPA is proposing to add and amend certain data reporting requirements in 40 CFR 98.426(f) and (h). The proposed changes would improve our understanding of supplied CO_2 through the economy. CO_2 is captured across a range of different facilities including gas processing plants, ethanol plants, electric generating units (EGUs), and other manufacturing and processing facilities. In the future, CO_2 capture deployment is expected to expand at these types of facilities and may also be captured at other types of facilities including at direct air capture facilities. The GHGRP tracks the supply and storage of CO_2 through the economy based on data reported to subparts PP (Suppliers of Carbon Dioxide), RR (Geologic Sequestration of Carbon Dioxide), UU (Injection of Carbon Dioxide), and proposed subpart VV (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916) (see 87 FR 36920; June 21, 2022).

Suppliers subject to subpart PP report data on CO_2 captured. These suppliers must report the aggregated annual quantity of CO_2 in metric tons that is transferred to each of the end use applications listed at 40 CFR 98.426(f). This includes, but is not limited to, reporting the amount transferred for geologic sequestration that is covered by subpart RR (40 CFR 98.426(f)(11)). In the 2022 Data Quality Improvements Proposal, the EPA proposed to add subpart VV (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916). To ensure that we are adequately tracking the end use applications of supplied CO_2, the EPA is proposing to add a data element to 40 CFR 98.426(f) that would require suppliers to report the annual quantity of CO_2 in metric tons that is transferred for use in geologic sequestration with EOR subject to subpart VV. Without this change, suppliers would have otherwise been required to report this quantity under one of the other end use applications listed at 40 CFR 98.426(f). Therefore, the EPA anticipates that this new data element would result in a negligible increase in reporting burden.

The EPA is considering further expanding the list of end-use applications reported at 40 CFR 98.426(f) to better account for and track emerging CO_2 end uses. To that end, the EPA is seeking comment on CO_2 end uses that would be appropriate to add to 40 CFR 98.426(f). Possible additions could include algal systems, chemical production, and/or mineralization processes, such as the production of cements, aggregates, or bicarbonates. The EPA seeks comment on what other end uses may be appropriate to add to 40 CFR 98.426(f) in future rulemakings.

Under 40 CFR 98.426(h), facilities that capture a CO_2 stream from an EGU that is subject to subpart D of part 98 (Electricity Generation) and transfer CO_2 to any facilities that are subject to subpart RR are currently required to report additional information including the GHGRP facility identification number associated with the subpart D facility, the GHGRP facility identification numbers for the subpart RR facilities to which the CO_2 is transferred, and the annual quantities of CO_2 transferred to each of those subpart RR facilities. The EPA believes that expanding the applicability of 40 CFR 98.426(h) to apply to sources beyond subpart D EGUs is essential to allow the EPA to fully track captured and sequestered CO_2 in the economy. Additionally, the EPA believes that expanding the paragraphs to apply to facilities that transfer CO_2 to facilities subject to subpart VV would be more comprehensive, given that proposed subpart VV would also apply to geologic sequestration.

Therefore, the EPA is proposing to amend 40 CFR 98.426(h) to apply to any facilities that capture a CO_2 stream from a facility subject to 40 CFR part 98 and supply that CO_2 stream to facilities that are subject to either subpart RR or proposed subpart VV. In other words, the revised paragraph would no longer apply only to EGUs subject to subpart D, but to any direct emitting facility that is the source of CO_2 captured and transferred to facilities subject to subparts RR or VV. The revised data elements would require that any facility that captures a CO_2 stream and transfers CO_2 to any facility subject to subpart RR or subpart VV to report the GHGRP facility identification number for the facility from which the CO_2 is captured, the GHGRP facility identification numbers for the subpart RR and subpart VV facilities to which the CO_2 is transferred, and the quantities of CO_2 supplied to each receiving facility. For 40 CFR 98.426(h)(1), which requires the facility identification number for the CO_2 source facility, the applicable facility identification number may be the same as the subpart PP facility or may be that of a separate direct emitting facility (*e.g.,* a subpart D EGU facility, a subpart P hydrogen production facility), depending on the facility-specific characteristics. The EPA believes the reporting burden for these revisions will be negligible because facilities already have this information readily available.

The EPA is considering further expanding the requirement at 40 CFR 98.426(h) such that facilities subject to subpart PP would report transfers of CO_2 to any facilities reporting under 40 CFR part 98, not just those subject to subparts RR and VV. This would include reporting the amount of CO_2 transferred on an annual basis as well as the relevant GHGRP facility identification numbers. The EPA understands that this information would be readily available to facilities subject to subpart PP as these facilities are aware of their customer base. In addition, subpart PP facilities already report information on a variety of end uses under 40 CFR 98.426(f). The EPA is requesting comment on whether this information would be readily available as well as other relevant information the EPA should consider regarding this potential revision.

M. Subpart QQ—Importers and Exporters of Fluorinated Greenhouse Gases Contained in Pre-Charged Equipment and Closed-Cell Foams

For the reasons provided in section II.D of this preamble, we are proposing revisions to subpart QQ of part 98 (Importers and Exporters of Fluorinated Greenhouse Gases Contained in Pre-Charged Equipment or Closed-Cell Foams) that would improve the quality of the data collection under the GHGRP. Specifically, we are proposing to add a requirement for importers of F–GHGs in equipment and foams to provide, as part of the information required for each import in the annual report, copies of the corresponding CBP entry forms (*e.g.,* CBP form 7501). The EPA currently requires at 40 CFR 98.437(a) that importers retain records substantiating each of the imports that they report, including: a copy of the bill of lading for the import, the invoice for the import, and the CBP entry form. Under the existing regulations, these records must be made available to the EPA upon request by the administrator (40 CFR 98.3(g)). As discussed in section III.K of this preamble, in conducting verification reviews of the historically reported subpart OO (Suppliers of Industrial Greenhouse Gases) import data for HFCs, the EPA discovered discrepancies between data reported to e-GGRT and those entry data reported to CBP. The EPA contacted the corresponding suppliers to request substantiating documentation and found several erroneous subpart OO submissions for various suppliers and years, with some of these errors representing significant CO_2e quantities. The EPA has so far been unable to do a similarly useful comparison for subpart QQ data, primarily because the data in e-GGRT and those in CBP are not directly comparable (due to differences in scope, differences in HTS code coverage, etc.). Therefore, the EPA has thus far been unable to screen for errors in subpart QQ data using external data sets. Additionally, subpart QQ imports can vary greatly from year to year for an individual supplier, so the EPA's standard verification checks (*e.g.,* looking at outliers or changes from year to year) are not as effective at identifying errors in subpart QQ reports as they are for other GHGRP Subparts. Therefore, requiring that suppliers submit substantiating records (*i.e.,* the CBP entry forms) as a part of the annual report would improve verification and data quality for subpart QQ. The EPA would be able to review the documentation to ensure that supplier-level and national-level fluorinated gas import data are accurate. The proposed changes would add a reporting requirement to 40 CFR 98.436(a). Because the entry form is already required to be retained as a record at 40 CFR 98.437(a)(3) for each import reported, it is not anticipated that this reporting requirement would cause a significant change in burden.

While we are proposing to collect copies of the CBP entry form for each import, we seek comment on whether other types of documentation associated with an import may be more useful, *e.g.,* the bill of lading. We seek comment on the type of information available in these forms in practice, and which would best suit the verification goals of the GHGRP. We are also proposing a related confidentiality determination for the documentation reporting requirement, as discussed in section VI of this preamble.

Additionally, we are proposing to add a requirement for importers or exporters of fluorinated GHGs contained in pre-charged equipment or closed-cell foams to include, as part of the information required for each import and export in the annual report, the Harmonized Tariff System (HTS) code (for importers) and the Schedule B codes (for exporters) used for shipping each equipment type.[41] These would be new data reporting requirements under 40 CFR 98.436(a) and 40 CFR 98.436(b). The HTS assigns 10-digit codes to identify products that are unique to U.S. markets. HTS codes start with a 6-digit code specifying a chapter, heading, and subheading, and in full include a specific 10-digit code including a subheading for duty and a statistical suffix. Commodity codes are currently collected as a data element under subpart OO, with most suppliers reporting the applicable HTS code. In the 2022 Data Quality Improvements Proposal, we proposed to revise the reporting of ''commodity code'' under subpart OO to clarify that reporters should submit the HTS code for each F–GHG, F–HTF, or N_2O shipment (87 FR 37012). In this supplemental proposal, we are proposing to require the reporting of HTS codes from importers under subpart QQ to be consistent with the proposed revisions to subpart OO. Reporters would enter the full 10-digit HTS code with decimals, to extend to the statistical suffix, as it was entered on related customs forms. We are proposing to require reporting of Schedule B codes for exporters. Schedule B codes determine the export classification and are required when filling out trade documents to export goods out of the United States. Suppliers subject to subpart QQ are already required to maintain records substantiating their imports and exports, such as bills of lading, invoices, and CBP entry forms. It is the understanding of the EPA that these documents would contain the HTS codes or Schedule B codes associated with the shipments. We are proposing to gather this data, which is likely already available in supplier records, to verify and compare the data submitted to the GHGRP with other available import and export data. The proposed HTS and Schedule B codes would provide a means to cross-reference the data submitted and would help to ensure the accuracy and completeness of the information reported under the GHGRP. However, we are seeking comment on whether it is reasonable to require reporting of the HTS code for both importers and exporters, and on how the use of HTS codes differs for imports and exports. We are also seeking comment on whether shippers typically use a standard set of Schedule B codes or HTS codes for exports or if the codes may change based on the recipient country.

We are also proposing related confidentiality determinations for the proposed new and revised data elements, as discussed in section VI of this preamble.

N. Subpart RR—Geologic Sequestration of Carbon Dioxide

The Geologic Sequestration of Carbon Dioxide source category (subpart RR of part 98) provides an accounting framework for facilities to report amounts of CO_2 sequestered annually. Facilities develop an EPA-approved monitoring, reporting, and verification (MRV) plan, report on monitoring activities and use a mass balance approach to calculate amounts of carbon dioxide sequestered. Information collected under the GHGRP provides a transparent means for the EPA and the public to continue to evaluate the effectiveness of geologic sequestration.

The EPA has received questions from stakeholders regarding the applicability of subpart RR to offshore geologic sequestration activities, including on the outer continental shelf. When the EPA finalized subpart RR (75 FR 75060, December 1, 2010), we noted that the source category covered not only onshore injection of CO_2, but also offshore injection. For example, 40 CFR 98.446 specifies well identification information to be reported for wells with Underground Injection Control (UIC) permits and for offshore wells not subject to the Safe Drinking Water Act. The EPA also explained in its response to comments on the 2010 rule promulgating subpart RR that the source category covered offshore injection.[42]

While subpart RR covers offshore activities, we observe that subpart RR does not provide a definition for the term ''offshore'' and that providing a definition for such term would be helpful. Therefore, the EPA is proposing to add a definition for ''offshore'' to 40 CFR 98.449. We propose that ''offshore'' means ''seaward of the terrestrial borders of the United States, including waters subject to the ebb and flow of the tide, as well as adjacent bays, lakes or other normally standing waters, and extending to the outer boundaries of the jurisdiction and control of the United States under the Outer Continental Shelf Lands Act.'' This is the same definition of offshore that is currently provided at 40 CFR 98.238 for subpart W of part 98 (Petroleum and Natural Gas Systems).

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[41] A complete listing of HTS codes is available at *https://hts.usitc.gov/current.* A complete listing of Schedule B codes is available at: *https://www.census.gov/foreign-trade/schedules/b/index.html.*

[42] *Mandatory Greenhouse Gas Reporting Rule: EPA's Response to Public Comments, Geologic Sequestration and Injection of Carbon Dioxide: Subparts RR and UU,* Docket Id. No. EPA–HQ–OAR–2009–0926–0834 (Response 2.1–a and Response 6.2–g), available at *www.epa.gov/sites/default/files/2015-07/documents/subpart-rr-uu_rtc.pdf.*

O. Subpart UU—Injection of Carbon Dioxide

In the 2022 Data Quality Improvements Proposal, the EPA proposed to amend subpart UU of part 98 (Injection of Carbon Dioxide). Specifically, the EPA proposed to amend 40 CFR 98.470 by redesignating paragraph (c) as paragraph (d) and adding new paragraph (c) to read, ''(c) If you report under subpart VV of this part for a well or group of wells, you are not required to report under this subpart for that well or group of wells.'' Some commenters were concerned that, as written, the regulatory text under proposed subpart VV (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27816) and subpart UU could allow for CO_2 to be reported under multiple subparts, resulting in double counting. Thus, we are proposing to revise the text in proposed paragraph 98.470(c) from ''are not required to report'' to ''shall not report.'' We are also proposing an additional sentence in paragraph 98.470(c) to clarify that CO_2-EOR projects that become subject to subpart VV during a reporting year must report under subpart UU for the portion of the reporting year before they began using CSA/ANSI ISO 27916:2019 and under subpart VV for the portion after they began using CSA/ANSI ISO 27916:2019. Facilities shall not report CO_2 under subparts VV and UU in a way that is duplicative, but it is possible that facilities would report under both subparts during the reporting year in which they transition to using CSA/ANSI ISO 27916:2019. Additionally, we are similarly proposing to revise the text in paragraph 98.470(b) from ''are not required to report'' to ''shall not report,'' to clarify that facilities should not report under both subparts UU and RR. This also ensures consistency between paragraphs (b) and (c).

P. Subpart VV—Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916

In the 2022 Data Quality Improvements Proposal, the EPA proposed adding a new source category, subpart VV (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916), to part 98 (see 87 FR 36920; June 21, 2022). The proposed new source category would add calculation and reporting requirements for quantifying geologic sequestration of CO_2 in association with EOR operations. The proposed requirements would apply only to facilities that quantify the geologic sequestration of CO_2 in association with EOR operations in conformance with the ISO standard designated as CSA/ANSI ISO 27916:2019, *Carbon Dioxide Capture, Transportation and Geological Storage—Carbon Dioxide Storage Using Enhanced Oil Recovery.* Under existing GHGRP requirements, facilities that receive CO_2 for injection at EOR operations report under subpart UU (Injection of Carbon Dioxide); however, facilities that geologically sequester CO_2 through EOR operations may instead opt-in to subpart RR (Geologic Sequestration of Carbon Dioxide).

The EPA proposed regulatory text to define the subpart VV source category and establish applicability. Specifically, proposed 40 CFR 98.480 stated that the source category pertains to CO_2 that is injected in enhanced recovery operations for oil and other hydrocarbons (CO_2-EOR) in which all of the following apply: (1) the CO_2-EOR project uses the ISO standard designated as CSA/ANSI ISO 27916:2019 (proposed to be incorporated by reference, see 40 CFR 98.7) as a method of quantifying geologic sequestration of CO_2 in association with EOR operations; (2) the CO_2-EOR project is not reporting under subpart UU of part 98; and (3) the facility is not reporting under subpart RR of part 98. In the preamble to the proposal (87 FR 37016), the EPA wrote, ''. . . the EPA is proposing a new source category—subpart VV—related to the option for reporting of incidental CO_2 storage associated with EOR based on the CSA/ANSI ISO 27916:2019 standard. Specifically, facilities that conduct EOR would be required to report basic information on CO_2 received under subpart UU, or they could choose to opt-in to either subpart RR or the new subpart (VV) to quantify amounts of CO_2 that are geologically sequestered.''

The public comment period for the proposed rule closed on October 6, 2022. With respect to subpart VV, the EPA received detailed comments on proposed 40 CFR 98.480 ''Definition of the Source Category.'' In particular, commenters were uncertain whether the EPA intended to require facilities using CSA/ANSI ISO 27916:2019 to report under subpart VV or whether facilities that used CSA/ANSI ISO 27916:2019 would have the option to choose under which subpart they would report to: subpart RR, subpart UU, or subpart VV.

After review of the comments, the EPA recognizes that the proposed subpart VV definition of the source category and the corresponding preamble text in the 2022 Data Quality Improvements Proposal were unclear. Therefore, we are re-proposing 40 CFR 98.480 in this proposed rule to clarify applicability of the rule and to seek comment on the re-proposed definition of the source category in subpart VV. Under this proposal, the EPA would not require that facilities quantify geologic sequestration of CO_2 in association with EOR operations through the use of the CSA/ANSI ISO 27916:2019 method; however, if the facility elects to use the CSA/ANSI ISO 27916:2019 method for quantifying geologic sequestration of CO_2 in association with EOR operations, then the facility would be required under the GHGRP to report under subpart VV (rather than reporting under subpart UU or opting into subpart RR). More specifically, the proposed rule would require facilities quantifying the mass of CO_2 geologically sequestered using CSA/ANSI ISO 27916:2019 to report the quantity of CO_2 sequestered under subpart VV and to meet all requirements of subpart VV. It is our intention that subpart VV would apply to facilities that use CSA/ANSI ISO 27916:2019 for the purpose of demonstrating secure geologic storage; in other words, facilities that use CSA/ANSI ISO 27916:2019 for that purpose would be subject to subpart VV. Subpart VV is not intended to apply to facilities that use the content of CSA/ANSI ISO 27916:2019 for a purpose other than demonstrating secure geologic storage, such as only as a reference material or for informational purposes. EOR facilities that inject a CO_2 stream into the subsurface that do not use CSA/ANSI ISO 27916:2019 and have not opted into subpart RR would continue to be required to report the quantities of CO_2 received for injection under subpart UU (Injection of Carbon Dioxide).

Additionally, to remove ambiguity and further clarify our intent in defining the subpart VV source category, the EPA in this proposed rule is removing a paragraph from proposed subpart VV (proposed as 40 CFR 98.480(a)(2) in the 2022 Data Quality Improvements Proposal). The proposed text in the 2022 Data Quality Improvements Proposal stated that the subpart VV source category applied to facilities not reporting under subpart UU. The EPA received comments that this language resulted in confusion over subpart VV applicability. We believe that removal of this text from the previously proposed ''Definition of the Source Category'' in 40 CFR 98.480 in this proposal provides additional clarity with respect to the EPA's intent concerning subpart VV applicability. Relatedly, to clarify our intent with regard to facilities that transition from reporting under subpart UU to reporting under subpart VV, the EPA in this proposed rule is proposing to add paragraph 40 CFR 98.481(c). The proposed text clarifies that CO_2-EOR projects previously reporting under subpart UU that begin using CSA/ANSI ISO 27916:2019 part-way through a reporting year must report under subpart UU for the portion of the year before CSA/ANSI ISO 27916:2019 was used and report under subpart VV for the portion of the year once CSA/ANSI ISO 27916:2019 began to be used and thereafter. After the initial transition year, these facilities would be required to report under subpart VV only, until the requirements to discontinue reporting are met.

The EPA notes that we are seeking comment on proposed subpart VV during the comment period for this supplemental proposal on only reproposed 40 CFR 98.480 and the newly proposed 40 CFR 98.481(c). Commenters do not need to resubmit comments previously submitted on proposed 40 CFR 98.481 through 98.489. The EPA is not reproposing or soliciting further comment on revised regulatory text or confidentiality determinations for the remaining sections of subpart VV that were originally proposed in the 2022 Data Quality Improvements Proposal (40 CFR 98.481 through 98.489). We are continuing to review and consider comments received on the 2022 Data Quality Improvements Proposal on those sections.

IV. Proposed Amendments To Add New Source Categories to Part 98

This section summarizes the specific amendments the EPA is proposing to add new subparts, as generally described in section II.B of this preamble. The impacts of the proposed revisions are summarized in section VII of this preamble. A full discussion of the cost impacts for the proposed revisions may be found in the memorandum, *Assessment of Burden Impacts for Proposed Revisions for the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

A. Subpart B—Energy Consumption

1. Rationale for Inclusion in the GHGRP

For the reasons described in section II.B and the 2022 Data Quality Improvements Proposal, consistent with its authority under the CAA, the EPA is proposing to add a new subpart—subpart B (Energy Consumption)—to improve the completeness of the data collected under the GHGRP, add to the EPA's understanding of GHG data, and to better inform future EPA policy under the CAA, such as informing potential future EPA actions with respect to GHGs. Once collected, such data would also be available to improve on the estimates provided in the Inventory, by providing more information on the allocation of electricity use to different end use sectors.

The GHGRP currently generally requires sources subject to part 98 to report direct emissions and supply of GHGs from large industrial sources across 41 source categories. For sources of direct emissions subject to part 98, the GHGRP currently includes requirements to monitor, calculate, and report the direct emissions of GHGs that occur onsite from sources which meet the part 98 applicability requirements. However, these direct GHG emissions do not enable a comprehensive assessment of the quantity of energy required to operate the facility because industrial operations can consume a significant amount of energy for which direct GHG emissions do not occur at the production site, primarily through purchased electricity and thermal energy products.[43] The purchased energy consumed is produced offsite, and the offsite energy production can result in significant GHG emissions. Because the facility's production processes are reliant on its energy consumption, the emissions associated with producing this energy are associated with the facility, and are often referred to as indirect emissions or Scope 2 emissions.[44] Energy consumption can be a significant portion of the total energy input to making products, and therefore, a significant component of a facility's overall GHG footprint (*i.e.,* a total accounting of both the direct emissions that occur onsite as well as indirect emissions that occur offsite in the production of the purchased energy that the facility consumes).

The EPA is interested in collecting data on energy consumption to gain an improved understanding of the energy intensity (*i.e.,* the amount of energy required to produce a given level of product or activity, both through onsite energy produced from fuel combustion and purchased energy) of specific facilities or sectors, and to better inform our understanding of energy needs and the potential indirect GHG emissions associated with certain sectors. Understanding the energy intensity of facilities and sectors is critical for evaluating and identifying the most effective energy efficiency and GHG reduction programs for different industrial sectors, particularly for sectors where purchased energy accounts for a significant portion of a typical facility's onsite energy use. For example, based on the most recent Manufacturing and Energy Consumption Survey (MECS) published by the DOE Energy Information Administration (EIA) in 2018,[45] the EPA estimates that indirect GHG emissions from electricity consumption from the chemical manufacturing sector (4.8 million $mtCO_2e$) were approximately equal to the chemical manufacturing sector's direct emissions from natural gas combustion (5.2 million $mtCO_2e$). Similarly, these MECS data indicate that each of the following manufacturing sectors had indirect GHG emissions from electricity consumption approximately equal to or greater than the sector's direct GHG emissions from natural gas combustion: food, beverage, and tobacco products; textile mills; wood products; primary metals; fabricated metal products; transportation equipment; furniture and related products; chemicals; nonmetallic mineral products; and primary metals. For RY2020, more than 1,800 facilities from these manufacturing sectors reported direct GHG emissions to the GHGRP to a total of 26 subparts.

Understanding the energy intensity of the facilities and sectors reporting under the GHGRP would also allow the EPA to identify industry-specific best operating practices for increasing energy efficiency and reducing GHG emissions, and to evaluate options for expanding the use of these best practices or other potential policy options. For example, while U.S. Energy Information Administration data show that industrial U.S. electric power usage declined from 1,372 megawatt-hour (MWh) per customer in 2007 to 1,188 MWh per customer in 2019,[46] the EPA is unable to determine how individual industrial sectors contributed to the decreased electric power usage and is

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[43] In this preamble, we refer to purchased electricity and thermal energy products such as steam, heat (in the form of hot water), and cooling (in the form of chilled water) broadly as ''purchased energy'' or ''purchased energy products.'' These terms exclude purchased fuels associated with direct emissions at the facility.

[44] See, *e.g.,* the EPA's Scope 1 and Scope 2 Inventory Guidance, available at: *www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance.*

[45] See U.S. Energy Information Administration 2018 Manufacturing and Energy Consumption Survey, *www.eia.gov/consumption/manufacturing/pdf/MECS%202018%20Results%20Flipbook.pdf.*

[46] Please see the *Technical Support Document for Non-Fuel Energy Purchases: Supplemental Proposed Rule for Adding Energy Consumption Source Category* under 40 CFR part 98, available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424) for additional information on U.S. electric power sector usage.

therefore unable to identify best practices in use. With respect to thermal energy products, one best practice involves an industrial facility contracting with an adjacent, separately owned facility for steam delivery services. Often the steam suppliers deploy relatively more efficient combined heat and power (CHP) technologies, compared to the industrial source generating its own steam.[47] Obtaining data on thermal energy product purchases would allow the EPA to better understand the use of this technology in different sectors and evaluate potential related policy options.

In this proposal, the EPA is reasserting that collecting information on purchased energy products is consistent with the EPA's existing CAA authority. As summarized in the 2009 Proposed Rule, CAA section 114(a)(1) authorizes the EPA to, *inter alia,* require certain persons on a one-time, periodic, or continuous basis to keep records, make reports, undertake monitoring, sample emissions, or provide such other information as the EPA may reasonably require. The EPA may require the submission of this information from any person who (1) owns or operates an emission source, (2) manufactures control or process equipment, (3) the EPA believes may have information necessary for the purposes set forth in this section, or (4) is subject to any requirement of the Act (except for manufacturers subject to certain title II requirements, who are subject to CAA section 208). The EPA may require this information for the purposes of developing or assisting in the development of any implementation plan, an emission standard under sections 111, 112 or 129, determining if any person is in violation of any such standard or any requirement of an implementation plan, or ''carrying out any provision'' [48] of the Act.

As the EPA noted in the 2022 Data Quality Improvements Proposal, in the development of the GHGRP in the 2009 rule,[49] the Agency considered its authorities under CAA sections 114 and 208 and the information that would be relevant to the EPA's ''carrying out'' a wide variety of CAA provisions when identifying source categories for reporting requirements. The scope of the persons potentially subject to a CAA section 114(a)(1) information request (*e.g.,* a person ''who the Administrator believes may have information necessary for the purposes set forth in'' CAA section 114(a)) and the reach of the phrase ''carrying out any provision'' of the Act are quite broad. Given the broad scope of CAA section 114, it is appropriate for the EPA to collect information on purchased energy because such information is relevant to the EPA's ability to carry out a wide variety of CAA provisions. As the EPA explained in initially promulgating the GHGRP, it is entirely appropriate for the Agency under CAA section 114 to gather such information to allow a comprehensive assessment of how to best address GHG emissions and climate change under the CAA, including both regulatory [50] and non-regulatory [51] options. A firm understanding of both upstream and downstream sources provides a sounder foundation for effective research and development for potential actions under the CAA. The better the EPA's understanding of differences within and between source categories, the better the Agency's ability to identify and prioritize research and development as well as program needs under the CAA.

2. Public Comments Received in Request for Comment

In the 2009 Proposed Rule (74 FR 16479, April 10, 2009), the EPA sought comment on, but did not propose, requiring reporting related to purchased energy products. The EPA explained in the 2009 Final Rule that, while it was not then deciding to require facilities to report their electricity purchases or indirect emissions from electricity consumption, we believed that acquiring such data may be important in the future and intended to explore options for possible future data collection on electricity purchases and indirect emissions, and the uses of such data. Comments received on the 2009 Proposed Rule, as well as the Agency's responses to those comments, are summarized in the 2009 Final rule (74 FR 56288–56289, October 30, 2009) and the 2009 response to public comments.[52]

In section IV.F of the 2022 Data Quality Improvements Proposal, the EPA requested further comment on the potential addition of the energy consumption source category, including the following topics:

- Whether the EPA should add a source category for energy consumption;
- Information to characterize purchased energy markets (*i.e.,* regulated or de-regulated) and products (*e.g.,* renewable attributes of purchased products);
- Whether the EPA should limit reporting requirements to purchased energy or require facilities to convert their energy consumption to indirect emission estimates;
- Information on whether or not associated reporting requirements should include purchased thermal energy products and if the requirements should differentiate purchased thermal energy products from purchased electricity;
- Whether the EPA should limit the applicability to sources that are already subject to the GHGRP or consider specific industrial sectors or technologies that may not be completely represented within the GHGRP but that should be considered when evaluating the energy use performance of industrial sources;
- What measures would minimize the burden of reporting parameters related to purchased energy transactions;
- What monitoring and recordkeeping systems are currently in place for purchased energy transactions and what methodologies are recommended for monitoring and QA/QC; and
- What existing industry standards are available for assessing the accuracy of the monitoring systems used for purchased energy transactions.

This section presents a broad overview of the comments received on the request for comment in the 2022 Data Quality Improvements Proposal as well as relevant comments from the 2009 Proposed Rule's request for comment.

We note that in response to the 2009 Proposed Rule and the 2022 Data Quality Improvements Proposal requests

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[47] CHP systems achieve fuel use efficiencies of 65 to 80 percent, compared to separate heat and power systems (*i.e.,* purchased grid electricity from the utility and an on-site boiler), which have efficiencies of approximately 50 percent. Due to the higher efficiencies of CHP systems, they reduce the amount of fuel burned and reduce GHG emissions. See *www.epa.gov/chp/chp-benefits* for additional information.

[48] Except a provision of Title II of the CAA with respect to a manufacturer of new motor vehicles or new motor vehicle engines, as those provisions are covered under CAA section 208.

[49] We also note that as part of the process in selecting the original list of source categories to include in the GHG Reporting Rule in 2009, the EPA also considered the language of the Appropriations Act, which referred to reporting ''in all sectors of the economy,'' and the accompanying explanatory statement, which directed the EPA to include ''emissions from upstream production and downstream sources to the extent the Administrator deems it appropriate'' (74 FR 16465, April 10, 2009).

[50] *See, e.g.,* under CAA sections 111(b) and (d).

[51] *See, e.g.,* under CAA section 103(g). As explained further in the record for the 2009 Final Rule (74 FR 16448), it is entirely appropriate for the EPA to propose to gather information for purposes of carrying out CAA section 103 in this supplemental proposed rule.

[52] *Mandatory Greenhouse Gas Reporting Rule: EPA's Response to Public Comments, Volume No.: 1, Selection of Source Categories to Report and Level of Reporting.* Available at Docket Id. No. EPA–HQ–OAR–2008–0508–2258.

for comment, some commenters stated that collecting information on electricity purchases was either outside the scope of the GHGRP or outside the scope of the EPA's CAA section 114 authority. However, other commenters stated that collecting purchased electricity information was within the scope of the GHGRP and the EPA's CAA section 114 authority. Certain commenters stated that such information could inform the EPA's analysis of the feasibility, cost, and efficacy of reducing emissions through electrification in various subsectors, as well as the impacts of the incidental electrification that results when sources comply with regulatory requirements premised on other control techniques.

The EPA disagrees that we should or must interpret the language of CAA section 114 as narrowly as some commenters advocate. While Congress highlighted certain potential uses of the information gathered under CAA section 114 in a portion of CAA section 114(a), Congress also explicitly listed in CAA section 114(a) the potential use of ''carrying out any provision'' of the Act. The EPA has a variety of duties in the CAA that extend to both regulatory and non-regulatory programs, and limiting the scope of CAA section 114 as some commenters urge would hinder the EPA's ability to implement those provisions and subvert Congressional intent. The EPA also notes that the point of gathering information under CAA section 114 is to inform decisions regarding the legal, technical, and policy viability of various options for carrying out provisions under the CAA. To require a narrowing of those options beforehand would curtail the EPA's decision making before the information is available for consideration. Collection of energy consumption information as the EPA is proposing in this action would allow the Agency to undertake a more thorough and holistic evaluation of how to utilize its authority under the CAA, both regulatory and non-regulatory, to address GHG emissions and climate change, consistent with its authority under CAA section 114.

We received several comments from stakeholders regarding how the EPA should define the energy consumption source category. Commenters discussed issues such as: (i) reporting at the facility-level versus the corporate-level; (ii) applying requirements to sources currently subject to part 98 versus sources that are not currently subject to part 98, including both purchased electricity and thermal energy products; and (iii) excluding purchased electricity consumed by power plants.

With respect to the facility-level versus corporate-level reporting issue, some commenters supporting the addition of the energy consumption source category stated that already established voluntary programs for reporting energy consumption are based on corporate-level protocols rather than the facility-level approach that is being proposed under the GHGRP. Other commenters opposing reporting of purchased energy said that electricity purchases are made at the corporate-level for some facilities. Commenters supporting the addition of energy consumption stated that the definition of the source category should apply to both current GHGRP reporters and non-reporters with energy consumption levels comparable to current reporters; these commenters suggested that energy consumption reporting requirements should be codified under subpart A of part 98 (General Provisions). Certain commenters also said that the definition should include both purchased electricity and thermal energy products, with separate reporting requirements for each.

As discussed in section IV.A.3 of this preamble, the EPA is proposing to define the energy consumption category to include direct-emitting facilities that (1) purchase metered electricity or metered thermal energy products, and (2) are currently required to report under part 98. At this time, the EPA is proposing to limit the source category to include metered, purchased energy products that are consumed at the facility in order to reduce burden for reporters, by allowing reporters to rely on existing purchase contracts for which metering and billing requirements are already in place. In determining which requirements to propose, the EPA has considered both the reporting burden that would result and the need to collect that information to inform policy under the CAA at this time. While we are proposing to require reporting at the facility-level for direct emitters, the proposed requirements do not require calculation or reporting of indirect GHG emissions. The proposed requirements are limited at this time to development of a metered energy monitoring plan and recordkeeping and reporting activities that direct-emitting facilities that currently report under part 98 may complete using information that we anticipate is readily available to them, predominantly in their energy bills. We are proposing to include reporting for both purchased electricity and purchased thermal energy products, because both forms of energy are needed to evaluate the efficiency of GHG emitting activities within discrete sectors.

The EPA also received comments stating that indirect emissions estimates derived from energy consumption would not be useful, would be inherently inaccurate, and would lead to double counting of direct emissions. Specifically, certain commenters said that the EPA should continue to focus only on direct GHG emissions and expressed concerns that any future indirect emissions estimates (derived from energy consumption data) could be added together with direct emissions estimates for the power sector leading to overall double counting of air emissions in multisector inventories. Other commenters stated that indirect emissions estimates derived from energy consumption data are inherently inaccurate and not useful because the origin of consumed energy cannot be easily determined for all consumers.

The EPA is not proposing in this action to require reporters to develop indirect emissions estimates. The EPA disagrees with the commenters to the extent they assert or suggest that the reporting of energy consumption has no value, that it constitutes double counting, and that the Agency should not collect purchased energy data because of accounting concerns related to indirect emissions estimates. For industrial sectors that rely on fossil fuel energy conversion activities like boilers, turbines, and engines, part 98 currently provides energy efficiency analysts with sector-specific information on the fuels used and associated direct emissions. These data can be converted to the same basis as purchased energy data (*i.e.,* kilowatt-hours consumed) with standard engineering calculations. However, the EPA has determined that it is difficult to compare energy efficiencies of different facilities within the same industrial sector when looking only at facility-located fossil fuel energy conversion operations. Accordingly, in developing this proposal the EPA has determined that sector-specific energy consumption data are not only useful but are also essential for identifying the most energy efficient facilities within each sector. Additionally, the EPA disagrees with those commenters asserting that energy consumption data should not be collected based on the commenters' asserted potential accuracy and accounting concerns related to indirect emissions. As noted previously, it is not necessary to convert purchased energy data into indirect emissions estimates to compare the energy efficiency of different facilities within the same sector, as intended by the EPA in this action. For example, the EPA could complete facility-specific analyses for the iron and steel sector (or for discrete iron and steel subsectors) by combining the reported fuel-specific direct emissions values and emissions factors to estimate the fuel use quantity, which could subsequently be converted to annual kilowatt-hours-thermal (kWhth) values using fuel-specific heating values. With the addition of purchased energy data under part 98, each facility's thermal fossil energy consumption could be added to each facility's purchased energy consumption to compare all facilities within the iron and steel sector on the same total energy consumption basis.

Finally, the commenters' concerns that analysts may use the energy consumption data in multisector analyses (*e.g.,* analyses that double count emissions by summing power sector direct emissions with another sector's indirect emissions estimates) is inconsistent with the EPA's intent to use these data appropriately to complete facility-level, energy efficiency comparisons within discrete sectors. In response to comments on the 2009 Proposed Rule regarding the potential double counting of emissions reported by power plants and electricity purchased downstream from those power plants, the EPA noted that there is inherent and intentional double reporting of emissions in a program that includes both energy suppliers and energy users (74 FR 16479, April 10, 2009), and that both supply- and demand-side data are necessary to evaluate and identify the best policy options. However, double reporting is not inherently the same as double counting. Subparts C (General Stationary Fuel Combustion Sources) and NN (Suppliers of Natural Gas and Natural Gas Liquids) are an example in the existing GHGRP requirements of double reporting. Double counting is likely best characterized as a form of misuse or misunderstanding of two reported values, where an analyst could potentially improperly add potential emissions (calculated from the subpart NN supplier's data) to actual emissions (from the subpart C user's data) and erroneously represent the sum of these two values as the total emissions from the energy transaction. To mitigate the potential for any such double counting by users of part 98 data, the EPA designates subparts as either ''direct emitter'' or ''supplier'' subparts. Similarly, in this proposal, the EPA has proposed to include a new definition for ''indirect emissions'' under the proposed subpart B to distinguish any associated indirect emissions estimates (that may be derived by users of GHGRP reported energy consumption data) from direct emissions reported in direct emitter subparts. The demand-side information proposed to be collected under this subpart would be used to understand the energy intensity of facilities and sectors.

We also received several comments regarding whether the EPA should establish a reporting threshold for the energy consumption source category. Commenters were divided on whether or not energy consumption should be considered toward the reporting threshold. Some commenters supporting the addition of the energy consumption category said that applicability should be based on direct emissions only, while others said that the reporting threshold should be broadened to also include facilities not currently subject to reporting within a part 98 sector if a facility uses comparable quantities of energy to facilities currently subject to part 98. One commenter responded to the EPA's request for comment on whether the approach of limiting applicability of an energy consumption source category to facilities that are currently subject to the GHGRP would exclude certain sectors that consume very large quantities of purchased energy. The commenter identified gas compression facilities that replace reciprocating engines with electric motors as one type of activity that would be excluded under the current thresholds.

As discussed in section IV.A.3 of this preamble, at this time the EPA is proposing to retain the current GHGRP reporting thresholds. While the EPA recognizes that some sectors may include facilities operating below the current GHGRP reporting thresholds with very large energy purchases, only one sector was identified by commenters responding to the EPA's request for comment on such excluded facilities. Refer to section IV.A.4 of the preamble for further detail on the EPA's rationale for proposing to retain the current reporting thresholds.

We received several comments on potential calculation methodologies that could be adopted for the energy consumption source category. Commenters recommended that methodologies should be consistent with ongoing rulemakings and programs by other Federal agencies with considerations for renewable energy credits (RECs) and use of location-based emission factors for indirect emissions estimates. The commenters stated that any calculation methodologies used by the EPA should be consistent with the Security and Exchange Commission's (SEC) ongoing, corporate-level rulemaking for climate-related disclosures. Other commenters stated that calculations should be consistent with other voluntary and regulatory programs. Some commenters stated that calculations should include a location-based approach and use of retired RECs.

As previously noted, at this time the EPA is not proposing to require reporters to calculate or report indirect emissions estimates from the proposed collection of energy consumption data. In the future, if the EPA determines that the purposes of the Clean Air Act would be advanced by information gathered through a uniform methodology for estimating indirect emissions from energy consumption, the EPA may consider established protocols in other voluntary and regulatory programs, and address similarities and differences, in any such future undertaking.

We received several comments from stakeholders regarding reporting and recordkeeping procedures for the energy consumption source category. Commenters stated that the EPA is mistaken about the ease of reporting energy consumption data for some facilities that may have power purchasing agreements that do not include all required reporting elements. One commenter stated that, while individual facilities may have electricity meters, uses of electricity within a facility may not be separately metered, meaning that it would be difficult to separate the electricity purchased to be used in connection with the source subject to reporting under the GHGRP from the electricity used for purposes that do not fall into a GHGRP reporting subpart. Commenters also said that energy consumption records may be considered CBI and gathering all the energy consumption records for a large facility would impose significant burden on reporters. Other commenters suggested reporting requirements that may be useful for converting energy consumption data to indirect emissions estimates, and some reporters made recommendations for ensuring any future indirect emissions estimates developed by the EPA were clearly demarked separately from direct emissions estimates.

The EPA appreciates the commenters suggestions related to indirect emissions estimates, but, as stated previously in this preamble section, the EPA is not proposing that reporters calculate or report indirect emissions estimates. With regard to commenter concerns about potential difficulties with reporting energy consumption data, the EPA is proposing at this time to limit the energy consumption data to be reported to data based on existing billing statements and purchasing agreements. The EPA is proposing to require a copy of a representative billing statement for each existing or new energy purchasing agreement between two counterparties. This information would ensure that all reported quantities of energy consumed are consistent with the periodic billing statements. The proposed approach for collection of energy consumption data would not require the reporting of any information that is not readily available to the reporting facility on periodic billing statements. Regarding the commenter concern about differentiating electricity use between activities supporting the industrial activities related to the source reporting direct emissions to the GHGRP versus those not related to industrial source activities, the EPA is proposing to allow the use of company records or engineering judgment to make these estimates.

3. Proposed Definition of Source Category

We are proposing to define the energy consumption source category as direct emitting facilities that: (1) purchase metered electricity or metered thermal energy products; (2) are required to report under §§ 98.2(a)(1), (2), or (3) or are required to resume reporting under §§ 98.2(i)(1), (2) or (3); and (3) are not eligible to discontinue reporting under the provisions at §§ 98.2(i)(1) (2), or (3). Under proposed 40 CFR 98.28, we are proposing definitions for the terms ''metered,'' ''purchased electricity,'' ''purchasing agreement,'' and ''thermal energy products'' and the EPA specifically requests comments on these proposed definitions. This subpart would only apply where existing meters are installed for purchased electricity or for purchasing agreements for thermal energy products. The definition of ''metered'' clarifies that, for thermal energy products purchasing agreements, design parameters would be used for reporting energy consumption if real-time operating meters are not required by the purchasing agreement. As proposed, this source category would not require the installation of meters; however, we are proposing that purchased electricity consumers subject to proposed subpart B would be required, in certain specified circumstances, to request that their electricity delivery service provider ensure any installed purchased electricity meter meets minimum accuracy requirements. The proposed definition of ''thermal energy products'' for the purposes of part 98 subpart B would include metered steam, hot water, hot oil, chilled water, refrigerant, or any other medium used to transfer thermal energy. Only facilities that are required for that RY to report direct emissions under another subpart of the GHGRP (*i.e.,* that meet the applicability requirements for reporting direct emissions under source categories listed in 40 CFR 98.2(a)(1), (2), or (3) and are not eligible to discontinue reporting for that RY under the provisions at 40 CFR 98.2(i)(1), (2), or (3) (*i.e.,* ''off-ramp''), or that are previous reporters that ceased reporting (*i.e.,* ''off-ramped'') but are required to resume reporting for that RY under 40 CFR 98.2(i)(1), (2), or (3)) and purchase metered electricity or metered thermal energy products would be required to report under this subpart. Note, under the proposal, the proposed addition of subpart B would not affect the eligibility of existing reporters to off-ramp per the requirements of 40 CFR 98.2(i)(1), (2), or (3), or affect whether the facility must resume reporting under those same provisions (*i.e.,* would not factor into whether the reporting threshold to resume reporting of 25,000 mtCO$_2$e per year or more is met for 40 CFR 98.2(i)(1) and (2), or for whether operations resumed for 40 CFR 98.2(i)(3)). Facilities eligible to off-ramp include a relatively small subset of total GHG emissions reported to the GHGRP; therefore, our analysis at this time is that collection of energy consumption data from these sources would not provide substantial information to the program. As discussed further in section IV.A.4 of this preamble, the proposed subpart B would also not affect the calculations that certain facilities conduct for comparison to the 25,000 mtCO$_2$e per year applicability threshold or result in the addition of new reporters to the GHGRP.

The proposed source category does not include the purchase of fuel and the associated direct emissions from the use of fuel on site, as those are already reported as applicable under existing part 98 subparts. The proposed source category also does not apply to the use of electricity and thermal energy products that are not subject to purchasing agreements. While such arrangements are expected to be uncommon, some geothermal and biogas energy sources may not be metered or may not be subject to purchasing agreements. In order to minimize the potential burden on reporters, at this time the EPA is proposing to require reporting of only energy consumption data that is commonly available in energy billing statements and transactional records exchanged pursuant to existing purchasing agreements.

4. Selection of Proposed Reporting Threshold

As described above, facilities that meet the applicability requirements for reporting direct emissions under another source category of the GHGRP (and not otherwise eligible to discontinue reporting for that RY under the provisions at 40 CFR 98.2(i)(1), (2), or (3)) or that are previous reporters that ceased reporting (*i.e.,* ''off-ramped'') but are required to resume reporting for that RY under 40 CFR 98.2(i)(1), (2), or (3)), and that purchase metered electricity or metered thermal energy products, would be required to report under this proposed subpart.

The EPA also considered requiring reporting based on certain CO$_2$e thresholds. In these scenarios, the threshold would include both a facility's total direct emissions as well as indirect emissions associated with that facility's energy consumption (*i.e.,* resulting from purchased metered electricity or thermal energy products). Table 4 of this preamble presents the thresholds that the EPA considered for this supplemental proposal along with an estimate of the number of facilities that would be required to report under each of these scenarios and an estimate of the percent of total electricity use that would be covered under each option. Note, the EPA does not have sufficient data on thermal energy products to estimate the percent of total thermal energy products that would be included under each option.

TABLE 4—THRESHOLD ANALYSIS FOR ENERGY CONSUMPTION

Threshold level (mtCO$_2$e)	Estimated number of subpart B reporters	Percent of total electricity use covered
CO$_2$e facility-wide emissions of 100,000 metric tons or more	Approximately 2,850 (virtually all 2,850 facilities are current GHGRP reporting facilities).	4.3

TABLE 4—THRESHOLD ANALYSIS FOR ENERGY CONSUMPTION—Continued

Threshold level ($mtCO_2e$)	Estimated number of subpart B reporters	Percent of total electricity use covered
CO_2e facility-wide emissions of 25,000 metric tons or more	Approximately 11,850 (of which 6,450 are current GHGRP reporting facilities).	7.5
CO_2e facility-wide emissions of 10,000 metric tons or more	49,850 (of which 7,050 are current GHGRP reporting facilities)	14.7
CO_2e facility-wide emissions of 1,000 metric tons or more	74,850 (of which 7,350 are current GHGRP reporting facilities)	29.8
Selected Proposed Option: No Threshold; subpart applies to reporters that meet applicability requirements of other direct emitting subparts and that purchase energy products.	7,587[53] (the number of existing direct emitters reporting for RY2021).	7.4

For additional details on the analysis of these thresholds and the estimated number of facilities potentially subject to subpart B under these scenarios, please see the *Technical Support Document for Non-Fuel Energy Purchases: Supplemental Proposed Rule for Adding Energy Consumption Source Category under 40 CFR part 98,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

Following our analysis, the EPA is not proposing a certain CO_2e threshold approach. At this time, the EPA is most interested in better understanding the energy intensity of facilities and sectors that are required to report their direct emissions under the existing GHGRP subparts. For this proposal, we have determined that obtaining information on purchased metered electricity or metered thermal energy products from direct emitting facilities, which include the most energy-intensive industrial sectors, is sufficient at this time, as direct emissions currently reported to the GHGRP account for approximately 70 percent of all U.S. GHG direct emissions from stationary point sources. Adopting a threshold of 25,000, 10,000 or 1,000 $mtCO_2e$ of combined direct and indirect emissions would at a minimum add over 4,000 reporters and at a maximum increase the number of reporters by nearly an order of magnitude. As shown in Table 4, the additional electricity data that would result from these thresholds would do little to further the objectives of the program at this time for the initial purposes of the proposed subpart B. Applying the requirements to existing GHGRP direct emitters more effectively targets large industrial emitters. Therefore, there are no proposed requirements for direct emitting facilities that meet the applicability under 40 CFR 98.2(a)(2) to consider indirect emissions from subpart B for comparison to a 25,000 $mtCO_2e$ threshold (as currently directed, as applicable, under 40 CFR 98.2(b)), and no indirect emissions from subpart B are proposed to be reported or included in the facility's total annual emissions as calculated under 40 CFR 98.2(c)(4)(i). As such, the proposed subpart B requirements would not add new reporters to the GHGRP.

5. Selection of Proposed Calculation Methods

As discussed in section IV.A.4 of this preamble, we are not proposing to require facilities to calculate or report indirect emissions estimates associated with purchased metered electricity or metered thermal energy products. We have proposed a definition for the term ''indirect emissions'' under 40 CFR 98.28 to distinguish this attribute of energy consumption from direct emissions reported under the direct emitting subparts listed in Tables A–3 and A–4 of part 98. In general, the greenhouse gases CO_2, CH_4, and N_2O are emitted during the combustion of fuels to generate electricity or during the combustion of fuels to produce thermal energy products. However, under the proposed requirements, facilities would not be required to convert their energy usage into indirect emission estimates (*i.e.,* energy-use-to-emissions conversions intended to associate offsite, energy production emissions with on-site, non-emitting energy consumption). The EPA is proposing that facilities simply report the quantity of purchased electricity and purchased thermal energy products during the reporting year because (1) these data are more readily available to facilities; and (2) the EPA does not need the energy use to be converted to emissions estimates to better understand the energy intensity of facilities and sectors reporting to the GHGRP. As previously noted, at this time the EPA is not proposing to require reporters to calculate or report indirect emissions estimates from the proposed collection of energy consumption data.

6. Selection of Proposed Monitoring, QA/QC, and Verification Methods

The proposed monitoring and quality assurance/quality control (QA/QC) requirements would require facilities subject to the new subpart to develop a written MEMP. The MEMP would serve to document metering equipment that would be used to collect the data required to be reported under this subpart. The EPA is proposing that electricity meters subject to this subpart must conform to the accuracy specifications required by the voluntary standard for electricity metering accuracy under the ANSI standards C12.1–2022 *Electric Meters—Code for Electricity Metering,* or with another consensus standard having accuracy specifications at least as stringent as the cited ANSI standard. The ANSI standard is widely referenced in state utility commission performance standards governing the accuracy of electric meters used for billing calculations. Facilities with meter(s) that do not meet either the accuracy specifications in these ANSI standards or another, similar consensus standard with accuracy specifications at least as stringent as the cited ANSI standard would be required to request that the electricity delivery service provider install equipment that conforms with either the ANSI standard or another, similar consensus standard with accuracy specifications at least as stringent as the cited ANSI standard. This ANSI standard is available at the following web link: ANSI C12.1–2022—*https://webstore.ansi.org/standards/nema/ansic122022.*

We are proposing that thermal energy product metering systems be audited at least once every five years and meet accuracy specifications in 40 CFR 98.3(i)(2) or (3). We are seeking comment on existing industry standards for assessing the accuracy of electric and thermal energy monitoring systems, the frequency of audits of these systems, and the accuracy specification(s) used

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[53] The facility count for the proposed option includes all facilities that reported to the EPA in RY2021 under a direct emitting subpart or subpart RR (Geologic Sequestration of Carbon Dioxide). In reviewing this information for this supplemental proposal, the EPA assessed that this facility count includes many facilities that do not appear to be required to report under 40 CFR part 98. However, the EPA has included all facilities that reported to the EPA in RY2021 in this total, as it provides a conservative estimate of the number of facilities that would be affected by these proposed revisions.

for thermal energy product metering systems.

The EPA understands that contracts between host facilities and energy producers are governed by clear metering and billing requirements. Accordingly, we are seeking comment on our understanding that monitoring and recordkeeping systems are already in place for purchased energy transactions, and our assessment that the incremental reporting burden would be minimal.

7. Selection of Proposed Procedures for Estimating Missing Data

The EPA is proposing that reporters with missing billing statements for purchased energy products must request replacement copies of lost statements from their energy delivery service provider. In the event that the energy delivery service provider is unable to provide replacement copies of billing statements, the facility would be required to estimate the data based on the best available estimate of the energy use, based on all available data which may affect energy usage (*e.g.,* processing rates, operating hours, etc.). The owner or operator shall document and keep records of the procedures used for all missing data estimates. For example, with respect to electricity purchases, if a facility's electrical usage varies by season, it may choose to estimate the missing usage data based on the same month in a previous year. However, if a facility's electricity usage varies more with production levels than with seasons, it would be more appropriate for that facility to estimate the missing usage data based on a time period during which the facility's production level was similar to the production level at the time of the missing data.

The EPA considered proposing more prescriptive requirements regarding procedures for estimating missing data, but ultimately concluded that each individual facility is in the best position to determine the most appropriate approach for determining the period of similar operations. The EPA seeks comment on this approach to estimating missing data.

8. Selection of Proposed Data Reporting Requirements

Under proposed subpart B, facilities would be required to report the annual purchases of electricity (in kilowatt hours (kWh)) and thermal energy products (in million British thermal units (mmBtu)). Facilities would also report supporting information on the energy providers and meters used. Under the proposed subpart B, reporters would be required to report readily available information from periodic billing statements provided by their electricity and thermal energy providers including the name of the provider, dates of service, meter locations and identifiers, quantities purchased, and billing period data such as billing period dates and rate descriptors. In states with deregulated markets where the billing statements have separate line items for electricity delivery services and electricity supply services, the delivery service and supply service providers may be different entities. Reporters would also be required to provide a copy of one billing statement for each energy delivery service provider of purchased energy with the first annual report. If the facility changes or adds one or more energy delivery service providers after the first reporting year, the annual report would be required to include an electronic copy of all pages of one billing statement received from each new provider for only the first reporting year of each new purchasing agreement. Facilities subject to multiple direct emitter subparts would additionally report the fraction of quantities purchased that is attributable to each subpart, as estimated by company records or engineering judgment. If the periodic billing statement spans two reporting years, the quantity of purchased energy would be required to be allocated to each year based on either the operational knowledge or the number of days of service in each reporting year. Reporters would be allowed to exclude purchased electricity as estimated by company records or engineering judgment, where: (1) electricity is generated outside the facility and delivered into the facility, but the final destination and usage is outside of the facility, or (2) electricity is consumed by operations or activities that do not support any activities reporting direct emissions under this part.

Please see section VI of this preamble for the EPA's proposed confidentiality determinations for these reporting elements. The EPA understands that these reporting requirements are readily available to the energy purchasing facility on periodic billing statements. The EPA also seeks comment on measures that could minimize the burden of reporting parameters related to purchased metered electricity or metered thermal energy transactions.

The EPA recognizes that under the proposed reporting requirements, the Agency would not receive information on the energy attributes of the metered electricity or metered thermal energy products purchased. For example, if a facility has purchased a REC which certifies that the electricity purchased is generated and delivered to the electricity grid from a renewable energy resource, this would not be reflected in the data reported to the EPA. We reiterate that the purpose of this data collection is to better understand the energy intensity of facilities and sectors reporting to the GHGRP, and energy intensity is independent from energy attributes. Therefore, we are at this time proposing that facilities would report only quantities of energy products purchased, as well as supporting information on the service provider and meters used.

9. Selection of Proposed Records That Must Be Retained

The EPA is proposing that facilities must retain (1) copies of all purchased electricity or thermal energy products billing statements, (2) the results of all required certification and quality assurance tests referenced in the MEMP for all purchased electricity meters or thermal energy products meters used to develop the energy consumption values reported under this part, and (3) maintenance records for all monitoring systems, flow meters, and other instrumentation used to provide data on consumption of purchased electricity or thermal energy products under this part. Maintaining records of information, including purchase statements, certifications, quality assurance tests, and maintenance records, are necessary to support the verification of the energy consumption data reported.

The EPA is considering further expanding the reporting requirements for this proposed subpart to include information on the sources used to generate the purchased electricity or thermal energy when this information is known to reporters, such as with facilities that have a bilateral power purchase agreement with an energy provider. In these cases, this information would allow GHGRP data users to more accurately estimate the indirect emissions attributable to these purchases as compared to using regional grid factors or other less accurate methods. The EPA is seeking comments and information related to this potential expansion. For electrical energy, the EPA is seeking comment on requiring facilities to report the quantity of purchased electricity generated by each of the following sources: non-hydropower including solar, wind, geothermal and tidal, hydropower, natural gas, oil, coal, nuclear, and other. For thermal energy, the EPA is seeking comment on requiring facilities to report the quantity of purchased thermal steam generated by each of the following sources: solar, geothermal, natural gas, oil, coal, nuclear and other. In addition, the EPA is also seeking comment on the availability of this data to reporters. In some situations, the EPA believes this information would be readily available, such as when a bilateral purchase agreement for dedicated off-site generation is in place. In most situations, the EPA anticipates facilities would not have access to this information, however, the requirement would be to report this information only if known. This would minimize burden as facilities would not be required to acquire any new information from their energy suppliers.

B. Subpart WW—Coke Calciners

1. Rationale for Inclusion in the GHGRP

For the reasons described in section II.B of this preamble and the 2022 Data Quality Improvements Proposal, consistent with its authority under the CAA, the EPA is proposing to add a new subpart, subpart WW of part 98 (Coke Calciners). Coke calcining is a process in which ''green'' petroleum coke with low metals content (commonly called ''anode grade petroleum coke'') is heated to high temperatures in the absence of air or oxygen for the purpose of removing impurities or volatile substances in the green coke. The calcined petroleum coke product is a nearly pure carbon material used primarily to make anodes for the aluminum, steel, and titanium smelting industries. There are approximately 15 coke calcining facilities in the United States. The typical coke calcining facility emits 150,000 mt CO_2 per year. We estimate that coke calcining facilities emit approximately 2 million mt CO_2 per year.[54] On both an emissions per facility basis and an aggregate industry GHG emissions basis, the proposed coke calciners subpart is comparable with the GHG emissions required to be reported to the GHGRP for several other subparts.

Emissions from coke calciners located at a petroleum refinery must be reported to the GHGRP under subpart Y of part 98 (Petroleum Refineries) using CEMS or a carbon balance method. Some facilities with coke calciners report emissions from coke calciners under subpart C of part 98 (General Stationary Fuel Combustion Sources) assuming that coke is the fuel consumed. This is not accurate because the primary fuel used in the calciner is process gas consisting of volatile organic compounds driven from the green coke, which have a lower carbon content than the green coke. Additionally, this leads to a disparity between calculation methods used for coke calciners at petroleum refineries and other facilities.

Creating a subpart specifically to provide GHG calculation methods and reporting requirements for coke calciners would clarify the applicability of the reporting requirements, improve the accuracy and usability of the data, provide consistency in the methods used to estimate emissions from coke calciners, and better inform future EPA policy under the CAA.

2. Public Comments Received in Request for Comment

In section IV.E of the 2022 Data Quality Improvements Proposal, the EPA requested comment on the addition of coke calcining as a new subpart to part 98. The request for comment covered the following topics:

- Whether the EPA should add a source category related to coke calcining, including information on the total number of facilities currently operating coke calciners in the United States;
- What calculation methodologies should be used for purposes of part 98 reporting, including the use of CEMS and what information is readily available to reporters that do not use CEMS to support calculation methodologies; and
- What monitoring requirements should be in place and what methodologies are recommended for monitoring and QA/QC.

This section presents a broad overview of the comments received regarding the request for comment on coke calcining.

The EPA received two comments on the addition of coke calcining as a new source category to part 98. One commenter supported the addition of the source category to provide consistent reporting of coke calciner emissions, but suggested that the EPA allow petroleum refineries to continue to report their coke calciner emissions in subpart Y to minimize burden to current reporters. The other commenter suggested that the new source category was unnecessary because coke calciner emissions could be sufficiently reported under subpart C. Upon review of these comments, the EPA is proposing to require reporting of coke calciner emissions under subpart WW because this proposed approach would provide a consistent and more accurate method of estimating emissions from coke calciners than subpart C and would not significantly alter the burden for existing reporters with coke calciners collocated at petroleum refineries.

3. Proposed Definition of the Source Category

The proposed coke calciner source category consists of processes that heat petroleum coke to high temperatures in the absence of air or oxygen for the purpose of removing impurities or volatile substances in the petroleum coke feedstock. The proposed coke calciner source category includes, but is not limited to, rotary kilns or rotary hearth furnaces used to calcine petroleum coke and any afterburner or other equipment used to treat the process gas from the calciner. The proposed source category would include all coke calciners, not just those collocated at petroleum refineries, to provide consistent requirements for all coke calciners.

4. Selection of Proposed Reporting Threshold

The EPA considered various options for reporting thresholds including ''all-in'' (no threshold), as well as emissions-based thresholds of 10,000 $mtCO_2e$, 25,000 $mtCO_2e$, and 100,000 $mtCO_2e$. Table 5 of this preamble illustrates the estimated process and combustion CO_2 emissions, and facilities, that would be covered nationally under each scenario.

TABLE 5—THRESHOLD ANALYSIS FOR COKE CALCINERS

Threshold level ($mtCO_2e$)	Emissions covered		Facilities covered	
	$mtCO_2e$/yr	Percent	Number	Percent
100,000	1,970,000	98.5	14	93
25,000	2,000,000	100	15	100
10,000	2,000,000	100	15	100

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[54] See *Revised Technical Support Document For Coke Calciners: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

TABLE 5—THRESHOLD ANALYSIS FOR COKE CALCINERS—Continued

Threshold level ($mtCO_2e$)	Emissions covered		Facilities covered	
	$mtCO_2e/yr$	Percent	Number	Percent
All-in (no threshold)	2,000,000	100	15	100

Because coke calciners are large emission sources, they are expected to emit over the 25,000 $mtCO_2e$ threshold generally required to report under existing GHGRP subparts with thresholds, and nearly all of them are also projected to exceed the 100,000 $mtCO_2e$ threshold. Therefore, the EPA projects that there are limited differences in the number of reporting facilities based on any of the emission thresholds considered. For this reason, the EPA is proposing to include the coke calciner source category as an ''all-in'' subpart (*i.e.,* regardless of their emissions profile), which would avoid the need for facilities to calculate whether their emissions exceed the threshold and the associated burden to do so, while continuing to focus the Agency's efforts on collecting information from facilities with larger total emissions.

5. Selection of Proposed Calculation Methods

Coke calciners primarily emit CO_2, but also have CH_4 and N_2O emissions as part of the process gas combustion process. Subpart Y (Petroleum Refineries) includes two directly applicable methods for estimating GHG (specifically CO_2) emissions from coke calciners. These are (1) the CEMS method (using CO_2 concentration and total volumetric flow rate of the process vent gas to calculate emissions) and (2) the carbon mass balance method [see equation Y–13 of 40 CFR 98.253(g)(2)]. In subpart Y, if a qualified CEMS is in place, the CEMS must be used. Otherwise, the facility can elect to install a CEMS or elect to use the carbon mass balance method. Subpart Y also includes methods for estimating CH_4 and N_2O emissions based on the CO_2 emissions.

To support this proposal, we conducted an updated review of calculation methods applicable for coke calciners as documented in the *Revised Technical Support Document For Coke Calciners: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

Option 1. This approach directly measures emissions using a CEMS. The CEMS would measure CO_2 concentration and total exhaust gas flow rate for the combined process and combustion source emissions. CO_2 mass emissions would be calculated from these measured values using equation C–6 and, if necessary, equation C–7 in 40 CFR 98.33(a)(4).

Option 2. This approach is a carbon mass balance method using the carbon content of the green and calcined coke. The methodology is the same as current equation Y–13 of 40 CFR 98.253(g)(2) used for coke calcining processes collocated at petroleum refineries.

Option 3. The methane in green coke method is based on use of a fixed methane content in the coke of 0.035 mass fraction and uses mass reduction in the quantity of coke fed to the process (corrected for moisture, volatile, and sulfur content) and the quantity of coke leaving the process (corrected for sulfur content). It is expected that coke calcine operators could just as easily determine the carbon content of the green and calcined coke and use the more direct carbon balance method.

Option 4. The vapor combustion method relies on analysis of carbon content of the gas stream inlet to the vapor combustion unit. CO_2 emissions are calculated assuming non-CO_2 carbon is combusted and converted to CO_2 at the efficiency of the combustion system, and assuming 100 percent of the CO_2 in the inlet gas stream is emitted. The difficulty with applying this method for coke calciners is collecting representative samples of the process off-gas prior to the afterburner.

Option 5. The coke combustion method is based on the method that some non-refinery facilities report emissions from coke calcining operations under 40 CFR part 98, subpart C. This method can be applied using either the default high heat values and emission factors in Table C–1 to subpart C of part 98 for petroleum coke (Tier 1 or 2) or measured carbon content of the green coke (Tier 3) and attribute the mass reduction of coke as petroleum coke combusted. This method does not correct for the fact that the volatile matter has a lower carbon content than the green petroleum coke and so is likely to produce CO_2 emission estimates that are biased high.

Proposed option. Following this review, we maintain that the CEMS (Option 1) and carbon mass balance methods (Option 2) are the most accurate methods for determining CO_2 emissions from coke calciners. Several existing coke calciners currently operate a CEMS. For those facilities that do not have a qualified CEMS in-place, the carbon mass balance method provides an accurate approach for determining CO_2 emissions using data that is expected to be routinely monitored by coke calcining facilities. Furthermore, using these methods allows petroleum refineries with coke calciners to maintain their calculation methods. Additional detail on the calculation methods reviewed are available in, *Revised Technical Support Document For Coke Calciners: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

We note that the CEMS method as implemented in subpart Y of part 98 requires reporters to determine CO_2 emissions from auxiliary fuel use discharged in the coke calciner exhaust stack using methods in subpart C of part 98, and to subtract those emissions from the measured CEMS emissions to determine the process CO_2 emissions, comparable to the emissions determined using the carbon mass balance approach. We are proposing to retain this requirement and have the auxiliary fuel-related emissions reported in subpart C. We are also proposing to require reporters using the carbon mass balance approach to also determine auxiliary fuel use in the coke calciner (and afterburner) and estimate and report the CO_2 emissions from this fuel use in subpart C.

We are proposing that coke calciners also estimate process CH_4 and N_2O emissions based on the total CO_2 emissions determined for the coke calciner and the ratio of the default CO_2 emission factor for petroleum coke in Table C–1 to subpart C of part 98 to the default CH_4 and N_2O emission factors for petroleum products in Table C–2 to subpart C of part 98. The proposed approach is consistent with the requirements for determining these GHG emissions for coke calciners in subpart Y. We are proposing to include these GHG emissions in the new coke calcining subpart to fully account for GHG emissions from coke calciners.

6. Selection of Proposed Monitoring, QA/QC, and Verification Requirements

We are proposing two separate monitoring methods: direct measurement and a mass balance emission calculation.

Proposed option for direct measurement using CEMS. The proposed CEMS method requires both a continuous CO_2 concentration monitor and a continuous volumetric flow monitor. We are proposing reporters required to or electing to use CEMS must install, operate, and calibrate the monitoring system according to subpart C (General Stationary Fuel Combustion Sources), which is consistent with CEMS requirements in other GHGRP subparts. We are proposing that all CO_2 CEMS and flow rate monitors used for direct measurement of GHG emissions should comply with QA/QC procedures for daily calibration drift checks and quarterly or annual accuracy assessments, such as those provided in Appendix F to part 60 or similar QA procedures. We are proposing these requirements to ensure the quality of the reported GHG emissions and to be consistent with the current requirements for CEMS measurements within subparts A (General Provisions) and C of the GHGRP.

Proposed option for mass balance calculation. The carbon mass balance method requires monitoring of mass quantities of green coke fed to the process, calcined coke leaving the process, and coke dust removed from the process by dust collection systems. It also requires periodic determination of carbon content of the green and calcined coke. For coke mass measurements, we are proposing that the measurement device be calibrated according to the procedures specified by the updated *Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices,* NIST Handbook 44 (2022) or the procedures specified by the manufacturer. We are proposing that the measurement device be recalibrated either biennially or at the minimum frequency specified by the manufacturer. We are proposing these requirements to ensure the quality of the reported GHG emissions and to be consistent with the current requirements for coke calciner mass measurements within subpart Y.

For carbon content of coke measurements, we are proposing that the owner or operator follow approved analytical procedures and maintain and calibrate instruments used according to manufacturer's instructions and to document the procedures used to ensure the accuracy of the measurement devices used. We are proposing these requirements to ensure the quality of the reported GHG emissions and to be consistent with the current requirements for coke calciner mass measurements within subpart Y.

We are proposing that these determinations be made monthly. Current requirements in subpart Y do not specify a monitoring frequency, such that only the annual mass of coke entering and leaving the process needs to be determined. It is expected that facilities likely determine these mass quantities on a daily or more frequent basis, so it would be minimal burden for facilities to determine and record these quantities monthly. Similarly, facilities are expected to regularly determine the carbon content of the green coke feedstock, so determining and reporting the monthly average carbon content of green and calcined coke would require limited additional effort compared to determining and reporting annual values. If carbon content measurements are made more often than monthly, we are proposing that all measurements made within the calendar month should be used to determine the average for the month. Conducting the calculation monthly would improve accuracy compared to annual or quarterly calculations. It also improves the verification process for the reported data. Because we expect reporters will have this data available on a monthly or more frequent basis, we are proposing to require reporters to conduct the calculations monthly. We solicit comment on whether quarterly averages for composition and quantity data would adequately account for potential variations in carbon content, production rates, and other factors that may affect the estimated GHG emissions.

7. Selection of Proposed Procedures for Estimating Missing Data

Whenever a quality-assured value of a required parameter is unavailable (*e.g.,* if a CEMS malfunctions during unit operation or if a required fuel sample is not taken), we are proposing that a substitute data value for the missing parameter shall be used in the calculations. For missing CEMS data, we are proposing that the missing data procedures in subpart C be used. The subpart C missing data procedures require the substitute data value to be the best available estimate of the parameter, based on all available process data (*e.g.,* electrical load, steam production, operating hours, etc.). For each missing value of mass or carbon content of coke, we are proposing that the average of the data measurements before and after the missing data period be used to calculate the emissions during the missing data period because this is expected to provide the more accurate estimate for the missing value. If, for a particular parameter, no quality-assured data are available prior to the missing data incident, we are proposing that the substitute data value should be the first quality-assured value obtained after the missing data period. Similarly, if no quality-assured data are available after the missing data incident, we are proposing that the substitute data value should be the most recently acquired quality-assured value obtained prior to the missing data period. Missing data procedures are applicable for CEMS measurements when using the CEMS method and for mass of coke measurements and carbon content measurements of green and calcined coke when using the carbon mass balance method. These missing data procedures were selected because they are consistent with current GHGRP methods and because they are expected to provide the most accurate values for the missing data.

8. Selection of Proposed Data Reporting Requirements

For coke calcining units, we are proposing that the owner and operator shall report general information about the coke calciner (unit ID number and maximum rated throughput of the unit), the method used to calculate GHG emissions, and the calculated CO_2, CH_4, and N_2O annual emissions for each unit, expressed in metric tons of each pollutant emitted. We are also proposing to require the owner and operator to report the annual mass of green coke fed to the coke calcining unit, the annual mass of marketable petroleum coke produced by the coke calcining unit, the annual mass of petroleum coke dust removed from the process through the dust collection system of the coke calcining unit, the annual average mass fraction carbon content of green coke fed to the unit, and the annual average mass fraction carbon content of the marketable petroleum coke produced by the coke calcining unit.

9. Selection of Proposed Records That Must Be Retained

We are proposing that facilities maintain records documenting the procedures used to ensure the accuracy of the measurements of all reported parameters, including but not limited to, calibration of weighing equipment, flow meters, and other measurement devices. The estimated accuracy of measurements made with these devices must also be recorded, and the technical basis for these estimates must be provided. We are proposing these requirements based on the provisions in subpart A of part 98. Maintaining records of information used to determine reported GHG emissions is necessary to allow us to verify that GHG emissions monitoring and calculations were done correctly.

For the coke calciners source category, we are proposing that the verification software specified in 40 CFR 98.5(b) would be used to fulfill the recordkeeping requirements for the following five data elements:

- Monthly mass of green coke fed to the coke calcining unit;
- Monthly mass of marketable petroleum coke produced by the coke calcining unit;
- Monthly mass of petroleum coke dust removed from the process through the dust collection system of the coke calcining unit;
- Average monthly mass fraction carbon content of green coke fed to the coke calcining unit; and
- Average monthly mass fraction carbon content of marketable petroleum coke produced by the coke calcining unit.

Maintaining records of information used to determine reported GHG emissions is necessary to allow us to verify that GHG emissions monitoring and calculations were done correctly.

C. Subpart XX—Calcium Carbide Production

1. Rationale for Inclusion in the GHGRP

For the reasons described in section II.B and the 2022 Data Quality Improvements Proposal, consistent with its authority under the CAA, the EPA is proposing to add a new subpart for facilities engaged in the manufacturing of calcium carbide to quantify and report GHG emissions from their processes and from fuel combustion. Calcium carbide production is currently identified as a potential source of GHG emissions in the IPCC 2006 Guidelines.[55] Although we are aware of at least one active calcium carbide production facility in the United States, emissions from calcium carbide production are currently not explicitly accounted for in the GHGRP. The one current producer of calcium carbide in the United States is Carbide Industries, LLC, located in Louisville, KY. Carbide Industries, LLC currently reports their process GHG emissions under subpart K of part 98 (Ferroalloy Production) (e-GGRT identifier 1005537), although there is no requirement for them to report under subpart K because they do not meet the definition of the subpart. They also report combustion emissions under subpart C of part 98 (General Stationary Fuel Combustion Sources), which includes CO_2 emissions from an acetylene flare and other combustion sources. Because the subpart K calculation methodology is not intended for calcium carbide production processes, we anticipate that the emissions as estimated under this methodology do not accurately account for the CO_2 emissions from the calcium carbide process.

Therefore, we are proposing the addition of a calcium carbide production source category to the GHGRP to better align with intergovernmental approaches to estimating emissions and to provide more accurate applicability requirements and emissions estimation methodologies for these types of facilities. Further, the proposed requirements would improve the completeness of the data collected under the GHGRP, add to the EPA's understanding of the GHG emissions from these sources, and better inform future EPA policy under the CAA. Once collected, such data would also be available to and improve on the estimates provided in the Inventory, by incorporating the recommendations of the 2006 IPCC guidelines.

2. Public Comments Received in Request for Comment

In section IV.C of the 2022 Data Quality Improvements Proposal, the EPA requested comment on the addition of calcium carbide production as a new subpart to part 98. The request for comment covered the following topics:

- Whether the EPA should add a source category related to calcium carbide production;
- Information related to the source category definition, including information to contextualize potential reporters and, where acetylene production from calcium carbide occurs at the same facility, whether the EPA should account for emissions from these sources;
- Information on how emissions could be estimated at a facility-level based on methods available in the 2006 IPCC guidelines;
- What monitoring requirements should be in place; and
- What reporting requirements should be in place that would help to support emissions estimates.

This section presents a broad overview of the comments received regarding the request for comment on calcium carbide production.

We received one comment on the addition of a source category for calcium carbide production, stating that the addition was unnecessary. The commenter noted that the EPA already receives emissions data from the one U.S. calcium carbide production facility that voluntarily reports to part 98 under existing subpart K (Ferroalloy Production), and therefore a new source category is redundant. The EPA is proposing the addition of a new source category for calcium carbide production to provide accurate applicability requirements, require data specific to the calcium carbide industry, and better align with international emissions evaluations. In considering the comment, we think this proposal is appropriate in part because we have assessed that it is technically inconsistent with our regulations for a calcium carbide facility to voluntarily report under subpart K. Receiving data for a facility that does not align with the source category of subpart K presents potential data quality issues for the EPA that would be addressed under the proposed new subpart. Additionally, as discussed in the June 21, 2022 proposed rule, the data we would receive from these sources would better align the data collected under GHGRP with the 2006 IPCC Guidelines.

We received one comment on the potential calculation methodology for the calcium carbide production source category, stating that the adjustment factor within the carbon consumption method should be changed from 0.33 (for 100 percent pure calcium carbide) to 0.28, because commercial calcium carbide is not a pure product. As discussed in section IV.C.5 of this preamble, the EPA is requesting additional information regarding the purity level of commercial calcium carbide.

3. Proposed Definition of the Source Category

We propose defining calcium carbide production to include any process that produces calcium carbide. Calcium carbide is an industrial chemical manufactured from lime (CaO) and carbon, usually petroleum coke, by heating the mixture to 2,000 to 2,100 °C (3,632 to 3,812 °F) in an electric arc furnace. During the production of calcium carbide, the use of carbon-

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[55] IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3, Industrial Processes and Product Use, Mineral Industry Emissions. 2006. *www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_2_Ch2_Mineral_Industry.pdf.*

containing raw materials (petroleum coke) results in emissions of CO_2.

The largest application of calcium carbide is producing acetylene (C_2H_2) by reacting calcium carbide with water. The production of acetylene from calcium carbide results in the emissions of CO_2. Although we considered accounting for emissions from the production of acetylene at calcium carbide facilities in the 2022 Data Quality Improvements Proposal, we determined that acetylene is not produced at the one known plant that produces calcium carbide. Therefore, we are not proposing that CO_2 emissions from the production of acetylene from calcium carbide be reported under proposed subpart XX. Additional background information about GHG emissions from the calcium carbide production source category is available in the *Revised Technical Support Document for Calcium Carbide: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

4. Selection of Proposed Reporting Threshold

In developing the reporting threshold for calcium carbide production, we considered emissions-based thresholds of 10,000 $mtCO_2e$, 25,000 $mtCO_2e$ and 100,000 $mtCO_2e$. Requiring all facilities to report (no threshold) was also considered. Process emissions for 2020 from the one calcium carbide production facility were estimated to be 41,244 $mtCO_2e$/yr. Including their reported combustion emissions, total emissions in 2020 were 46,878 $mtCO_2e$. Table 6 of this preamble illustrates the emissions and facilities that would be covered under these various thresholds.

TABLE 6—THRESHOLD ANALYSIS FOR CALCIUM CARBIDE PRODUCTION

Threshold level ($mtCO_2e$)	Emissions covered		Facilities covered	
	$mtCO_2e$/yr	Percent	Number	Percent
100,000	0	0	0	0
25,000	46,878	100	1	100
10,000	46,878	100	1	100
All-in (no threshold)	46,878	100	1	100

Following our analysis, we are proposing that all calcium carbide manufacturing facilities be required to report under the GHGRP. The current estimate of emissions from the known facility exceeds 25,000 $mtCO_2e$ by a factor of about 1.9. Therefore, in order to simplify the rule and avoid the need for the facility to calculate and report whether the facility exceeds the threshold value, we propose that all facilities report in this source category. Requiring all facilities to report captures 100 percent of emissions, and small temporary changes to the facility would not affect reporting requirements.

For a full discussion of the threshold analysis, please refer to the *Revised Technical Support Document for Calcium Carbide: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

5. Selection of Proposed Calculation Methods

We are proposing to require facilities to report the process CO_2 emissions from each calcium carbide process unit or furnace used for production of calcium carbide. We reviewed existing methodologies for estimating process related GHG emissions including those of the 2006 IPCC Guidelines for National Greenhouse Inventories,[56] the European Union,[57] Canada's Greenhouse Quantification Requirements,[58] and the EPA's GHGRP. The methodologies reviewed are detailed in the *Revised Technical Support Document for Calcium Carbide: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program* (available in the docket for this rulemaking, Docket Id. No. EPA–HQ–OAR–2019–0424), and generally fall into one of the following options.

Option 1. Apply a default emission factor to calcium carbide output, or production. Generally, this method is less accurate as it involves multiplying production data by an emission factor that is likely a default value based on carbon content (*i.e.,* percentage of petroleum coke content that is carbon) assumptions. This method involves multiplying the amount of calcium carbide produced by the appropriate default emission factor from the 2006 IPCC Guidelines. This method would not account for facility-specific variances of process inputs or outputs.

While we included an adjustment factor of 0.33 in the carbon consumption method provided in the *Revised Technical Support Document for Calcium Carbide: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program* (available in the docket for this rulemaking, Docket Id. No. EPA–HQ–OAR–2019–0424), a factor of 0.28 was suggested by one commenter. The EPA is requesting additional information regarding the purity level of commercial calcium carbide and data supporting the suggested factor of 0.28.

Option 2. The carbon balance option, which is the IPCC Tier 3 approach, is generally more accurate as it involves measuring the consumption of specific process inputs and process outputs and the amounts of these materials consumed or produced. This method requires that the carbon content and the mass of carbonaceous materials input to and output from the process be determined. Carbon contents of materials are determined through the analysis of samples of the material or from information provided by the material suppliers. Also, the quantities of these materials consumed and produced during production would be measured and recorded. CO_2 emissions are estimated by multiplying the carbon content of each input and output material by the corresponding mass. The difference between the calculated total

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[56] IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3, Industrial Processes and Product Use, Mineral Industry Emissions. 2006. *https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_2_Ch2_Mineral_Industry.pdf.*

[57] European Union (EU). *Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the Monitoring and Reporting of Greenhouse Gas Emissions Pursuant to Directive 2003/87/EC of the European Parliament and of the Council and Amending Commission Regulation (EU) No. 601/2012.* January 1, 2021. Available at: *https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02018R2066-20210101&from=EN.*

[58] Environment and Climate Change Canada (ECCC). Canada's Greenhouse Gas Quantification Requirements. Version 4.0. December 2020. Available at: *http://publications.gc.ca/collections/collection_2021/eccc/En81-28-2020-eng.pdf.*

carbon input and the total carbon output is the estimated CO_2 emissions.

Option 3. Direct measurement of using CEMS. For configurations in which the process off-gases are contained within a stack or vent, direct measurement of the CO_2 emissions can be made by continuously measuring the off-gas stream CO_2 concentration and flow rate using a CEMS. Using a CEMS, the total CO_2 emissions tabulated from the recorded emissions measurement data would be reported annually.

Proposed option. We are proposing two different methods for quantifying GHG emissions from calcium carbide manufacturing, depending on current emissions monitoring at the facility. Under the proposed rule, if a qualified CEMS is in place, the CEMS must be used. Otherwise, under the proposed rule, the facility can elect to either install a CEMS or elect to use the carbon mass balance method.

CEMS method (Option 3). Under the proposed rule, facilities with an existing CEMS that meet the requirements outlined in 40 CFR part 98, subpart C would be required to use CEMS to estimate combined process and combustion CO_2 emissions. Facilities would be required to follow the requirements of 40 CFR part 98, subpart C to estimate all CO_2 emissions from the industrial source. Facilities would be required to follow 40 CFR part 98, subpart C to estimate emissions of CO_2, CH_4, and N_2O from stationary combustion.

Carbon balance method (Option 2). For facilities that do not have CEMS that meet the requirements of 40 CFR part 98 subpart C, the proposed monitoring method is Option 2, the carbon balance method. For any stationary combustion units included at the facility, facilities would be required to follow the existing requirements at 40 CFR part 98, subpart C to estimate emissions of CO_2, CH_4, and N_2O from stationary combustion.

Use of facility specific information under Option 2 is consistent with IPCC Tier 3 methods and is the preferred method for estimating emissions for other GHGRP sectors. Any additional burden associated with material measurement required for the carbon balance would be small in relation to the increased accuracy expected from using this site-specific information. Among the non-CEMS options, we are proposing Option 2 because it has the lowest uncertainty.

6. Selection of Proposed Monitoring, QA/QC, and Verification Requirements

We are proposing two separate monitoring methods: direct measurement and a mass balance emission calculation.

Proposed option for direct measurement using CEMS. For facilities where process emissions and/or combustion GHG emissions are contained within a stack or vent, facilities can take direct measurement of the GHG concentration in the stack gas and the flow rate of the stack gas using a CEMS. Under the proposed rule, if facilities use an existing CEMS to meet the monitoring requirements, they would be required to use CEMS to estimate CO_2 emissions. Where the CEMS capture all combustion- and process-related CO_2 emissions, facilities would be required to follow the requirements of 40 CFR part 98, subpart C to estimate emissions.

A CEMS continuously withdraws and analyzes a sample of the stack gas and continuously measures the GHG concentration and flow rate of the total exhaust stack gas. The emissions are calculated from the CO_2 concentration and the flow rate of the stack gas. The proposed CEMS method requires both a continuous CO_2 concentration monitor and a continuous volumetric flow monitor. To qualify as a CEMS, the monitors would be required to be installed, operated, and calibrated according to subpart C (General Stationary Fuel Combustion Sources) of the GHGRP (40 CFR 98.33(a)(4)), which is consistent with CEMS requirements in other GHGRP subparts.

Proposed option for mass balance calculation. For facilities using the carbon mass balance method, we are proposing that the facility must determine the annual mass for each material used for the calculations of annual process CO_2 emissions by summing the monthly mass for the material determined for each month of the calendar year. The monthly mass may be determined using plant instruments used for accounting purposes, including either direct measurement of the quantity of the material placed in the unit or by calculations using process operating information.

For the carbon content of the materials used to calculate process CO_2 emissions, we are proposing that the owner or operator determine the carbon content using material supplier information or collect and analyze at least three representative samples of the material inputs and outputs each year. The proposed rule would require the carbon content be analyzed at least annually using standard ASTM methods, including their QA/QC procedures. To reduce burden, we are proposing that if a specific process input or output contributes less than one percent of the total mass of carbon into or out of the process, you do not have to determine the monthly mass or annual carbon content of that input or output.

7. Selection of Proposed Procedures for Estimating Missing Data

We are proposing the use of substitute data whenever a quality-assured value of a parameter is used to calculate emission is unavailable, or ‘‘missing.’’ If the carbon content analysis of carbon inputs or outputs is missing, we are proposing the substitute data value would be based on collected and analyzed representative samples for average carbon contents. If the monthly mass of carbon-containing inputs and outputs is missing, we are proposing the substitute data value would be based on the best available estimate of the mass of the inputs and outputs from all available process data or data used for accounting purposes, such as purchase records. The likelihood for missing process input or output data is low, as businesses closely track their purchase of production inputs. These missing data procedures are the same as those for the ferroalloy production source category, subpart K of part 98, under which the existing U.S. calcium carbide production facility currently reports.

8. Selection of Proposed Data Reporting Requirements

We propose that each carbon carbide production facility report the annual CO_2 emissions from each calcium carbide production process, as well as any stationary fuel combustion emissions. In addition, we propose that additional information that forms the basis of the emissions estimates, along with supplemental data, also be reported so that we can understand and verify the reported emissions. All calcium carbide production facilities would be required to report their annual production and production capacity, total number of calcium carbide production process units, annual consumption of petroleum coke, each end use of any calcium carbide produced and sent off site, and, if the facility produces acetylene, the annual production of acetylene, the quantity of calcium carbide used for acetylene production at the facility, and the end use of the acetylene produced on-site. We propose reporting the end use of calcium carbide sent off site, as well as acetylene production information for current or future calcium carbide production facilities, to inform future Agency policy under the CAA. Collection of this information would also better synchronize use of the GHGRP data in Inventory reporting based on the 2006 IPCC Guidelines. While the only known calcium carbide facility does not currently produce acetylene on site, it is possible that this facility or other facilities would do so in the future. If a facility uses CEMS to measure their CO_2 emissions, they would be required to also report the identification number of each process unit. If a CEMS is not used to measure CO_2 emissions, the facility would also report the method used to determine the carbon content of each material for each process unit, how missing data were determined, and the number of months missing data procedures were used.

9. Selection of Proposed Records That Must Be Retained

Maintaining records of information used to determine reported GHG emissions is necessary to allow us to verify that GHG emissions monitoring and calculations were done correctly. If a facility uses a CEMS to measure their CO_2 emissions, they would be required to record the monthly calcium carbide production from each process unit and the number of monthly and annual operating hours for each process unit. If a CEMS is not used, the facility would be required to retain records of monthly production, monthly and annual operating hours, monthly quantities of each material consumed or produced, and carbon content determinations.

We are proposing that the owner or operator maintain records of how measurements are made including measurements of quantities of materials used or produced and the carbon content of process input and output materials. The procedures for ensuring accuracy of measurement methods, including calibration, would be recorded.

The proposed rule would also require the retention of a record of the file generated by the verification software specified in 40 CFR 98.5(b) including:

- carbon content (percent by weight expressed as a decimal fraction) of the reducing agent (petroleum coke), carbon electrode, product produced, and non-product outgoing materials; and
- annual mass (tons) of the reducing agent (petroleum coke), carbon electrode, product produced, and non-product outgoing materials.

Maintaining records of information used to determine reported GHG emissions is necessary to allow us to verify that GHG emissions monitoring and calculations were done correctly.

D. Subpart YY—Caprolactam, Glyoxal, and Glyoxylic Acid Production

1. Rationale for Inclusion in the GHGRP

For the reasons described in section II.B and the 2022 Data Quality Improvements Proposal, the EPA is proposing to add a new subpart, subpart YY of part 98 (Caprolactam, Glyoxal, and Glyoxylic Acid Production). Caprolactam, glyoxal, and glyoxylic acid production facilities are identified as a potential important source of GHG emissions, specifically N_2O, in the IPCC 2006 Guidelines,[59] which provides limited methodologies for calculating emissions from these sources. There are approximately two caprolactam facilities operating in the United States, and likely two to four facilities that produce glyoxal and glyoxylic acid. However, the emissions from these caprolactam, glyoxal, and glyoxylic production operations are currently not explicitly accounted for in the GHGRP. Currently, two caprolactam production facilities only report combustion emissions under subpart C (General Stationary Fuel Combustion Sources).

Therefore, we are proposing the addition of a new source category to the GHGRP for caprolactam, glyoxal, and glyoxylic acid production sources consistent with our authority under the CAA to better align with intergovernmental guidance on emissions estimation and to provide clear applicability requirements and emissions estimation methodologies for these types of facilities. This new subpart would improve the completeness of the data collected under the GHGRP, add to the EPA's understanding of the GHG emissions from these sources, and better inform future EPA policy under the CAA. Once collected, such data would also be available to and improve on the estimates provided in the Inventory, by incorporating the recommendations of the 2006 IPCC guidelines. Grouping these three organic compounds together into one source category for GHGRP purposes would be reasonable because the 2006 IPCC guidelines methodology for estimating GHG emissions from the production of these compounds does the same.

We are requesting comment on the level of production of glyoxal and glyoxylic acid in the United States and whether production of glyoxal and glyoxylic acid are expected to increase in the future.

2. Public Comments Received in Request for Comment

In section IV.D of the 2022 Data Quality Improvements Proposal, the EPA requested comment on the addition of caprolactam, glyoxal, and glyoxylic acid production as a new subpart to part 98. The request for comment covered the following topics:

- Whether the EPA should add a source category;
- Information related to source category definitions, calculation methodologies, and reporting requirements;
- Whether there are any glyoxal and/or glyoxylic acid production facilities currently operating in the United States;
- Whether facilities have installed abatement equipment;
- Which information or inputs for each calculation methodology is readily available;
- Information on the mechanisms that generate CO_2 emissions from glyoxal and glyoxylic acid production;
- Available monitoring methodologies and quality assurance procedures that should be used; and
- Data that are readily available for reporting that would help to support emissions estimates.

We received no comments on the addition of a source category related to caprolactam, glyoxal, and glyoxylic acid production. For the reasons described in section IV.D.1 of this preamble, we are proposing to add new subpart YY for caprolactam, glyoxal, and glyoxylic acid production based on additional information gathered by the Agency following the publication of the 2022 Data Quality Improvements Proposal. The definitions, thresholds, and requirements for the proposed subpart are outlined in sections IV.D.2 through IV.D.9 of this preamble.

3. Proposed Definition of the Source Category

Caprolactam is a crystalline solid organic compound with a wide variety of uses, including brush bristles, textile stiffeners, film coatings, synthetic leather, plastics, plasticizers, paint vehicles, cross-linking for polyurethanes, and in the synthesis of lysine. Caprolactam is primarily used in the manufacture of synthetic fibers, especially Nylon 6.

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[59] IPCC 2006. IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3, Industrial Processes and Product Use. Chapter 3, Chemical Industry Emissions. 2006. *www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_3_Ch3_Chemical_Industry.pdf.*

Glyoxal is a solid organic compound with a wide variety of uses, including as a crosslinking agent in various polymers for paper coatings, textile finishes, adhesives, leather tanning, cosmetics, and oil-drilling fluids; as a sulfur scavenger in natural gas sweetening processes; as a biocide in water treatment; to improve moisture resistance in wood treatment; and as a chemical intermediate in the production of pharmaceuticals, dyestuffs, glyoxylic acid, and other chemicals. It is also used as a less toxic substitute for formaldehyde in some applications (*e.g.,* in wood adhesives and embalming fluids).

Glyoxylic acid is a solid organic compound exclusively produced by the oxidation of glyoxal with nitric acid. It is used mainly in the synthesis of vanillin, allantoin, and several antibiotics like amoxicillin, ampicillin, and the fungicide azoxystrobin.

We are proposing that the caprolactam, glyoxal, and glyoxylic acid production source category would include any facility that produces caprolactam, glyoxal, or glyoxylic acid. We are also proposing that the source category would exclude the production of glyoxal through the LaPorte process (*i.e.,* the gas-phase catalytic oxidation of ethylene glycol with air in the presence of a silver or copper catalyst). The LaPorte process does not emit N_2O and there are no methods for estimating CO_2 in available literature.

4. Selection of Proposed Reporting Threshold

The total process emissions from current production of caprolactam, glyoxal, and glyoxylic acid are estimated at 1.2 million $mtCO_2e$. Most of the emissions are from the two known caprolactam production facilities. There are approximately two to four facilities that produce glyoxal and glyoxylic acid. Therefore, the known universe of facilities that produce caprolactam, glyoxal, and glyoxylic acid in the United States is four to six total facilities.[60]

In developing the reporting threshold for caprolactam, glyoxal, and glyoxylic acid production, we considered both an ''all-in'' (no threshold) and emissions-based thresholds of 10,000 $mtCO_2e$, 25,000 $mtCO_2e$, and 100,000 $mtCO_2e$. Table 7 of this preamble illustrates the emissions and facilities that would be covered under these various thresholds.

TABLE 7—THRESHOLD ANALYSIS FOR CAPROLACTAM, GLYOXAL, AND GLYOXYLIC ACID PRODUCTION

Threshold level ($mtCO_2e$)	Emissions covered		Facilities covered	
	$mtCO_2e$/yr (million)	Percent	Number	Percent
100,000	0	0	0	0
25,000	1.2	99.6	3	50
10,000	1.2	99.6	3	50
All-in (no threshold)	1.2	100	6	100

Table 7 of this preamble illustrates that there is a small difference in the total emissions that would be covered but a larger difference in the number of facilities that would be covered, depending on the threshold chosen. All thresholds except 100,000 $mtCO_2e$ ensure that both of the known caprolactam facilities are covered by this subpart. However, using a threshold of 10,000 $mtCO_2e$ or 25,000 $mtCO_2e$ would exclude three of the four facilities that potentially produce glyoxal and glyoxylic acid. Adding caprolactam, glyoxal, and glyoxylic acid production as an ''all-in'' subpart (*i.e.,* regardless of their emissions profile) is a conservative approach to gather information from as many facilities that produce caprolactam, glyoxal, and glyoxylic acid as possible, especially if production of glyoxal and glyoxylic acid increase in the near future. Defining this source category as an ''all-in'' subpart also accounts for the uncertainty in the data and assumptions used in the initial emissions analysis for glyoxal and glyoxylic acid. The CO_2 emissions from glyoxal production (1,500 mt CO_2e) were estimated based on nationwide production data of 50 million pounds from 2011,[61] relied on literature estimates to determine the yield of glyoxal, and assumed that all hydrocarbon feedstock that is not converted to glyoxal is converted to CO_2. The N_2O emissions from glyoxylic acid production were estimated as zero based on nationwide data from 2015.[62]

Collecting data from all caprolactam, glyoxal, and glyoxylic acid facilities would help the EPA better understand the current level of production of each chemical and how accurate the literature estimates are at the facility level. Further details on the estimated emissions from facilities that produce caprolactam, glyoxal, and glyoxylic acid are available in, *Revised Technical Support Document For Caprolactam, Glyoxal, and Glyoxylic Acid Production: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

5. Selection of Proposed Calculation Methods

The ammonia oxidation step of caprolactam production results in emissions of N_2O, and the ammonium carbonate step results in insignificant emissions of CO_2. Therefore, only N_2O process emissions are estimated from caprolactam production.

The liquid-phase oxidation of acetaldehyde with nitric acid to produce glyoxal emits both N_2O and CO_2, but available methods for estimating emissions address only the N_2O. The LaPorte process for producing glyoxal generates CO_2 emissions but there are no methods for estimating such emissions. Therefore, only N_2O process emissions are estimated from glyoxal production.

Glyoxylic acid is produced by the oxidation of glyoxal with nitric acid. A considerable amount of the glyoxal is overoxidized to oxalic acid, and N_2O is created through this secondary reaction. Only N_2O process emissions are estimated from glyoxylic acid production.

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[60] See *Revised Technical Support Document For Caprolactam, Glyoxal, and Glyoxylic Acid Production: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

[61] Compilation of data submitted under the Toxic Substances Control Act (TSCA) in 2011. Accessed April 2021. Available at *https://chemview.epa.gov/chemview.*

[62] Compilation of data submitted under TSCA in 2015. Accessed April 2021. Available at *https://chemview.epa.gov/chemview.*

Combustion emissions at facilities that produce caprolactam, glyoxal, and glyoxylic acid are expected to include CO_2, CH_4, and N_2O.

We reviewed two methods from the 2006 IPCC Guidelines[63] for calculating N_2O emissions from the production of caprolactam, glyoxal, and glyoxylic acid, as summarized in this section of the preamble. Additional detail on the calculation methods reviewed are available in the *Revised Technical Support Document For Caprolactam, Glyoxal, and Glyoxylic Acid Production: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

Option 1 for calculating N_2O emissions. Following the Tier 2 approach established by the IPCC, apply default N_2O generation factors on a site-specific basis. This option requires raw material input to be known in addition to a standard N_2O generation factor, which differs for each of the three chemicals. In addition, Tier 2 requires site-specific knowledge of the use of N_2O control technologies. The volume or mass of each product would be measured with a flow meter or weigh scales. The process-related N_2O emissions are estimated by multiplying the generation factor by the production and the destruction efficiency of any N_2O control technology.

Option 2 for calculating N_2O emissions. Follow the Tier 3 approach established by IPCC using periodic direct monitoring of N_2O emissions to determine the relationship between production and the amount of N_2O emissions, *i.e.,* develop a site-specific emissions factor. The site-specific N_2O emission factor would be determined from an annual measurement or a single annual stack test. The site-specific emissions factor developed from this test and production rate (activity level) are used to calculate N_2O emissions. After the initial test, annual testing of N_2O emissions would be required to estimate the N_2O emission factor. The new factor would then be applied to production to estimate N_2O emissions.

Proposed Option for calculating N_2O emissions. We are proposing Option 1 (IPCC Tier 2 approach) to quantify N_2O process emissions from caprolactam, glyoxal, and glyoxylic acid production facilities. Option 1 is already being used in the Inventory for caprolactam production and the method is also directly applicable to glyoxal and glyoxylic acid production. Synergy would be gained from using the same methodology for both programs.

For any stationary combustion units included at the facility, facilities would be required to follow the existing requirements in 40 CFR part 98, subpart C to calculate emissions of CO_2, CH_4 and N_2O from stationary combustion.

6. Selection of Proposed Monitoring, QA/QC, and Verification Requirements

The proposed monitoring required to comply with the N_2O calculation methodologies for reporters that produce caprolactam, glyoxal, and glyoxylic acid are to determine the monthly and annual production quantities of each chemical and to determine the N_2O destruction efficiency of any N_2O abatement technologies in use. The EPA considered two options for determination of production quantities:

Option 1 for production quantities. Use direct measurement of production quantities for all three chemicals. This option is consistent with existing GHGRP subparts but could be burdensome to require a specific measurement method.

Option 2 for production quantities. Use existing plant procedures used for accounting purposes to determine production quantities for all three chemicals. This option is also consistent with existing GHGRP subparts and would not impose additional burden to applicable facilities.

Proposed option for production quantities. We are proposing to allow either direct measurement of production quantities or existing plant procedures to determine production quantities. This option requires one of the following from reporters: maintain documentation of the procedures used to ensure the accuracy of the measurements of all reported parameters and the estimated accuracy of the measurements made with these devices, or maintain documentation of how accounting procedures were used to determine production. Allowing reporters to use either method for determining production quantities provides flexibility to reporters and is consistent with existing part 98 subparts.

The EPA considered two options for determination of the N_2O destruction efficiency:

Option 1 for control device destruction efficiency. Estimate the destruction efficiency for each N_2O abatement technology. This can be determined by using the N_2O control device's manufacturer-specified destruction efficiency or estimating the destruction efficiency through process knowledge.

Option 2 for control device destruction efficiency. Use a default N_2O destruction efficiency according to the 2006 IPCC guidelines.[64] The IPCC default is 80 percent for glyoxal and glyoxylic acid if the facility is known to have abatement and 0 percent if no abatement. The IPCC default is 0 percent for caprolactam.

Proposed option for control device destruction efficiency. We are proposing to require reporters to estimate the destruction efficiency for each N_2O abatement technology because this option is more accurate than using a default destruction efficiency. The destruction efficiency can be determined by using the manufacturer's specific destruction efficiency or estimating the destruction efficiency through process knowledge. Documentation of how process knowledge was used to estimate the destruction efficiency is required if reporters choose that option. Examples of information that could constitute process knowledge include calculations based on material balances, process stoichiometry, or previous test results provided that the results are still relevant to the current vent stream conditions.

For the caprolactam, glyoxal, and glyoxylic acid production subpart, we are proposing to require reporters to perform all applicable flow meter calibration and accuracy requirements and maintain documentation as specified in 40 CFR 98.3(i).

7. Selection of Proposed Procedures for Estimating Missing Data

For caprolactam, glyoxal, and glyoxylic acid production, we are proposing that substitute data would be the best available estimate based on all available process data or data used for accounting purposes (such as sales records). For the control device destruction efficiency, assuming that the control device operation is generally consistent from year to year, we are proposing the substitute data value would be the most recent quality-assured value.

8. Selection of Proposed Data Reporting Requirements

We are proposing that facilities report annual N_2O emissions (in metric tons) from each production line. In addition, we are proposing that facilities submit the following data to understand the emissions data and verify the

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[63] IPCC 2006. IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3, Industrial Processes and Product Use. Chapter 3, Chemical Industry Emissions. 2006. *www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_3_Ch3_Chemical_Industry.pdf.*

[64] *Id.*

reasonableness of the reported emissions: number of process lines; annual production capacity; annual production; number of operating hours in the calendar year for each process line; abatement technology used and installation dates (if applicable); abatement utilization factor; number of times in the reporting year that missing data procedures were followed to measure production quantities of caprolactam, glyoxal, or glyoxylic acid (months); and overall percent N_2O reduction for each chemical.

Capacity, production, and operating hours would be helpful in determining the potential for growth in the subpart. Under the proposed rule, the production rate can be determined through sales records or by direct measurement using flow meters or weigh scales.

A list of abatement technologies would be helpful in assessing how widespread the use of abatement is in this subpart, cataloging any new technologies that are being used, and documenting the amount of time that the abatement technologies are being used.

9. Selection of Proposed Records That Must Be Retained

We are proposing that facilities maintain records documenting the procedures used to ensure the accuracy of the measurements of all reported parameters, including but not limited to, calibration of weighing equipment, flow meters, and other measurement devices. The estimated accuracy of measurements made with these devices would also be required to be recorded, and the technical basis for these estimates would be required to be provided. We are also proposing that facilities maintain records documenting the estimate of production rate and abatement technology destruction efficiency through accounting procedures and process knowledge, respectively.

The proposed rule would also require the retention of a record of the file generated by the verification software specified in 40 CFR 98.5(b) including:

- Monthly production quantities of caprolactam from all process lines;
- Monthly production quantities of glyoxal from all process lines; and
- Monthly production quantities of glyoxylic acid from all process lines.

Maintaining records of information used to determine reported GHG emissions is necessary to allow us to verify that GHG emissions monitoring and calculations were done correctly.

E. Subpart ZZ—Ceramics Production

1. Rationale for Inclusion in the GHGRP

For the reasons described in section II.B and the 2022 Data Quality Improvements Proposal, consistent with its authority under the CAA, the EPA is proposing to add a new subpart, subpart ZZ of part 98 (Ceramics Production), for facilities engaged in the manufacturing of ceramics to quantify and report GHG emissions from their processes and from fuel combustion. Ceramics manufacturing facilities are identified in the IPCC 2006 Guidelines as a source of CO_2 emissions based on the calcination process, which incorporates raw carbonates such as clay, shale, limestone, and dolomite, and as a source of CO_2, CH_4, and N_2O emissions from combustion in kilns, dryers, and other sources.[65] Although there are currently a large number of ceramics manufacturing facilities operating in the United States, emissions from these operations are not explicitly accounted for in the GHGRP. While it was originally anticipated that some of these ceramic production facilities would be required to report under subpart U of part 98 (Miscellaneous Uses of Carbonate), there are no such facilities currently reporting under this subpart, likely because they do not meet the applicability requirements of subpart U due to the use of carbonates contained in clay rather than pure carbonates. Currently, only 16 ceramics facilities report under part 98, and these facilities only report combustion emissions under subpart C (General Stationary Fuel Combustion Sources). As such, we have determined that emissions from ceramics manufacturing are likely not appropriately captured in the GHGRP.

For these reasons, we are proposing the addition of a new source category for ceramics manufacturing to better align with the guidance and approach of the IPCC 2006 Guidelines and to provide clear applicability requirements and emissions estimation methodologies for these types of facilities. The proposed requirements would improve the completeness of the data collected under the GHGRP, add to the EPA's understanding of the GHG emissions from these sources, and better inform future EPA policy under the CAA. Once collected, such data would also be available to and improve on the estimates provided in the Inventory, by incorporating the recommendations of the 2006 IPCC guidelines.

2. Public Comments Received in Request for Comment

In section IV.B of the 2022 Data Quality Improvements Proposal, the EPA requested comment on the addition of ceramics manufacturing as a new subpart to part 98. The request for comment covered the following topics:

- Whether the EPA should add a source category related to ceramics manufacturing;
- Information related to the source category definition, including whether it should be included as a separate category or as part of an existing category such as subpart N (Glass Production);
- What calculation methodologies should be used for purposes of part 98 reporting, including what information is readily available to reporters to support calculation methodologies;
- What monitoring requirements should be in place and what methodologies are recommended for monitoring and QA/QC; and
- What reporting requirements should be in place.

This section presents a broad overview of the comments received regarding the request for comment on ceramics production.

We received one comment on the addition of a source category for ceramics manufacturing, stating that the commenter opposed a new source category for brick manufacturing and that the EPA has methods available to estimate GHG emissions from the brick industry without annual GHG reporting. The commenter suggested that the EPA consider a one-time information collection request for GHG emissions data or other collaboration with the brick industry as an alternative to mandatory reporting requirements. The EPA is proposing the addition of a new source category for ceramics manufacturing that would include a variety of ceramics production industries in addition to brick manufacturing. As discussed in the 2022 Data Quality Improvements Proposal, we are seeking data from these sources to improve the coverage of the GHGRP, provide more accurate emissions estimations, and better inform the development of GHG policies and programs under the CAA. This information would also further align the data collected under GHGRP with the 2006 IPCC Guidelines.

3. Proposed Definition of the Source Category

Ceramics manufacturing is the process in which nonmetallic, inorganic materials, many of which are clay-

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[65] IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3, Industrial Processes and Product Use, Mineral Industry Emissions. 2006. *www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_2_Ch2_Mineral_Industry.pdf.*

based, are used to produce ceramic products such as bricks and roof tiles, wall and floor tiles, table and ornamental ware (household ceramics), sanitary ware, refractory products, vitrified clay pipes, expanded clay products, inorganic bonded abrasives, and technical ceramics (*e.g.,* aerospace, automotive, electronic, or biomedical applications). Most ceramic products are made from one or more different types of clay (*e.g.,* shales, fire clay, ball clay). The general process of manufacturing ceramic products consists of raw material processing (grinding, calcining, and drying), forming, firing, and final processing (which may include grinding, polishing, surface coating, annealing, and/or chemical treatment). GHG emissions are produced during the calcination process in the kiln, dryer, or oven, and from any combustion source.

We are proposing that the ceramics source category would apply to facilities that annually consume at least 2,000 tons of carbonates or 20,000 tons of clay heated to a temperature sufficient to allow the calcination reaction to occur, and operate a ceramics manufacturing process unit. We propose to define a ceramics manufacturing process unit as a kiln, dryer, or oven used to calcine clay or other carbonate-based materials for the production of a ceramics product. The proposed definition of ceramics manufacturers as facilities that use at least the minimum quantity of carbonates or clay (2,000 tons/20,000 tons) would be consistent with the Miscellaneous Uses of Carbonate source category (subpart U of part 98). The source category definition establishes a minimum production level as a means to exclude and thus reduce the reporting burden for small artisan-level ceramics manufacturing processes. An example of a facility that may fall under this scenario is a university with a small ceramics department onsite for students. The university may be required to report GHGs under subpart D (Electricity Generation) but would only be required to gather data and report GHGs under subpart ZZ if the small ceramics department consumed at least 2,000 tons of carbonates or 20,000 tons of clay, as ceramic process and combustion emissions from use of 2,000 tons of carbonate are roughly estimated to be 3,100 $mtCO_2e$.

Additional background information about GHG emissions from the ceramics manufacturing source category is available in the *Revised Technical Support Document for Ceramics: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

4. Selection of Proposed Reporting Threshold

Per the 2018 U.S. Census, approximately 815 corporations reported their primary NAICS code as one of the two NAICS codes associated with Clay Product and Refractory Manufacturing, representing an estimated 850 facilities in the ceramics manufacturing industry.[66] Additionally, there is an unknown number of corporations that operate a ceramics facility as a secondary or tertiary operation onsite.

A large number of small artisan ceramic facilities comprise this industry—of the 815 corporations noted in the 2018 census, an estimated 700 corporations representing 86 percent have less than 100 employees corporate-wide and likely low production rates and small GHG emissions (likely less than 25,000 $mtCO_2e$).

In developing the ceramics production source category, we considered including facilities that emit at least 10,000 $mtCO_2e$, 25,000 $mtCO_2e$, or 100,000 $mtCO_2e$. Requiring all facilities to report (no threshold) was also considered. Table 8 of this preamble illustrates the estimated process and combustion CO_2 emissions, and facilities that would be covered under each scenario.

TABLE 8—THRESHOLD ANALYSIS FOR CERAMICS MANUFACTURING

Threshold level (metric tons)	Emissions covered		Facilities covered	
	$mtCO_2e/yr$	Percent	Number	Percent
100,000	0	0	0	0
25,000	2,770,000	60	34	4.0
10,000	2,770,000	60	34	4.0
All-in (no threshold)	4,630,000	100	850	100

As the quantity of emissions covered were estimated to be the same for the 10,000 $mtCO_2e$ and 25,000 $mtCO_2e$ thresholds, between these two options it is reasonable to adopt a facility definition that would include facilities estimated to emit 25,000 $mtCO_2e$ or more. A threshold of 25,000 $mtCO_2e$ is also preferable at this time to the ''all-in'' option because it would avoid burden on small facilities with few employees and lower overall emissions.

The proposed definition of ceramics manufacturers as facilities that use at least the minimum quantity of carbonates or clay (2,000 tons/20,000 tons) and the 25,000 $mtCO_2e$ threshold are both expected to ensure that small ceramics manufacturers are excluded. It is estimated that over 30 facilities would meet the proposed definition of a ceramics manufacturer and the proposed threshold of 25,000 $mtCO_2e$ for reporting. The total combined process and combustion emissions from this source category are estimated at 2.77 million $mtCO_2e$.

For a full discussion of this analysis, please refer to the *Revised Technical Support Document for Ceramics: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

5. Selection of Proposed Calculation Methods

CO_2 emissions result from the calcination of carbonates in the raw material (particularly clay, shale, limestone, dolomite, and witherite) and the use of limestone or other additives as a flux. Carbonates are heated to high temperatures in a ceramics process unit producing oxides and CO_2. Additionally, CO_2, CH_4, and N_2O emissions are produced during combustion in the ceramics manufacturing process unit and from other combustion sources on site.

We reviewed existing methodologies for estimating ceramics manufacturing

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[66] See the *Revised Technical Support Document for Ceramics: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424), for additional information.

process related GHG emissions including those of the 2006 IPCC Guidelines for National Greenhouse Inventories,[67] the European Union, Canada's Greenhouse Quantification Requirements, the EPA's GHGRP, and Australia's National Greenhouse and Energy Reporting Amendment. Additional detail on the calculation methods reviewed are available in the *Revised Technical Support Document for Ceramics: Supplemental Proposed Rule For The Greenhouse Gas Reporting Program,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424). From the review of existing programs, three basic calculation methodologies were identified.

Option 1. This approach directly measures emissions using a CEMS. The CEMS would measure CO_2 concentration and total exhaust gas flow rate for the combined process and combustion source emissions. CO_2 mass emissions would be calculated from these measured values using equation C–6 and, if necessary, equation C–7 in 40 CFR 98.33(a)(4). The combined process and combustion CO_2 emissions would be calculated according to the Tier 4 Calculation Methodology specified in 40 CFR 98.33(a)(4).

Option 2. The carbon mass balance method, which is based on the IPCC Tier 3 approach, requires that the carbon content and the mass of carbonaceous materials input to the process be determined. The facility would measure the consumption of specific process inputs and the amounts of these materials consumed by end-use/product type. Carbon contents of materials would be determined through the analysis of samples of the material or from information provided by the material suppliers. Also, the quantities of these materials consumed and produced during production would be measured and recorded. CO_2 emissions would be estimated by multiplying the carbon content of each raw material by the corresponding mass, by a carbonate emission factor, and by the decimal fraction of calcination achieved for that raw material.

Option 3. The IPCC Tier 1 approach is a basic mass balance method that assumes limestone and dolomite are the only carbonates used as input, and that 85 percent of carbonates consumed are limestone and 15 percent of carbonates consumed are dolomite. This carbonate assumption reflects pure carbonates, and not carbonate rock or materials such as clay that contain carbonate-based minerals. For clay or other carbonate-based raw materials, this approach assumes a default purity of 10 percent for clay content. Generally, this method is less accurate as it involves multiplying raw material usage by a default carbonate-based mineral content. CO_2 emissions would be estimated by multiplying the quantity of clay used by the assumed limestone and dolomite percentages and their respective carbonate emission factors.

For option 2 and option 3, facilities would be required to follow 40 CFR part 98, subpart C (General Stationary Fuel Combustion Sources) to estimate combustion GHG emissions of CO_2, CH_4, and N_2O from ceramics process units.

Proposed option. We are proposing two different methods for quantifying GHG emissions from ceramics manufacturing, depending on current emissions monitoring at the facility. If a qualified CEMS is in place, the CEMS must be used. Otherwise, the facility can elect to either install a CEMS or elect to use the carbon mass balance method.

CEMS method (Option 1). Facilities with a CEMS that meet the requirements in 40 CFR part 98, subpart C would be required to use CEMS to estimate the combined process and combustion CO_2 emissions. Facilities would be required to use subpart C to estimate emissions of $CO_{2,}$ CH_4, and N_2O from stationary combustion.

Carbon balance method (Option 2). For facilities that do not have CEMS that meet the requirements of 40 CFR part 98, subpart C, the proposed monitoring method for process emissions is the Option 2 carbon mass balance method. For any stationary combustion units included at the facility, facilities would be required to follow 40 CFR part 98, subpart C to estimate emissions of CO_2, CH_4, and N_2O from stationary combustion.

Use of facility specific information under Option 2 is consistent with IPCC Tier 3 methods and is the preferred method for estimating emissions for other GHGRP sectors. Any additional burden associated with material measurement required for the carbon balance would be small in relation to the increased accuracy expected from using this site-specific information. Of the two non-CEMS options, we are proposing Option 2 as it has the lowest uncertainty.

6. Selection of Proposed Monitoring, QA/QC, and Verification Requirements

We are proposing two separate monitoring methods: direct measurement and a mass balance emission calculation.

Proposed option for direct measurement using CEMS. Industrial source categories for which the process emissions and/or combustion GHG emissions are contained within a stack or vent can take direct measurement of the GHG concentration in the stack gas and the flow rate of the stack gas using a CEMS. In the case of ceramics manufacturing, process and combustion GHG emissions from ceramics process units are typically emitted from the same stack. Under the proposed rule, if facilities use an existing CEMS to meet the monitoring requirements, they would be required to use CEMS to estimate CO_2 emissions. Where the CEMS capture all combustion- and process-related CO_2 emissions, facilities would be required to follow the requirements of 40 CFR part 98, subpart C to estimate all CO_2 emissions from the industrial source.

A CEMS continuously withdraws and analyzes a sample of the stack gas and continuously measures the GHG concentration and flow rate of the total exhaust stack gas. The emissions are calculated from the CO_2 concentration and the flow rate of the stack gas. The proposed CEMS method requires both a continuous CO_2 concentration monitor and a continuous volumetric flow monitor. To qualify as a CEMS, the monitors would be required to be installed, operated, and calibrated according to subpart C (General Stationary Fuel Combustion Sources) of part 98 (40 CFR 98.33(a)(4)), which is consistent with CEMS requirements in other GHGRP subparts.

Proposed option for mass balance calculation. The proposed carbon mass balance method requires monitoring of mass quantities of carbonate-based raw material (*e.g.,* clay) fed to the process, establishing the mass fraction of carbonate-based minerals in the raw material, and an emission factor based on the type of carbonate consumed.

The mass quantities of carbonate-based raw materials consumed by each ceramics process unit can be determined using direct weight measurement of plant instruments or techniques used for accounting purposes, such as calibrated scales, weigh hoppers, or weigh belt feeders. The direct weight measurement can then be compared to records of raw material purchases for the year.

For the carbon content of the materials used to calculate process CO_2 emissions, we are proposing that the owner or operator determine the carbon mass fraction either by using information provided by the raw

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[67] IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3, Industrial Processes and Product Use, Mineral Industry Emissions. 2006. *https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_2_Ch2_Mineral_Industry.pdf.*

material supplier, by collecting and sending representative samples of each carbonate-based material consumed to an offsite laboratory for a chemical analysis of the carbonate content (weight fraction), or by choosing to use the default value of 1.0. The use of 1.0 for the mass fraction assumes that the carbonate-based raw material comprises 100 percent of one carbonate-based mineral. Suitable chemical analysis methods include using an x-ray fluorescence standard method. The proposed rule would require the carbon content be analyzed at least annually using standard ASTM methods, including their QA/QC procedures.

The carbonate emission factors provided in proposed Table ZZ–1 to subpart ZZ of part 98 are based on stoichiometric ratios and represent the weighted average of the emission factors for each particular carbonate. These factors were pulled from Table N–1 to subpart N of part 98, and from Table 2.1 of the 2006 IPCC Guidelines.[68] Emission factors provided by the carbonate vendor for other minerals not listed in Table ZZ–1 may also be used.

For the ceramics manufacturing source category, we are proposing for QA/QC requirements that reporters calibrate all meters or monitors and maintain documentation of this calibration. These meters or monitors should be calibrated prior to the first reporting year, using a suitable method published by a consensus standards organization (*e.g.,* ASTM, American Society of Mechanical Engineers (ASME), American Petroleum Institute (API), American Gas Association (AGA), etc.), or as specified by the meter/monitor manufacturer. These meters or monitors would be required to be recalibrated either annually or at the minimum frequency specified by the manufacturer.

In addition, any flow rate monitors used for direct measurement would be required to comply with QA procedures for daily calibration drift checks and quarterly or annual accuracy assessments, such as those provided in Appendix F to part 60 or similar QA procedures. We are proposing these requirements to ensure the quality of the reported GHG emissions and to be consistent with the current requirements for CEMS measurements within subparts A (General Provisions) and C of the GHGRP.

For measurements of carbonate content, reporters would assess representativeness of the carbonate content received from suppliers with laboratory analysis.

7. Selection of Proposed Procedures for Estimating Missing Data

The proposed rule would require the use of substitute data whenever a quality-assured value of a parameter is used to calculate emission is unavailable, or ‘‘missing.’’ For example, if the CEMS malfunctions during unit operation, the substitute data value would be the average of the quality-assured values of the parameter immediately before and immediately after the missing data period. For missing data on the amounts of carbonate-based raw materials consumed, we are proposing reporters must use the best available estimate based on all available process data or data used for accounting purposes, such as purchase records. For missing data on the mass fractions of carbonate-based minerals in the carbonate-based raw materials, reporters would assume that the mass fraction of each carbonate-based mineral is 1.0. The use of 1.0 for the mass fraction assumes that the carbonate-based raw material comprises 100 percent of one carbonate-based mineral. The likelihood for missing process input or output data is low, as business closely track their purchase of production inputs. Missing data procedures would be applicable for CEMS measurements, mass measurements of raw material, and carbon content measurements.

8. Selection of Proposed Data Reporting Requirements

We propose that each ceramics manufacturing facility report the annual CO_2 process emissions from each ceramics manufacturing process, as well as any stationary fuel combustion emissions. In addition, we propose that additional information that forms the basis of the emissions estimates also be reported so that we can understand and verify the reported emissions.

For ceramic manufacturers, the additional information would include: the total number of ceramics process units at the facility and the total number of units operating; annual production of each ceramics product for each process unit; the annual production capacity of each ceramics process unit; and the annual quantity of carbonate-based raw material charged for all ceramics process units combined.

For ceramic manufacturers with non-CEMS units, the proposed rules would also require reporting of the following information: the method used for the determination for each carbon-based mineral in each raw material; applicable test results used to verify the carbonate-based mineral mass fraction for each carbonate-based raw material charged to a ceramics process unit, including the date of test and test methods used; and the number of times in the reporting year that missing data procedures were used.

9. Selection of Proposed Records That Must Be Retained

Maintaining records of information used to determine reported GHG emissions is necessary to allow the EPA to verify that GHG emissions monitoring and calculations were done correctly. The proposed rule would require facilities subject to subpart ZZ to maintain monthly records of the ceramics production rate for each ceramics process unit, and the monthly amount of each carbonate-based raw material charged to each ceramics process unit.

Additionally, if facilities use the carbon balance procedure, the proposed rule would require facilities to maintain monthly records of the carbonate-based mineral mass fraction for each mineral in each carbonate-based raw material. Facilities would also be required to maintain (1) records of the supplier-provided mineral mass fractions for all raw materials consumed annually, (2) results of all analyses used to verify the mineral mass fraction for each raw material (including the mass fraction of each sample, the date of test; test methods and method variations; and equipment calibration data, and identifying information for the laboratory conducting the test); and (3) annual operating hours for each unit. If facilities use the CEMS procedure, they would be required to maintain the CEMS measurement records.

Under the proposed rule, the procedures for ensuring accuracy of measurement methods, including calibration, must be recorded. The proposed rules would require records of how measurements are made including measurements of quantities of materials used or produced and the carbon content of minerals in raw materials.

The proposed rule would require the retention of a record of the file generated by the verification software specified in 40 CFR 98.5(b) including: annual average decimal mass fraction of each carbonate-based mineral per carbonate-based raw material for each ceramics process unit (percent by weight expressed as a decimal fraction); annual mass of each carbonate-based raw material charged to each ceramics process unit (tons); and the decimal fraction of calcination achieved for each carbonate-based raw material for each ceramics process unit (percent by weight expressed as a decimal fraction).

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[68] *Id.*

V. Schedule for the Proposed Amendments

In the 2022 Data Quality Improvements Proposal, the EPA intended the proposed amendments to take effect starting January 1, 2023. We are now planning to consider the comments on the 2022 Data Quality Improvements Proposal and this supplemental proposal, which would delay the effective date of any final rule. If amendments from either the 2022 Data Quality Improvements Proposal or this supplemental proposal are finalized, we plan to respond to comments and publish any final rule(s) regarding both notices during 2024. We are proposing that the final amendments would become effective on January 1, 2025. Reporters would implement the changes beginning with reports prepared for RY2025 and submitted March 31, 2026, with one exception explained in this section below for existing reporters.

We are proposing this revised schedule because it would provide additional time for reporters to prepare to comply and simplify implementation. There are several source categories for which we have included proposed revisions in both the 2022 Data Quality Improvements Proposal and in this supplemental notification. We anticipate that it would be less burdensome for reporters in these source categories to have the proposed rule amendments go into effect in the same year instead of having the amendments go into effect separately across two different reporting years. This proposed revised schedule would also provide time for affected stakeholders to adapt to new monitoring requirements and purchase and install any necessary monitoring equipment. We intend to finalize this proposed rule early-2024 and have determined that it would be feasible for reporters to implement the proposed changes for RY2025.

For existing reporters, the proposed amendments largely update or clarify calculations, clarify provisions, or amend reporting requirements, but do not result in changes that require monitoring, sampling, or calibration of equipment. A number of proposed changes would amend the reporting requirements for individual sectors to require information that we anticipate would be readily available to facilities. For example, we are proposing revisions that would require facilities to report information regarding annual production capacity and operation hours (*e.g.,* subpart F (Aluminum Production)), capacity of emission units (*e.g.,* subpart Y (Petroleum Refineries)) or to provide information regarding process inputs (*e.g.,* subpart N (Glass Production)) or process types (*e.g.,* subpart P (Hydrogen Production)). In these cases, we anticipate that facilities can easily identify and obtain capacity and process information, and we anticipate that facilities would have any additional inputs for calculations available in company records or could easily calculate the required input from existing process knowledge and engineering estimates, or from available company records. In other cases, we are proposing to require reporting of information that facilities have currently maintained as records for the purposes of part 98 (*e.g.,* we are proposing that facilities submit CBP entry forms previously retained as records under subparts OO (Suppliers of Industrial Greenhouse Gases) and QQ (Importers and Exporters of Fluorinated GHGs Contained in Pre-charged Equipment and Closed-Cell Foams)), or information that is already maintained in keeping with existing facility data permits (*e.g.,* hours of operation), or may be estimated using emission factors or engineering judgment. Therefore, for these types of changes, reporters would not need a significant amount of time in advance of the 2025 reporting year to collect the additional data. Existing reporters that are direct emitters that would be newly required to report energy consumption under proposed subpart B (Energy Consumption) would be able to implement the requirements for RY2025 because facilities would not be required to immediately install special equipment or conduct routine monitoring, but rather would be able to rely on billing statements for purchased energy products that would be readily available to facilities. For existing reporters subject to subpart HH (Municipal Solid Waste Landfills), we anticipate that facilities would be able to implement the proposed revisions to the monitoring and calculation methodologies for RY2025 because the proposed revisions apply to facilities that are already subject to landfills NSPS (40 CFR part 60, subpart WWW or XXX), state plans implementing landfills EG (40 CFR part 60, subparts Cc or Cf), or landfills Federal plans (40 CFR part 62, subpart GGG or OOO). Facilities are already required to conduct surface measurement monitoring per the requirements of the NSPS, EG, or Federal plans, and would only be required to use the existing measurement data to provide a count of the number of exceedances to adjust the reported methane emissions to account for these exceedances. The proposed requirements also require facilities that are not subject to the landfill NSPS (40 CFR part 60, subpart WWW or XXX), EG (40 CFR part 60, subparts Cc or Cf), or Federal plans (40 CFR part 62, subpart GGG or OOO) to either use the proposed lower gas collection efficiency value or elect to monitor their landfill as specified in this proposal and use the currently existing gas collection efficiency values. Therefore, although we are proposing to add surface methane concentration monitoring methods at 40 CFR 98.344, this monitoring is optional to facilities that are not subject to the NSPS, EG, or Federal plans. As such, we anticipate that landfills would be able to incorporate these changes for their RY2025 reports with minimal changes to their existing monitoring and operations.

Some facilities that are not currently subject to the GHGRP would be brought into the program by proposed revisions that change what facilities must report under the rule. For example, we are proposing to revise subpart P (Hydrogen Production) to include non-merchant (captive) hydrogen production plants, as outlined in section III.G of this preamble, and proposing to collect data in several new source categories, including subparts WW (Coke Calciners), XX (Calcium Carbide Production), YY (Caprolactam, Glyoxal, and Glyoxylic Acid Production), and ZZ (Ceramics Production), as outlined in section IV of this preamble. The facilities affected by these proposed amendments would need to start implementing requirements, including any required monitoring and recordkeeping, on January 1, 2025, and prepare reports for RY2025 that must be submitted by March 31, 2026. Because we plan to promulgate any final rule(s) by early-2024, new reporters under these subparts should have sufficient time to implement the amendments, including installation or calibration of any necessary equipment, and be ready to collect data for reporting starting on January 1, 2025. We anticipate that new reporters that have not previously reported under part 98 would have over six months to comply with the monitoring methods for new emission sources in subparts P, WW, XX, YY, and ZZ, which would allow time for facilities to install necessary monitoring equipment and set up internal recordkeeping and reporting systems.[69]

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[69] Existing reporters with coke calciners located at petroleum refineries that currently report under subpart Y would continue to report under subpart

Continued

Some facilities that have not previously reported to the GHGRP may also become subject to the rule due to the proposed revisions to GWPs in Table A–1 to subpart A of part 98.[70] Reporters that become subject to a new subpart of part 98 due to the proposed revisions to Table A–1 to subpart A, per the existing requirements at 40 CFR 98.3(k), would not be required to submit an annual GHG report until the following reporting year. Therefore, these new reporters would also implement changes and begin monitoring and recordkeeping on January 1, 2025.

Per the existing regulations at 40 CFR 98.3(k), there is one exception to this proposed schedule. Specifically, in keeping with 40 CFR 98.3(k), the GWP amendments to Table A–1 to subpart A would apply to reports submitted by current reporters that are submitted in calendar year 2025 and subsequent years, *i.e.,* starting with reports submitted for RY2024 on March 31, 2025. The revisions to GWPs do not affect the data collection, monitoring, or calculation methodologies used by these existing reporters. The EPA's e-GGRT generally automatically applies GWPs to a facility's emissions as reported in metric tons. Therefore, existing facilities would not have to conduct any additional activities for the reports submitted for RY2024.

Finally, although we previously stated in the 2022 Data Quality Improvements Proposal that facilities that would report under proposed subpart VV (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916) would implement the requirements beginning in RY2023, we are now proposing that these reporters would begin to implement the proposed changes and begin reporting under subpart VV starting in RY2025. As we stated in the 2022 Data Quality Improvements Proposal, these facilities already report under part 98 and are likely to follow the calculation requirements and data gathering prescribed under CSA/ANSI ISO 27916:2019 to quantify storage for the Internal Revenue Code (IRC) section 45Q tax credit.[71] The facilities that are likely to be subject to subpart VV are thus not anticipated to be new reporters and would not perform any additional calculation, monitoring, or quality assurance procedures under the proposed requirements; therefore, the information submitted to the GHGRP would be obtained and provided from readily available data and could be implemented beginning January 1, 2025. We request comment on the proposed schedule for existing and new reporters and the feasibility of implementing these requirements for the proposed schedule.

VI. Proposed Confidentiality Determinations for Certain Data Elements

A. Overview and Background

Part 98 requires reporting of numerous data elements to characterize, quantify, and verify GHG emissions and related information. Following proposal of part 98 (74 FR 16448, April 10, 2009), the EPA received comments addressing the issue of whether certain data could be entitled to confidential treatment. In response to these comments, the EPA stated in the preamble to the 2009 Final Rule (74 FR 56387, October 30, 2009) that through a notice and comment process, we would establish those data elements that are entitled to confidential treatment. This proposal is one of a series of rules dealing with confidentiality determinations for data reported under part 98. For more information on previous confidentiality determinations for part 98 data elements, see the following documents:

- 75 FR 39094, July 7, 2010. Describes the data categories and category-based determinations the EPA developed for the part 98 data elements.
- 76 FR 30782, May 26, 2011; hereafter referred to as the ''2011 Final CBI Rule.'' Assigned data elements to data categories and published the final CBI determinations for the data elements in 34 part 98 subparts, except for those data elements that were assigned to the ''Inputs to Emission Equations'' data category.
- 77 FR 48072, August 13, 2012. Finalized confidentiality determinations for data elements reported under nine subparts, except for those data elements that are ''inputs to emission equations.'' Also finalized confidentiality determinations for new data elements added to subparts II (Industrial Wastewater Treatment) and TT (Industrial Waste Landfills) in the November 29, 2011 Technical Corrections document (76 FR 73886).
- 78 FR 68162; November 13, 2013. Finalized confidentiality determinations for new data elements added to subpart I (Electronics Manufacturing).
- 78 FR 69337, November 29, 2013. Finalized determinations for new and revised data elements in 15 subparts, except for those data elements assigned to the ''Inputs to Emission Equations'' data category.
- 79 FR 63750, October 24, 2014. Revised recordkeeping and reporting requirements for ''inputs to emission equations'' for 23 subparts and finalized confidentiality determinations for new data elements in 11 subparts.
- 79 FR 70352, November 25, 2014. Finalized confidentiality determinations for new and substantially revised data elements in subpart W (Petroleum and Natural Gas Systems).
- 79 FR 73750, December 11, 2014. Finalized confidentiality determinations for certain reporting requirements in subpart L (Fluorinated GHG Production).
- 80 FR 64262, October 22, 2015. Finalized confidentiality determinations for new data elements in subpart W.
- 81 FR 86490, November 30, 2016. Finalized confidentiality determinations for new or substantially revised data elements in subpart W.
- 81 FR 89188, December 9, 2016. Finalized confidentiality determinations for new or substantially revised data elements in 18 subparts and for certain existing data elements in four subparts.

In the 2022 Data Quality Improvements Proposal, the EPA proposed confidentiality determinations for certain data elements in 26 subparts, including data elements newly added or substantially revised in the proposed amendments and existing data elements where the EPA had previously not established a determination or was proposing to revise or clarify a determination based on new information. In this supplemental proposal, the EPA is proposing additional amendments to part 98 that would complement, expand on, or refine the amendments proposed in the 2022 Data Quality Improvements Proposal or that would further enhance the quality of part 98 and implementation of the GHGRP. To support the proposed amendments described in sections III and IV of this preamble, we are also proposing confidentiality determinations or ''emission data'' designations for the following:

Y for RY2024, and would begin reporting under subpart WW with their RY2025 reports. The monitoring, calculation, reporting, and recordkeeping requirements for coke calciners under subpart WW do not substantially differ from the existing requirements for these units under subpart Y.

[70] Part 98 requires direct emitters and suppliers of GHGs to use the GWP values in Table A–1 to subpart A to calculate emissions (or supply) of GHGs in CO_2e. These values are used to determine whether the facility meets a CO_2e-based threshold and is required to report under part 98, as well as to calculate total facility emissions for the annual report. A change to the GWP for a GHG will change the calculated emissions (in CO_2e) of that gas. Therefore, the proposed amendments could affect the number of facilities required to report under part 98.

[71] See 26 CFR 1.45Q–0 through 26 CFR 1.45Q–5.

- New or substantially revised reporting requirements (*i.e.,* the proposed change requires additional or different data to be reported); and
- Existing reporting requirements for which the EPA did not previously finalize a confidentiality determination or ''emission data'' designation.

Further, we propose to designate certain new or substantially revised data elements as ''inputs to emission equations.'' For each element that we propose would fall in this category, we further propose whether the data element would be directly reported to the EPA or whether it would be entered into IVT (see section VI.C of this preamble for a discussion of ''inputs to emission equations'').

Table 9 of this preamble provides the number of affected data elements and the affected subparts for each of these proposed actions. The majority of the determinations would apply at the same time as the proposed schedule described in section V of this preamble. In the cases where the EPA is proposing a determination for an existing data element where one was not previously made, the proposed determinations would be effective on January 1, 2025, and would apply to annual reports submitted for RY2025, as well as all prior years that the data were collected.

TABLE 9—SUMMARY OF PROPOSED ACTIONS RELATED TO DATA CONFIDENTIALITY

Proposed actions related to data confidentiality	Number of data elements [a]	Subparts
New or substantially revised reporting requirements for which the EPA is proposing a confidentiality determination or ''emission data'' designation.	153	A, B, C, F, G, N, P, Y, HH, OO, PP, QQ, WW, XX, YY, ZZ.
Existing reporting requirements for which the EPA is proposing a confidentiality determination or ''emission data'' designation because the EPA did not previously make a confidentiality determination or ''emission data'' designation.	1	A.
New or substantially revised reporting requirements that the EPA is proposing be designated as ''inputs to emission equations'' and for which the EPA is proposing reporting determinations.	32	P, HH, WW, XX, YY, ZZ.

[a] These data elements are individually listed in the memoranda: (1) Proposed Confidentiality Determinations and Emission Data Designations for Data Elements in Proposed Supplemental Revisions to the Greenhouse Gas Reporting Rule and (2) Proposed Reporting Determinations for Data Elements Assigned to the Inputs to Emission Equations Data Category in Proposed Supplemental Revisions to the Greenhouse Gas Reporting Rule, available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

B. Proposed Confidentiality Determinations and Emissions Data Designations

1. Proposed Approach

The EPA is proposing to assess the data elements in this supplemental proposed rule in the same manner as the 2022 Data Quality Improvements Proposal. In that proposal, the EPA described a revised approach to assessing data in response to *Food Marketing Institute* v. *Argus Leader Media,* 139 S. Ct. 2356 (2019) (hereafter referred to as *Argus Leader*).[72]

First, we proposed that the *Argus Leader* decision does not affect our approach to designating data elements as ''inputs to emission equations'' or our previous approach for designating new and revised reporting requirements as ''emission data.'' We proposed to continue identifying new and revised reporting elements that qualify as ''emission data'' (*i.e.,* data necessary to determine the identity, amount, frequency, or concentration of the emission emitted by the reporting facilities) by evaluating the data for assignment to one of the four data categories designated by the 2011 Final CBI Rule to meet the CAA definition of ''emission data'' in 40 CFR 2.301(a)(2)(i)[73] (hereafter referred to as ''emission data categories''). Refer to section II.B of the July 7, 2010 proposal for descriptions of each of these data categories and the EPA's rationale for designating each data category as ''emission data.'' For data elements designated as ''inputs to emission equations,'' the EPA maintained the two subcategories, data elements entered into e-GGRT's Inputs Verification Tool (IVT) and those directly reported to the EPA. Refer to section VI.C of the preamble of the 2022 Data Quality Improvements Proposal for further discussion of ''inputs to emission equations.''

Then in the 2022 Data Quality Improvements Proposal, for new or revised data elements that the EPA did not propose to designate as ''emission data'' or ''inputs to emission equations,'' the EPA proposed a revised approach for assessing data confidentiality. We proposed to assess each individual reporting element according to the new *Argus Leader* standard. So, we evaluated each data element individually to determine whether the information is customarily and actually treated as private by the reporter and proposed a confidentiality determination based on that evaluation.

2. Proposed Confidentiality Determinations and ''Emission Data'' Designations

In this section, we discuss the proposed confidentiality determinations and ''emission data'' designations for 153 new or substantially revised data elements. We also discuss one existing data element (*i.e.,* not proposed to be substantially revised) for which for no determination has been previously established.

a. Proposed Confidentiality Determinations and ''Emission Data'' Designations for New or Substantially Revised Data Reporting Elements

For the 153 new and substantially revised data elements, the EPA is proposing ''emission data'' designations for 38 data elements and confidentiality determinations for 115 data elements. The EPA is proposing to designate 38 new or substantially revised data

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[72] Available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

[73] See section I.C of the July 7, 2010 proposal (75 FR 39100) for a discussion of the definition of ''emission data.'' As discussed therein, the relevant paragraphs (to the GHGRP) of the CAA definition of ''emission data'' include 40 CFR 2.301(a)(2)(i)(A) and (C), as follows: (A) ''Information necessary to determine the identity, amount, frequency, concentration, or other characteristics (to the extent related to air quality) of any emission which has been emitted by the source (or of any pollutant resulting from any emission by the source), or any combination of the foregoing;'' and (C) ''A general description of the location and/or nature of the source to the extent necessary to identify the source and to distinguish it from other sources (including, to the extent necessary for such purposes, a description of the device, installation, or operation constituting the source).''

elements as ''emission data'' by assigning the data elements to four emission data categories (established in the 2011 Final CBI Rule as discussed in section VI.B.1 of this preamble), as follows:

- 16 data elements that are proposed to be reported under subparts C, P, WW, XX, YY, and ZZ are proposed to be assigned to the ''Emissions'' emission data category;
- 10 data elements that are proposed to be reported under subparts P, HH, WW, XX, and YY are proposed to be assigned to the ''Facility and Unit Identifier Information'' emission data category;
- Four data elements that are proposed to be reported under subparts P, HH, WW, and XX are proposed to be assigned to the ''Calculation Methodology and Methodological Tier'' emission data category; and
- Eight data elements that are proposed to be reported under subparts N, XX, YY, and ZZ are proposed to be assigned to the ''Data Elements Reported for Periods of Missing Data that are Not Inputs to Emission Equations'' emission category.

Refer to Table 1 in the memorandum, *Proposed Confidentiality Determinations and Emission Data Designations for Data Elements in Proposed Supplemental Revisions to the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424), for a list of these 38 data elements proposed to be designated as ''emission data,'' the proposed emission data category assignment for each data element, and the EPA's rationale for each proposed ''emission data'' category assignment.

The remaining 115 new and substantially revised data elements not proposed to be designated as ''emission data,'' or ''inputs to emission equations,'' are proposed to be reported under subparts A, B, C, F, G, N, P, Y, HH, OO, PP, QQ, WW, XX, YY, and ZZ. This proposal assesses each individual reporting element according to the *Argus Leader* criteria as discussed in section VI.B.1 of this preamble. Refer to Table 2 in the memorandum, *Proposed Confidentiality Determinations and Emission Data Designations for Data Elements in Proposed Revisions to the Greenhouse Gas Reporting Rule,* to see a list of these 115 specific data elements, the proposed confidentiality determination for each data element, and the EPA's rationale for each proposed confidentiality determination. These determinations show the data elements that the EPA would hold as confidential and those that the EPA would publish.

b. Proposed Confidentiality Determinations for Existing Part 98 Data Elements for Which No Determination Has Been Previously Established

We are proposing to make a confidentiality determination for one existing data element in subpart A for which no confidentiality determination has been previously established under part 98. Review of previous rules revealed one instance where a confidentiality determination had been made for a previous version of a data element, but not for the current version of that data element. This data element (40 CFR 98.3(c)(5)(i)) is the total quantity of GHG aggregated for all GHG from all applicable supply categories in Table A–5 (in $mtCO_2e$). When part 98 was first promulgated, 40 CFR 98.3(c)(5)(i) referred explicitly to individual supplier categories rather than to Table A–5. Consequently, when a confidentiality determination for 40 CFR 98.3(c)(5)(i) was finalized in the May 26, 2011 final rule (76 FR 30782), the determination referred explicitly to the supply categories that existed when the confidentiality determination was proposed in July 2010, which included subparts LL through PP. On December 1, 2010, the EPA finalized subpart QQ and added it to Table A–5, but the EPA never updated the confidentiality determination for 40 CFR 98.3(c)(5)(i) to clearly include importers and exporters reporting under subpart QQ. To update the determination for this data element, the EPA is now proposing to extend the existing determination to include suppliers under QQ. In particular, the EPA is proposing that this data element would not be eligible for confidential treatment except in cases where a single product is supplied, and the amount of that single product supplied has been determined to be eligible for confidential treatment. Refer to Table 3 in the memorandum, *Proposed Confidentiality Determinations and Emission Data Designations for Data Elements in Proposed Supplemental Revisions to the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424), for details of the data element receiving a determination, the proposed confidentiality determination, and the Agency's rationale for the proposed determinations.

C. Proposed Reporting Determinations for Inputs to Emission Equations

In this section, we discuss data elements that EPA proposes to assign to the ''Inputs to Emission Equations'' data category. This data category includes data elements that are the inputs to the emission equations used by sources that directly emit GHGs to calculate their annual GHG emissions.[74] As discussed in section VI.B.1 of the 2022 Data Quality Improvements Proposal, the EPA determined that the *Argus Leader* decision does not affect our approach for handling of data elements assigned to the ''Inputs to Emission Equations'' data category.

The EPA organizes data assigned to the ''Inputs to Emission Equations'' data category into two subcategories. The first subcategory includes ''inputs to emission equations'' that must be directly reported to the EPA. This is done in circumstances where the EPA has determined that the data elements do not meet the criteria necessary for them to be entered into the IVT system. These ''inputs to emission equations,'' once received by the EPA, are not held as confidential. The second subcategory includes ''inputs to emission equations'' that are entered into IVT. These ''inputs to emission equations'' are entered into IVT to satisfy the EPA's verification requirements. These data must be maintained as verification software records by the submitter, but the data are not included in the annual report that is submitted to the EPA. This is done in circumstances where the EPA has determined that the data elements meet the criteria necessary for them to be entered into the IVT system. Refer to the memorandum, *Proposed Reporting Determinations for Data Elements Assigned to the Inputs to Emission Equations Data Category in Proposed Supplemental Revisions to the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424), for a discussion of the criteria that we established in 2011 for evaluating whether data assigned to the ''Inputs to Emission Equations'' data category should be entered into the IVT system.

We are proposing to assign 32 new or substantially revised data elements in subparts HH, WW, XX, YY, and ZZ to the ''Inputs to Emission Equations'' data category. We evaluated each of the 32 proposed new or substantially revised

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[74] For facilities that directly emit GHGs, part 98 includes equations that facilities use to calculate emission values. The ''Inputs to Emission Equations'' data category includes the data elements that facilities would be required to enter in the equations to calculate the facility emissions values, *e.g.,* monthly consumption or production data or measured values from required monitoring, such as carbon content. See 75 FR 39094, July 7, 2010 for a full description of the ''Inputs to Emission Equations'' data category.

data elements assigned to the ''Inputs to Emission Equations'' data category and determined that 13 of these 32 data elements do not meet the criteria necessary for them to be entered into the IVT system; therefore, we propose that these 13 data elements be directly reported to the EPA. As ''inputs to emission equations'' are emissions data, these 13 data elements would not be eligible for confidential treatment once directly reported to the EPA, and they would be published once received by the EPA. Refer to Table 1 in the memorandum, *Proposed Reporting Determinations for Data Elements Assigned to the Inputs to Emission Equations Data Category in Proposed Supplemental Revisions to the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424), for a list of these 13 data elements proposed to be designated as ''inputs to emission equations'' that would be directly reported to the EPA and the EPA's rationale for the proposed reporting determinations.

For the remaining 19 proposed new data elements in subparts WW, XX, YY, and ZZ of the 32 data elements assigned to the ''Inputs to Emission Equations'' data category and evaluated based on the criteria discussed earlier in this section VI.C, we determined that all 19 data elements meet the criteria necessary for them to be entered into the IVT system. These 19 data elements include information such as quantities of materials produced and quantities of raw materials consumed. As documented in previous rules (refer to the list of rules specified in section VI.A of this preamble), the EPA has generally determined that these types of data meet the criteria necessary for them to be entered into the IVT system (except in cases where the information is already publicly available). Therefore, these 19 data elements in subparts WW, XX, YY, and ZZ are not proposed to be directly reported to the EPA (*i.e.,* the EPA is not proposing to include these data elements as reporting requirements), but instead these 19 data elements would be entered into the IVT and maintained as verification software records by the submitter. A list of these data elements is included in Table 2 of the memorandum, *Proposed Reporting Determinations for Data Elements Assigned to the Inputs to Emission Equations Data Category in Proposed Supplemental Revisions to the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424). Refer to section IV of this preamble for discussion of all proposed recordkeeping requirements of subparts WW, XX, YY, and ZZ.

D. Request for Comments on Proposed Category Assignments, Confidentiality Determinations, or Reporting Determinations

By proposing confidentiality determinations prior to data reporting through this proposal and rulemaking process, we are providing potential reporters an opportunity to submit comments, particularly comments identifying data elements proposed by the Agency to be ''not CBI'' that reporters consider to be customarily and actually treated as private. Likewise, we provide potential reporters an opportunity to submit comments on whether there are disclosure concerns for data elements proposed to be categorized as ''inputs to emission equations'' that we propose would be directly reported to the EPA via annual reports and subsequently released by the EPA. This opportunity to submit comments is intended to provide reporters with the opportunity that is afforded to reporters when the EPA considers claims for confidential treatment of information in case-by-case confidentiality determinations under 40 CFR part 2. In addition, the comment period provides an opportunity to respond to the EPA's proposed determinations with more information for the Agency to consider prior to finalization. We will evaluate the comments on our proposed determinations, including claims of confidentiality and information substantiating such claims, before finalizing the confidentiality determinations. Please note that this will be reporters' only opportunity to substantiate a confidentiality claim for data elements included in this proposed rule where a confidentiality determination or reporting determination is being proposed. Upon finalizing the confidentiality determinations and reporting determinations of the data elements identified in this proposed rule, the EPA will release or withhold these data in accordance with 40 CFR 2.301(d), which contains special provisions governing the treatment of part 98 data for which confidentiality determinations have been made through rulemaking pursuant to CAA sections 114 and 307(d).

If members of the public have reason to believe any data elements in this proposed rule that are proposed to be treated as confidential are not customarily and actually treated as private by reporters, please provide comment explaining why the Agency should not provide an assurance of confidential treatment for data. Likewise, if members of the public have reason to disagree with the EPA's proposal that ''inputs to emission equations'' qualify to be entered into IVT and retained as verification software records instead of being directly reported to the EPA, please provide comment explaining why the ''inputs to emission equations'' do not qualify to be entered into IVT, should be directly reported to the EPA, and subsequently released by the EPA.

When submitting comments regarding the confidentiality determinations or reporting determinations we are proposing in this action, please identify each individual proposed new, revised, or existing data element you consider to be confidential or do not consider to be ''emission data'' in your comments. If the data element has been designated as ''emission data,'' please explain why you do not believe the information should be considered ''emission data'' as defined in 40 CFR 2.301(a)(2)(i). If the data has not been designated as ''emission data'' and is proposed to be not entitled to confidential treatment, please explain specifically how the data element is commercial or financial information that is both customarily and actually treated as private. Particularly describe the measures currently taken to keep the data confidential and how that information has been customarily treated by your company and/or business sector in the past. This explanation is based on the requirements for confidential treatment set forth in *Argus Leader.* If the data element has been designated as an ''input to an emission equation'' (*i.e.,* not entitled to confidential treatment) and proposed to be directly reported to the EPA via annual reports and subsequently released by the EPA, please explain specifically why there are disclosure concerns. Likewise, if the data element has been designated as an ''input to an emission equation'' that we propose would not be directly reported to the EPA, but instead entered into IVT and retained as verification software records, please explain specifically why there are not disclosure concerns.

Please also discuss how this data element may be different from or similar to data that are already publicly available, including data already collected and published annually by the GHGRP, as applicable. Please submit information identifying any publicly available sources of information containing the specific data elements in question. Data that are already available through other sources would likely be found not to qualify for confidential treatment. In your comments, please identify the manner and location in which each specific data element you identify is publicly available, including a citation. If the data are physically published, such as in a book, industry trade publication, or Federal agency publication, provide the title, volume number (if applicable), author(s), publisher, publication date, and International Standard Book Number (ISBN) or other identifier. For data published on a website, provide the address of the website, the date you last visited the website and identify the website publisher and content author. Please avoid conclusory and unsubstantiated statements, or general assertions regarding the confidential nature of the information.

Finally, we are not proposing new confidentiality determinations and reporting determinations for data reporting elements proposed to be unchanged or minimally revised because the final confidentiality determinations and reporting determinations that the EPA made in previous rules for these unchanged or minimally revised data elements are unaffected by this proposed amendment and will continue to apply. The minimally revised data elements are those where we are proposing revisions that would not require additional or different data to be reported. For example, under subpart P (Hydrogen Production), we are proposing to revise the data element at 40 CFR 98.166(b)(3)(i) ''annual quantity of hydrogen produced (metric tons)'' to read ''annual quantity of hydrogen produced by reforming, gasification, oxidation, reaction, or other transformation of feedstock (metric tons)'' to clarify the reporting requirement by harmonizing the data element description with the definition of the source category in 40 CFR 98.160(b). This proposed change would not affect the data collected, and therefore we are not proposing a new or revised confidentiality determination. However, we are soliciting comment on any cases where a minor revision would affect the previous confidentiality determination or reporting determination. In your comments, please identify the specific data element, including name and citation, and explain why the minor revision would affect the previous confidentiality determination or reporting determination.

VII. Impacts of the Proposed Amendments

The EPA is proposing amendments to part 98 where we have identified revisions that would complement, expand on, or refine the amendments proposed in the 2022 Data Quality Improvements Proposal as well as additional amendments that we have determined would further enhance the quality of part 98. The proposed revisions include revisions to the global warming potentials in Table A–1 to subpart A of part 98, revisions to establish requirements for new source categories and expanding reporting for new emission sources for specific sectors, updates to existing emissions estimation methodologies, and revisions to collect data that would improve the EPA's understanding of the sector-specific processes or other factors that influence GHG emission rates, verification of collected data, or to complement or inform other EPA programs under the CAA. We anticipate that the proposed revisions would result in an overall increase in burden to reporters.

The primary costs associated with the rule include initial labor and non-labor costs for reporters that are newly subject to part 98 to come into compliance with the rule. The proposed revisions to Table A–1 to subpart A to part 98 are estimated to result in a change to the number of reporters under subparts V, W, DD, HH, II, OO, and TT (*i.e.,* where a change to GWPs would affect reporters that are currently at or close to the 25,000 mtCO_2e threshold, or that would affect a reporter's ability to off-ramp from part 98 reporting as determined under 40 CFR 98.2(i)). Additional revisions to the applicability of subparts P, Y, and the proposed addition of new source categories for energy consumption; coke calcining; calcium carbide; caprolactam, glyoxal, and glyoxylic acid production; and ceramics manufacturing are also anticipated to change the number of reporters reporting under current subparts of part 98 or that are newly subject to reporting under part 98. We also estimated costs where we are proposing to add or revise monitoring and calculation methods that would require additional data to be collected or estimated, and where reporters would be required to submit additional data that we anticipate could be obtained from existing company records or are readily available or estimated from other data currently gathered under part 98. Where we included proposed revisions for a source category in both the 2022 Data Quality Improvements Proposal and in this supplemental notification, the costs for this supplemental proposal were adjusted to account for revisions from the 2022 Data Quality Improvements Proposal.

As discussed in section V of this preamble, we are proposing to implement these changes for existing and new reporters on January 1, 2025, to apply to RY2025 reports.[75] Costs have been estimated over the three years following the year of implementation. The incremental implementation labor costs for all subparts include $11,748,619 in RY2025, and $7,644,140 in each subsequent year (RY2026 and RY2027). The incremental implementation labor costs over the next three years (RY2025 through RY2027) total $27,076,898. There is an additional incremental burden of $3,223,041 for capital and operation and maintenance (O&M) costs in RY2025 and $3,225,282 in each subsequent year (RY2026 and RY2027), which reflects changes to applicability and monitoring for subparts P, W, V, Y, DD, HH, II, OO, and TT and new subparts B, WW, XX, YY, and ZZ. The incremental non-labor costs for RY2025 through RY2027 total $9,673,605.

The incremental burden for the proposed supplemental revisions is summarized by subpart for initial and subsequent years in Table 10 of this preamble. Note that subparts I, RR, UU, and VV include proposed revisions that are clarifications that would not result in any changes to burden (beyond those previously estimated in the 2022 Data Quality Improvements Proposal) and are not included in Table 10.

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[75] As discussed in section V of this preamble, for existing reporters, per the current regulations at 40 CFR 98.3(k), the proposed amendments to the GWPs in Table A–1 to subpart A would apply to reports submitted for RY2024 on March 31, 2025. However, there are no costs associated with implementing GWPs for RY2024 reports because the proposed revisions would not affect the data collection, monitoring, or calculation methodologies used by existing reporters.

TABLE 10—ANNUAL INCREMENTAL BURDEN BY SUBPART

[$2021]

Subpart	Number of affected facilities	Labor costs		Capital and O&M
		Initial year RY2025	Subsequent year RY2026–27	
A—General Provisions [a]	7,840	$64,133	$64,133	$ –
B—Energy Consumption [a]	7,840	8,771,243	4,700,877	489,050
C—General Stationary Fuel Combustion Sources	346	9,906	9,906	
F—Aluminum Production	7	57	57	
G—Ammonia Manufacturing	29	119	119	
N—Glass Production	100	1,227	1,227	
P—Hydrogen Production [b]	118	7,179	7,179	4,481
V—Nitric Acid Production [c] [d]	1	(2,680)	(2,680)	(11,085)
W—Petroleum and Natural Gas Systems [e]	188	2,620,418	2,620,418	2,717,864
Y—Petroleum Refineries [b] [f]	6	(6,881)	(6,881)	(3,930)
AA—Pulp and Paper Manufacturing	1	104	104	
DD—Electrical Transmission [c]	2	6,200	6,200	3,119
HH—Municipal Solid Waste Landfills	1,126	130,188	127,330	374
II—Industrial Wastewater Treatment [c]	2	5,288	4,713	3,077
OO—Suppliers of Industrial Greenhouse Gases	105	6,680	6,680	62
PP—Suppliers of Carbon Dioxide	11	135	135	
QQ—Importers and Exporters of Fluorinated Greenhouse Gases Contained in Pre-Charged Equipment or Closed-Cell Foams	33	384	384	
TT—Industrial Waste Landfills [c]	1	4,853	3,934	62
WW—Coke Calciners [b]	15	37,847	34,525	19,649
XX—Calcium Carbide [b] Production	1	2,849	2,627	62
YY—Caprolactam, Glyoxal, and Glyoxylic Acid Production [b]	6	12,285	11,089	374
ZZ—Ceramics Production [b]	34	77,083	72,062	2,121
Total		11,748,619	7,664,140	3,225,282

[a] Applies to existing direct emitters under subpart B and new reporters anticipated under subparts W, DD, HH, II, OO, TT, WW, XX, YY, and ZZ.

[b] Applies to reporters that may currently report under existing subparts of part 98 and that are newly subject to reporting under part 98.

[c] Applies to reporters estimated to be affected due to revisions to Table A–1 to subpart A only.

[d] Reflects changes to the number of reporters able to off-ramp from reporting under the part 98 source category.

[e] For Subpart W, the revisions to Table A–1 included in this supplemental proposal and the revisions included in the 2022 Data Quality Improvements Proposal would increase the number of facilities subject to the requirements of the GHGRP. Some facilities would become subject to the requirements of the GHGRP due to either of these proposed changes. The EPA anticipates issuing a separate proposed rulemaking to implement certain provisions of the Methane Emissions and Waste Reduction Incentive Program that would propose further revisions to the requirements of Subpart W and which could also change the number of facilities subject to this subpart.[76] The estimate included here for Subpart W in this supplemental proposal conservatively includes all facilities that would become subject to the GHGRP due to the proposed changes to Table A–1 included in this supplemental proposal compared to the existing requirements of the GHGRP and does not consider revisions proposed under the 2022 Data Quality Improvement Proposal.

[f] Reflects changes to the number of reporters with coke calciners reporting under subpart Y that would be required to report under proposed subpart WW.

Additional information regarding the costs impacts of the proposed amendments may be found in the memorandum, *Assessment of Burden Impacts for Proposed Supplemental Notice of Revisions for the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

VIII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is a significant regulatory action that was submitted to OMB for review. Any changes made in response to reviewer recommendations have been documented in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

B. Paperwork Reduction Act (PRA)

The information collection requirements in this supplemental proposal have been submitted for approval to OMB under the PRA. The Information Collection Request (ICR) document that the EPA prepared for this supplemental proposal has been assigned OMB No. 2060–NEW (EPA ICR number 2773.01). You can find a copy of the ICR in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424), and it is briefly summarized here.

The EPA has estimated that the supplemental proposal would result in an increase in burden. The burden associated with the proposed rule is primarily due to revisions to applicability, including revisions to the global warming potentials in Table A–1 to subpart A of part 98 that would change the number of reporters currently at or near the 25,000 mtCO$_2$e threshold; revisions to establish requirements for new source categories for energy consumption, coke calcining, calcium carbide, caprolactam, glyoxal, and glyoxylic acid production, and ceramics manufacturing; and revisions to expand reporting to include new emission sources for specific sectors, such as the addition of captive (non-merchant) hydrogen production facilities. The proposed revisions would affect approximately 253 new reporters across 13 source categories, including the hydrogen production, oil and gas, petroleum refineries, electrical transmission and distribution, industrial

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[76] See the entry for RIN 060–AV83 in the Fall 2022 Regulatory Agenda at: *https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202210&RIN=2060-AV83.*

wastewater, municipal solid waste landfill, fluorinated GHG supplier, and industrial landfill source categories. Additionally, there is burden associated with the proposed revisions to existing monitoring or emissions estimation methodologies, such as the additional time required to conduct engineering calculations or incorporate additional data (*e.g.,* under subpart HH, we are proposing that reporters adjust emissions by including count and surface measurement methane concentration data gathered under other regulatory standards). Finally, there is burden associated with proposed revisions to collect additional facility production or input data that would improve the EPA's understanding of the sector-specific processes or other factors that influence GHG emission rates, verification of collected data, or to complement or inform other EPA programs under the CAA.

The estimated annual average burden is 114,678 hours and $12,250,168 over the 3 years covered by this information collection, including $3,224,535 in non-labor costs. The labor burden costs include $11,748,619 from revisions implemented in the first year (RY2025), and $7,664,140 per year from revisions implemented in each subsequent year (RY2026 and RY2027). The incremental labor burden over the next three years (RY2025 through RY2027) totals 344,034 hours, $27,076,898 in labor costs, and $9,673,605 in capital and O&M costs. Further information on the EPA's assessment on the impact on burden can be found in the memorandum, *Assessment of Burden Impacts for Proposed Revisions for the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424).

Respondents/affected entities: Owners and operators of facilities that must report their GHG emissions and other data to the EPA to comply with 40 CFR part 98.

Respondent's obligation to respond: The respondent's obligation to respond is mandatory and the requirements in this rule are under the authority provided in CAA section 114.

Estimated number of respondents: 7,990 (affected by proposed amendments).

Frequency of response: Initially, annually.

Total estimated burden: 114,678 hours (annual average per year). Burden is defined at 5 CFR 1320.3(b).

Total estimated cost: $12,250,168 (annual average), includes $3,224,535 annualized capital or operation & maintenance costs.

An Agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for the EPA's regulations in 40 CFR are listed in 40 CFR part 9.

Submit your comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the EPA using the docket identified at the beginning of this rule. The EPA will respond to any ICR-related comments in the final rule. You may also send your ICR-related comments to OMB's Office of Information and Regulatory Affairs using the interface at *www.reginfo.gov/public/do/PRAMain.* Find this particular information collection by selecting ''Currently under Review—Open for Public Comments'' or by using the search function. OMB must receive comments no later than July 21, 2023.

C. Regulatory Flexibility Act (RFA)

I certify that this supplemental proposal would not have a significant economic impact on a substantial number of small entities under the RFA. The small entities subject to the requirements of this action are small businesses across all sectors encompassed by the rule, small governmental jurisdictions, and small non-profits. In the development of 40 CFR part 98, the EPA determined that some small entities are affected because their production processes emit GHGs that must be reported, because they have stationary combustion units on site that emit GHGs that must be reported, or because they have fuel supplier operations for which supply quantities and GHG data must be reported. Small Governments and small non-profits are generally affected because they have regulated landfills or stationary combustion units on site, or because they own a local distribution company (LDC).

In the promulgation of the 2009 rule, the EPA took several steps to reduce the impact on small entities. For example, the EPA determined appropriate thresholds that reduced the number of small entities reporting (*e.g.,* the 25,000 mtCO$_2$e threshold used to determine applicability under 40 CFR 98.2(a)(2)). In addition, the EPA conducted meetings with industry associations to discuss regulatory options and the corresponding burden on industry, such as recordkeeping and reporting. This supplemental proposal includes amendments that would improve the existing emissions estimation methodologies; implement requirements to collect additional data to understand new source categories or emissions sources; and improve the EPA's understanding of the sector-specific processes or other factors that influence GHG emission rates and improve verification of collected data; and more broadly inform climate programs and policies. For existing reporters, these changes are improvements or clarifications of requirements that do not require new monitoring and would not significantly increase reporter burden, or are changes that require data that is readily available and may be obtained from company records or estimated from existing inputs or data elements already collected under part 98. Further, the proposed revisions in this supplemental notification would not revise the 25,000 mtCO$_2$e threshold or other subpart thresholds, therefore, we do not expect a significant number of small entities would be newly impacted under this supplemental proposal.

Although the EPA continues to maintain thresholds that reduce the number of small entities reporting, we evaluated the impacts of the proposed revisions where we identified small entities could potentially be affected and considered whether additional measures to minimize impacts were needed. The EPA conducted a small entity analysis that assessed the costs and impacts to small entities in three areas, including: (1) amendments that revise the number or types of facilities required to report (*i.e.,* updates of the GHGRP's applicability to certain sources), (2) changes to refine existing monitoring or calculation methodologies, and (3) revisions to reporting and recordkeeping requirements for data provided to the program. The analysis provides the subparts affected, the number of small entities affected, and the estimated impact to these entities based on the total annualized reporting costs of the proposed rule. Details of this analysis are presented in the memorandum, *Assessment of Burden Impacts for Proposed Supplemental Revisions for the Greenhouse Gas Reporting Rule,* available in the docket for this rulemaking (Docket Id. No. EPA–HQ–OAR–2019–0424). Based on the results of this analysis, we concluded that this proposed action will have no significant regulatory burden for any directly regulated small entities and thus that this proposed action would not have a significant economic impact on a substantial number of small entities. The EPA continues to conduct significant outreach on the GHGRP and maintains an ''open door'' policy for stakeholders to help inform the EPA's understanding of key issues for the industries. We continue to be interested in the potential impacts of the proposed rule amendments on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act (UMRA)

This supplemental proposal does not contain an unfunded mandate of $100 million or more as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small Governments.

E. Executive Order 13132: Federalism

This supplemental proposal does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the National Government and the states, or on the distribution of power and responsibilities among the various levels of Government.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This supplemental proposal has tribal implications. However, it will neither impose substantial direct compliance costs on federally recognized Tribal Governments, nor preempt tribal law. The supplemental proposal would only have tribal implications where the tribal entity owns a facility that directly emits GHGs above threshold levels; therefore, relatively few (six) tribal entities would be affected. This regulation is not anticipated to affect facilities or suppliers of additional sectors owned by Tribal Governments.

In evaluating the potential implications for tribal entities, we first assessed whether tribes would be affected by any proposed revisions that expanded the universe of facilities that would report GHG data to the EPA. The proposed rule amendments would implement requirements to collect additional data to understand new source categories or new emission sources for specific sectors; improve the existing emissions estimation methodologies; and improve the EPA's understanding of the sector-specific processes or other factors that influence GHG emission rates and improve verification of collected data. Of the 133 facilities that we anticipate would be newly required to report under the proposed revisions, we do not anticipate that there are any tribally owned facilities. As discussed in section VII of this preamble, we expect the proposed revisions to Table A–1 to part 98 to result in a change to the number of facilities required to report under subparts W (Petroleum and Natural Gas Systems), V (Nitric Acid Production), DD (Electrical Transmission and Distribution Equipment Use), HH (MSW Landfills), II (Industrial Wastewater Treatment), OO (Suppliers of Industrial GHGs), and TT (Industrial Waste Landfills). However, we did not identify any potential sources in these source categories that are owned by tribal entities not already reporting to the GHGRP. Similarly, although we are proposing amendments that would require that some facilities not currently subject to the GHGRP begin reporting and implementing requirements under the program for select new source categories, as discussed in section IV of this preamble, we have not identified, and do not anticipate, any such affected facilities in the proposed source categories that are owned by Tribal Governments.

As a second step to evaluate potential tribal implications, we evaluated whether there were any tribally owned facilities that are currently reporting under the GHGRP that would be affected by the proposed revisions. Tribally owned facilities currently subject to part 98 would only be subject to proposed changes that do not significantly change the existing requirements or result in substantial new activities because they do not require new equipment, sampling, or monitoring. Rather, tribally owned facilities would only be subject to new requirements where reporters would provide data that is readily available from company records. As such, the proposed revisions would not substantially increase reporter burden, impose significant direct compliance costs for tribal facilities, or preempt tribal law. Specifically, we identified ten facilities currently reporting to part 98 that are owned by six tribal parent companies. For these six parent companies, we identified facilities in the stationary fuel combustion (subpart C), petroleum and natural gas (subpart W), and MSW landfill (subpart HH) source categories that may be affected by the proposed revisions. These facilities would be affected by the proposed revisions to subparts C and HH and the proposed addition of reporting requirements under subpart B (Energy Consumption). For these six parent companies, we reviewed publicly available sales and revenue data to determine whether the parent company was a small entity and to assess whether the costs of the proposed rule would be significant. Based on our review, we located sales and revenue data for three of the six parent companies (currently reporting under subparts C, W, and HH) and were able to confirm that the costs of the proposed revisions, including reporting of energy consumption data under proposed subpart B, would reflect less than one half of one percent of company revenue for these sources. The remaining three parent companies include facilities that report under subparts C and HH, and that would be required to report under new subpart B. Under the proposed rule, the costs for facilities currently reporting under subparts C or HH would be anticipated to increase by less than $100 per year per subpart. For subpart C, this would include costs related to revisions to report whether the facility has an electricity generating unit and the fraction of reported emissions attributable to electricity generation under subparts, which we do not anticipate would apply to tribal facilities. For subpart HH, this includes time to report additional information for landfills with gas collection systems and destruction devices, as well as additional time to adjust estimated methane emissions based on methane surface monitoring measurements or to use a default lower gas collection efficiency value. Under proposed subpart B, facilities would be anticipated to incur costs of up to $1,189 in the first year (for planning and implementation of a Metered Energy Monitoring Plan and associated reporting and recordkeeping) and $670 in subsequent years (for update of the Plan and associated reporting and recordkeeping). Based on our review of similar tribally owned facilities and small entity analysis (discussed in VIII.C of this preamble), we do not anticipate the proposed revisions to subparts B, C, or HH would impose substantial direct compliance costs on the remaining tribally owned entities.

Further, although few facilities subject to part 98 are likely to be owned by Tribal Governments, the EPA previously sought opportunities to provide information to Tribal Governments and representatives during the development of the proposed and final rules for part 98 subparts that were promulgated on October 30, 2009 (74 FR 52620), July 12, 2010 (75 FR 39736), November 30, 2010 (75 FR 74458), and December 1, 2010 (75 FR 74774 and 75 FR 75076). Consistent with the 2011 EPA Policy on Consultation and Coordination with Indian Tribes,[77] the

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[77] EPA Policy on Consultation and Coordination with Indian Tribes, May 4, 2011. Available at:

Continued

EPA previously consulted with tribal officials early in the process of developing part 98 regulations to permit them to have meaningful and timely input into its development and to provide input on the key regulatory requirements established for these facilities. A summary of these consultations is provided in section VIII.F of the preamble to the final rule published on October 30, 2009 (74 FR 52620), section V.F of the preamble to the final rule published on July 12, 2010 (75 FR 39736), section IV.F of the preamble to the re-proposal of subpart W (Petroleum and Natural Gas Systems) published on April 12, 2010 (75 FR 18608), section IV.F of the preambles to the final rules published on December 1, 2010 (75 FR 74774 and 75 FR 75076). As described in this section, the proposed rule does not significantly revise the established regulatory requirements and would not substantially change the equipment, monitoring, or reporting activities conducted by these facilities, or result in other substantial impacts for tribal facilities.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

The EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that the EPA has reason to believe may disproportionately affect children, per the definition of ''covered regulatory action'' in section 2–202 of the Executive order. This supplemental proposal is not subject to Executive Order 13045 because it does not concern an environmental health risk or safety risk.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This action is not a ''significant energy action'' because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The proposed amendments would implement requirements to collect additional data to understand new source categories or new emission sources for specific sectors; improve the EPA's understanding of factors that influence GHG emission rates; improve the existing emissions estimation methodologies; improve verification of collected data; and provide additional data to complement or inform other EPA programs. We are also proposing revisions that clarify or update provisions that have been unclear. In general, these changes would not substantially impact the supply, distribution, or use of energy. The EPA is proposing to require reporting of metered energy consumption from direct emitter facilities that currently report under part 98 in order to gain an improved understanding of the energy intensity (*i.e.,* the amount of energy required to produce a given level of product or activity) of specific facilities or sectors, and to better inform our understanding of the potential indirect GHG emissions associated with certain sectors. The proposed regulations under subpart B include QA/QC requirements for energy meters for this source category, but the EPA understands that these meters would already be in place to monitor energy purchases. Therefore, the proposed regulations would not require installation of new equipment. Therefore, the proposed new subpart is not anticipated to add significant burden for existing reporters or to impact the supply, distribution, or use of energy. In addition to the data quality improvements described, the EPA is proposing confidentiality determinations for new and revised data elements in this proposed rule and for certain existing data elements for where the EPA has determined that the current determination is no longer appropriate. These proposed amendments and confidentiality determinations do not make any changes to the existing monitoring, calculation, and reporting requirements under part 98 that would affect the supply, distribution, or use of energy.

I. National Technology Transfer and Advancement Act

This action involves technical standards. The EPA is proposing the use of several standards in establishing monitoring requirements in these proposed amendments. For proposed subpart B (Energy Consumption), the EPA is proposing that reporters must determine whether electric meters at the facility comply with the *American National Standards Institute (ANSI) standard C12.1–2022 Electric Meters—Code for Electric Metering* or another, similar consensus standard with accuracy specifications at least as stringent. The ANSI standard is widely referenced in state utility commission performance standards governing the accuracy of electric meters used for billing calculations. The proposed standard establishes acceptable performance criteria for electricity meters including accuracy class designations, current class designations, voltage and frequency ratings, test current values, service connection arrangements, pertinent dimensions, form designations, and environmental tests. The proposed requirements under subpart B allow for reporters to rely on manufacturer's certification, certification from the local utility supplying the electric service and meter, or to provide copy of written request that the existing meter be replaced by an electrical meter that meets the accuracy specifications of the cited ANSI standard. Additionally, the proposed requirements allow for reporters to use another consensus standard having accuracy specifications at least as stringent as the proposed ANSI standards C12.1–2022. Anyone may access the standard on the ANSI website (*www.ansi.org*) for additional information; the standard is available at the following web link: *https://webstore.ansi.org/standards/nema/ansic122022.* The standard is available to everyone at a cost determined by the ANSI ($423). The ANSI also offers memberships or subscriptions that allow unlimited access to their methods. Because facilities may rely on certifications from the meter manufacturer or the local utility, or use an alternative consensus standard that is at least as stringent as the proposed standards, the EPA has determined that obtaining these methods is not a significant financial burden, making the methods reasonably available for reporters.

The EPA is proposing amendments to subpart HH (Municipal Solid Waste Landfills) at 40 CFR 98.344 that would allow for facilities that elect to conduct surface methane concentration monitoring to use measurement methods that are consistent with those already required and standard under existing landfills regulations. The proposed amendments would require landfill owners and operators that are already subject to the NSPS at 40 CFR part 60, subparts WWW or XXX, the EG at 40 CFR part 60, subpart Cc of Cf, or according to the Federal plan at 40 CFR part 62, subpart GGG or OOO to follow the monitoring measurement requirements under the NSPS, EG, or Federal plans; facilities would be able to use the measurements collected under the existing NSPS, EG, and Federal plan rules for estimation of emissions from cover leaks. We are also proposing to add surface methane concentration monitoring methods at 40 CFR 98.344 for landfill owners and operators that are not required to conduct surface measurements according to the NSPS

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www.epa.gov/sites/default/files/2013-08/documents/cons-and-coord-with-indian-tribes-policy.pdf.

(40 CFR part 60, subpart WWW or XXX), EG (40 CFR part 60, subparts Cc or Cf as implemented in approved state plans), or Federal plans (40 CFR part 62, subparts GGG or OOO), but that voluntarily elect to conduct these surface measurements. Landfill owners and operators that are not required to conduct surface measurements according to the NSPS (40 CFR part 60, subpart WWW or XXX), EG (40 CFR part 60, subparts Cc or Cf), or Federal plans (40 CFR part 62, subparts GGG or OOO) would also have the option to use a default lower gas collection efficiency value in lieu of monitoring. Landfill reporters that elect to conduct surface measurements under part 98 would follow the procedures in 40 CFR 60.765(c) and (d), which must be performed in accordance with Method 21 of appendix A to part 60. Because we are proposing the option to use of a default lower gas collection efficiency and not requiring reporters that are not subject to the control requirements in the NSPS (40 CFR part 60, subpart WWW or XXX), EG (40 CFR part 60, subparts Cc or Cf), or Federal plans (40 CFR part 62, subparts GGG or OOO) to perform this surface methane concentration monitoring, the use of Method 21 is voluntary for those reporters. Therefore, the EPA has determined that use of Method 21 is not a significant financial burden and would be reasonably available for reporters.

The EPA previously proposed to allow the use of the ISO standard designated as CSA/ANSI ISO 27916:2019, *Carbon Dioxide Capture, Transportation and Geological Storage—Carbon Dioxide Storage Using Enhanced Oil Recovery (CO_2–EOR)* (2019) consistent with the proposed addition of proposed subpart VV (Geologic Sequestration of Carbon Dioxide With Enhanced Oil Recovery Using ISO 27916) in the 2022 Data Quality Improvements Proposal (87 FR 37035). The EPA also previously proposed paragraph 98.470(c) of subpart UU (Injection of Carbon Dioxide) to indicate that facilities that report under proposed subpart VV would not be required to report under subpart UU. In this supplemental action, the EPA is re-proposing section 40 CFR 98.470, section 40 CFR 98.480, and section 40 CFR 98.481 to clarify the applicability of the rule. The re-proposed section 98.480 would require that facilities that elect to use the CSA/ANSI ISO 27916:2019 method for the purpose of quantifying geologic sequestration of CO_2 in association with EOR operations would be required to report under proposed subpart VV. The re-proposed sections 40 CFR 98.470 and 40 CFR 98.481 clarify that CO_2-EOR projects previously reporting under subpart UU that begin using CSA/ANSI ISO 27916:2019 part-way through a reporting year must report under subpart UU for the portion of the year before CSA/ANSI ISO 27916:2019 was used and report under subpart VV for the portion of the year once CSA/ANSI ISO 27916:2019 began to be used and thereafter. Our supporting analysis in the 2022 Data Quality Improvements Proposal regarding the availability and the cost of obtaining the ISO standard are the same for this re-proposal, and we reiterate that the proposed amendments to subparts UU and VV would not impose a significant financial burden for reporters, as the proposed rule would apply to reporters that elect to use CSA/ANSI ISO 27916:2019 for quantifying their geologic sequestration of CO_2 in association with EOR operations.

The EPA also proposes to allow the use of any one of the following standards for coke calcining facilities subject to proposed new subpart WW: (1) ASTM D3176–15 *Standard Practice for Ultimate Analysis of Coal and Coke,* (2) ASTM D5291–16 *Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants,* and (3) ASTM D5373–21 *Standard Test Methods for Determination of Carbon, Hydrogen, and Nitrogen in Analysis Samples of Coal and Carbon in Analysis Samples of Coal and Coke.* These proposed methods are used to determine the carbon content of petroleum coke. The EPA currently allows for the use of an earlier version of these proposed standard methods for the instrumental determination of carbon content in laboratory samples of petroleum coke in other sections of part 98, including the use of ASTM D3176–89, ASTM D5291–02, and ASTM D5373–08 in 40 CFR 98.244(b) (subpart X—Petrochemical Production) and 40 CFR 98.254(i) (subpart Y—Petroleum Refineries). The EPA is proposing to allow the use of the updated versions of these standards (ASTM D3176–15, ASTM D5291–16, and ASTM D5373–21) to determine the carbon content of petroleum coke for proposed subpart WW (Coke Calciners). Anyone may access the standards on the ASTM website (*www.astm.org/*) for additional information. These standards are available to everyone at a cost determined by the ASTM (between $48 and $60 per method). The ASTM also offers memberships or subscriptions that allow unlimited access to their methods. The cost of obtaining these methods is not a significant financial burden, making the methods reasonably available for reporters.

We are also proposing to allow the use of the following standard for coke calciners subject to subpart WW: *Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices,* NIST Handbook 44 (2022). The EPA currently allows for the use of an earlier version of the proposed standard methods (*Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices,* NIST Handbook 44 (2009)) for the calibration and maintenance of instruments used for weighing of mass of samples of petroleum coke in other sections of part 98, including 40 CFR 98.244(b) (subpart X). The EPA is proposing to allow the use of the updated versions of these standards (*Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices,* NIST Handbook 44 (2022)) for performing mass measurements of petroleum coke for proposed subpart WW (Coke Calciners). Anyone may access the standards on the NIST website (*www.nist.gov/index.html*) for additional information. These standards are available to everyone at no cost, therefore the methods are reasonably available for reporters.

The EPA proposes to allow the use of one of the following standards for calcium carbide production facilities subject to proposed subpart XX (Calcium Carbide Production): (1) ASTM D5373–08 *Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Laboratory Samples of Coal,* or (2) ASTM C25–06, *Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime.* ASTM D5373–08 addresses the determination of carbon in the range of 54.9 percent m/m to 84.7 percent m/m, hydrogen in the range of 3.25 percent m/m to 5.10 percent m/m, and nitrogen in the range of 0.57 percent m/m to 1.80 percent m/m in the analysis sample of coal. The EPA currently allows for the use of ASTM D5373–08 in other sections of part 98, including in 40 CFR 98.244(b) (subpart X—Petrochemical Production), 40 CFR 98.284(c) (subpart BB—Silicon Carbide Production), and 40 CFR 98.314(c) (subpart EE—Titanium Production) for the instrumental determination of carbon content in laboratory samples. Therefore, we are proposing to allow the use of ASTM D5373–08 for determination of carbon content of materials consumed, used, or produced at calcium carbide facilities.

The EPA currently allows for the use of ASTM C25–06 in other sections of part 98, including in 40 CFR 98.194(c) (subpart S—Lime Production) for chemical composition analysis of lime products and calcined byproducts and in 40 CFR 98.184(b) (subpart R—Lead Production) for analysis of flux materials such as limestone or dolomite. ASTM C25–06 addresses the chemical analysis of high-calcium and dolomitic limestone, quicklime, and hydrated lime. We are proposing to allow the use of ASTM C25–06 for determination of carbon content of materials consumed, used, or produced at calcium carbide facilities, including analysis of materials such as limestone or dolomite. Anyone may access the standards on the ASTM website (*www.astm.org/*) for additional information. These standards are available to everyone at a cost determined by the ASTM (between $64 and $92 per method). The ASTM also offers memberships or subscriptions that allow unlimited access to their methods. The cost of obtaining these methods is not a significant financial burden, making the methods reasonably available for reporters.

The EPA is not proposing to require the use of specific consensus standards for proposed new subparts YY (Caprolactam, Glyoxal, and Glyoxylic Acid Production) or ZZ (Ceramics Production), or for other proposed amendments to part 98.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 (59 FR 7629, February 16, 1994) directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations (people of color) and low-income populations.

The EPA believes that this proposed action does not directly concern human health or environmental conditions and therefore cannot be evaluated with respect to potentially disproportionate and adverse effects on people of color, low-income populations and/or indigenous peoples. This action does not affect the level of protection provided to human health or the environment, but instead, addresses information collection and reporting procedures.

K. Determination Under CAA Section 307(d)

Pursuant to CAA section 307(d)(1)(V), the Administrator determines that this supplemental proposal is subject to the provisions of CAA section 307(d). Section 307(d)(1)(V) of the CAA provides that the provisions of CAA section 307(d) apply to ''such other actions as the Administrator may determine.''

List of Subjects in 40 CFR Part 98

Environmental protection, Greenhouse gases, Reporting and recordkeeping requirements, Suppliers.

Michael S. Regan,
Administrator.

For the reasons stated in the preamble, the Environmental Protection Agency proposes to amend title 40, chapter I, of the Code of Federal Regulations as follows:

PART 98—MANDATORY GREENHOUSE GAS REPORTING

■ 1. The authority citation for part 98 continues to read as follows:

Authority: 42 U.S.C. 7401–7671q.

Subpart A—General Provision

■ 2. Amend § 98.2 by revising paragraphs (a)(1), (a)(2), and (a)(3) introductory text as follows:

§ 98.2 Who must report?

(a) * * *

(1) A facility that contains any source category that is listed in Table A–3 of this subpart. For these facilities, the annual GHG report must cover energy consumption (subpart B of this part), stationary fuel combustion sources (subpart C of this part), miscellaneous use of carbonates (subpart U of this part), and all applicable source categories listed in Tables A–3 and A–4 of this subpart.

(2) A facility that contains any source category that is listed in Table A–4 of this subpart and that emits 25,000 metric tons CO_2e or more per year in combined emissions from stationary fuel combustion units, miscellaneous uses of carbonate, and all applicable source categories that are listed in Table A–3 and Table A–4 of this subpart. For these facilities, the annual GHG report must cover energy consumption (subpart B of this part), stationary fuel combustion sources (subpart C of this part), miscellaneous use of carbonates (subpart U of this part), and all applicable source categories listed in Table A–3 and Table A–4 of this subpart.

(3) A facility that in any calendar year starting in 2010 meets all three of the conditions listed in this paragraph (a)(3). For these facilities, the annual GHG report must cover energy consumption (subpart B of this part) and emissions from stationary fuel combustion sources.

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■ 3. Amend § 98.3 by:
■ a. Revising paragraph (c)(4) introductory text;
■ b. Redesignating paragraphs (c)(4)(iv) and (v) as paragraphs (c)(4)(v) and (vi), respectively;
■ c. Adding new paragraph (c)(4)(iv);
■ d. Revising paragraphs (k)(1), (2), and (3);
■ e. Revising paragraphs (l)(1) introductory text, (l)(2) introductory text, (l)(2)(i), (l)(2)(ii)(C), (D), and (E), and (l)(2)(iii).

The revisions and additions read as follows:

§ 98.3 What are the general monitoring, reporting, recordkeeping and verification requirements of this part?

* * * * *

(c) * * *

(4) For facilities, except as otherwise provided in paragraph (c)(12) of this section, report annual emissions of CO_2, CH_4, N_2O, each fluorinated GHG (as defined in § 98.6), and each fluorinated heat transfer fluid (as defined in § 98.98), as well as annual quantities of electricity and thermal energy purchases, as follows.

* * * * *

(iv) Annual quantity of electricity purchased expressed in kilowatt-hours (kWh) and annual quantity of thermal energy purchased expressed in mmBtu for all applicable source categories, per the requirements of subpart B of this part.

(v) Except as provided in paragraph (c)(4)(vii) of this section, emissions and other data for individual units, processes, activities, and operations as specified in the ''Data reporting requirements'' section of each applicable subpart of this part.

(vi) Indicate (yes or no) whether reported emissions include emissions from a cogeneration unit located at the facility.

* * * * *

(k) * * *

(1) A facility or supplier that first becomes subject to part 98 due to a change in the GWP for one or more compounds in Table A–1 of this subpart, Global Warming Potentials, is not required to submit an annual GHG report for the reporting year during which the change in GWPs is published

in the **Federal Register** as a final rulemaking.

(2) A facility or supplier that was already subject to one or more subparts of part 98 but becomes subject to one or more additional subparts due to a change in the GWP for one or more compounds in Table A–1 of this subpart, is not required to include those subparts to which the facility is subject only due to the change in the GWP in the annual GHG report submitted for the reporting year during which the change in GWPs is published in the **Federal Register** as a final rulemaking.

(3) Starting on January 1 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking, facilities or suppliers identified in paragraph (k)(1) or (2) of this section must start monitoring and collecting GHG data in compliance with the applicable subparts of part 98 to which the facility is subject due to the change in the GWP for the annual greenhouse gas report for that reporting year, which is due by March 31 of the following calendar year.

* * * * *

(l) * * *

(1) Best available monitoring methods. From January 1 to March 31 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking, owners or operators subject to this paragraph (l) may use best available monitoring methods for any parameter (*e.g.,* fuel use, feedstock rates) that cannot reasonably be measured according to the monitoring and QA/QC requirements of a relevant subpart. The owner or operator must use the calculation methodologies and equations in the ''Calculating GHG Emissions'' sections of each relevant subpart, but may use the best available monitoring method for any parameter for which it is not reasonably feasible to acquire, install, and operate a required piece of monitoring equipment by January 1 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking. Starting no later than April 1 of the year after the year during which the change in GWPs is published, the owner or operator must discontinue using best available methods and begin following all applicable monitoring and QA/QC requirements of this part, except as provided in paragraph (l)(2) of this section. Best available monitoring methods means any of the following methods:

* * * * *

(2) Requests for extension of the use of best available monitoring methods. The owner or operator may submit a request to the Administrator to use one or more best available monitoring methods beyond March 31 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking.

(i) Timing of request. The extension request must be submitted to EPA no later than January 31 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking.

(ii) * * *

(C) A description of the reasons that the needed equipment could not be obtained and installed before April 1 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking.

(D) If the reason for the extension is that the equipment cannot be purchased and delivered by April 1 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking, include supporting documentation such as the date the monitoring equipment was ordered, investigation of alternative suppliers and the dates by which alternative vendors promised delivery, backorder notices or unexpected delays, descriptions of actions taken to expedite delivery, and the current expected date of delivery.

(E) If the reason for the extension is that the equipment cannot be installed without a process unit shutdown, include supporting documentation demonstrating that it is not practicable to isolate the equipment and install the monitoring instrument without a full process unit shutdown. Include the date of the most recent process unit shutdown, the frequency of shutdowns for this process unit, and the date of the next planned shutdown during which the monitoring equipment can be installed. If there has been a shutdown or if there is a planned process unit shutdown between November 29 of the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking and April 1 of the year after the year during which the change in GWPs is published, include a justification of why the equipment could not be obtained and installed during that shutdown.

* * * * *

(iii) Approval criteria. To obtain approval, the owner or operator must demonstrate to the Administrator's satisfaction that it is not reasonably feasible to acquire, install, and operate a required piece of monitoring equipment by April 1 of the year after the year during which the change in GWPs is published in the **Federal Register** as a final rulemaking. The use of best available methods under this paragraph (l) will not be approved beyond December 31 of the year after the year during which the change in GWPs is published.

■ 4. Amend § 98.6 by:

■ a. Adding a definition for ''Cyclic'' and ''Fluorinated heat transfer fluids'' in alphabetic order;

■ b. Revising the definitions for ''Bulk''; ''Fluorinated greenhouse gas'', ''Fluorinated greenhouse gas (GHG) group'', ''Greenhouse gas or GHG'', and ''Process vent'';

■ c. Removing the definition for ''Other fluorinated GHGs''; and

■ d. Adding definitions for ''Remaining fluorinated GHGs'', ''Saturated chlorofluorocarbons (CFCs)'', ''Unsaturated bromochlorofluorocarbons (BCFCs)'', ''Unsaturated bromofluorocarbons (BFCs)'', ''Unsaturated chlorofluorocarbons (CFCs), ''Unsaturated hydrobromochlorofluorocarbons (HBCFCs)'', and ''Unsaturated hydrobromofluorocarbons (HBFCs)'' in alphabetic order.

The revisions and additions read as follows:

§ 98.6 Definitions.

* * * * *

Bulk, with respect to industrial GHG suppliers and CO_2 suppliers, means a transfer of gas in any amount that is in a container for the transportation or storage of that substance such as cylinders, drums, ISO tanks, and small cans. An industrial gas or CO_2 that must first be transferred from a container to another container, vessel, or piece of equipment in order to realize its intended use is a bulk substance. An industrial GHG or CO_2 that is contained in a manufactured product such as electrical equipment, appliances, aerosol cans, or foams is not a bulk substance.

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Cyclic, in the context of fluorinated GHGs, means a fluorinated GHG in which three or more carbon atoms are connected to form a ring.

* * * * *

Fluorinated greenhouse gas (GHG) means sulfur hexafluoride (SF_6), nitrogen trifluoride (NF_3), and any fluorocarbon except for controlled substances as defined at 40 CFR part 82, subpart A and substances with vapor pressures of less than 1 mm of Hg absolute at 25 degrees C. With these exceptions, ''fluorinated GHG'' includes but is not limited to any hydrofluorocarbon, any perfluorocarbon, any fully fluorinated linear, branched or cyclic alkane, ether, tertiary amine or aminoether, any perfluoropolyether, and any hydrofluoropolyether.

Fluorinated greenhouse gas (GHG) group means one of the following sets of fluorinated GHGs:

(1) Fully fluorinated GHGs;

(2) Saturated hydrofluorocarbons with two or fewer carbon-hydrogen bonds;

(3) Saturated hydrofluorocarbons with three or more carbon-hydrogen bonds;

(4) Saturated hydrofluoroethers and hydrochlorofluoroethers with one carbon-hydrogen bond;

(5) Saturated hydrofluoroethers and hydrochlorofluoroethers with two carbon-hydrogen bonds;

(6) Saturated hydrofluoroethers and hydrochlorofluoroethers with three or more carbon-hydrogen bonds;

(7) Saturated chlorofluorocarbons (CFCs);

(8) Fluorinated formates;

(9) Cyclic forms of the following: unsaturated perfluorocarbons (PFCs), unsaturated HFCs, unsaturated CFCs, unsaturated hydrochlorofluorocarbons (HCFCs), unsaturated bromofluorocarbons (BFCs), unsaturated bromochlorofluorocarbons (BCFCs), unsaturated hydrobromofluorocarbons (HBFCs), unsaturated hydrobromochlorofluorocarbons (HBCFCs), unsaturated halogenated ethers, and unsaturated halogenated esters;

(10) Fluorinated acetates, carbonofluoridates, and fluorinated alcohols other than fluorotelomer alcohols;

(11) Fluorinated aldehydes, fluorinated ketones and non-cyclic forms of the following: unsaturated PFCs, unsaturated HFCs, unsaturated CFCs, unsaturated HCFCs, unsaturated BFCs, unsaturated BCFCs, unsaturated HBFCs, unsaturated HBCFCs, unsaturated halogenated ethers, and unsaturated halogenated esters;

(12) Fluorotelomer alcohols;

(13) Fluorinated GHGs with carbon-iodine bonds; or

(14) Remaining fluorinated GHGs.

Fluorinated heat transfer fluids means fluorinated GHGs used for temperature control, device testing, cleaning substrate surfaces and other parts, other solvent applications, and soldering in certain types of electronics manufacturing production processes and in other industries. Fluorinated heat transfer fluids do not include fluorinated GHGs used as lubricants or surfactants in electronics manufacturing. For fluorinated heat transfer fluids, the lower vapor pressure limit of 1 mm Hg in absolute at 25 °C in the definition of ''fluorinated greenhouse gas'' in § 98.6 shall not apply. Fluorinated heat transfer fluids include, but are not limited to, perfluoropolyethers (including PFPMIE), perfluoroalkylamines, perfluoroalkylmorpholines, perfluoroalkanes, perfluoroethers, perfluorocyclic ethers, and hydrofluoroethers. Fluorinated heat transfer fluids include HFC–43–10meee but do not include other hydrofluorocarbons.

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Greenhouse gas or *GHG* means carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated greenhouse gases (GHGs) as defined in this section.

* * * * *

Process vent means a gas stream that: Is discharged through a conveyance to the atmosphere either directly or after passing through a control device; originates from a unit operation, including but not limited to reactors (including reformers, crackers, and furnaces, and separation equipment for products and recovered byproducts); and contains or has the potential to contain GHG that is generated in the process. Process vent does not include safety device discharges, equipment leaks, gas streams routed to a fuel gas system or to a flare, discharges from storage tanks.

* * * * *

Remaining fluorinated GHGs means fluorinated GHGs that are none of the following:

(1) Fully fluorinated GHGs;

(2) Saturated hydrofluorocarbons with two or fewer carbon-hydrogen bonds;

(3) Saturated hydrofluorocarbons with three or more carbon-hydrogen bonds;

(4) Saturated hydrofluoroethers and hydrochlorofluoroethers with one carbon-hydrogen bond;

(5) Saturated hydrofluoroethers and hydrochlorofluoroethers with two carbon-hydrogen bonds;

(6) Saturated hydrofluoroethers and hydrochlorofluoroethers with three or more carbon-hydrogen bonds;

(7) Saturated chlorofluorocarbons (CFCs);

(8) Fluorinated formates;

(9) Cyclic forms of the following: unsaturated perfluorocarbons (PFCs), unsaturated HFCs, unsaturated CFCs, unsaturated hydrochlorofluorocarbons (HCFCs), unsaturated bromofluorocarbons (BFCs), unsaturated bromochlorofluorocarbons (BCFCs), unsaturated hydrobromofluorocarbons (HBFCs), unsaturated hydrobromochlorofluorocarbons (HBCFCs), unsaturated halogenated ethers, and unsaturated halogenated esters;

(10) Fluorinated acetates, carbonofluoridates, and fluorinated alcohols other than fluorotelomer alcohols;

(11) Fluorinated aldehydes, fluorinated ketones and non-cyclic forms of the following: unsaturated PFCs, unsaturated HFCs, unsaturated CFCs, unsaturated HCFCs, unsaturated BFCs, unsaturated BCFCs, unsaturated HBFCs, unsaturated HBCFCs, unsaturated halogenated ethers, and unsaturated halogenated esters;

(12) Fluorotelomer alcohols; or

(13) Fluorinated GHGs with carbon-iodine bonds.

* * * * *

Saturated chlorofluorocarbons (CFCs) means fluorinated GHGs that contain only chlorine, fluorine, and carbon and that contain only single bonds.

* * * * *

Unsaturated bromochlorofluorocarbons (BCFCs) means fluorinated GHGs that contain only bromine, chlorine, fluorine, and carbon and that contain one or more bonds that are not single bonds.

Unsaturated bromofluorocarbons (BFCs) means fluorinated GHGs that contain only bromine, fluorine, and carbon and that contain one or more bonds that are not single bonds.

Unsaturated chlorofluoro-carbons (CFCs) means fluorinated GHGs that contain only chlorine, fluorine, and carbon and that contain one or more bonds that are not single bonds.

* * * * *

Unsaturated hydrobromochlorofluorocarbons (HBCFCs) means fluorinated GHGs that contain only hydrogen, bromine, chlorine, fluorine, and carbon and that contain one or more bonds that are not single bonds.

Unsaturated hydrobromofluoro carbons (HBFCs) means fluorinated GHGs that contain only hydrogen, bromine, fluorine, and carbon and that contain one or more bonds that are not single bonds.

* * * * *

■ 5. Amend § 98.7 by:

■ a. Adding paragraph (a);

■ b. Revising paragraphs (e)(1), (e)(18), (e)(26), (e)(27), and (i)(1); and

■ c. Adding paragraphs (e)(50) through (52), (g)(6) and (i)(2).

§ 98.7 What standardized methods are incorporated by reference into this part?

* * * * *

(a) The following material is available for purchase from the American National Standards Institute (ANSI), 25 W 43rd Street, 4th Floor, New York, NY 10036, Telephone (212) 642–4980, and is also available at the following website: *http://www.ansi.org.*

(1) ANSI C12.1–2022 Electric Meters—Code for Electricity Metering, incorporation by reference (IBR) approved for § 98.24(b).

(2) [Reserved]

* * * * *

(e) * * *

(1) ASTM C25–06 Standard Test Method for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime, incorporation by reference (IBR) approved for §§ 98.114(b), 98.174(b), 98.184(b), 98.194(c), 98.334(b), and 98.504(b).

* * * * *

(18) ASTM D3176–89 (Reapproved 2002) Standard Practice for Ultimate Analysis of Coal and Coke, IBR approved for §§ 98.74(c), 98.164(b), 98.244(b), 98.284(c), 98.284(d), 98.314(c), 98.314(d), and 98.314(f).

* * * * *

(26) ASTM D5291–02 (Reapproved 2007) Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants, IBR approved for §§ 98.74(c), 98.164(b), and 98.244(b).

(27) ASTM D5373–08 Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Laboratory Samples of Coal, IBR approved for §§ 98.74(c), 98.114(b), 98.164(b), 98.174(b), 98.184(b), 98.244(b), 98.274(b), 98.284(c), 98.284(d), 98.314(c), 98.314(d), 98.314(f), 98.334(b), and 98.504(b).

* * * * *

(50) ASTM D3176–15 Standard Practice for Ultimate Analysis of Coal and Coke, IBR approved for § 98.494(c).

(51) ASTM D5291–16 Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants, IBR approved for § 98.494(c).

(52) ASTM D5373–21 Standard Test Methods for Determination of Carbon, Hydrogen, and Nitrogen in Analysis Samples of Coal and Carbon in Analysis Samples of Coal and Coke, IBR approved for § 98.494(c).

* * * * *

(g) * * *

(6) CSA/ANSI ISO 27916:19, Carbon dioxide capture, transportation and geological storage—Carbon dioxide storage using enhanced oil recovery (CO_2-EOR). Edition 1. January 2019; IBR approved for §§ 98.470(c), 98.480(a), 98.481(a), 98.481(b), 98.481(c), 98.482, 98.483, 98.484, 98.485, 98.486(g), 98.487, 98.488(a)(5), and 98.489.

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(i) * * *

(1) Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices, NIST Handbook 44 (2009), incorporation by reference (IBR) approved for §§ 98.244(b) and 98.344(a).

(2) Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices, NIST Handbook 44 (2022), IBR approved for § 98.494(b).

* * * * *

■ 6. Revise table A–1 to subpart A of part 98 to read as follows:

TABLE A–1 TO SUBPART A OF PART 98—GLOBAL WARMING POTENTIALS

[100-Year time horizon]

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
Chemical-Specific GWPs			
Carbon dioxide	124–38–9	CO_2	1
Methane	74–82–8	CH_4	[a,d]28
Nitrous oxide	10024–97–2	N_2O	[a,d]265
Fully Fluorinated GHGs			
Sulfur hexafluoride	2551–62–4	SF_6	[a,d]23,500
Trifluoromethyl sulphur pentafluoride	373–80–8	SF_5CF_3	[d]17,400
Nitrogen trifluoride	7783–54–2	NF_3	[d]16,100
PFC-14 (Perfluoromethane)	75–73–0	CF_4	[a,d]6,630
PFC-116 (Perfluoroethane)	76–16–4	C_2F_6	[a,d]11,100
PFC-218 (Perfluoropropane)	76–19–7	C_3F_8	[a,d]8,900
Perfluorocyclopropane	931–91–9	c-C_3F_6	[d]9,200
PFC-3-1-10 (Perfluorobutane)	355–25–9	C_4F_{10}	[a,d]9,200
PFC-318 (Perfluorocyclobutane)	115–25–3	c-C_4F_8	[a,d]9,540
Perfluorotetrahydrofuran	773–14–8	c-C_4F_8O	[e]13,900
PFC-4-1-12 (Perfluoropentane)	678–26–2	C_5F_{12}	[a,d]8,550
PFC-5-1-14 (Perfluorohexane, FC-72)	355–42–0	C_6F_{14}	[a,d]7,910
PFC-6-1-12	335–57–9	C_7F_{16}; $CF_3(CF_2)_5CF_3$	[b]7,820
PFC-7-1-18	307–34–6	C_8F_{18}; $CF_3(CF_2)_6CF_3$	[b]7,620
PFC-9-1-18	306–94–5	$C_{10}F_{18}$	[d]7,190
PFPMIE (HT-70)	NA	$CF_3OCF(CF_3)CF_2OCF_2OCF_3$	[d]9,710
Perfluorodecalin (cis)	60433–11–6	Z-$C_{10}F_{18}$	[b,d]7,240
Perfluorodecalin (trans)	60433–12–7	E-$C_{10}F_{18}$	[b,d]6,290
Perfluorotriethylamine	359–70–6	$N(C_2F_5)_3$	[e]10,300
Perfluorotripropylamine	338–83–0	$N(CF_2CF_2CF_3)_3$	[e]9,030
Perfluorotributylamine	311–89–7	$N(CF_2CF_2CF_2CF_3)_3$	[e]8,490
Perfluorotripentylamine	338–84–1	$N(CF_2CF_2CF_2CF_2CF_3)_3$	[e]7,260
Saturated Hydrofluorocarbons (HFCs) With Two or Fewer Carbon-Hydrogen Bonds			
(4s,5s)-1,1,2,2,3,3,4,5-octafluorocyclopentane	158389–18–5	trans-cyc ($-CF_2CF_2CF_2CHFCHF-$)	[e]258
HFC-23	75–46–7	CHF_3	[a,d]12,400
HFC-32	75–10–5	CH_2F_2	[a,d]677
HFC-125	354–33–6	C_2HF_5	[a,d]3,170
HFC-134	359–35–3	$C_2H_2F_4$	[a,d]1,120
HFC-134a	811–97–2	CH_2FCF_3	[a,d]1,300
HFC-227ca	2252–84–8	$CF_3CF_2CHF_2$	[b]2,640
HFC-227ea	431–89–0	C_3HF_7	[a,d]3,350
HFC-236cb	677–56–5	$CH_2FCF_2CF_3$	[d]1,210
HFC-236ea	431–63–0	CHF_2CHFCF_3	[d]1,330

TABLE A–1 TO SUBPART A OF PART 98—GLOBAL WARMING POTENTIALS—Continued

[100-Year time horizon]

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
HFC-236fa	690–39–1	$C_3H_2F_6$	[a,d]8,060
HFC-329p	375–17–7	$CHF_2CF_2CF_2CF_3$	[b]2,360
HFC-43-10mee	138495–42–8	$CF_3CFHCFHCF_2CF_3$	[a,d]1,650
Saturated Hydrofluorocarbons (HFCs) With Three or More Carbon-Hydrogen Bonds			
1,1,2,2,3,3-hexafluorocyclopentane	123768–18–3	cyc (-$CF_2CF_2CF_2CH_2CH_2$-)	[e]120
1,1,2,2,3,3,4-heptafluorocyclopentane	15290–77–4	cyc (-$CF_2CF_2CF_2CHFCH_2$-)	[e]231
HFC-41	593–53–3	CH_3F	[a,d]116
HFC-143	430–66–0	$C_2H_3F_3$	[a,d]328
HFC-143a	420–46–2	$C_2H_3F_3$	[a,d]4,800
HFC-152	624–72–6	CH_2FCH_2F	[d]16
HFC-152a	75–37–6	CH_3CHF_2	[a,d]138
HFC-161	353–36–6	CH_3CH_2F	[d]4
HFC-245ca	679–86–7	$C_3H_3F_5$	[a,d]716
HFC-245cb	1814–88–6	$CF_3CF_2CH_3$	[b]4,620
HFC-245ea	24270–66–4	$CHF_2CHFCHF_2$	[b]235
HFC-245eb	431–31–2	$CH_2FCHFCF_3$	[b]290
HFC-245fa	460–73–1	$CHF_2CH_2CF_3$	[d]858
HFC-263fb	421–07–8	$CH_3CH_2CF_3$	[b]76
HFC-272ca	420–45–1	$CH_3CF_2CH_3$	[b]144
HFC-365mfc	406–58–6	$CH_3CF_2CH_2CF_3$	[d]804
Saturated Hydrofluoroethers (HFEs) and Hydrochlorofluoroethers (HCFEs) With One Carbon-Hydrogen Bond			
HFE-125	3822–68–2	CHF_2OCF_3	[d]12,400
HFE-227ea	2356–62–9	$CF_3CHFOCF_3$	[d]6,450
HFE-329mcc2	134769–21–4	$CF_3CF_2OCF_2CHF_2$	[d]3,070
HFE-329me3	428454–68–6	$CF_3CFHCF_2OCF_3$	[b]4,550
1,1,1,2,2,3,3-Heptafluoro-3-(1,2,2,2-tetrafluoroethoxy)-propane	3330–15–2	$CF_3CF_2CF_2OCHFCF_3$	[b]6,490
Saturated HFEs and HCFEs With Two Carbon-Hydrogen Bonds			
HFE-134 (HG-00)	1691–17–4	CHF_2OCHF_2	[d]5,560
HFE-236ca	32778–11–3	$CHF_2OCF_2CHF_2$	[b]4,240
HFE-236ca12 (HG-10)	78522–47–1	$CHF_2OCF_2OCHF_2$	[d]5,350
HFE-236ea2 (Desflurane)	57041–67–5	$CHF_2OCHFCF_3$	[d]1,790
HFE-236fa	20193–67–3	$CF_3CH_2OCF_3$	[d]979
HFE-338mcf2	156053–88–2	$CF_3CF_2OCH_2CF_3$	[d]929
HFE-338mmz1	26103–08–2	$CHF_2OCH(CF_3)_2$	[d]2,620
HFE-338pcc13 (HG-01)	188690–78–0	$CHF_2OCF_2CF_2OCHF_2$	[d]2,910
HFE-43-10pccc (H-Galden 1040x, HG-11)	E1730133	$CHF_2OCF_2OC_2F_4OCHF_2$	[d]2,820
HCFE-235ca2 (Enflurane)	13838–16–9	CHF_2OCF_2CHFCl	[b]583
HCFE-235da2 (Isoflurane)	26675–46–7	$CHF_2OCHClCF_3$	[d]491
HG-02	205367–61–9	$HF_2C\text{-}(OCF_2CF_2)_2\text{-}OCF_2H$	[b,d]2,730
HG-03	173350–37–3	$HF_2C\text{-}(OCF_2CF_2)_3\text{-}OCF_2H$	[b,d]2,850
HG-20	249932–25–0	$HF_2C\text{-}(OCF_2)_2\text{-}OCF_2H$	[b]5,300
HG-21	249932–26–1	$HF_2C\text{-}OCF_2CF_2OCF_2OCF_2O\text{-}CF_2H$	[b]3,890
HG-30	188690–77–9	$HF_2C\text{-}(OCF_2)_3\text{-}OCF_2H$	[b]7,330
1,1,3,3,4,4,6,6,7,7,9,9,10,10,12,12,13,13,15,15-eicosafluoro-2,5,8,11,14-Pentaoxapentadecane.	173350–38–4	$HCF_2O(CF_2CF_2O)_4CF_2H$	[b]3,630
1,1,2-Trifluoro-2-(trifluoromethoxy)-ethane	84011–06–3	$CHF_2CHFOCF_3$	[b]1,240
Trifluoro(fluoromethoxy)methane	2261–01–0	CH_2FOCF_3	[b]751
Saturated HFEs and HCFEs With Three or More Carbon-Hydrogen Bonds			
HFE-143a	421–14–7	CH_3OCF_3	[d]523
HFE-245cb2	22410–44–2	$CH_3OCF_2CF_3$	[d]654
HFE-245fa1	84011–15–4	$CHF_2CH_2OCF_3$	[d]828
HFE-245fa2	1885–48–9	$CHF_2OCH_2CF_3$	[d]812
HFE-254cb2	425–88–7	$CH_3OCF_2CHF_2$	[d]301
HFE-263fb2	460–43–5	$CF_3CH_2OCH_3$	[d]1
HFE-263m1; R-E-143a	690–22–2	$CF_3OCH_2CH_3$	[b]29
HFE-347mcc3 (HFE-7000)	375–03–1	$CH_3OCF_2CF_2CF_3$	[d]530
HFE-347mcf2	171182–95–9	$CF_3CF_2OCH_2CHF_2$	[d]854
HFE-347mmy1	22052–84–2	$CH_3OCF(CF_3)_2$	[d]363
HFE-347mmz1 (Sevoflurane)	28523–86–6	$(CF_3)_2CHOCH_2F$	[c,d]216
HFE-347pcf2	406–78–0	$CHF_2CF_2OCH_2CF_3$	[d]889
HFE-356mec3	382–34–3	$CH_3OCF_2CHFCF_3$	[d]387
HFE-356mff2	333–36–8	$CF_3CH_2OCH_2CF_3$	[b]17
HFE-356mmz1	13171–18–1	$(CF_3)_2CHOCH_3$	[d]14
HFE-356pcc3	160620–20–2	$CH_3OCF_2CF_2CHF_2$	[d]413
HFE-356pcf2	50807–77–7	$CHF_2CH_2OCF_2CHF_2$	[d]719
HFE-356pcf3	35042–99–0	$CHF_2OCH_2CF_2CHF_2$	[d]446
HFE-365mcf2	22052–81–9	$CF_3CF_2OCH_2CH_3$	[b]58
HFE-365mcf3	378–16–5	$CF_3CF_2CH_2OCH_3$	[d]0.99
HFE-374pc2	512–51–6	$CH_3CH_2OCF_2CHF_2$	[d]627
HFE-449s1 (HFE-7100) Chemical blend	163702–07–6	$C_4F_9OCH_3$	[d]421

TABLE A–1 TO SUBPART A OF PART 98—GLOBAL WARMING POTENTIALS—Continued

[100-Year time horizon]

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
	163702–08–7	$(CF_3)_2CFCF_2OCH_3$	
HFE-569sf2 (HFE-7200) Chemical blend	163702–05–4	$C_4F_9OC_2H_5$	[d] 57
	163702–06–5	$(CF_3)_2CFCF_2OC_2H_5$	
HFE-7300	132182–92–4	$(CF_3)_2CFCFOC_2H_5CF_2CF_2CF_3$	[e] 405
HFE-7500	297730–93–9	n-$C_3F_7CFOC_2H_5CF(CF_3)_2$	[e] 13
HG′-01	73287–23–7	$CH_3OCF_2CF_2OCH_3$	[b] 222
HG′-02	485399–46–0	$CH_3O(CF_2CF_2O)_2CH_3$	[b] 236
HG′-03	485399–48–2	$CH_3O(CF_2CF_2O)_3CH_3$	[b] 221
Difluoro(methoxy)methane	359–15–9	CH_3OCHF_2	[b] 144
2-Chloro-1,1,2-trifluoro-1-methoxyethane	425–87–6	CH_3OCF_2CHFCl	[b] 122
1-Ethoxy-1,1,2,2,3,3,3-heptafluoropropane	22052–86–4	$CF_3CF_2CF_2OCH_2CH_3$	[b] 61
2-Ethoxy-3,3,4,4,5-pentafluorotetrahydro-2,5-bis[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-furan.	920979–28–8	$C_{12}H_5F_{19}O_2$	[b] 56
1-Ethoxy-1,1,2,3,3,3-hexafluoropropane	380–34–7	$CF_3CHFCF_2OCH_2CH_3$	[b] 23
Fluoro(methoxy)methane	460–22–0	CH_3OCH_2F	[b] 13
1,1,2,2-Tetrafluoro-3-methoxy-propane; Methyl 2,2,3,3-tetrafluoropropyl ether	60598–17–6	$CHF_2CF_2CH_2OCH_3$	[b d] 0.49
1,1,2,2-Tetrafluoro-1-(fluoromethoxy)ethane	37031–31–5	$CH_2FOCF_2CF_2H$	[b] 871
Difluoro(fluoromethoxy)methane	461–63–2	CH_2FOCHF_2	[b] 617
Fluoro(fluoromethoxy)methane	462–51–1	CH_2FOCH_2F	[b] 130
Saturated Chlorofluorocarbons (CFCs)			
E-R316c	3832–15–3	trans-cyc (-$CClFCF_2CF_2CClF$-)	[e] 4,230
Z-R316c	3934–26–7	cis-cyc (-$CClFCF_2CF_2CClF$-)	[e] 5,660
Fluorinated Formates			
Trifluoromethyl formate	85358–65–2	$HCOOCF_3$	[b] 588
Perfluoroethyl formate	313064–40–3	$HCOOCF_2CF_3$	[b] 580
1,2,2,2-Tetrafluoroethyl formate	481631–19–0	$HCOOCHFCF_3$	[b] 470
Perfluorobutyl formate	197218–56–7	$HCOOCF_2CF_2CF_2CF_3$	[b] 392
Perfluoropropyl formate	271257–42–2	$HCOOCF_2CF_2CF_3$	[b] 376
1,1,1,3,3,3-Hexafluoropropan-2-yl formate	856766–70–6	$HCOOCH(CF_3)_2$	[b] 333
2,2,2-Trifluoroethyl formate	32042–38–9	$HCOOCH_2CF_3$	[b] 33
3,3,3-Trifluoropropyl formate	1344118–09–7	$HCOOCH_2CH_2CF_3$	[b] 17
Fluorinated Acetates			
Methyl 2,2,2-trifluoroacetate	431–47–0	CF_3COOCH_3	[b] 52
1,1-Difluoroethyl 2,2,2-trifluoroacetate	1344118–13–3	$CF_3COOCF_2CH_3$	[b] 31
Difluoromethyl 2,2,2-trifluoroacetate	2024–86–4	$CF_3COOCHF_2$	[b] 27
2,2,2-Trifluoroethyl 2,2,2-trifluoroacetate	407–38–5	$CF_3COOCH_2CF_3$	[b] 7
Methyl 2,2-difluoroacetate	433–53–4	HCF_2COOCH_3	[b] 3
Perfluoroethyl acetate	343269–97–6	$CH_3COOCF_2CF_3$	[b d] 2
Trifluoromethyl acetate	74123–20–9	CH_3COOCF_3	[b d] 2
Perfluoropropyl acetate	1344118–10–0	$CH_3COOCF_2CF_2CF_3$	[b, d] 2
Perfluorobutyl acetate	209597–28–4	$CH_3COOCF_2CF_2CF_2CF_3$	[b d] 2
Ethyl 2,2,2-trifluoroacetate	383–63–1	$CF_3COOCH_2CH_3$	[b d] 1
Carbonofluoridates			
Methyl carbonofluoridate	1538–06–3	$FCOOCH_3$	[b] 95
1,1-Difluoroethyl carbonofluoridate	1344118–11–1	$FCOOCF_2CH_3$	[b] 27
Fluorinated Alcohols Other Than Fluorotelomer Alcohols			
Bis(trifluoromethyl)-methanol	920–66–1	$(CF_3)_2CHOH$	[d] 182
2,2,3,3,4,4,5,5-Octafluorocyclopentanol	16621–87–7	cyc (-$(CF_2)_4CH(OH)$-)	[d] 13
2,2,3,3,3-Pentafluoropropanol	422–05–9	$CF_3CF_2CH_2OH$	[d] 19
2,2,3,3,4,4,4-Heptafluorobutan-1-ol	375–01–9	$C_3F_7CH_2OH$	[b d] 34
2,2,2-Trifluoroethanol	75–89–8	CF_3CH_2OH	[b] 20
2,2,3,4,4,4-Hexafluoro-1-butanol	382–31–0	$CF_3CHFCF_2CH_2OH$	[b] 17
2,2,3,3-Tetrafluoro-1-propanol	76–37–9	$CHF_2CF_2CH_2OH$	[b] 13
2,2-Difluoroethanol	359–13–7	CHF_2CH_2OH	[b] 3
2-Fluoroethanol	371–62–0	CH_2FCH_2OH	[b] 1.1
4,4,4-Trifluorobutan-1-ol	461–18–7	$CF_3(CH_2)_2CH_2OH$	[b] 0.05
Non-Cyclic, Unsaturated Perfluorocarbons (PFCs)			
PFC-1114; TFE	116–14–3	$CF_2{=}CF_2$; C_2F_4	[b] 0.004
PFC-1216; Dyneon HFP	116–15–4	C_3F_6; $CF_3CF{=}CF_2$	[b] 0.05
Perfluorobut-2-ene	360–89–4	$CF_3CF{=}CFCF_3$	[b] 1.82
Perfluorobut-1-ene	357–26–6	$CF_3CF_2CF{=}CF_2$	[b] 0.10
Perfluorobuta-1,3-diene	685–63–2	$CF_2{=}CFCF{=}CF_2$	[b] 0.003
Non-Cyclic, Unsaturated Hydrofluorocarbons (HFCs) and Hydrochlorofluorocarbons (HCFCs)			
HFC-1132a; VF2	75–38–7	$C_2H_2F_2$; $CF_2{=}CH_2$	[b] 0.04

TABLE A–1 TO SUBPART A OF PART 98—GLOBAL WARMING POTENTIALS—Continued

[100-Year time horizon]

Name	CAS No.	Chemical formula	Global warming potential (100 yr.)
HFC-1141; VF	75–02–5	C_2H_3F; $CH_2=CHF$	[b] 0.02
(E)-HFC-1225ye	5595–10–8	$CF_3CF=CHF(E)$	[b] 0.06
(Z)-HFC-1225ye	5528–43–8	$CF_3CF=CHF(Z)$	[b] 0.22
Solstice 1233zd(E)	102687–65–0	$C_3H_2ClF_3$; $CHCl=CHCF_3$	[b] 1.34
HCFO-1233zd(Z)	99728–16–2	(Z)-$CF_3CH=CHCl$	[e] 0.45
HFC-1234yf; HFO-1234yf	754–12–1	$C_3H_2F_4$; $CF_3CF=CH_2$	[b] 0.31
HFC-1234ze(E)	1645–83–6	$C_3H_2F_4$; trans-$CF_3CH=CHF$	[b] 0.97
HFC-1234ze(Z)	29118–25–0	$C_3H_2F_4$; cis-$CF_3CH=CHF$; $CF_3CH=CHF$	[b] 0.29
HFC-1243zf; TFP	677–21–4	$C_3H_3F_3$; $CF_3CH=CH_2$	[b] 0.12
(Z)-HFC-1336	692–49–9	$CF_3CH=CHCF_3(Z)$	[b] 1.58
HFO-1336mzz(E)	66711–86–2	(E)-$CF_3CH=CHCF_3$	[e] 18
HFC-1345zfc	374–27–6	$C_2F_5CH=CH_2$	[b] 0.09
HFO-1123	359–11–5	$CHF=CF_2$	[e] 0.005
HFO-1438ezy(E)	14149–41–8	(E)-$(CF_3)_2CFCH=CHF$	[e] 8.2
HFO-1447fz	355–08–8	$CF_3(CF_2)_2CH=CH_2$	[e] 0.24
Capstone 42-U	19430–93–4	$C_6H_3F_9$; $CF_3(CF_2)_3CH=CH_2$	[b] 0.16
Capstone 62-U	25291–17–2	$C_8H_3F_{13}$; $CF_3(CF_2)_5CH=CH_2$	[b] 0.11
Capstone 82-U	21652–58–4	$C_{10}H_3F_{17}$; $CF_3(CF_2)_7CH=CH_2$	[b] 0.09
(e)-1-chloro-2-fluoroethene	460–16–2	(E)-$CHCl=CHF$	[e] 0.004
3,3,3-trifluoro-2-(trifluoromethyl)prop-1-ene	382–10–5	$(CF_3)_2C=H_2$	[e] 0.38
Non-Cyclic, Unsaturated CFCs			
CFC-1112	598–88–9	$CClF=CClF$	[e] 0.13
CFC-1112a	79–35–6	$CCl_2=CF_2$	[e] 0.021
Non-Cyclic, Unsaturated Halogenated Ethers			
PMVE; HFE-216	1187–93–5	$CF_3OCF=CF_2$	[b] 0.17
Fluoroxene	406–90–6	$CF_3CH_2OCH=CH_2$	[b] 0.05
Methyl-perfluoroheptene-ethers	N/A	$CH_3OC_7F_{13}$	[e] 15
Non-Cyclic, Unsaturated Halogenated Esters			
Ethenyl 2,2,2-trifluoroacetate	433–28–3	$CF_3COOCH=CH_2$	[e] 0.008
Prop-2-enyl 2,2,2-trifluoroacetate	383–67–5	$CF_3COOCH_2CH=CH_2$	[e] 0.007
Cyclic, Unsaturated HFCs and PFCs			
PFC C-1418	559–40–0	c-C_5F_8	[d] 2
Hexafluorocyclobutene	697–11–0	cyc (-$CF=CFCF_2CF_2$-)	[e] 126
1,3,3,4,4,5,5-heptafluorocyclopentene	1892–03–1	cyc (-$CF_2CF_2CF_2CF=CH$-)	[e] 45
1,3,3,4,4-pentafluorocyclobutene	374–31–2	cyc (-$CH=CFCF_2CF_2$-)	[e] 92
3,3,4,4-tetrafluorocyclobutene	2714–38–7	cyc (-$CH=CHCF_2CF_2$-)	[e] 26
Fluorinated Aldehydes			
3,3,3-Trifluoro-propanal	460–40–2	CF_3CH_2CHO	[b] 0.01
Fluorinated Ketones			
Novec 1230 (perfluoro (2-methyl-3-pentanone))	756–13–8	$CF_3CF_2C(O)CF\ (CF3)_2$	[b] 0.1
1,1,1-trifluoropropan-2-one	421–50–1	CF_3COCH_3	[e] 0.09
1,1,1-trifluorobutan-2-one	381–88–4	$CF_3COCH_2CH_3$	[e] 0.095
Fluorotelomer Alcohols			
3,3,4,4,5,5,6,6,7,7,7-Undecafluoroheptan-1-ol	185689–57–0	$CF_3(CF_2)_4CH_2CH_2OH$	[b] 0.43
3,3,3-Trifluoropropan-1-ol	2240–88–2	$CF_3CH_2CH_2OH$	[b] 0.35
3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-Pentadecafluorononan-1-ol	755–02–2	$CF_3(CF_2)_6CH_2CH_2OH$	[b] 0.33
3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,11-Nonadecafluoroundecan-1-ol	87017–97–8	$CF_3(CF_2)_8CH_2CH_2OH$	[b] 0.19
Fluorinated GHGs With Carbon-Iodine Bond(s)			
Trifluoroiodomethane	2314–97–8	CF_3I	[b] 0.4
Remaining Fluorinated GHGs With Chemical-Specific GWPs			
Dibromodifluoromethane (Halon 1202)	75–61–6	CBR_2F_2	[b] 231
2-Bromo-2-chloro-1,1,1-trifluoroethane (Halon-2311/Halothane)	151–67–7	$CHBrClCF_3$	[b] 41
Heptafluoroisobutyronitrile	42532–60–5	$(CF_3)_2CFCN$	[e] 2,750
Carbonyl fluoride	353–50–4	COF_2	[e] 0.14

Fluorinated GHG group[f]	Global warming potential (100 yr.)
Default GWPs for Compounds for Which Chemical-Specific GWPs Are Not Listed Above	
Fully fluorinated GHGs[g]	9,200
Saturated hydrofluorocarbons (HFCs) with 2 or fewer carbon-hydrogen bonds[g]	3,000
Saturated HFCs with 3 or more carbon-hydrogen bonds[g]	840
Saturated hydrofluoroethers (HFEs) and hydrochlorofluoroethers (HCFEs) with 1 carbon-hydrogen bond[g]	6,600
Saturated HFEs and HCFEs with 2 carbon-hydrogen bonds[g]	2,900
Saturated HFEs and HCFEs with 3 or more carbon-hydrogen bonds[g]	320
Saturated chlorofluorocarbons (CFCs)[g]	4,900
Fluorinated formats	350
Cyclic forms of the following: unsaturated perfluorocarbons (PFCs), unsaturated HFCs, unsaturated CFCs, unsaturated hydrochlorofluorocarbons (HCFCs), unsaturated bromofluorocarbons (BFCs), unsaturated bromochlorofluorocarbons (BCFCs), unsaturated hydrobromofluorocarbons (HBFCs), unsaturated hydrobromochlorofluorocarbons (HBCFCs), unsaturated halogenated ethers, and unsaturated halogenated esters[g]	58
Fluorinated acetates, carbonofluoridates, and fluorinated alcohols other than fluorotelomer alcohols[g]	25
Fluorinated aldehydes, fluorinated ketones, and non-cyclic forms of the following: unsaturated perfluorocarbons (PFCs), unsaturated HFCs, unsaturated CFCs, unsaturated HCFCs, unsaturated BFCs, unsaturated BCFCs, unsaturated HBFCs, unsaturated HBCFCs, unsaturated halogenated ethers and unsaturated halogenated esters[g]	1
Fluorotelomer alcohols[g]	1
Fluorinated GHGs with carbon-iodine bond(s)[g]	1
Other fluorinated GHGs[g]	1,800

[a] The GWP for this compound was updated in the final rule published on November 29, 2013 [78 FR 71904] and effective on January 1, 2014.

[b] This compound was added to Table A–1 in the final rule published on December 11, 2014, and effective on January 1, 2015.

[c] The GWP for this compound was updated in the final rule published on December 11, 2014, and effective on January 1, 2015.

[d] The GWP for this compound was updated in the final rule published on [Date of publication of the final rule in the **Federal Register**] and effective on January 1, 2025.

[e] The GWP for this compound was added to Table A–1 in the final rule published on [Date of publication of the final rule in the **Federal Register**] and effective on January 1, 2025.

[f] For electronics manufacturing (as defined in § 98.90), the term "fluorinated GHGs" in the definition of each fluorinated GHG group in § 98.6 shall include fluorinated heat transfer fluids (as defined in § 98.6), whether or not they are also fluorinated GHGs.

[g] The GWP for this fluorinated GHG group was updated in the final rule published on [Date of publication of the final rule in the **Federal Register**] and effective on January 1, 2025.

■ 7. Amend table A–3 to subpart A of part 98 by adding the entries "Additional Source Categories[a] Applicable in Reporting Year 2025 and Future Years", "Geologic sequestration of carbon dioxide with enhanced oil recovery using ISO 27916 (subpart VV).", "Coke calciners (subpart WW).", "Calcium carbide production (subpart XX).", and "Caprolactam, glyoxal, and glyoxylic acid production (subpart YY)." to the end of the table to read as follows.

TABLE A–3 TO SUBPART A OF PART 98—SOURCE CATEGORY LIST FOR § 98.2(a)(1)

Source Category List for § 98.2(a)(1)

* * * * * * *

Additional Source Categories[a] Applicable in Reporting Year 2025 and Future Years:
  Geologic sequestration of carbon dioxide with enhanced oil recovery using ISO 27916 (subpart VV).
  Coke calciners (subpart WW).
  Calcium carbide production (subpart XX).
  Caprolactam, glyoxal, and glyoxylic acid production (subpart YY).

[a] Source categories are defined in each applicable subpart.

■ 8. Amend table A–4 to subpart A of part 98 by adding the entries "Additional Source Categories[a] Applicable in Reporting Year 2025 and Future Years." and "Ceramics manufacturing facilities, as determined under § 98.XXXX (subpart ZZ)", to the end of the table.

TABLE A–4 TO SUBPART A OF PART 98—SOURCE CATEGORY LIST FOR § 98.2(a)(2)

* * * * * * *

Additional Source Categories[a] Applicable in Reporting Year 2025 and Future Years:
  Ceramics manufacturing facilities, as determined under § 98.XXXX (subpart ZZ)

[a] Source categories are defined in each applicable subpart.

■ 9. Add subpart B to read as follows:

Subpart B—Energy Consumption

§ 98.20 Definition of the source category.

(a) The energy consumption source category consists of direct emitting facilities that (1) purchase metered electricity or metered thermal energy products; (2) are required to report under §§ 98.2(a)(1), (2), or (3) or are required to resume reporting under §§ 98.2(i)(1), (2), or (3); and (3) are not eligible to discontinue reporting under the provisions at §§ 98.2(i)(1), (2), or (3).

(b) This source category does not include:

(1) Purchases of fuel and the associated direct emissions from the use of that fuel on site.

(2) Electricity and thermal energy products that are not subject to purchasing agreements.

§ 98.21 Reporting threshold.

You must report the quantity of purchased electricity and thermal energy products in accordance with the reporting requirements of § 98.26 of this subpart.

§ 98.22 GHGs to report.

This subpart does not require the reporting of either direct or indirect greenhouse gas emissions.

§ 98.23 Calculating GHG emissions.

This subpart does not require the calculation of either direct or indirect greenhouse gas emissions.

§ 98.24 Monitoring and QA/QC requirements.

Facilities subject to this subpart must develop a written Metered Energy Monitoring Plan (MEMP) for purchased electricity and thermal energy products in accordance with paragraph (a) of this section. The MEMP may rely on references to existing corporate documents (*e.g.,* purchasing agreements, standard operating procedures, quality assurance programs under appendix F to 40 CFR part 60 or appendix B to 40 CFR part 75, and other documents) provided that the elements required by paragraphs (a)(1) through (7) of this section are easily recognizable. Facilities must complete QA/QC requirements in accordance with paragraphs (b) and (c) of this section.

(a) MEMP Requirements. At a minimum, the MEMP must specify recordkeeping activities at the same frequency as billing statements from the energy delivery service provider and must include the elements listed in this paragraph (a).

(1) Identification of positions of responsibility (*i.e.,* job titles) for collection of the energy consumption data.

(2) The identifier of each meter shown on periodic billing statements with a description of the portions of the facility served by the meter and a photograph that shows the meter identifier, manufacturer's name, and model number.

(3) For each meter, an indication of the billing frequency (*e.g.,* monthly, quarterly, or semi-annually).

(4) A copy of one typical billing statement that includes all pages for each meter with the meter identifier, the name of the energy delivery service provider, the name of the energy supply service provider (if applicable in deregulated states), the dates of service, the usage, and the rate descriptor.

(5) An indication of whether each electricity meter conforms to the accuracy specifications required by § 98.24(b). The MEMP must include one of the potential outcomes listed in paragraphs (a)(5)(i) through (iii) of this section for each electricity meter serving the facility:

(i) Manufacturer's certification that the electricity meter model number conforms to the accuracy specifications required by § 98.24(b), with a copy of the associated manufacturer's technical data. If this option is selected the owner or operator must include a picture of the meter with a copy of the technical data from the manufacturer indicating conformance to the accuracy specifications required by § 98.24(b).

(ii) Certification letter from the electricity delivery service provider indicating the meter conforms to the accuracy specifications required by § 98.24(b).

(iii) An indication that either the conformance status of the meter to the accuracy specifications required by § 98.24(b) could not be determined, or the meter was determined to have accuracy specifications less stringent than required by § 98.24(b), according to paragraphs (a)(5)(iii)(A) through (C) of this section.

(A) A copy of the certified letter sent to the electricity delivery service provider, requesting installation of a meter that conforms to the accuracy specifications required by § 98.24(b).

(B) The return receipt for the certified letter.

(C) Any correspondence from the electricity delivery service provider related to the request.

(6) For both purchased electricity and thermal energy product meters, an explanation of the processes and methods used to collect the necessary data to report the total annual usage of purchased electricity in kWh and the total annual usage of purchased thermal energy products in mmBtu. For thermal energy products the plan must include a clear procedure and example of how measured data are converted to mmBtu.

(7) Description of the procedures and methods that are used for quality assurance, maintenance, and repair of all monitoring systems, flow meters, and other instrumentation used to collect the energy consumption data reported under this part.

(8) The facility must revise the MEMP as needed to reflect changes in production processes, monitoring instrumentation, and quality assurance procedures; or to improve procedures for the maintenance and repair of monitoring systems to reduce the frequency of monitoring equipment downtime.

(9) Upon request by the Administrator, the facility must make all information that is collected in conformance with the MEMP available for review. Electronic storage of the information in the plan is permissible, provided that the information can be made available in hard copy upon request.

(b) Quality assurance for purchased electricity monitoring. The facility must determine if each electricity meter conforms to ANSI C12.1–2022: Electric Meters—Code for Electricity Metering (incorporated by reference, see § 98.7) or another similar consensus standard with accuracy specifications at least as stringent as the ANSI standard, using one of the methods under paragraphs (b)(1) through (3) of this section.

(1) The facility may identify the manufacturer and model number of the meter and obtain a copy of the meter's technical reference guide or technical data sheet indicating the meter's conformance with the requirements of § 98.24(b). If this option is selected the facility must include a picture of the meter with a copy of the technical data from the manufacturer indicating conformance with the requirements of § 98.24(b).

(2) The facility may obtain a certification from the electricity delivery service provider that owns the meter indicating that the meter conforms to the accuracy specifications required by § 98.24(b).

(3) If the facility determines that either the conformance status of the meter under § 98.24(b) could not be determined, or that the meter does not conform to the accuracy specifications required by § 98.24(b), the facility must submit, via certified mail (with return receipt requested) to the electricity delivery service provider that owns the meter, a request that the existing meter be replaced by an electricity meter that meets the accuracy specifications required by § 98.24(b). The facility must maintain in the MEMP a copy of the written request, the return receipt, and any correspondence from the electricity delivery service provider. Any meters that do not conform to the accuracy specifications required by § 98.24(b)

must be flagged as such in the MEMP, until such time that they are replaced with meters that conform to the accuracy specifications required by § 98.24(b).

(c) Quality assurance for purchased thermal energy product monitoring. The facility must contact the energy delivery service provider of each purchased thermal energy product and request a copy of the most recent audit of the accuracy of each meter referenced in the purchasing agreement. If an audit of the meter has never been completed or if the audit is more than five years old, the facility must request that the energy delivery service provider complete an energy audit consistent with the terms of the purchasing agreement. If the purchasing agreement does not include provisions for periodic audits of the meter, the facility must complete an audit of the meter using a qualified metering specialist with knowledge of the associated thermal medium. Every five years an audit of the meter must be completed. If the audit indicates that the meter is producing readings with errors greater than specified by § 98.3(i)(2) or (3), the meter must be repaired or replaced and retested to demonstrate compliance with the specifications at § 98.3(i)(2) or (3).

§ 98.25 Procedures for estimating missing data.

For both purchased electricity and thermal energy products, a facility with missing billing statements must request replacement copies of the statements from its energy delivery service provider. If the energy delivery service provider is unable to provide replacement copies of billing statements, the facility must estimate the missing data based on the best available estimate of the energy use, based on all available data which may impact energy usage (*e.g.,* processing rates, operating hours, etc.). The facility must document and keep records of the procedures used for all missing data estimates.

§ 98.26 Data reporting requirements.

In addition to the facility-level information required under § 98.3, the annual GHG report must contain the data specified in paragraphs (a) through (m) of this section for each purchased electricity and thermal energy product meter located at the facility.

(a) The state in which each meter is located.

(b) The locality of the meter. You must report the county in which each meter is located. If the meter is not located in a county (*e.g.,* meters in Alexandria, Virginia), you must report the city in which the meter is located.

(c) Energy delivery service provider's name (*i.e.,* the name of the entity to whom the purchasing facility will send payment).

(d) An identifying number for the energy delivery service provider as specified in paragraph (d)(1) or (2) of this section:

(1) For purchased electricity, the zip code associated with the payment address for the provider.

(2) For purchased thermal energy products, the public GHGRP facility identifier of the energy supply service provider. If the provider does not have an assigned GHGRP facility identifier, report the zip code for the physical location in which the thermal energy product was produced.

(e) Electricity supply service provider's name. This reporting requirement applies only to purchased electricity in states with deregulated markets where the electricity billing statements have separate line items for electricity delivery services and electricity supply services. In these states, the electricity delivery service provider may be a different entity from the electricity supply service provider.

(f) Meter number. This is the meter number that appears on each billing statement.

(g) Annual sequence of bill. This is a number from 1 to 12 for monthly billing cycles, from 1 to 4 for quarterly billing cycles, and 1 to 2 for semi-annual billing cycles.

(h) Start date(s) of period(s) billed. This is the date designating when the usage period began for each billing statement. For monthly billing cycles, the annual report would include 12 start dates. For quarterly billing cycles the annual report would include four start dates. For semi-annual billing cycles the annual report would include two start dates.

(i) End date(s) of period(s) billed. This is the date designating when the usage period ends for each billing statement. For monthly billing cycles, the annual report would include 12 end dates. For quarterly billing cycles the annual report would include four end dates. For semi-annual billing cycles the annual report would include two end dates.

(j) Quantities of purchased electricity and thermal energy products as specified in paragraphs (j)(1) through (3) of this section, excluding any quantities described in paragraph (j)(4) of this section.

(1) Purchased electricity. You must report the kWh used as reported on each periodic billing statement received during the reporting year. For each meter on each electricity billing statement received during the reporting period, the usage will be clearly designated for the month, quarter, or semi-annual billing period. This value may be listed on the billing statement in megawatt-hours (MWh). To convert values on billing statements that report usage in MWh to kWh, the MWh value should be multiplied by 1,000.

(2) Purchased thermal energy products. You must report the quantity of thermal energy products purchased as reported on each periodic billing statement received during the reporting year, converted to mmBtu. This value must be calculated in accordance with the method described and documented in the MEMP.

(3) Allocation. If the periodic billing statement specified in paragraph (j)(1) or (2) of this section spans two reporting years, you must allocate the quantity of purchased electricity and thermal energy products using either the method specified in paragraph (j)(3)(i) or (ii) of this section:

(i) You may allocate the purchased electricity and thermal energy products to each reporting year based on operational knowledge of the industrial processes for which energy is purchased, or

(ii) You may allocate to each reporting year the portion of purchased electricity and thermal energy products in the periodic billing statement proportional to the number of days of service in each reporting year.

(4) Excluded quantities. For the purpose of reporting under this paragraph (j), the facility may exclude any electricity that is generated outside the facility and delivered into the facility with final destination and usage outside of the facility. The facility may also exclude electricity consumed by operations or activities that do not support any activities reporting direct emissions in this part. The excluded quantities may be estimated based on company records or engineering judgment.

(k) Rate descriptor for each electricity billing statement. Each electricity billing statement should have a statement that describes the rate plan in effect for the billing location. This rate descriptor can indicate if the customer is billed based on a time-of-use rate or if the customer is purchasing a renewable energy product. For example, a typical rate statement could be ''Your current rate is Large Commercial Time of Use (LC–TOUD).'' In this case the GHGRP reporter would enter ''LC–TOUD'' as the rate descriptor for the associated billing period.

(l) Facilities subject to multiple direct emitting part 98 subparts must report, for the quantities reported under paragraph (j) of this section, the decimal fraction of purchased electricity or thermal energy products attributable to each subpart. The fraction may be estimated based on company records or engineering judgment.

(m) Copy of one billing statement per energy delivery service provider of purchased electricity or thermal energy products, as specified in paragraphs (m)(1) through (3) of this section.

(1) The first annual report under this subpart must include an electronic copy of all pages of one billing statement received by the facility from each energy delivery service provider of purchased electricity or thermal energy products.

(2) If the facility changes or adds one or more energy delivery service providers after the first reporting year, the annual report must include an electronic copy of all pages of one billing statement received from each new energy delivery service provider for only the first reporting year of each new purchasing agreement.

(3) The electronic copy specified in paragraph (m)(2) of this section must be submitted in the format specified in the reporting instructions published for the reporting year.

§ 98.27 Records that must be retained.

(a) Copies of all purchased electricity or thermal energy product billing statements.

(b) The results of all required certification and quality assurance tests referenced in the MEMP for all purchased electricity or thermal energy product meters used to develop the energy consumption data reported under this part.

(c) Maintenance records for all monitoring systems, flow meters, and other instrumentation used to provide data on consumption of purchased electricity or thermal energy products under this part.

§ 98.28 Definitions.

Except as provided in this section, all terms used in this part shall have the same meaning given in the Clean Air Act and subpart A of this part.

Indirect emissions are an attribute of activities that consume energy and are intended to provide an estimate of the quantity of greenhouse gases associated with the production and delivery of purchased electricity and thermal energy products delivered to the energy consumer. Indirect emissions are released to the atmosphere at a facility that is owned by the energy supply service provider, but the indirect emissions attribute is associated with the consuming activity.

Metered means, as applied to electricity, that the quantity of electricity is determined by an electricity meter installed at the location of service by an electricity delivery service provider who periodically conducts meter readings for billing purposes. As applied to thermal energy products, metered means that the thermal energy product is metered in accordance with the purchasing agreement with additional information, as necessary, such as design or operating temperature, pressure, and mass flow rate to determine the supplied quantity of thermal energy products.

Purchased electricity means metered electricity that is delivered to a facility subject to this subpart.

Purchasing agreement means, for purchased electricity, the terms and conditions governing the provision of electric services by an electricity delivery service provider to a consumer seeking electric service (*i.e.,* the applicable part 98 source). For purchased thermal energy products, this term means a contract, such as a steam purchase contract, between a supplier of thermal energy products and a consumer of thermal energy products (*i.e.,* the applicable part 98 source). Purchasing agreements include specific provisions for metering the purchased electricity or thermal energy products.

Thermal energy products means metered steam, hot water, hot oil, chilled water, refrigerant, or any other medium used to transfer thermal energy and delivered to a facility subject to this subpart.

Subpart C—General Stationary Fuel Combustion Sources

■ 10. Amend § 98.36 by adding paragraphs (b)(12), (c)(1)(xii), (c)(2)(xii), and (c)(3)(xi) to read as follows:

§ 98.36 Data reporting requirements.

* * * * *

(b) * * *

(12) An indication of whether the unit is an electricity generating unit.

(c) * * *

(1) * * *

(xii) An indication of whether any unit in the group is an electricity generating unit, and, if so, an estimate of the group's total reported emissions attributable to electricity generation (expressed as a decimal fraction). This estimate may be based on engineering estimates.

(2) * * *

(xii) An indication of whether any unit in the group is an electricity generating unit, and, if so, an estimate of the group's total reported emissions attributable to electricity generation (expressed as a decimal fraction). This estimate may be based on engineering estimates.

(3) * * *

(xii) An indication of whether any unit in the group is an electricity generating unit, and, if so, an estimate of the group's total reported emissions attributable to electricity generation (expressed as a decimal fraction). This estimate may be based on engineering estimates.

* * * * *

Subpart F—Aluminum Production

■ 11. Amend § 98.66 by revising paragraphs (a) and (g) to read as follows:

§ 98.66 Data reporting requirements.

* * * * *

(a) Annual production capacity (tons).

* * * * *

(g) Annual operating days per potline.

* * * * *

Subpart G—Ammonia Manufacturing

■ 12. Amend § 98.76 by adding paragraph (b)(16) to read as follows:

§ 98.76 Data reporting requirements.

* * * * *

(b) * * *

(16) Annual quantity of excess hydrogen produced that is not consumed through the production of ammonia (metric tons).

Subpart I—Electronics Manufacturing

§ 98.98 [Amended]

■ 13. Amend § 98.98 by removing the definition for ''Fluorinated heat transfer fluids.''

■ 14. Revise table I–16 of subpart I of part 98 to read as follows:

TABLE I–16 TO SUBPART I OF PART 98—DEFAULT EMISSION DESTRUCTION OR REMOVAL EFFICIENCY (DRE) FACTORS FOR ELECTRONICS MANUFACTURING

Manufacturing type/process type/gas	Default DRE (%)
MEMS, LCDs, and PV manufacturing	60
Semiconductor Manufacturing	
CF_4	87
CH_3F	98
CHF_3	97
CH_2F_2	98
C_4F_8	93
C_4F_8O	93
C_5F_8	97
C_4F_6	95
C_3F_8	98
C_2HF_5	97
C_2F_6	98
SF_6	95
NF_3	96
All other carbon-based fluorinated GHGs used in Semiconductor Manufacturing	60
N_2O Processes	
CVD and all other N_2O-using processes	60

■ 15. Revise table I–18 of subpart I of part 98 to read as follows:

TABLE I–18 TO SUBPART I OF PART 98—DEFAULT FACTORS FOR GAMMA ($\gamma_{i,p}$ AND $\gamma_{k,i,p}$) FOR SEMICONDUCTOR MANUFACTURING AND FOR MEMS AND PV MANUFACTURING UNDER CERTAIN CONDITIONS * FOR USE WITH THE STACK TESTING METHOD

Process type	In-situ thermal or in-situ plasma cleaning					Remote plasma cleaning		
Gas	CF_4	C_2F_6	c-C_4F_8	NF_3	SF_6	C_3F_8	CF_4	NF_3
If manufacturing wafer sizes ≤200 mm AND manufacturing 300 mm (or greater) wafer sizes								
γ_i	13	9.3	4.7	14	11	NA	NA	5.7
$\gamma_{CF4,i}$	NA	23	6.7	63	8.7	NA	NA	58
$\gamma_{C2F6,i}$	NA	NA	NA	NA	3.4	NA	NA	NA
$\gamma_{CHF3,i}$	NA	NA	NA	NA	NA	NA	NA	0.24
$\gamma_{CH2F2,i}$	NA	NA	NA	NA	NA	NA	NA	111
$\gamma_{CH3F,i}$	NA	NA	NA	NA	NA	NA	NA	33
If manufacturing ≤200 mm OR manufacturing 300 mm (or greater) wafer sizes								
γ_i (≤200 mm wafer size)	13	9.3	4.7	2.9	11	NA	NA	1.4
$\gamma_{CF4,i}$ (≤200 mm wafer size)	NA	23	6.7	110	8.7	NA	NA	36
$\gamma_{C2F6,i}$ (≤200 mm wafer size)	NA	NA	NA	NA	3.4	NA	NA	NA
γ_i (300 mm wafer size)	NA	NA	NA	26	NA	NA	NA	10
$\gamma_{CF4,i}$ (300 mm wafer size)	NA	NA	NA	17	NA	NA	NA	80
$\gamma_{C2F6,i}$ (300 mm wafer size)	NA	NA	NA	NA	NA	NA	NA	NA
$\gamma_{CHF3,i}$ (300 mm wafer size)	NA	NA	NA	NA	NA	NA	NA	0.24
$\gamma_{CH2F2,i}$ (300 mm wafer size)	NA	NA	NA	NA	NA	NA	NA	111
$\gamma_{CH3F,i}$ (300 mm wafer size)	NA	NA	NA	NA	NA	NA	NA	33

* If you manufacture MEMS or PVs and use semiconductor tools and processes, you may use the corresponding γ in this table. For all other tools and processes, a default γ of 10 must be used.

Subpart N—Glass Production

■ 16. Amend § 98.146 by:

■ a. Revising paragraphs (a) introductory text and (a)(1);

■ b. Adding paragraph (a)(3); and

■ c. Revising paragraphs (b)(4) and (9).

The revisions and additions read as follows:

§ 98.146 Data reporting requirements.

* * * * *

(a) If a CEMS is used to measure CO_2 emissions, then you must report under this subpart the relevant information required under § 98.36 for the Tier 4 Calculation Methodology and the following information specified in paragraphs (a)(1) through (3) of this section:

(1) Annual quantity of each carbonate-based raw material (tons) charged to each continuous glass melting furnace and for all furnaces combined.

* * * * *

(3) Annual quantity (tons), by glass type, of recycled scrap glass (cullet) charged to each glass melting furnace and for all furnaces combined.

(b) * * *

(4) Annual quantity (tons), by glass type, of recycled scrap glass (cullet)

charged to each glass melting furnace and for all furnaces combined.

* * * * *

(9) The number of times in the reporting year that missing data procedures were followed to measure monthly quantities of carbonate-based raw materials, recycled scrap glass (cullet), or mass fraction of the carbonate-based minerals for any continuous glass melting furnace (months).

■ 17. Amend § 98.147 by:

■ a. Revising paragraph (a) introductory text;

■ b. Adding paragraph (a)(3);

■ c. Revising paragraphs (b) introductory text and (b)(1) and (2);

■ d. Redesignating paragraphs (b)(3) through (5) as paragraphs (b)(4) through (6), respectively; and

■ e. Adding new paragraph (b)(3).

The revisions and additions read as follows:

§ 98.147 Records that must be retained.

* * * * *

(a) If a CEMS is used to measure emissions, then you must retain the records required under § 98.37 for the Tier 4 Calculation Methodology and the following information specified in paragraphs (a)(1) through (a)(3) of this section:

* * * * *

(3) Monthly amount (tons) of recycled scrap glass (cullet) charged to each glass melting furnace, by glass type.

(b) If process CO_2 emissions are calculated according to the procedures specified in § 98.143(b), you must retain the records in paragraphs (b)(1) through (b)(6) of this section.

(1) Monthly glass production rate for each continuous glass melting furnace, by glass type (tons).

(2) Monthly amount of each carbonate-based raw material charged to each continuous glass melting furnace (tons).

(3) Monthly amount (tons) of recycled scrap glass (cullet) charged to each glass melting furnace, by glass type.

(4) Data on carbonate-based mineral mass fractions provided by the raw material supplier for all raw materials consumed annually and included in calculating process emissions in Equation N–1 of this subpart, if applicable.

(5) Results of all tests, if applicable, used to verify the carbonate-based mineral mass fraction for each carbonate-based raw material charged to a continuous glass melting furnace, including the data specified in paragraphs (b)(5)(i) through (v) of this section.

(i) Date of test.

(ii) Method(s), and any variations of the methods, used in the analyses.

(iii) Mass fraction of each sample analyzed.

(iv) Relevant calibration data for the instrument(s) used in the analyses.

(v) Name and address of laboratory that conducted the tests.

(6) The decimal fraction of calcination achieved for each carbonate-based raw material, if a value other than 1.0 is used to calculate process mass emissions of CO_2.

* * * * *

Subpart P—Hydrogen Production

■ 18. Revise § 98.160 to read as follows:

§ 98.160 Definition of the source category.

(a) A hydrogen production source category consists of facilities that produce hydrogen gas as a product.

(b) This source category comprises process units that produce hydrogen by reforming, gasification, oxidation, reaction, or other transformations of feedstocks except the processes listed in paragraph (b)(1) or (2) of this section.

(1) Any process unit for which emissions are reported under another subpart of this part. This includes, but is not necessarily limited to:

(A) Ammonia production units for which emissions are reported under subpart G.

(B) Catalytic reforming units at petroleum refineries that transform naphtha into higher octane aromatics for which emissions are reported under subpart Y.

(C) Petrochemical process units for which emissions are reported under subpart X.

(2) Any process unit that only separates out diatomic hydrogen from a gaseous mixture and is not associated with a unit that produces hydrogen created by transformation of one or more feedstocks, other than those listed in paragraph (b)(1) of this section.

(c) This source category includes the process units that produce hydrogen and stationary combustion units directly associated with hydrogen production (*e.g.,* reforming furnace and hydrogen production process unit heater).

■ 19. Amend § 98.162 by revising paragraph (a) to read as follows:

§ 98.162 GHGs to report.

* * * * *

(a) CO_2 emissions from each hydrogen production process unit, including fuel combustion emissions accounted for in the calculation methodologies in § 98.163.

* * * * *

■ 20. Amend § 98.163 by revising paragraph (c) to read as follows:

§ 98.163 Calculating GHG emissions.

* * * * *

(c) If GHG emissions from a hydrogen production process unit are vented through the same stack as any combustion unit or process equipment that reports CO_2 emissions using a CEMS that complies with the Tier 4 Calculation Methodology in subpart C of this part (General Stationary Fuel Combustion Sources), then the owner or operator shall report under this subpart the combined stack emissions according to the Tier 4 Calculation Methodology in § 98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources). If GHG emissions from a hydrogen production process unit using a CEMS that complies with the Tier 4 Calculation Methodology in subpart C of this part (General Stationary Fuel Combustion Sources) does not include combustion emissions from the hydrogen production unit (*i.e.,* the hydrogen production unit has separate stacks for process and combustion emissions), then the calculation methodology in paragraph (b) of this section shall be used considering only fuel inputs to calculate and report CO_2 emissions from fuel combustion related to the hydrogen production unit.

■ 21. Revise § 98.166 to read as follows:

§ 98.166 Data reporting requirements.

In addition to the information required by § 98.3(c), each annual report must contain the information specified in paragraphs (a) and (b) of this section, as appropriate.

(a) If a CEMS is used to measure CO_2 emissions, then you must report the relevant information required under § 98.36 for the Tier 4 Calculation Methodology for each CEMS monitoring location.

(b) For each hydrogen production process unit, report:

(1) Unit identification number and the information about the unit specified in paragraphs (b)(1)(i) and (ii) of this section:

(i) The type of hydrogen production unit (steam methane reformer (SMR) only, SMR followed by water gas shift reaction (WGS), partial oxidation (POX) only, POX followed by WGS, water electrolysis, brine electrolysis, other (specify)); and,

(ii) The type of hydrogen purification method (pressure swing adsorption, amine adsorption, membrane separation, other (specify), none).

(2) Annual CO_2 emissions (metric tons) and the calculation methodology (CEMS for single hydrogen production unit; CEMS on a common stack for multiple hydrogen production units; CEMS on a common stack with hydrogen production unit(s) and other sources; CEMS measuring only process emissions plus fuel combustion emissions calculated using Equations P–1 through P–3; material balance using Equations P–1 through P–3 only; material balance using Equations P–1 through P–4).

(i) If either a CEMS on a common stack for multiple hydrogen production units or CEMS on a common stack for hydrogen production unit(s) and other sources is used, you must also report the estimated decimal fraction of the total annual CO_2 emissions from the CEMS monitoring location (estimated using engineering estimates or best available data) attributable to this hydrogen production unit.

(ii) If the method selected is CEMS measuring process emissions alone plus mass balance for hydrogen production unit fuel combustion using Equations P–1 through P–3, you must also report the annual CO_2 emissions (metric tons) calculated for this hydrogen production unit's fuel combustion using Equations P–1 through P–3.

(3) The following quantities of hydrogen exiting the hydrogen production unit:

(i) Annual quantity of hydrogen produced by reforming, gasification, oxidation, reaction, or other transformation of feedstocks (metric tons).

(ii) Annual quantity of hydrogen that is purified only (metric tons). This quantity may be assumed to be equal to the annual quantity of hydrogen in the feedstocks to the hydrogen production unit.

(4) Annual quantity of ammonia intentionally produced as a desired product, if applicable (metric tons).

(5) If a material balance method is used, name and annual quantity (metric tons) of each carbon-containing fuel and feedstock.

(6) Quantity of CO_2 collected and transferred off site in either gas, liquid, or solid forms, following the requirements of subpart PP of this part.

(7) Annual quantity of carbon other than CO_2 or methanol collected and transferred off site in either gas, liquid, or solid forms (metric tons carbon).

(8) Annual quantity of methanol intentionally produced as a desired product, if applicable, (metric tons) for each process unit.

(9) Annual net quantity of steam consumed by the unit, (metric tons). Include steam purchased or produced outside of the hydrogen production unit. If the hydrogen production unit is a net producer of steam, enter the annual net quantity of steam consumed by the unit as a negative value.

■ 22. Amend § 98.167 by revising paragraph (b), removing and reserving paragraph (c), and revising paragraph (d).

§ 98.167 Records that must be retained.

* * * * *

(b) You must retain records of all analyses and calculations conducted to determine the values reported in § 98.166(b).

(c) [Reserved]

(d) The owner or operator must document the procedures used to ensure the accuracy of the estimates of fuel and feedstock usage in § 98.163(b), including, but not limited to, calibration of weighing equipment, fuel and feedstock flow meters, and other measurement devices. The estimated accuracy of measurements made with these devices must also be recorded, and the technical basis for these estimates must be provided.

* * * * *

Subpart Y—Petroleum Refineries

■ 23. Amend § 98.250 by revising paragraph (c) to read as follows:

§ 98.250 Definition of source category.

* * * * *

(c) This source category consists of the following sources at petroleum refineries: Catalytic cracking units; fluid coking units; delayed coking units; catalytic reforming units; asphalt blowing operations; blowdown systems; storage tanks; process equipment components (compressors, pumps, valves, pressure relief devices, flanges, and connectors) in gas service; marine vessel, barge, tanker truck, and similar loading operations; flares; and sulfur recovery plants.

§ 98.252 [Amended]

■ 24. Amend § 98.252 by removing and reserving paragraphs (e) and (i).

■ 25. Amend § 98.253 by:

■ a. Revising parameter "CO_2" of Equation Y–9 in paragraph (c)(4) and parameter "CO_2" of Equation Y–10 in paragraph (c)(5); and

■ b. Removing and reserving paragraph (g).

The revisions read as follows:

§ 98.253 Calculating GHG emissions.

* * * * *

(c) * * *

(4) * * *

CO_2 = Emission rate of CO_2 from coke burn-off calculated in paragraphs (c)(1), (c)(2), (e)(1), or (e)(2) of this section, as applicable (metric tons/year).

* * * * *

(5) * * *

CO_2 = Emission rate of CO_2 from coke burn-off calculated in paragraphs (c)(1), (c)(2), (e)(1), or (e)(2) of this section, as applicable (metric tons/year).

* * * * *

(g) [Removed and Reserved]

§ 98.254 [Amended]

■ 26. Amend § 98.254 by removing and reserving paragraphs (h) and (i).

§ 98.255 [Amended]

■ 27. Amend § 98.255 by removing and reserving paragraph (d).

■ 28. Amend § 98.256 by:

■ a. Removing and reserving paragraphs (b) and (i); and

■ b. Revising paragraph (j)(2).

The revisions read as follows:

§ 98.256 Data reporting requirements.

* * * * *

(b) [Removed and Reserved]

* * * * *

(i) [Removed and Reserved]

* * * * *

(j) * * *

(2) Maximum rated throughput of the unit, in metric tons asphalt/stream day.

* * * * *

■ 29. Amend § 98.257 by:

■ a. Revising paragraphs (b)(16) through (19); and

■ b. Removing and reserving paragraphs (b)(27) through (31).

The revisions read as follows:

§ 98.257 Records that must be retained.

* * * * *

(b) * * *

(16) Value of unit-specific CH_4 emission factor, including the units of measure, for each catalytic cracking unit, traditional fluid coking unit, and catalytic reforming unit (calculation method in § 98.253(c)(4)).

(17) Annual activity data (*e.g.,* input or product rate), including the units of measure, in units of measure consistent with the emission factor, for each catalytic cracking unit, traditional fluid coking unit, and catalytic reforming unit (calculation method in § 98.253(c)(4)).

(18) Value of unit-specific N_2O emission factor, including the units of measure, for each catalytic cracking unit, traditional fluid coking unit, and catalytic reforming unit (calculation method in § 98.253(c)(5)).

(19) Annual activity data (*e.g.,* input or product rate), including the units of

measure, in units of measure consistent with the emission factor, for each catalytic cracking unit, traditional fluid coking unit, and catalytic reforming unit (calculation method in § 98.253(c)(5)).

* * * * *

(27) [Removed and Reserved]
(28) [Removed and Reserved]
(29) [Removed and Reserved]
(30) [Removed and Reserved]
(31) [Removed and Reserved]

* * * * *

Subpart AA—Pulp and Paper Manufacturing

■ 30. Amend § 98.273 by:
■ a. Revising introductory paragraph (a) and paragraphs (a)(1) and (2);
■ b. Adding paragraph (a)(4);
■ c. Revising introductory paragraph (b) and paragraphs (b)(1) and (2);
■ d. Adding paragraph (b)(5);
■ e. Revising introductory paragraph (c) and paragraphs (c)(1) and (2); and
■ f. Adding paragraph (c)(4).

The revisions and additions read as follows:

§ 98.273 Calculating GHG emissions.

(a) For each chemical recovery furnace located at a kraft or soda facility, you must determine CO_2, biogenic CO_2, CH_4, and N_2O emissions using the procedures in paragraphs (a)(1) through (a)(4) of this section. CH_4 and N_2O emissions must be calculated as the sum of emissions from combustion of fuels and combustion of biomass in spent liquor solids.

(1) Calculate CO_2 emissions from fuel combustion using direct measurement of fuels consumed and default emissions factors according to the Tier 1 methodology for stationary combustion sources in § 98.33(a)(1). Tiers 2 or 3 from § 98.33(a)(2) or (3) may be used to calculate CO_2 emissions if the respective monitoring and QA/QC requirements described in § 98.34 are met.

(2) Calculate CH_4 and N_2O emissions from fuel combustion using direct measurement of fuels consumed, default or site-specific HHV, and default emissions factors and convert to metric tons of CO_2 equivalent according to the methodology for stationary combustion sources in § 98.33(c).

* * * * *

(4) Calculate biogenic CO_2 emissions from combustion of biomass (other than spent liquor solids) with other fuels according to the applicable methodology for stationary combustion sources in § 98.33(e).

(b) For each chemical recovery combustion unit located at a sulfite or stand-alone semichemical facility, you must determine CO_2, CH_4, and N_2O emissions using the procedures in paragraphs (b)(1) through (5) of this section:

(1) Calculate CO_2 emissions from fuel combustion using direct measurement of fuels consumed and default emissions factors according to the Tier 1 Calculation Methodology for stationary combustion sources in § 98.33(a)(1). Tiers 2 or 3 from § 98.33(a)(2) or (3) may be used to calculate CO_2 emissions if the respective monitoring and QA/QC requirements described in § 98.34 are met.

(2) Calculate CH_4 and N_2O emissions from fuel combustion using direct measurement of fuels consumed, default or site-specific HHV, and default emissions factors and convert to metric tons of CO_2 equivalent according to the methodology for stationary combustion sources in § 98.33(c).

* * * * *

(5) Calculate biogenic CO_2 emissions from combustion of biomass (other than spent liquor solids) with other fuels according to the applicable methodology for stationary combustion sources in § 98.33(e).

(c) For each pulp mill lime kiln located at a kraft or soda facility, you must determine CO_2, CH_4, and N_2O emissions using the procedures in paragraphs (c)(1) through (c)(4) of this section:

(1) Calculate CO_2 emissions from fuel combustion using direct measurement of fuels consumed and default HHV and default emissions factors, according to the Tier 1 Calculation Methodology for stationary combustion sources in § 98.33(a)(1). Tiers 2 or 3 from § 98.33(a)(2) or (3) may be used to calculate CO_2 emissions if the respective monitoring and QA/QC requirements described in § 98.34 are met.

(2) Calculate CH_4 and N_2O emissions from fuel combustion using direct measurement of fuels consumed, default or site-specific HHV, and default emissions factors and convert to metric tons of CO_2 equivalent according to the methodology for stationary combustion sources in § 98.33(c); use the default HHV listed in Table C–1 of subpart C and the default CH_4 and N_2O emissions factors listed in Table AA–2 of this subpart.

* * * * *

(4) Calculate biogenic CO_2 emissions from combustion of biomass with other fuels according to the applicable methodology for stationary combustion sources in § 98.33(e).

* * * * *

■ 31. Amend § 98.276 by revising paragraph (a) to read as follows:

§ 98.276 Data reporting requirements.

* * * * *

(a) Annual emissions of CO_2, biogenic CO_2, CH_4, and N_2O (metric tons per year).

* * * * *

■ 32. Amend § 98.277 by revising paragraph (d) to read as follows:

§ 98.277 Records that must be retained.

* * * * *

(d) Annual quantity of spent liquor solids combusted in each chemical recovery furnace and chemical recovery combustion unit, and the basis for determining the annual quantity of the spent liquor solids combusted (whether based on T650 om-05 Solids Content of Black Liquor, TAPPI (incorporated by reference, see § 98.7) or an online measurement system). If an online measurement system is used, you must retain records of the calculations used to determine the annual quantity of spent liquor solids combusted from the continuous measurements.

* * * * *

Subpart HH—Municipal Solid Waste Landfills

■ 33. Amend § 98.343 by:
■ a. Revising paragraph (c) introductory text;
■ b. Revising Equation HH–6 in paragraph (c)(3)(i);
■ c. Adding parameters ‘‘M,’’ ‘‘0.0026,’’ ‘‘d_m,’’ and ‘‘S_m’’ to Equation HH–6 in paragraph (c)(3)(i);
■ d. Revising parameters ‘‘R_n’’ and ‘‘$f_{Dest,n}$’’ to Equation HH–6 in paragraph (c)(3)(i);
■ e. Revising Equations HH–7 and HH–8 in paragraph (c)(3)(ii);
■ f. Removing parameter ‘‘$f_{Rec,n}$’’ to Equations HH–7 and HH–8 in paragraph (c)(3)(ii);
■ g. Adding parameters ‘‘C,’’ ‘‘X,’’ ‘‘$R_{x,c}$,’’ ‘‘$f_{Rec,c}$,’’ ‘‘M,’’ ‘‘0.0026,’’ ‘‘d_m,’’ and ‘‘S_m’’ to Equation HH–7 in paragraph (c)(3)(ii);
■ h. Revising parameter ‘‘CE’’ to Equation HH–7 in paragraph (c)(3)(ii);
■ i. Adding parameters ‘‘C,’’ ‘‘X,’’ ‘‘$R_{x,c}$,’’ and ‘‘$f_{Rec,c}$’’ to Equation HH–8 in paragraph (c)(3)(ii);
■ j. Revising parameters ‘‘N’’ and ‘‘$f_{Dest,n}$’’ to Equation HH–8 in paragraph (c)(3)(ii); and
■ k. Adding paragraph (c)(4).

The revisions read as follows:

§ 98.343 Calculating GHG emissions.

* * * * *

(c) For all landfills, calculate CH_4 generation (adjusted for oxidation in cover materials) and actual CH_4 emissions (taking into account any CH_4 recovery, and oxidation in cover materials) according to the applicable methods in paragraphs (c)(1) through (4) of this section.

* * * * *

(3) * * *

(i) * * *

$$\text{Emissions} = \left[\left(G_{CH4} - \sum_{n=1}^{N} R_n\right) \times (1 - \text{OX}) + \sum_{n=1}^{N}\left\{R_n \times \left(1 - \left(\text{DE}_n \times f_{\text{Dest,n}}\right)\right)\right\} + \text{OX} \times \sum_{m=1}^{M}\left[0.0000284 \times d_m \times S_m\right]\right] \text{ (Eq. HH-6)}$$

* * * * *

R_n = Quantity of recovered CH_4 from Equation HH–4 of this section for the nth measurement location (metric tons CH_4).

* * * * *

M = Number of individual surface measurements that exceed 500 parts per million (ppm) above background in the reporting year. If surface monitoring is not performed or no measurement exceeded 500 ppm above background in the reporting year, assume M = 0.

0.0000284 = Correlation factor (metric tons methane per ppm surface concentration per day).

d_m = Leak duration (days), estimated as the number of days since the last monitoring event at the specified location from company records. Alternatively, you may use the following defaults for d: 10 days for 10-day monitoring events; 30 days for monthly monitoring, 91 days for quarterly monitoring, and 365 days for annual monitoring.

S_m = Surface measurement methane concentration for the mth measurement that exceeds 500 parts per million above background (parts per million by volume).

* * * * *

$f_{Dest,n}$ = Fraction of hours the destruction device associated with the nth measurement location was operating during active gas flow calculated as the annual operating hours for the destruction device divided by the annual hours flow was sent to the destruction device as measured at the nth measurement location. The annual operating hours for the destruction device should include only those periods when flow was sent to the destruction device and the destruction device was operating at its intended temperature or other parameter indicative of effective operation. For flares, times when there is no pilot flame present must be excluded from the annual operating hours for the destruction device. If the gas is transported off-site for destruction, use $f_{Dest,n}$= 1. If the volumetric flow and CH_4 concentration of the recovered gas is measured at a single location providing landfill gas to multiple destruction devices (including some gas destroyed on-site and some gas sent off-site for destruction), calculate $f_{Dest,n}$ as the arithmetic average of the f_{Dest} values determined for each destruction device associated with that measurement location.

(ii) * * *

$$\text{MG} = \frac{1}{\text{CE}}\sum_{c=1}^{C}\left[\frac{\sum_{x=1}^{X} R_{x,c}}{f_{\text{Rec,c}}}\right] \times \ (1\text{ -OX}) + \sum_{m=1}^{M}\left[0.0000284 \times d_m \times S_m\right] \text{ (Eq. HH-7)}$$

$$\text{Emissions} = \left[\left(\frac{1}{\text{CE}}\sum_{c=1}^{C}\left[\frac{\sum_{x=1}^{X} R_{x,c}}{f_{\text{Rec,c}}}\right] - \sum_{n=1}^{N} R_n\right) \times (1 - \text{OX}) + \sum_{n=1}^{N}\left\{R_n \times \left(1 - \left(\text{DE}_n \times f_{\text{Dest,n}}\right)\right)\right\} + \sum_{m=1}^{M}\left[0.0000284 \times d_m \times S_m\right]\right] \text{ (Eq. HH-8)}$$

* * * * *

C = Number of landfill gas collection systems operated at the landfill.

X = Number of landfill gas measurement locations associated with landfill gas collection system ‘‘c’’.

N = Number of landfill gas measurement locations (associated with a destruction device or gas sent off-site). If a single monitoring location is used to monitor volumetric flow and CH_4 concentration of the recovered gas sent to one or multiple destruction devices, then N = 1. Note that $N = \Sigma^{C}_{c=1} [\Sigma^{X}_{x=1}[1]]$.

$R_{x,c}$ = Quantity of recovered CH_4 from Equation HH–4 of this section for the xth measurement location for landfill gas collection system ‘‘c’’ (metric tons CH_4).

* * * * *

CE = Collection efficiency estimated at landfill, taking into account system coverage, operation, measurement practices, and cover system materials from Table HH–3 of this subpart. If area by soil cover type information is not available, use applicable default value for CE4 in Table HH–3 of this subpart for all areas under active influence of the collection system.

* * * * *

$f_{Rec,c}$ = Fraction of hours the landfill gas collection system ‘‘c’’ was operating normally (annual operating hours/8760 hours per year or annual operating hours/8784 hours per year for a leap year). Do not include periods of shut down or poor operation, such as times when pressure, temperature, or other parameters indicative of operation are outside of normal variances, in the annual operating hours.

* * * * *

M = Number of individual surface measurements that exceed 500 parts per million (ppm) above background in the reporting year. If surface monitoring is not performed or no measurement exceeded 500 ppm above background in the reporting year, assume M = 0.

0.0000284 = Correlation factor (metric tons methane per ppm surface concentration per day)

d_m = Leak duration (days), estimated as the number of days since the last monitoring event at the specified location from company records. Alternatively, you may use the following defaults for d: 10 days for 10-day monitoring events; 30 days for monthly monitoring, 91 days for quarterly monitoring, and 365 days for annual monitoring.

S_m = Surface measurement methane concentration for the mth measurement that exceeds 500 parts per million above background (parts per million by volume).

* * * * *

$f_{Dest,n}$ = Fraction of hours the destruction device associated with the nth measurement location was operating during active gas flow calculated as the annual operating hours for the destruction device divided by the annual hours flow was sent to the destruction device as measured at the nth measurement location. The annual operating hours for the destruction device should include only those periods when flow was sent to the destruction device and the destruction device was operating at its intended temperature or other parameter indicative of effective operation. For flares, times when there is no pilot flame present must be excluded from the annual operating hours for the destruction device. If the gas is transported off-site for destruction, use $f_{Dest,n}$= 1. If the volumetric flow and CH_4 concentration of the recovered gas is measured at a single location providing landfill gas to multiple destruction devices (including some gas destroyed on-site and some gas sent off-site for destruction), calculate $f_{Dest,n}$ as the arithmetic average of the f_{Dest} values determined for each destruction device associated with that measurement location.

(4) For landfills with landfill gas collection systems, you must comply with the applicable requirements in paragraphs (c)(4)(i) through (iii) of this section when calculating the emissions in paragraph (c)(3) of this section.

(i) For landfills with landfill gas collection systems required to conduct surface methane concentration measurements according to 40 CFR part 60, subparts Cc, Cf, WWW or XXX or according to 40 CFR part 62, subpart GGG or OOO, you must use the method for conducting surface methane concentration measurements in § 98.344(g) of this subpart as applicable to your landfill, you must account for each exceedance including exceedances when re-monitoring, and you must use the landfill gas collection efficiencies in Table HH–3 of this subpart applicable to ''landfills for which surface methane concentration measurements are conducted.''

(ii) For landfills with landfill gas collection systems that are not required to conduct surface methane concentration measurements according to 40 CFR part 60, subparts Cc, Cf, WWW or XXX or according to 40 CFR part 62, subpart GGG or OOO but elect to conduct surface methane concentration measurements in lieu of meeting the requirements in paragraph (c)(4)(iii) of this section for landfills with landfill gas collection systems that do not conduct surface methane concentration measurements, you must use the method for conducting surface methane concentration measurements described in § 98.344(g)(7) of this subpart, you must account for each exceedance including re-monitoring exceedances (if re-monitoring is conducted), and you must use the landfill gas collection efficiencies in Table HH–3 of this subpart applicable to ''landfills for which surface methane concentration measurements are conducted.''

(iii) For landfills with landfill gas collection systems that are not required to conduct surface methane concentration measurements according to 40 CFR part 60, subparts Cc, Cf, WWW or XXX or according to 40 CFR part 62, subpart GGG or OOO and elect not to conduct surface methane concentration measurements, you must use the landfill gas collection efficiencies in Table HH–3 of this subpart applicable to ''landfills for which no surface methane concentration measurements are conducted.''

■ 34. Amend § 98.344 by adding paragraph (g) to read as follows:

§ 98.344 Monitoring and QA/QC requirements.

* * * * *

(g) The owner or operator shall conduct surface methane concentration measurements according to the requirements in paragraphs (g)(1) through (7) of this section, as applicable.

(1) For landfills with landfill gas collection systems that are required to conduct surface methane concentration measurements according to 40 CFR part 60, subpart Cc, you must monitor surface concentrations of methane according to the procedures in § 60.755(c) and the instrument specifications in § 60.755(d) of this chapter.

(2) For landfills with landfill gas collection systems that are required to conduct surface methane concentration measurements according to 40 CFR part 60, subpart Cf, you must monitor surface concentrations of methane according to the procedures in § 60.36f(c) and the instrument specifications in § 60.36f(d) of this chapter.

(3) For landfills with landfill gas collection systems that are required to conduct surface methane concentration measurements according to 40 CFR part 60, subpart WWW, you must monitor surface concentrations of methane according to the procedures in § 60.755(c) and the instrument specifications in § 60.755(d) of this chapter.

(4) For landfills with landfill gas collection systems that are required to conduct surface methane concentration measurements according to 40 CFR part 60, subpart XXX, you must monitor surface concentrations of methane according to the procedures in § 60.765(c) and the instrument specifications in § 60.765(d) of this chapter.

(5) For landfills with landfill gas collection systems that are required to conduct surface methane concentration measurements according to 40 CFR part 62, subpart GGG, you must monitor surface concentrations of methane according to the procedures in § 60.755(c) and the instrument specifications in § 60.755(d) of this chapter.

(6) For landfills with landfill gas collection systems that are required to conduct surface methane concentration measurements according to 40 CFR part 62, subpart OOO, you must monitor surface concentrations of methane according to the procedures in § 62.16720(c) and the instrument specifications in § 60.16720(d) of this chapter.

(7) For landfills with landfill gas collection systems that are not required to conduct surface methane concentration measurements according to 40 CFR part 60, subparts Cc, Cf, WWW or XXX or according to 40 CFR part 62, subpart GGG or OOO but elect to conduct surface methane concentration measurements, you must monitor surface concentrations of methane according to the procedures in § 60.765(c) and the instrument specifications in § 60.765(d) of this chapter.

■ 35. Amend § 98.346 by:

■ a. Redesignating paragraph (i) as paragraph (j).

■ b. Revising newly redesignated paragraphs (j)(5) through (7)

■ c. Redesignating paragraph (h) as paragraph (i).

■ d. Adding new paragraph (h) to read as follows:

§ 98.346 Data reporting requirements.

* * * * *

(h) An indication of the applicability of 40 CFR part 60 or part 62 requirements to the landfill (40 CFR part 60, subpart WWW, 40 CFR part 60, subpart XXX, approved state plan implementing 40 CFR part 60, subparts Cc or Cf, Federal plan as implemented at 40 CFR part 62, subparts GGG or OOO, or not subject to 40 CFR part 60 or part 62 municipal solid waste landfill rules) and, if the landfill is subject to a 40 CFR part 60 or part 62 municipal solid waste landfill rule, an indication of whether the landfill exceeds the applicable nonmethane organic carbon emission rates requiring landfill gas collection.

* * * * *

(j) * * *

(5) The number of gas collection systems at the landfill facility.

(6) For each gas collection system at the facility report:

(i) A unique name or ID number for the gas collection system.

(ii) A description of the gas collection system (manufacturer, capacity, and number of wells).

(iii) The annual hours the gas collection system was operating normally. Do not include periods of shut down or poor operation, such as times when pressure, temperature, or other parameters indicative of operation are outside of normal variances, in the annual operating hours.

(iv) The number of measurement locations associated with the gas collection system.

(v) For each measurement location associated with the gas collection system, report:

(A) A unique name or ID number for the measurement location.

$$\sum^{C}{}_{c=1}\left[\sum^{X}{}_{x=1}[1]\right].$$

(B) Annual quantity of recovered CH_4 (metric tons CH_4) calculated using Equation HH–4 of this subpart.

(C) An indication of whether destruction occurs at the landfill facility, off-site, or both for the measurement location.

(D) If destruction occurs at the landfill facility for the measurement location (in full or in part), also report the number of destruction devices associated with the measurement location that are located at the landfill facility and the information in paragraphs (j)(6)(v)(D)(*1*) through (*6*) of this section for each destruction device located at the landfill facility.

(*1*) A unique name or ID number for the destruction device.

(*2*) The type of destruction device (flare, a landfill gas to energy project (*i.e.,* engine or turbine), off-site, or other (specify)).

(*3*) The destruction efficiency (decimal).

(*4*) The total annual hours where active gas flow was sent to the destruction device.

(*5*) The annual operating hours where active gas flow was sent to the destruction device and the destruction device was operating at its intended temperature or other parameter indicative of effective operation. For flares, times when there is no pilot flame present must be excluded from the annual operating hours for the destruction device.

(*6*) The estimated fraction of the recovered CH_4 reported for the measurement location directed to the destruction device based on best available data or engineering judgement (decimal, must total to 1 for each measurement location).

(*7*) The following information about the landfill.

(i) The surface area (square meters) and estimated waste depth (meters) for each area specified in Table HH–3 to this subpart.

(ii) The estimated gas collection system efficiency for the landfill.

(iii) An indication of whether passive vents and/or passive flares (vents or flares that are not considered part of the gas collection system as defined in § 98.6) are present at the landfill.

(iv) An indication of whether surface methane concentration measurements were made at the landfill during the reporting year, the frequency of routine measurements (annual, semiannual, quarterly, bimonthly, monthly, or varied during the reporting year), and the total number of surface methane concentration measurements that exceeded 500 parts per million above background during the reporting year.

(v) For each surface methane concentration measurement that exceeded 500 parts per million above background during the reporting year report:

(A) A unique name or ID number for the surface measurement.

(B) The date of the measurement.

(C) The measured methane concentration (in parts per million by volume).

(D) The leak duration (days).

* * * * *

■ 36. Revise table HH–1 to subpart HH of part 98 to read as follows:

TABLE HH–1 TO SUBPART HH OF PART 98—EMISSIONS FACTORS, OXIDATION FACTORS AND METHODS

Factor	Default value	Units
DOC and k values—Bulk waste option		
DOC (bulk waste)	0.17	Weight fraction, wet basis.
k (precipitation plus recirculated leachate [a] <20 inches/year)	0.055	yr^{-1}.
k (precipitation plus recirculated leachate [a] 20–40 inches/year)	0.111	yr^{-1}.
k (precipitation plus recirculated leachate [a] >40 inches/year)	0.142	yr^{-1}.
DOC and k values—Modified bulk MSW option		
DOC (bulk MSW, excluding inerts and C&D waste)	0.27	Weight fraction, wet basis.
DOC (inerts, *e.g.,* glass, plastics, metal, concrete)	0.00	Weight fraction, wet basis.
DOC (C&D waste)	0.08	Weight fraction, wet basis.
k (bulk MSW, excluding inerts and C&D waste)	0.055 to 0.142 [b]	yr^{-1}.
k (inerts, *e.g.,* glass, plastics, metal, concrete)	0.00	yr^{-1}.
k (C&D waste)	0.02 to 0.04 [b]	yr^{-1}.
DOC and k values—Waste composition option		
DOC (food waste)	0.15	Weight fraction, wet basis.
DOC (garden)	0.2	Weight fraction, wet basis.
DOC (paper)	0.4	Weight fraction, wet basis.
DOC (wood and straw)	0.43	Weight fraction, wet basis.
DOC (textiles)	0.24	Weight fraction, wet basis.
DOC (diapers)	0.24	Weight fraction, wet basis.
DOC (sewage sludge)	0.05	Weight fraction, wet basis.
DOC (inerts, *e.g.,* glass, plastics, metal, cement)	0.00	Weight fraction, wet basis.
DOC (Uncharacterized MSW)	0.32	Weight fraction, wet basis.
k (food waste)	0.06 to 0.185 [c]	yr^{-1}.
k (garden)	0.05 to 0.10 [c]	yr^{-1}.
k (paper)	0.04 to 0.06 [c]	yr^{-1}.
k (wood and straw)	0.02 to 0.03 [c]	yr^{-1}.

TABLE HH–1 TO SUBPART HH OF PART 98—EMISSIONS FACTORS, OXIDATION FACTORS AND METHODS—Continued

Factor	Default value	Units
k (textiles)	0.04 to 0.06[c]	yr^{-1}.
k (diapers)	0.05 to 0.10[c]	yr^{-1}.
k (sewage sludge)	0.06 to 0.185[c]	yr^{-1}.
k (inerts, *e.g.,* glass, plastics, metal, concrete)	0.00	yr^{-1}.
k (uncharacterized MSW)	0.055 to 0.142[b]	yr^{-1}.
Other parameters—All MSW landfills		
MCF	1.	
DOC_F	0.5.	
F	0.5.	
OX	See Table HH–4 of this subpart.	
DE	0.99.	

[a] Recirculated leachate (in inches/year) is the total volume of leachate recirculated from company records or engineering estimates divided by the area of the portion of the landfill containing waste with appropriate unit conversions. Alternatively, landfills that use leachate recirculation can elect to use the k value of 0.142 rather than calculating the recirculated leachate rate.

[b] Use the lesser value when precipitation plus recirculated leachate is less than 20 inches/year. Use the greater value when precipitation plus recirculated leachate is greater than 40 inches/year. Use the average of the range of values when precipitation plus recirculated leachate is 20 to 40 inches/year (inclusive). Alternatively, landfills that use leachate recirculation can elect to use the greater value rather than calculating the recirculated leachate rate.

[c] Use the lesser value when the potential evapotranspiration rate exceeds the mean annual precipitation rate plus recirculated leachate. Use the greater value when the potential evapotranspiration rate does not exceed the mean annual precipitation rate plus recirculated leachate. Alternatively, landfills that use leachate recirculation can elect to use the greater value rather than assessing the potential evapotranspiration rate or recirculated leachate rate.

■ 37. Amend table HH–3 to subpart HH of part 98 to read as follows:

TABLE HH–3 TO SUBPART HH OF PART 98—LANDFILL GAS COLLECTION EFFICIENCIES

Description	Landfill gas collection efficiency		
	Term ID	Landfills for which surface methane concentration measurements[1] are conducted (%)	Landfills for which no surface methane concentration measurements[1] are conducted (%)
A1: Area with no waste in-place	Not applicable; do not use this area in the calculation.		
A2: Area without active gas collection, regardless of cover type	CE2	0	0
A3: Area with daily soil cover and active gas collection	CE3	60	50
A4: Area with an intermediate soil cover, or a final soil cover not meeting the criteria for A5 below, and active gas collection.	CE4	75	65
A5: Area with a final soil cover of 3 feet or thicker of clay or final cover (as approved by the relevant agency) and/or geomembrane cover system and active gas collection.	CE5	95	85
Area weighted average collection efficiency for landfills	CEave1 = (A2*CE2 + A3*CE3 + A4*CE4 + A5*CE5)/(A2 + A3 + A4 + A5).		

[1] Surface methane concentration measurements include only those conducted as required under 40 CFR part 60, subparts WWW or XXX, or approved state plans to implement the emission guidelines in 40 CFR part 60, subparts Cc or Cf, or Federal plan at 40 CFR part 62 subparts GGG or OOO, or, for those electing to conduct surface concentration measurements, those conducted according to the method provided in § 98.344(g) of this subpart.

■ 38. Revise footnote ''b'' to table HH–4 to subpart HH of part 98 to read as follows:

TABLE HH–4 TO SUBPART HH OF PART 98—LANDFILL METHANE OXIDATION FRACTIONS

Under these conditions:	Use this landfill methane oxidation fraction:

* * * * * * *

* * * * * * *

[b] Methane flux rate (in grams per square meter per day; g/m²/d) is the mass flow rate of methane per unit area at the bottom of the surface soil prior to any oxidation and is calculated as follows:

For Equation HH–5 of this subpart, or for Equation TT–6 of subpart TT of this part,

$$MF = K \times G_{CH4}/SArea$$

For Equation HH–6 of this subpart,

$$MF = K \times \left(G_{CH4} - \sum_{n=1}^{N} R_n\right) \Big/ SArea$$

For Equation HH–7 of this subpart,

$$MF = K \times \left(\frac{1}{CE} \sum_{c=1}^{C} \left[\frac{\sum_{x=1}^{X} R_{x,c}}{f_{Rec,c}}\right]\right) / SArea$$

For Equation HH–8 of this subpart,

$$MF = K \times \left(\frac{1}{CE} \sum_{c=1}^{C} \left[\frac{\sum_{x=1}^{X} R_{x,c}}{f_{Rec,c}}\right] - \sum_{n=1}^{N} R_n\right) / SArea$$

Where:

MF = Methane flux rate from the landfill in the reporting year (grams per square meter per day, g/m²/d).

K = unit conversion factor = $10^6/365$ (g/metric ton per days/year) or $10^6/366$ for a leap year.

SArea = The surface area of the landfill containing waste at the beginning of the reporting year (square meters, m²).

G_{CH4} = Modeled methane generation rate in reporting year from Equation HH–1 of this subpart or Equation TT–1 of subpart TT of this part, as applicable, except for application with Equation HH–6 of this subpart (metric tons CH_4). For application with Equation HH–6 of this subpart, the greater of the modeled methane generation rate in reporting year from Equation HH–1 of this subpart or Equation TT–1 of this part, as applicable, and the quantity of recovered CH_4 from Equation HH–4 of this subpart (metric tons CH_4).

CE = Collection efficiency estimated at landfill, taking into account system coverage, operation, measurement practices, and cover system materials from Table HH–3 of this subpart. If area by soil cover type information is not available, use applicable default value for CE4 in Table HH–3 of this subpart for all areas under active influence of the collection system.

C = Number of landfill gas collection systems operated at the landfill.

X = Number of landfill gas measurement locations associated with landfill gas collection system ‘‘c’’.

N = Number of landfill gas measurement locations (associated with a destruction device or gas sent off-site). If a single monitoring location is used to monitor volumetric flow and CH_4 concentration of the recovered gas sent to one or multiple destruction devices, then N = 1. Note that $N = \Sigma_{c=1}{}^{C} [\Sigma_{x=1}{}^{X}[1]]$.

$R_{x,c}$ = Quantity of recovered CH_4 from Equation HH–4 of this subpart for the xth measurement location for landfill gas collection system ‘‘c’’ (metric tons CH_4).

R_n = Quantity of recovered CH_4 from Equation HH–4 of this subpart for the nth measurement location (metric tons CH_4).

$f_{Rec,c}$ = Fraction of hours the landfill gas collection system ‘‘c’’ was operating normally (annual operating hours/8760 hours per year or annual operating hours/8784 hours per year for a leap year). Do not include periods of shutdown or poor operation, such as times when pressure, temperature, or other parameters indicative of operation are outside of normal variances, in the annual operating hours.

Subpart OO—Suppliers of Industrial Greenhouse Gases

■ 39. Amend § 98.416 by:

■ a. Revising paragraph (c) introductory text;

■ b. Adding paragraph (c)(11);

■ c. Revising paragraph (d) introductory text; and

■ d. Adding paragraph (k).

The revisions and additions read as follows:

§ 98.416 Data reporting requirements.

* * * * *

(c) Each bulk importer of fluorinated GHGs, fluorinated HTFs, or nitrous oxide shall submit an annual report that summarizes its imports at the corporate level, except importers may exclude shipments including less than twenty-five kilograms of fluorinated GHGs, fluorinated HTFs, or nitrous oxide; transshipments if the importer also excludes transshipments from reporting of exports under paragraph (d) of this section; and heels that meet the conditions set forth at § 98.417(e) if the importer also excludes heels from any reporting of exports under paragraph (d) of this section. The report shall contain the following information for each import:

* * * * *

(11) For all GHGs that are not regulated substances under 40 CFR part 84 (Phasedown of Hydrofluorocarbons), a copy of the corresponding U.S. Customs entry form for each reported import.

(d) Each bulk exporter of fluorinated GHGs, fluorinated HTFs, or nitrous oxide shall submit an annual report that summarizes its exports at the corporate level, except exporters may exclude shipments including less than twenty-five kilograms of fluorinated GHGs, fluorinated HTFs, or nitrous oxide; transshipments if the exporter also excludes transshipments from reporting of imports under paragraph (c) of this section; and heels if the exporter also excludes heels from any reporting of imports under paragraph (c) of this section. The report shall contain the following information for each export:

* * * * *

(k) For nitrous oxide, saturated perfluorocarbons, sulfur hexafluoride, and fluorinated heat transfer fluids as defined at § 98.6, report the end use(s) for which each GHG or fluorinated HTF is transferred and the aggregated annual quantity of that GHG or fluorinated HTF in metric tons that is transferred to that end use application, if known.

Subpart PP—Suppliers of Carbon Dioxide

■ 40. Amend § 98.426 by:

■ a. Redesignating paragraphs (f)(12) and (13) as paragraphs (f)(13) and (14), respectively;

■ b. Adding new paragraph (f)(12); and

■ c. Revising paragraph (h).

The revisions and additions read as follows:

§ 98.426 Data reporting requirements.

* * * * *

(f) * * *

(12) Geologic sequestration of carbon dioxide with enhanced oil recovery that is covered by subpart VV of this part.

* * * * *

(h) If you capture a CO_2 stream from a facility that is subject to this part and transfer CO_2 to any facilities that are subject to subpart RR or subpart VV of this part, you must:

(1) Report the facility identification number associated with the annual GHG report for the facility that is the source of the captured CO_2 stream;

(2) Report each facility identification number associated with the annual GHG reports for each subpart RR and subpart VV facility to which CO_2 is transferred; and

(3) Report the annual quantity of CO_2 in metric tons that is transferred to each subpart RR and subpart VV facility.

Subpart QQ—Importers and Exporters of Fluorinated Greenhouse Gases Contained in Pre-Charged Equipment or Closed-Cell Foams

■ 41. Amend § 98.436 by adding paragraphs (a)(7) and (8) and (b)(7) to read as follows:

§ 98.436 Data reporting requirements.

(a) * * *

(7) The Harmonized tariff system (HTS) code for each type of pre-charged equipment or closed-cell foam imported.

(8) A copy of the corresponding U.S. Customs entry form for each reported import.

(b) * * *

(7) The Schedule B code for each type of pre-charged equipment or closed-cell foam exported.

Subpart RR—Geologic Sequestration of Carbon Dioxide

42. Add the definition of ''Offshore'' in § 98.449 to read as follows:

§ 98.449 Definitions.

* * * * *

Offshore means seaward of the terrestrial borders of the United States, including waters subject to the ebb and flow of the tide, as well as adjacent bays, lakes or other normally standing waters, and extending to the outer boundaries of the jurisdiction and control of the United States under the Outer Continental Shelf Lands Act.

* * * * *

Subpart UU—Injection of Carbon Dioxide

■ 43. Amend § 98.470 by:

■ a. Revising paragraph (b);

■ b. Redesignating paragraph (c) as paragraph (d); and

■ c. Adding new paragraph (c).

The revisions and additions read as follows:

§ 98.470 Definition of the source category.

* * * * *

(b) If you report under subpart RR of this part for a well or group of wells, you shall not report under this subpart for that well or group of wells.

(c) If you report under subpart VV of this part for a well or group of wells, you shall not report under this subpart for that well or group of wells. If you previously met the source category definition for subpart UU for a project where CO_2 is injected in enhanced recovery operations for oil and other hydrocarbons (CO_2-EOR) and then began using the International Standards Organization (ISO) standard designated as CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7) such that you met the definition of the source category for subpart VV during a reporting year, you must report under subpart UU for the portion of the year before you began using CSA/ANSI ISO 27916:2019 and report under subpart VV for the portion of the year after you began using CSA/ANSI ISO 27916:2019.

(d) A facility that is subject to this part only because it is subject to subpart UU of this part is not required to report emissions under subpart C of this part or any other subpart listed in § 98.2(a)(1) or (2).

■ 44. Add subpart VV to read as follows:

Subpart VV—Geologic Sequestration of Carbon Dioxide with Enhanced Oil Recovery Using ISO 27916

§ 98.480 Definition of the source category.

(a) This source category pertains to carbon dioxide (CO_2) that is injected in enhanced recovery operations for oil and other hydrocarbons (CO_2-EOR) in which all of the following apply:

(1) You are using the International Standards Organization (ISO) standard designated as CSA/ANSI ISO 27916:2019, ''Carbon Dioxide Capture, Transportation and Geological Storage—Carbon Dioxide Storage Using Enhanced Oil Recovery (CO_2-EOR)'' (CSA/ANSI ISO 27916:2019) (incorporated by reference, see § 98.7) as a method of quantifying geologic sequestration of CO_2 in association with EOR operations.

(2) You are not reporting under subpart RR of this part.

(b) This source category does not include wells permitted as Class VI under the Underground Injection Control program.

(c) If you are subject to only this subpart, you are not required to report emissions under subpart C of this part or any other subpart listed in § 98.2(a)(1) or (2).

§ 98.481 Reporting threshold.

(a) You must report under this subpart if your CO_2-EOR project uses CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7) as a method of quantifying geologic sequestration of CO_2 in association with CO_2-EOR operations. There is no threshold for reporting.

(b) The requirements of § 98.2(i) do not apply to this subpart. Once a CO_2-EOR project becomes subject to the requirements of this subpart, you must continue for each year thereafter to comply with all requirements of this subpart, including the requirement to submit annual reports until the facility has met the requirements of paragraphs (b)(1) and (2) of this section and submitted a notification to discontinue reporting according to paragraph (b)(3) of this section.

(1) Discontinuation of reporting under this subpart must follow the

requirements set forth under Clause 10 of CSA/ANSI ISO 27916:2019.

(2) CO_2-EOR project termination is completed when all of the following occur:

(i) Cessation of CO_2 injection.

(ii) Cessation of hydrocarbon production from the project reservoir; and

(iii) Wells are plugged and abandoned unless otherwise required by the appropriate regulatory authority.

(3) You must notify the Administrator of your intent to cease reporting and provide a copy of the CO_2-EOR project termination documentation.

(c) If you previously met the source category definition for subpart UU for your CO_2-EOR project and then began using CSA/ANSI ISO 27916:2019 as a method of quantifying geologic sequestration of CO_2 in association with CO_2-EOR operations during a reporting year, you must report under subpart UU for the portion of the year before you began using CSA/ANSI ISO 27916:2019 and report under subpart VV for the portion of the year after you began using CSA/ANSI ISO 27916:2019.

§ 98.482 GHGs to report.

You must report the following from Clause 8 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7):

(a) The mass of CO_2 received by the CO_2-EOR project.

(b) The mass of CO_2 loss from the CO_2-EOR project operations.

(c) The mass of native CO_2 produced and captured.

(d) The mass of CO_2 produced and sent off-site.

(e) The mass of CO_2 loss from the EOR complex.

(f) The mass of CO_2 stored in association with CO_2-EOR.

§ 98.483 Calculating CO_2 geologic sequestration.

You must calculate CO_2 sequestered using the following quantification principles from Clause 8.2 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7).

(a) You must calculate the mass of CO_2 stored in association with CO_2-EOR (m_{stored}) in the reporting year by subtracting the mass of CO_2 loss from operations and the mass of CO_2 loss from the EOR complex from the total mass of CO_2 input (as specified in Equation VV–1 of this section).

$$m_{\text{stored}} = m_{\text{input}} - m_{\text{loss operations}} - m_{\text{loss EOR complex}} \quad \text{(Equation VV-1)}$$

Where:

m_{stored} = the annual quantity of associated storage in metric tons of CO_2 mass.

m_{input} = the total mass of CO_2 m_{received} by the EOR project plus m_{native} (see Clause 8.3 and paragraph (c) of this section), metric tons. Native CO_2 produced and captured in the CO_2-EOR project (m_{native}) can be quantified and included in $m_{\text{input.}}$

$m_{\text{loss operations}}$ = the total mass of CO_2 loss from project operations (see Clauses 8.4.1 through 8.4.5 and paragraph (d) of this section), metric tons.

$m_{\text{loss EOR complex}}$ = the total mass of CO_2 loss from the EOR complex (see Clause 8.4.6), metric tons.

(b) The manner by which associated storage is quantified must assure completeness and preclude double counting. The annual mass of CO_2 that is recycled and reinjected into the EOR complex must not be quantified as associated storage. Loss from the CO_2 recycling facilities must be quantified.

(c) You must quantify the total mass of CO_2 input (m_{input}) in the reporting year according to paragraphs (g)(1) through (3) of this section.

(1) You must include the total mass of CO_2 received at the custody transfer meter by the CO_2-EOR project (m_{received}).

(2) The CO_2 stream received (including CO_2 transferred from another CO_2-EOR project) must be metered.

(A) The native CO_2 recovered and included as m_{native} must be documented.

(B) CO_2 delivered to multiple CO_2-EOR projects must be allocated among those CO_2-EOR projects.

(3) The sum of the quantities of allocated CO_2 must not exceed the total quantities of CO_2 received.

(d) You must calculate the total mass of CO_2 from project operations ($m_{\text{loss operations}}$) in the reporting year as specified in Equation VV–2 of this section.

$$m_{\text{loss operations}} = m_{\text{loss leakage facilities}} + m_{\text{loss vent/flare}} + m_{\text{loss entrained}} + m_{\text{loss transfer}} \quad \text{(Equation VV-2)}$$

Where:

$m_{\text{loss leakage facilities}}$ = Loss of CO_2 due to leakage from production, handling, and recycling CO_2-EOR facilities (infrastructure including wellheads), metric tons.

$m_{\text{loss vent/flare}}$ = Loss of CO_2 from venting/flaring from production operations, metric tons.

$m_{\text{loss entrained}}$ = Loss of CO_2 due to entrainment within produced gas/oil/water when this CO_2 is not separated and reinjected, metric tons.

$m_{\text{loss transfer}}$ = Loss of CO_2 due to any transfer of CO_2 outside the CO_2-EOR project, metric tons. You must quantify any CO_2 that is subsequently produced from the EOR complex and transferred offsite.

§ 98.484 Monitoring and QA/QC requirements.

You must use the applicable monitoring and quality assurance requirements set forth in Clause 6.2 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7).

§ 98.485 Procedures for estimating missing data.

Whenever the value of a parameter is unavailable or the quality assurance procedures set forth in § 98.484 cannot be followed, you must follow the procedures set forth in Clause 9.2 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7).

§ 98.486 Data reporting requirements.

In addition to the information required by § 98.3(c), the annual report shall contain the following information, as applicable:

(a) The annual quantity of associated storage in metric tons of CO_2 (m_{stored}).

(b) The density of CO_2 if volumetric units are converted to mass in order to be reported for annual quantity of CO_2 stored.

(c) The annual quantity of CO_2 input (m_{input}) and the information in paragraphs (c)(1) and (2) of this section.

(1) The annual total mass of CO_2 received at the custody transfer meter by the CO_2-EOR project, including CO_2

transferred from another CO_2-EOR project (m_{received}).

(2) The annual mass of native CO_2 produced and captured in the CO_2-EOR project (m_{native}).

(d) The annual mass of CO_2 that is recycled and reinjected into the EOR complex.

(e) The annual total mass of CO_2 loss from project operations ($m_{\text{loss operations}}$), and the information in paragraphs (e)(1) through (4) of this section.

(1) Loss of CO_2 due to leakage from production, handling, and recycling CO_2-EOR facilities (infrastructure including wellheads) ($m_{\text{loss leakage facilities}}$).

(2) Loss of CO_2 from venting/flaring from production operations ($m_{\text{loss vent/flare}}$).

(3) Loss of CO_2 due to entrainment within produced gas/oil/water when this CO_2 is not separated and reinjected ($m_{\text{loss entrained}}$).

(4) Loss of CO_2 due to any transfer of CO_2 outside the CO_2-EOR project ($m_{\text{loss transfer}}$).

(f) The total mass of CO_2 loss from the EOR complex ($m_{\text{loss EOR complex}}$).

(g) Annual documentation that contains the following components as described in Clause 4.4 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7):

(1) The formulas used to quantify the annual mass of associated storage, including the mass of CO_2 delivered to the CO_2-EOR project and losses during the period covered by the documentation (see Clause 8 and Annex B).

(2) The methods used to estimate missing data and the amounts estimated as described in Clause 9.2.

(3) The approach and method for quantification utilized by the operator, including accuracy, precision, and uncertainties (see Clause 8 and Annex B).

(4) A statement describing the nature of validation or verification including the date of review, process, findings, and responsible person or entity.

(5) Source of each CO_2 stream quantified as associated storage (see Clause 8.3).

(6) A description of the procedures used to detect and characterize the total CO_2 leakage from the EOR complex.

(7) If only the mass of anthropogenic CO_2 is considered for m_{stored}, a description of the derivation and application of anthropogenic CO_2 allocation ratios for all the terms described in Clauses 8.1 to 8.4.6.

(8) Any documentation provided by a qualified independent engineer or geologist, who certifies that the documentation provided, including the mass balance calculations as well as information regarding monitoring and containment assurance, is accurate and complete.

(h) Any changes made within the reporting year to containment assurance and monitoring approaches and procedures in the EOR operations management plan.

§ 98.487 Records that must be retained.

You must follow the record retention requirements specified by § 98.3(g). In addition to the records required by § 98.3(g), you must comply with the record retention requirements in Clause 9.1 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7).

§ 98.488 EOR Operations Management Plan.

(a) You must prepare and update, as necessary, a general EOR operations management plan that provides a description of the EOR complex and engineered system (see Clause 4.3 (a)), establishes that the EOR complex is adequate to provide safe, long-term containment of CO_2, and includes site-specific and other information including:

(1) Geologic characterization of the EOR complex.

(2) A description of the facilities within the CO_2-EOR project.

(3) A description of all wells and other engineered features in the CO_2-EOR project.

(4) The operations history of the project reservoir.

(5) The information set forth in Clauses 5 and 6 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7).

(b) You must prepare initial documentation at the beginning of the quantification period, and include the following as described in the EOR operations management plan:

(1) A description of the EOR complex and engineered systems (see Clause 5).

(2) The initial containment assurance (see Clause 6.1.2).

(3) The monitoring program (see Clause 6.2).

(4) The quantification method to be used (see Clause 8 and Annex B).

(5) The total mass of previously injected CO_2 (if any) within the EOR complex at the beginning of the CO_2-EOR project (see Clause 8.5 and Annex B).

(c) The EOR operation management plan in paragraph (a) of this section and initial documentation in paragraph (b) of this section must be submitted to the Administrator with the annual report covering the first reporting year that the facility reports under this subpart. In addition, any documentation provided by a qualified independent engineer or geologist, who certifies that the documentation provided is accurate and complete, must also be provided to the Administrator.

(d) If the EOR operations management plan is updated, the updated EOR management plan must be submitted to the Administrator with the annual report covering the first reporting year for which the updated EOR operation management plan is applicable.

§ 98.489 Definitions.

Except as provided in paragraphs (a) and (b) of this section, all terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

(a) Additional terms and definitions are provided in Clause 3 of CSA/ANSI ISO 27916:2019 (incorporated by reference, see § 98.7) and incorporated herein by reference.

(b) All references in this subpart preceded by the word Clause refer to the Clauses in CSA/ANSI ISO 27916:2019.

■ 45. Add subpart WW to read as follows:

Subpart WW—Coke Calciners

Sec.

§ 98.490 Definition of source category.

(a) A coke calciner is a process unit that heats petroleum coke to high temperatures in the absence of air or oxygen for the purpose of removing impurities or volatile substances in the petroleum coke feedstock.

(b) This source category consists of rotary kilns, rotary hearth furnaces, or similar process units used to calcine petroleum coke and also includes afterburners or other emission control systems used to treat the coke calcining unit's process exhaust gas.

§ 98.491 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains a coke calciner and the facility meets the requirements of either § 98.2(a)(1) or (2).

§ 98.492 GHGs to report.

You must report:

(a) CO_2, CH_4, and N_2O emissions from each coke calcining unit under this subpart.

(b) CO_2, CH_4, and N_2O emissions from auxiliary fuel used in the coke calcining unit and afterburner, if applicable, or other control system used to treat the coke calcining unit's process off-gas under subpart C of this part (General Stationary Fuel Combustion Sources) by following the requirements of subpart C.

§ 98.493 Calculating GHG emissions.

(a) Calculate GHG emissions required to be reported in § 98.492(a) using the applicable methods in paragraph (b) of this section.

(b) For each coke calcining unit, calculate GHG emissions according to the applicable provisions in paragraphs (b)(1) through (4) of this section.

(1) If you operate and maintain a CEMS that measures CO_2 emissions according to subpart C of this part, you must calculate and report CO_2 emissions under this subpart by following the Tier 4 Calculation Methodology specified in § 98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources). Auxiliary fuel use CO_2 emissions should be calculated in accordance with subpart C of this part and subtracted from the CO_2 CEMS emissions to determine process CO_2 emissions. Other coke calcining units must either install a CEMS that complies with the Tier 4 Calculation Methodology in subpart C of this part or follow the requirements of paragraph (b)(2) of this section.

(2) Calculate the CO_2 emissions from the coke calcining unit using monthly measurements and Equation WW–1 of this section.

$$CO_2 = \frac{44}{12} \times \sum_{m=1}^{12}\left(M_{in,m} \times CC_{GC,m} - \left(M_{out,m} + M_{dust,m}\right) \times CC_{MPC,m}\right) \text{ (Eq. WW-1)}$$

Where:

CO_2 = Annual CO_2 emissions (metric tons CO_2/year).

m = Month index.

$M_{in,m}$ = Mass of green coke fed to the coke calcining unit in month ''m'' from facility records (metric tons/year).

$CC_{GC,m}$ = Mass fraction carbon content of green coke fed to the coke calcining unit from facility measurement data in month ''m'' (metric ton carbon/metric ton green coke). If measurements are made more frequently than monthly, determine the monthly average as the arithmetic average for all measurements made during the calendar month.

$M_{out,m}$ = Mass of marketable petroleum coke produced by the coke calcining unit in month ''m'' from facility records (metric tons petroleum coke/year).

$M_{dust,m}$ = Mass of petroleum coke dust removed from the process through the dust collection system of the coke calcining unit in month ''m'' from facility records (metric ton petroleum coke dust/year). For coke calcining units that recycle the collected dust, the mass of coke dust removed from the process is the mass of coke dust collected less the mass of coke dust recycled to the process.

$CC_{MPC,m}$ = Mass fraction carbon content of marketable petroleum coke produced by the coke calcining unit in month ''m'' from facility measurement data (metric ton carbon/metric ton petroleum coke). If measurements are made more frequently than monthly, determine the monthly average as the arithmetic average for all measurements made during the calendar month.

44 = Molecular weight of CO_2 (kg/kg-mole).

12 = Atomic weight of C (kg/kg-mole).

(3) Calculate CH_4 emissions using Equation WW–2 of this section.

$$CH_4 = \left(CO_2 \times \frac{EmF_2}{EmF_1}\right) \text{ (Eq. WW-2)}$$

Where:

CH_4 = Annual methane emissions (metric tons CH_4/year).

CO_2 = Annual CO_2 emissions calculated in paragraph (b)(1) or (2) of this section, as applicable (metric tons CO_2/year).

EmF_1 = Default CO_2 emission factor for petroleum coke from Table C–1 of subpart C of this part (General Stationary Fuel Combustion Sources) (kg CO_2/MMBtu).

EmF_2 = Default CH_4 emission factor for ''Petroleum Products (All fuel types in Table C–1)'' from Table C–2 of subpart C of this part (General Stationary Fuel Combustion Sources) (kg CH_4/MMBtu).

(4) Calculate N_2O emissions using Equation WW–3 of this section.

(Eq. WW–3)

$$N_2O = \left(CO_2 \times \frac{EmF_3}{EmF_1}\right) \text{ (Eq. WW-3)}$$

Where:

N_2O = Annual nitrous oxide emissions (metric tons N_2O/year).

CO_2 = Annual CO_2 emissions calculated in paragraph (b)(1) or (2) of this section, as applicable (metric tons CO_2/year).

EmF_1 = Default CO_2 emission factor for petroleum coke from Table C–1 of subpart C of this part (General Stationary Fuel Combustion Sources) (kg CO_2/MMBtu).

EmF_3 = Default N_2O emission factor for ''Petroleum Products (All fuel types in Table C–1)'' from Table C–2 of subpart C of this part (kg N_2O/MMBtu).

§ 98.494 Monitoring and QA/QC requirements.

(a) Flow meters, gas composition monitors, and heating value monitors that are associated with sources that use a CEMS to measure CO_2 emissions according to subpart C of this part or that are associated with stationary combustion sources must meet the applicable monitoring and QA/QC requirements in § 98.34.

(b) Determine the mass of petroleum coke monthly as required by Equation WW–1 of this subpart using mass measurement equipment meeting the requirements for commercial weighing equipment as described in Specifications, Tolerances, and Other Technical Requirements For Weighing and Measuring Devices, NIST Handbook 44 (2022) (incorporated by reference, see § 98.7). Calibrate the measurement device according to the procedures specified by NIST handbook 44 (incorporated by reference, see § 98.7) or the procedures specified by the manufacturer. Recalibrate either biennially or at the minimum frequency specified by the manufacturer.

(c) Determine the carbon content of petroleum coke as required by Equation WW–1 of this subpart using any one of the following methods. Calibrate the measurement device according to procedures specified by the method or procedures specified by the measurement device manufacturer.

(1) ASTM D3176–15 Standard Practice for Ultimate Analysis of Coal and Coke (incorporated by reference, see § 98.7).

(2) ASTM D5291–16 Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants (incorporated by reference, see § 98.7).

(3) ASTM D5373–21 Standard Test Methods for Determination of Carbon, Hydrogen, and Nitrogen in Analysis Samples of Coal and Carbon in Analysis

Samples of Coal and Coke (incorporated by reference, see § 98.7).

(d) The owner or operator shall document the procedures used to ensure the accuracy of the monitoring systems used including but not limited to calibration of weighing equipment, flow meters, and other measurement devices. The estimated accuracy of measurements made with these devices shall also be recorded.

§ 98.495 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations is required (*e.g.,* concentrations, flow rates, fuel heating values, carbon content values). Therefore, whenever a quality-assured value of a required parameter is unavailable (*e.g.,* if a CEMS malfunctions during unit operation or if a required sample is not taken), a substitute data value for the missing parameter shall be used in the calculations.

(a) For missing auxiliary fuel use data, use the missing data procedures in subpart C of this part.

(b) For each missing value of mass or carbon content of coke, substitute the arithmetic average of the quality-assured values of that parameter immediately preceding and immediately following the missing data incident. If the ''after'' value is not obtained by the end of the reporting year, you may use the ''before'' value for the missing data substitution. If, for a particular parameter, no quality-assured data are available prior to the missing data incident, the substitute data value shall be the first quality-assured value obtained after the missing data period.

(c) For missing CEMS data, you must use the missing data procedures in § 98.35.

§ 98.496 Data reporting requirements.

In addition to the reporting requirements of § 98.3(c), you must report the information specified in paragraphs (a) through (i) of this section for each coke calcining unit.

(a) The unit ID number (if applicable).

(b) Maximum rated throughput of the unit, in metric tons coke calcined/stream day.

(c) The calculated CO_2, CH_4, and N_2O annual process emissions, expressed in metric tons of each pollutant emitted.

(d) A description of the method used to calculate the CO_2 emissions for each unit (*e.g.,* CEMS or Equation WW–1).

(e) Annual mass of green coke fed to the coke calcining unit from facility records (metric tons/year).

(f) Annual mass of marketable petroleum coke produced by the coke calcining unit from facility records (metric tons/year).

(g) Annual mass of petroleum coke dust removed from the process through the dust collection system of the coke calcining unit from facility records (metric tons/year) and an indication of whether coke dust is recycled to the unit (*e.g.,* all dust is recycled, a portion of the dust is recycled, or none of the dust is recycled).

(h) Annual average mass fraction carbon content of green coke fed to the coke calcining unit from facility measurement data (metric tons C per metric ton green coke).

(i) Annual average mass fraction carbon content of marketable petroleum coke produced by the coke calcining unit from facility measurement data (metric tons C per metric ton petroleum coke).

§ 98.497 Records that must be retained.

In addition to the records required by § 98.3(g), you must retain the records specified in paragraphs (a) and (b) of this section.

(a) The records of all parameters monitored under § 98.494.

(b) *Verification software records.* You must keep a record of the file generated by the verification software specified in § 98.5(b) for the applicable data specified in paragraphs (b)(1) through (5) of this section. Retention of this file satisfies the recordkeeping requirement for the data in paragraphs (b)(1) through (5) of this section.

(1) Monthly mass of green coke fed to the coke calcining unit from facility records (metric tons/year) (Equation WW–1 of § 98.493).

(2) Monthly mass of marketable petroleum coke produced by the coke calcining unit from facility records (metric tons/year) (Equation WW–1).

(3) Monthly mass of petroleum coke dust removed from the process through the dust collection system of the coke calcining unit from facility records (metric tons/year) (Equation WW–1).

(4) Average monthly mass fraction carbon content of green coke fed to the coke calcining unit from facility measurement data (metric tons C per metric ton green coke) (Equation WW–1).

(5) Average monthly mass fraction carbon content of marketable petroleum coke produced by the coke calcining unit from facility measurement data (metric tons C per metric ton petroleum coke) (Equation WW–1).

§ 98.498 Definitions.

All terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

■ 46. Add subpart XX to read as follows:

Subpart XX—Calcium Carbide Production

§ 98.500 Definition of the source category.

The calcium carbide production source category consists of any facility that produces calcium carbide.

§ 98.501 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains a calcium carbide production process and the facility meets the requirements of either § 98.2(a)(1) or (2).

§ 98.502 GHGs to report.

You must report:

(a) Process CO_2 emissions from each calcium carbide process unit or furnace used for the production of calcium carbide.

(b) CO_2, CH_4, and N_2O emissions from each stationary combustion unit following the requirements of subpart C of this part. You must report these emissions under subpart C of this part (General Stationary Fuel Combustion Sources) by following the requirements of subpart C.

§ 98.503 Calculating GHG emissions.

You must calculate and report the annual process CO_2 emissions from each calcium carbide process unit not subject to paragraph (c) of this section using the procedures in either paragraph (a) or (b) of this section.

(a) Calculate and report under this subpart the combined process and combustion CO_2 emissions by operating and maintaining CEMS according to the Tier 4 Calculation Methodology in § 98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources).

(b) Calculate and report under this subpart the annual process CO_2 emissions from the calcium carbide process unit using the carbon mass balance procedure specified in paragraphs (b)(1) and (2) of this section.

(1) For each calcium carbide process unit, determine the annual mass of carbon in each carbon-containing input and output material for the calcium carbide process unit and estimate annual process CO_2 emissions from the

calcium carbide process unit using Equation XX–1 of this section. Carbon-containing input materials include carbon electrodes and carbonaceous reducing agents. If you document that a specific input or output material contributes less than 1 percent of the total carbon into or out of the process, you do not have to include the material in your calculation using Equation XX–1 of this section.

$$\begin{gathered} E_{CO2} = \frac{44}{12} \times \frac{2000}{2205} \times \sum\nolimits_1^i \left(M_{reducing\ agent_i} \times C_{reducing\ agent_i}\right) \\ + \frac{44}{12} \times \frac{2000}{2205} \times \sum\nolimits_1^m \left(M_{electrode_m} \times C_{electrode_m}\right) \text{ (Eq. XX-1)} \\ - \frac{44}{12} \times \frac{2000}{2205} \times \sum\nolimits_1^k \left(M_{product\ outgoing_k} \times C_{product\ outgoing_k}\right) \\ - \frac{44}{12} \times \frac{2000}{2205} \times \sum\nolimits_1^l \left(M_{non-product\ outgoing_l} \times C_{non-product\ outgoing_l}\right) \end{gathered}$$

Where:

E_{CO2} = Annual process CO_2 emissions from an individual calcium carbide process unit (metric tons).

44/12 = Ratio of molecular weights, CO_2 to carbon.

2000/2205 = Conversion factor to convert tons to metric tons.

$M_{reducing\ agent_i}$ = Annual mass of reducing agent i fed, charged, or otherwise introduced into the calcium carbide process unit (tons).

$C_{reducing\ agent_i}$ = Carbon content in reducing agent i (percent by weight, expressed as a decimal fraction).

$M_{electrode_m}$ = Annual mass of carbon electrode m consumed in the calcium carbide process unit (tons).

$C_{electrode_m}$ = Carbon content of the carbon electrode m (percent by weight, expressed as a decimal fraction).

$M_{product\ outgoing_k}$ = Annual mass of alloy product k tapped from the calcium carbide process unit (tons).

$C_{product\ outgoing_k}$ = Carbon content in alloy product k (percent by weight, expressed as a decimal fraction).

$M_{non-product\ outgoing_l}$ = Annual mass of non-product outgoing material l removed from the calcium carbide unit (tons).

$C_{non-product\ outgoing_l}$ = Carbon content in non-product outgoing material l (percent by weight, expressed as a decimal fraction).

(2) Determine the combined annual process CO_2 emissions from the calcium carbide process units at your facility using Equation XX–2 of this section.

$$CO_2 = \sum\nolimits_1^k E_{CO2_k} \text{ (Eq. XX-2)}$$

Where:

CO_2 = Annual process CO_2 emissions from calcium carbide process units at a facility used for the production of calcium carbide (metric tons).

E_{CO2_k} = Annual process CO_2 emissions calculated from calcium carbide process unit k calculated using Equation XX–1 of this section (metric tons).

k = Total number of calcium carbide process units at facility.

(c) If all GHG emissions from a calcium carbide process unit are vented through the same stack as any combustion unit or process equipment that reports CO_2 emissions using a CEMS that complies with the Tier 4 Calculation Methodology in subpart C of this part (General Stationary Fuel Combustion Sources), then the calculation methodology in paragraph (b) of this section must not be used to calculate process emissions. The owner or operator must report under this subpart the combined stack emissions according to the Tier 4 Calculation Methodology in § 98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part.

§ 98.504 Monitoring and QA/QC requirements.

If you determine annual process CO_2 emissions using the carbon mass balance procedure in § 98.503(b), you must meet the requirements specified in paragraphs (a) and (b) of this section.

(a) Determine the annual mass for each material used for the calculations of annual process CO_2 emissions using Equation XX–1 of this subpart by summing the monthly mass for the material determined for each month of the calendar year. The monthly mass may be determined using plant instruments used for accounting purposes, including either direct measurement of the quantity of the material placed in the unit or by calculations using process operating information.

(b) For each material identified in paragraph (a) of this section, you must determine the average carbon content of the material consumed, used, or produced in the calendar year using the methods specified in either paragraph (b)(1) or (2) of this section. If you document that a specific process input or output contributes less than one percent of the total mass of carbon into or out of the process, you do not have to determine the monthly mass or annual carbon content of that input or output.

(1) Information provided by your material supplier.

(2) Collecting and analyzing at least three representative samples of the material inputs and outputs each year. The carbon content of the material must be analyzed at least annually using the standard methods (and their QA/QC procedures) specified in paragraphs (b)(2)(i) and (ii) of this section, as applicable.

(i) ASTM D5373–08 Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Laboratory Samples of Coal (incorporated by reference, see § 98.7), for analysis of carbonaceous reducing agents and carbon electrodes.

(ii) ASTM C25–06, Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime (incorporated by reference, see § 98.7) for analysis of materials such as limestone or dolomite.

§ 98.505 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations in § 98.503 is required. Therefore, whenever a quality-assured value of a required parameter is unavailable, a substitute data value for the missing parameter must be used in the calculations as specified in the paragraphs (a) and (b) of this section. You must document and keep records of the procedures used for all such estimates.

(a) If you determine CO_2 emissions for the calcium carbide process unit at your facility using the carbon mass balance procedure in § 98.503(b), 100 percent data availability is required for the carbon content of the input and output materials. You must repeat the test for average carbon contents of inputs according to the procedures in § 98.504(b) if data are missing.

(b) For missing records of the monthly mass of carbon-containing inputs and outputs, the substitute data value must be based on the best available estimate of the mass of the inputs and outputs from all available process data or data used for accounting purposes, such as purchase records.

§ 98.506 Data reporting requirements.

In addition to the information required by § 98.3(c), each annual report must contain the information specified in paragraphs (a) through (h) of this section, as applicable:

(a) Annual facility calcium carbide production capacity (tons).

(b) The annual facility production of calcium carbide (tons).

(c) Total number of calcium carbide process units at facility used for production of calcium carbide.

(d) Annual facility consumption of petroleum coke (tons).

(e) Each end use of any calcium carbide produced and sent off site.

(f) If the facility produces acetylene on site, provide the information in paragraphs (f)(1), (2), and (3) of this section.

(1) The annual production of acetylene at the facility (tons).

(2) The annual quantity of calcium carbide used for the production of acetylene at the facility (tons).

(3) Each end use of any acetylene produced on-site.

(g) If a CEMS is used to measure CO_2 emissions, then you must report under this subpart the relevant information required by § 98.36 for the Tier 4 Calculation Methodology and the information specified in paragraphs (g)(1) and (2) of this section.

(1) Annual CO_2 emissions (in metric tons) from each calcium carbide process unit.

(2) Identification number of each process unit.

(h) If a CEMS is not used to measure CO_2 process emissions, and the carbon mass balance procedure is used to determine CO_2 emissions according to the requirements in § 98.503(b), then you must report the information specified in paragraphs (h)(1) through (3) of this section.

(1) Annual process CO_2 emissions (in metric tons) from each calcium carbide process unit.

(2) List the method used for the determination of carbon content for each input and output material included in the calculation of annual process CO_2 emissions for each calcium carbide process unit (*e.g.,* supplier provided information, analyses of representative samples you collected).

(3) If you use the missing data procedures in § 98.505(b), you must report for each calcium carbide production process unit how monthly mass of carbon-containing inputs and outputs with missing data were determined and the number of months the missing data procedures were used.

§ 98.507 Records that must be retained.

In addition to the records required by § 98.3(g), you must retain the records specified in paragraphs (a) through (d) of this section for each calcium carbide process unit, as applicable.

(a) If a CEMS is used to measure CO_2 emissions according to the requirements in § 98.503(a), then you must retain under this subpart the records required for the Tier 4 Calculation Methodology in § 98.37 and the information specified in paragraphs (a)(1) through (3) of this section.

(1) Monthly calcium carbide process unit production quantity (tons).

(2) Number of calcium carbide processing unit operating hours each month.

(3) Number of calcium carbide processing unit operating hours in a calendar year.

(b) If the carbon mass balance procedure is used to determine CO_2 emissions according to the requirements in § 98.503(b)(2), then you must retain records for the information specified in paragraphs (b)(1) through (5) of this section.

(1) Monthly calcium carbide process unit production quantity (tons).

(2) Number of calcium carbide process unit operating hours each month.

(3) Number of calcium carbide process unit operating hours in a calendar year.

(4) Monthly material quantity consumed, used, or produced for each material included for the calculations of annual process CO_2 emissions (tons).

(5) Average carbon content determined and records of the supplier provided information or analyses used for the determination for each material included for the calculations of annual process CO_2 emissions.

(c) You must keep records that include a detailed explanation of how company records of measurements are used to estimate the carbon input and output to each calcium carbide process unit, including documentation of specific input or output materials excluded from Equation XX–1 of this subpart that contribute less than 1 percent of the total carbon into or out of the process. You also must document the procedures used to ensure the accuracy of the measurements of materials fed, charged, or placed in a calcium carbide process unit including, but not limited to, calibration of weighing equipment and other measurement devices. The estimated accuracy of measurements made with these devices must also be recorded, and the technical basis for these estimates must be provided.

(d) *Verification software records.* You must keep a record of the file generated by the verification software specified in § 98.5(b) for the applicable data specified in paragraphs (d)(1) through (13) of this section. Retention of this file satisfies the recordkeeping requirement for the data in paragraphs (d)(1) through (8) of this section.

(1) Carbon content in reducing agent (percent by weight, expressed as a decimal fraction) (Equation XX–1 of § 98.503).

(2) Annual mass of reducing agent fed, charged, or otherwise introduced into the calcium carbide process unit (tons) (Equation XX–1).

(3) Carbon content of carbon electrode (percent by weight, expressed as a decimal fraction) (Equation XX–1).

(4) Annual mass of carbon electrode consumed in the calcium carbide process unit (tons) (Equation XX–1).

(5) Carbon content in product (percent by weight, expressed as a decimal fraction) (Equation XX–1).

(6) Annual mass of product produced/tapped in the calcium carbide process unit (tons) (Equation XX–1).

(7) Carbon content in non-product outgoing material (percent by weight, expressed as a decimal fraction) (Equation XX–1).

(8) Annual mass of non-product outgoing material removed from calcium carbide process unit (tons) (Equation XX–1).

§ 98.508 Definitions.

All terms used of this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

■ 47. Add subpart YY to read as follows:

Subpart YY—Caprolactam, Glyoxal, and Glyoxylic Acid Production

Sec.

98.515 Procedures for estimating missing data.
98.516 Data reporting requirements.
98.517 Records that must be retained.
98.518 Definitions.

§ 98.510 Definition of source category.

This source category includes any facility that produces caprolactam, glyoxal, or glyoxylic acid. This source category excludes the production of glyoxal through the LaPorte process (*i.e.,* the gas-phase catalytic oxidation of ethylene glycol with air in the presence of a silver or copper catalyst).

§ 98.511 Reporting threshold.

You must report GHG emissions under this subpart if your facility meets the requirements of either § 98.2(a)(1) or (2) and the definition of source category in § 98.510.

§ 98.512 GHGs to report.

(a) You must report N_2O process emissions from the production of caprolactam, glyoxal, and glyoxylic acid as required by this subpart.

(b) You must report under subpart C of this part (General Stationary Fuel Combustion Sources) the emissions of CO_2, CH_4, and N_2O from each stationary combustion unit by following the requirements of subpart C.

§ 98.513 Calculating GHG emissions.

(a) You must determine annual N_2O process emissions from each caprolactam, glyoxal, and glyoxylic acid process line using the appropriate default N_2O generation factor(s) from Table YY–1 to this subpart, the site-specific N_2O destruction factor(s) for each N_2O abatement device, and site-specific production data according to paragraphs (b) through (e) of this section.

(b) You must determine the total annual amount of product *i* (caprolactam, glyoxal, or glyoxylic acid) produced on each process line *t* (metric tons product), according to § 98.514(b).

(c) If process line *t* exhausts to any N_2O abatement technology *j,* you must determine the destruction efficiency for each N_2O abatement technology according to paragraph (c)(1) or (2) of this section.

(1) Use the control device manufacturer's specified destruction efficiency.

(2) Estimate the destruction efficiency through process knowledge. Examples of information that could constitute process knowledge include calculations based on material balances, process stoichiometry, or previous test results provided the results are still relevant to the current vent stream conditions. You must document how process knowledge (if applicable) was used to determine the destruction efficiency.

(d) If process line *t* exhausts to any N_2O abatement technology *j,* you must determine the abatement utilization factor for each N_2O abatement technology according to paragraph (d)(1) or (2) of this section.

(1) If the abatement technology *j* has no downtime during the year, use 1.

(2) If the abatement technology *j* was not operational while product *i* was being produced on process line *t,* calculate the abatement utilization factor according to Equation YY–1 of this subpart.

$$AF_j = \frac{T_{i,j}}{T_i} \quad \text{Equation YY-1}$$

Where:

AF_j = Monthly abatement utilization factor of N_2O abatement technology *j* from process unit *t* (fraction of time that abatement technology is operating).
T_i = Total number of hours during month that product *i* (caprolactam, glyoxal, or glyoxylic acid), was produced from process unit *t* (hours).
$T_{i,j}$ = Total number of hours during month that product *i* (caprolactam, glyoxal, or glyoxylic acid), was produced from process unit *t* during which N_2O abatement technology *j* was operational (hours).

(e) You must calculate N_2O emissions for each product *i* from each process line *t* and each N_2O control technology *j* according to Equation YY–2 of this subpart.

$$E_{N2Ot} = \sum\nolimits_{i,j} \left[EF_i * P_i * \left(1 - \left(DE_j * AF_j\right)\right)\right] * 0.001 \quad \text{Eq. YY-2}$$

Where:

E_{N2Ot} = Monthly process emissions of N_2O, metric tons (mt) from process line *t.*
EF_i = N_2O generation factor for product *i* (caprolactam, glyoxal, or glyoxylic acid), kg N_2O/mt of product produced, as shown in Table YY–1 to this subpart.
P_i = Monthly production of product *i,* (caprolactam, glyoxal, or glyoxylic acid), mt.
DE_j = Destruction efficiency of N_2O abatement technology type *j,* fraction (decimal fraction of N_2O removed from vent stream).
AF_j = Monthly abatement utilization factor for N_2O abatement technology type *j,* fraction, calculated using Equation YY–1 of this subpart.
0.001 = Conversion factor from kg to metric tons.

§ 98.514 Monitoring and QA/QC requirements.

(a) You must determine the total monthly amount of caprolactam, glyoxal, and glyoxylic acid produced. These monthly amounts are determined according to the methods in paragraph (a)(1) or (2) of this section.

(1) Direct measurement of production (such as using flow meters, weigh scales, etc.).

(2) Existing plant procedures used for accounting purposes (*i.e.,* dedicated tank-level and acid concentration measurements).

(b) You must determine the annual amount of caprolactam, glyoxal, and glyoxylic acid produced. These annual amounts are determined by summing the respective monthly quantities determined in paragraph (a) of this section.

§ 98.515 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations is required. Therefore, whenever a quality-assured value of a required parameter is unavailable, a substitute data value for the missing parameter must be used in the calculations as specified in paragraphs (a) and (b) of this section.

(a) For each missing value of caprolactam, glyoxal, or glyoxylic acid production, the substitute data must be the best available estimate based on all available process data or data used for accounting purposes (such as sales records).

(b) For missing values related to the N_2O abatement device, assuming that the operation is generally constant from year to year, the substitute data value should be the most recent quality-assured value.

§ 98.516 Data reporting requirements.

In addition to the information required by § 98.3(c), each annual report must contain the information specified in paragraphs (a) through (j) of this section.

(a) Process line identification number.

(b) Annual process N_2O emissions from each process line according to paragraphs (b)(1) through (3) of this section.

(1) N_2O from caprolactam production (metric tons).

(2) N_2O from glyoxal production (metric tons).

(3) N_2O from glyoxylic acid production (metric tons).

(c) Annual production quantities from all process lines at the caprolactam, glyoxal, or glyoxylic acid production facility according to paragraphs (c)(1) through (3) of this section.

(1) Caprolactam production (metric tons).

(2) Glyoxal production (metric tons).

(3) Glyoxylic acid production (metric tons).

(d) Annual production capacity from all process lines at the caprolactam, glyoxal, or glyoxylic acid production facility, as applicable, in paragraphs (d)(1) through (3) of this section.

(1) Caprolactam production capacity (metric tons).

(2) Glyoxal production capacity (metric tons).

(3) Glyoxylic acid production capacity (metric tons).

(e) Number of process lines at the caprolactam, glyoxal, or glyoxylic acid production facility, by product, in paragraphs (e)(1) through (3) of this section.

(1) Total number of process lines producing caprolactam.

(2) Total number of process lines producing glyoxal.

(3) Total number of process lines producing glyoxylic acid.

(f) Number of operating hours in the calendar year for each process line at the caprolactam, glyoxal, or glyoxylic acid production facility (hours).

(g) N_2O abatement technologies used (if applicable) and date of installation of abatement technology at the caprolactam, glyoxal, or glyoxylic acid production facility.

(h) Monthly abatement utilization factor for each N_2O abatement technology at the caprolactam, glyoxal, or glyoxylic acid production facility.

(i) Number of times in the reporting year that missing data procedures were followed to measure production quantities of caprolactam, glyoxal, or glyoxylic acid (months).

(j) Annual percent N_2O emission reduction per chemical produced at the caprolactam, glyoxal, or glyoxylic acid production facility, as applicable, in paragraphs (j)(1) through (3) of this section.

(1) Annual percent N_2O emission reduction for caprolactam production.

(2) Annual percent N_2O emission reduction for glyoxal production.

(3) Annual percent N_2O emission reduction for glyoxylic acid production.

§ 98.517 Records that must be retained.

In addition to the information required by § 98.3(g), you must retain the records specified in paragraphs (a) through (d) of this section for each caprolactam, glyoxal, or glyoxylic acid production facility:

(a) Documentation of how accounting procedures were used to estimate production rate.

(b) Documentation of how process knowledge was used to estimate abatement technology destruction efficiency (if applicable).

(c) Documentation of the procedures used to ensure the accuracy of the measurements of all reported parameters, including but not limited to, calibration of weighing equipment, flow meters, and other measurement devices. The estimated accuracy of measurements made with these devices must also be recorded, and the technical basis for these estimates must be provided.

(d) You must keep a record of the file generated by the verification software specified in § 98.5(b) for the applicable data specified in paragraphs (d)(1) through (3) of this section. Retention of this file satisfies the recordkeeping requirement for the data in paragraphs (d)(1) through (3) of this section.

(1) Monthly production quantity of caprolactam from all process lines at the caprolactam, glyoxal, or glyoxylic acid production facility.

(2) Monthly production quantity of glyoxal from all process lines at the caprolactam, glyoxal, or glyoxylic acid production facility.

(3) Monthly production quantity of glyoxylic acid from all process lines at the caprolactam, glyoxal, or glyoxylic acid production facility.

§ 98.518 Definitions.

All terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

TABLE YY–1 TO SUBPART YY OF PART 98—N_2O GENERATION FACTORS

Product	N_2O generation factor[a]
Caprolactam	9.0
Glyoxal	5,200
Glyoxylic acid	1,000

[a] Generation factors in units of kilograms of N_2O emitted per metric ton of product produced.

■ 48. Add subpart ZZ to read as follows:

Subpart ZZ—Ceramics Manufacturing

§ 98.520 Definition of the source category.

(a) The ceramics manufacturing source category consists of any facility that uses nonmetallic, inorganic materials, many of which are clay-based, to produce ceramic products such as bricks and roof tiles, wall and floor tiles, table and ornamental ware (household ceramics), sanitary ware, refractory products, vitrified clay pipes, expanded clay products, inorganic bonded abrasives, and technical ceramics (*e.g.,* aerospace, automotive, electronic, or biomedical applications). For the purposes of this subpart, ceramics manufacturing processes include facilities that annually consume at least 2,000 tons of carbonates or 20,000 tons of clay, which is heated to a temperature sufficient to allow the calcination reaction to occur, and operate a ceramics manufacturing process unit.

(b) A ceramics manufacturing process unit is a kiln, dryer, or oven used to calcine clay or other carbonate-based materials for the production of a ceramics product.

§ 98.521 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains a ceramics manufacturing process and the facility meets the requirements of either § 98.2(a)(1) or (2).

§ 98.522 GHGs to report.

You must report:

(a) CO_2 process emissions from each ceramics process unit (*e.g.,* kiln, dryer, or oven).

(b) CO_2 combustion emissions from each ceramics process unit.

(c) CH_4 and N_2O combustion emissions from each ceramics process unit. You must calculate and report these emissions under subpart C of this part (General Stationary Fuel Combustion Sources) by following the requirements of subpart C of this part.

(d) CO_2, CH_4, and N_2O combustion emissions from each stationary fuel combustion unit other than kilns, dryers, or ovens. You must report these emissions under subpart C of this part (General Stationary Fuel Combustion Sources) by following the requirements of subpart C of this part.

§ 98.523 Calculating GHG emissions.

You must calculate and report the annual process CO_2 emissions from each ceramics process unit using the procedures in paragraphs (a) through (c) of this section.

(a) For each ceramics process unit that meets the conditions specified in § 98.33(b)(4)(ii) or (iii), you must calculate and report under this subpart the combined process and combustion CO_2 emissions by operating and maintaining a CEMS to measure CO_2 emissions according to the Tier 4 Calculation Methodology specified in § 98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources).

(b) For each ceramics process unit that is not subject to the requirements in paragraph (a) of this section, calculate and report the process and combustion CO_2 emissions from the ceramics process unit separately by using the procedures specified in paragraphs (b)(1) through (6) of this section, except as specified in paragraph (c) of this section.

(1) For each carbonate-based raw material charged to the ceramics process unit, either obtain the mass fractions of any carbonate-based minerals from the supplier of the raw material or by sampling the raw material, or use a default value of 1.0 as the mass fraction for the raw material.

(2) Determine the quantity of each carbonate-based raw material charged to the ceramics process unit.

(3) Apply the appropriate emission factor for each carbonate-based raw material charged to the ceramics process unit. Table ZZ–1 to this subpart provides emission factors based on stoichiometric ratios for carbonate-based minerals.

(4) Use Equation ZZ–1 of this section to calculate process mass emissions of CO_2 for each ceramics process unit:

$$E_{CO2} = \sum_j \left[\left(M_j \cdot \frac{2000}{2205}\right) \cdot \sum_i (MF_i \cdot EF_i \cdot F_i)\right] \quad \text{(Eq. ZZ-1)}$$

Where:

E_{CO2} = Annual process CO_2 emissions (metric tons/year).

MF_i = Annual average decimal mass fraction of carbonate-based mineral *i* in carbonate-based raw material *j.*

M_j = Annual mass of the carbonate-based raw material *j* consumed (tons/year).

2000/2205 = Conversion factor to convert tons to metric tons.

EF_i = Emission factor for the carbonate-based mineral *i,* (metric tons CO_2/metric ton carbonate, see Table ZZ–1 of this subpart).

F_i = Decimal fraction of calcination achieved for carbonate-based mineral *i,* assumed to be equal to 1.0.

i = Index for carbonate-based mineral in each carbonate-based raw material.

j = Index for carbonate-based raw material.

(5) Determine the combined annual process CO_2 emissions from the ceramic process units at your facility using Equation ZZ–2 of this subpart:

$$CO2 = \sum_1^k E_{CO2_k} \quad \text{(Eq. ZZ-2)}$$

Where:

CO_2 = Annual process CO_2 emissions from ceramic process units at a facility (metric tons).

E_{CO2_k} = Annual process CO_2 emissions calculated from ceramic process unit k calculated using Equation ZZ–1 of this subpart (metric tons).

k = Total number of ceramic process units at facility.

(6) Calculate and report under subpart C of this part (General Stationary Fuel Combustion Sources) the combustion CO_2 emissions in the ceramics process unit according to the applicable requirements in subpart C of this part.

(c) As an alternative to data provided by either the raw material supplier or a lab analysis, a value of 1.0 can be used for the mass fraction (MF_i) of carbonate-based mineral *i* in each carbonate-based raw material *j* in Equation ZZ–1 of this subpart. The use of 1.0 for the mass fraction assumes that the carbonate-based raw material comprises 100% of one carbonate-based mineral.

§ 98.524 Monitoring and QA/QC requirements.

(a) You must measure annual amounts of carbonate-based raw materials charged to each ceramics process unit from monthly measurements using plant instruments used for accounting purposes, such as calibrated scales or weigh hoppers. Total annual mass charged to ceramics process units at the facility must be compared to records of raw material purchases for the year.

(b) Unless you use the default value of 1.0 for the mass fraction of a carbonate-based mineral, you must measure carbonate-based mineral mass fractions at least annually to verify the mass fraction data provided by the supplier of the raw material; such measurements must be based on sampling and chemical analysis using consensus standards that specify X-ray fluorescence.

(c) Unless you use the default value of 1.0 for the mass fraction of a carbonate-based mineral, you must determine the annual average mass fraction for the carbonate-based mineral in each carbonate-based raw material by calculating an arithmetic average of the monthly data obtained from raw material suppliers or sampling and chemical analysis.

(d) Unless you use the default value of 1.0 for the calcination fraction of a carbonate-based mineral, you must determine on an annual basis the calcination fraction for each carbonate-based mineral consumed based on sampling and chemical analysis using an industry consensus standard. If performed, this chemical analysis must be conducted using an x-ray fluorescence test or other enhanced testing method published by an industry consensus standards organization (*e.g.,* ASTM, ASME, API, etc.).

§ 98.525 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG emissions calculations in § 98.523 is required. If the monitoring and quality assurance procedures in § 98.524 cannot be followed and data is unavailable, you must use the most appropriate of the missing data procedures in paragraphs (a) and (b) of this section in the calculations. You must document and keep records of the procedures used for all such missing value estimates.

(a) If the CEMS approach is used to determine combined process and combustion CO_2 emissions, the missing data procedures in § 98.35 apply.

(b) For missing data on the monthly amounts of carbonate-based raw materials charged to any ceramics process unit, use the best available estimate(s) of the parameter(s) based on all available process data or data used for accounting purposes, such as purchase records.

(c) For missing data on the mass fractions of carbonate-based minerals in the carbonate-based raw materials, assume that the mass fraction of a carbonate-based mineral is 1.0, which assumes that one carbonate-based mineral comprises 100 percent of the carbonate-based raw material.

§ 98.526 Data reporting requirements.

In addition to the information required by § 98.3(c), each annual report must contain the information specified in paragraphs (a) through (c) of this section, as applicable:

(a) The total number of ceramics process units at the facility and the number of units that operated during the reporting year.

(b) If a CEMS is used to measure CO_2 emissions from ceramics process units, then you must report under this subpart the relevant information required under § 98.36 for the Tier 4 Calculation Methodology and the following information specified in paragraphs (b)(1) through (3) of this section.

(1) The annual quantity of each carbonate-based raw material charged to each ceramics process unit and for all units combined (tons).

(2) Annual quantity of each type of ceramics product manufactured by each ceramics process unit and by all units combined (tons).

(3) Annual production capacity for each ceramics process unit (tons).

(c) If a CEMS is not used to measure CO_2 emissions from ceramics process units and process CO_2 emissions are calculated according to the procedures specified in § 98.523(b), then you must report the following information specified in paragraphs (c)(1) through (7) of this section.

(1) Annual process emissions of CO_2 (metric tons) for each ceramics process unit and for all units combined.

(2) The annual quantity of each carbonate-based raw material charged to all units combined (tons).

(3) Results of all tests used to verify each carbonate-based mineral mass fraction for each carbonate-based raw material charged to a ceramics process unit, as specified in paragraphs (c)(3)(i) through (iii) of this section.

(i) Date of test.

(ii) Method(s) and any variations used in the analyses.

(iii) Mass fraction of each sample analyzed.

(4) Method used to determine the decimal mass fraction of carbonate-based mineral, unless you used the default value of 1.0 (*e.g.,* supplier provided information, analyses of representative samples you collected).

(5) Annual quantity of each type of ceramics product manufactured by each ceramics process unit and by all units combined (tons).

(6) Annual production capacity for each ceramics process unit (tons).

(7) If you use the missing data procedures in § 98.525(b), you must report for each applicable ceramics process unit the number of times in the reporting year that missing data procedures were followed to measure monthly quantities of carbonate-based raw materials or mass fraction of the carbonate-based minerals (months).

§ 98.527 Records that must be retained.

In addition to the records required by § 98.3(g), you must retain the records specified in paragraphs (a) through (d) of this section for each ceramics process unit, as applicable.

(a) If a CEMS is used to measure CO_2 emissions according to the requirements in § 98.523(a), then you must retain under this subpart the records required under § 98.37 for the Tier 4 Calculation Methodology and the information specified in paragraphs (a)(1) and (2) of this section.

(1) Monthly ceramics production rate for each ceramics process unit (tons).

(2) Monthly amount of each carbonate-based raw material charged to each ceramics process unit (tons).

(b) If process CO_2 emissions are calculated according to the procedures specified in § 98.523(b), you must retain the records in paragraphs (b)(1) through (6) of this section.

(1) Monthly ceramics production rate for each ceramics process unit (metric tons).

(2) Monthly amount of each carbonate-based raw material charged to each ceramics process unit (metric tons).

(3) Data on carbonate-based mineral mass fractions provided by the raw material supplier for all raw materials consumed annually and included in calculating process emissions in Equation ZZ–1 of this subpart, if applicable.

(4) Results of all tests, if applicable, used to verify the carbonate-based mineral mass fraction for each carbonate-based raw material charged to a ceramics process unit, including the data specified in paragraphs (b)(4)(i) through (v) of this section.

(i) Date of test.

(ii) Method(s), and any variations of methods, used in the analyses.

(iii) Mass fraction of each sample analyzed.

(iv) Relevant calibration data for the instrument(s) used in the analyses.

(v) Name and address of laboratory that conducted the tests.

(5) Each carbonate-based mineral mass fraction for each carbonate-based raw material, if a value other than 1.0 is used to calculate process mass emissions of CO_2.

(6) Number of annual operating hours of each ceramics process unit.

(c) All other documentation used to support the reported GHG emissions.

(d) *Verification software records.* You must keep a record of the file generated by the verification software specified in § 98.5(b) for the applicable data specified in paragraphs (d)(1) through (3) of this section. Retention of this file satisfies the recordkeeping requirement for the data in paragraphs (d)(1) through (3) of this section.

(1) Annual average decimal mass fraction of each carbonate-based mineral in each carbonate-based raw material for each ceramics process unit (specify the default value, if used, or the value determined according to § 98.524) (percent by weight, expressed as a decimal fraction) (Equation ZZ–1 of § 98.523).

(2) Annual mass of each carbonate-based raw material charged to each ceramics process unit (tons) (Equation ZZ–1 of this subpart).

(3) Decimal fraction of calcination achieved for each carbonate-based raw material for each ceramics process unit (specify the default value, if used, or the value determined according to § 98.524) (percent by weight, expressed as a decimal fraction) (Equation ZZ–1 of this subpart).

§ 98.528 Definitions.

All terms used of this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

TABLE ZZ–1 TO SUBPART ZZ OF PART 98—CO_2 EMISSION FACTORS FOR CARBONATE-BASED RAW MATERIALS

Carbonate	Mineral name(s)	CO_2 emission factor[a]
$BaCO_3$	Witherite, Barium carbonate	0.223
$CaCO_3$	Limestone, Calcium Carbonate, Calcite, Aragonite	0.440
$Ca(Fe,Mg,Mn)(CO_3)_2$	Ankerite[b]	0.408–0.476
$CaMg(CO_3)_2$	Dolomite	0.477
$FeCO_3$	Siderite	0.380
K_2CO_3	Potassium carbonate	0.318
Li_2CO_3	Lithium carbonate	0.596
$MgCO_3$	Magnesite	0.522
$MnCO_3$	Rhodochrosite	0.383
Na_2CO_3	Sodium carbonate, Soda ash	0.415

TABLE ZZ–1 TO SUBPART ZZ OF PART 98—CO_2 EMISSION FACTORS FOR CARBONATE-BASED RAW MATERIALS—Continued

Carbonate	Mineral name(s)	CO_2 emission factor [a]
$SrCO_3$	Strontium carbonate, Strontianite	0.298

[a] Emission factors are in units of metric tons of CO_2 emitted per metric ton of carbonate-based mineral.

[b] Ankerite emission factors are based on a formula weight range that assumes Fe, Mg, and Mn are present in amounts of at least 1.0 percent.

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